Media Constructions of Sustainability: Finger Lakes

Food, Water and Agriculture

A Media Literacy Curriculum Kit for High School and College

Energy Economy Climate Change Social Justice

ITHACA COLLEGE

PROJECT LOOK SHARP

Media Constructions of Sustainability: Finger Lakes

Food, Water and Agriculture

by

Sox Sperry

www.projectlooksharp.org

Providing materials, training and support to help teachers prepare students for life in today's media-saturated world.

ITHACA COLLEGE

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Mission Statement

Project Look Sharp is a not-for-profit, mission driven initiative committed to providing teachers with the training and materials they need to integrate media literacy, critical thinking and 21st century learning into the curriculum.

Project Look Sharp provides staff development workshops and consulting.

Please Consider Donating

All our curriculum kits are available **free** of charge on our web site.
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About The Kit

This kit explores how sustainability within the Finger Lakes region of New York has been presented in the media with a particular focus on issues related to food, water and agriculture. Each of the seven lessons integrates media literacy and critical thinking with key knowledge and concepts related to sustainability. This kit is a companion to the nineteen-lesson collection, *Media Constructions of Sustainability: Food, Water and Agriculture*. The kit will be of particular interest to high school environmental science teachers, community sustainability educators, social studies teachers, and college–level agronomy and media studies professors.

All materials can be accessed for free on our website and are also available through mobile non-Internet based versions viewed on a digital media device. Digital devices include a master PDF as well as all specified media within lesson folders purchased from the Ithaca College Bookstore. Access the bookstore through our website.

Media Constructions of Sustainability: Finger Lakes

By **Sox Sperry**

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He is author of Project Look Sharp's document-based history kits, *Media Construction of Chemicals in the Environment, Media Construction of Endangered Species, Media Construction of Resource Depletion, Media Construction of Peace, Media Construction of Social Justice, Global Media Perspectives* and *Creativity and Aging Through the Lens of Film*. He is co-author with Chris Sperry of *Media Construction of Presidential Campaigns*, *Media Construction of the Middle East* and *Media Constructions of Martin Luther King, Jr*.

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INTRODUCTION

Overview, Objectives, Learning Standards, & Accessing Materials

Overview

This kit provides teachers, college faculty and community educators with the materials needed to engage students in a dynamic and constructivist process of learning how sustainability in the Finger Lakes region of central New York has been presented in the media with a particular focus on issues related to food, water and agriculture. Each lesson integrates media literacy and critical thinking with a content focus on a particular aspect of sustainability. Constant themes throughout the kit include social justice, climate change, energy, economics and unintended consequences of human actions. The subject areas covered include environmental science, agronomy, anthropology, sociology, economics, journalism and the creative arts among many others.

The kit contains seven lessons, *Lessons 20-26*, which each have a unique pedagogical structure and content concern. The companion kit, *Media Constructions of Sustainability: Food, Water and Agriculture* provides *Lessons 1-19* related to issues of food, water and agriculture throughout North America.

Objectives

• Students will learn key information about the sustainability of food, water and agriculture in the Finger Lakes and reflect on the sourcing, accuracy, credibility and biases of their knowledge and understandings.

• Students will identify the different ways in which sustainability is defined and envisioned and what views, values and motives underlie these definitions and visions.

• Students will analyze and evaluate a variety of perspectives on how our current economic, social, political, industrial and environmental systems are, or are not, sustainable.

• Students will be trained to ask and answer key questions about authorship, purpose, content, techniques, interpretations, context, and credibility when analyzing media messages.

• Students will analyze and evaluate diverse historic and current models for sustainability of food, water and agriculture including reflections on social justice, climate change, energy use and unintended consequences of human actions.

• Students will engage in complex, reflective, open minded yet skeptical critical thinking and develop reading, listening and visual decoding skills and attitudes that support life-long democratic citizenship.

• Students will take well-reasoned and self-reflective positions on controversial issues and consider actions that are consistent with their beliefs and knowledge about sustainability.

Learning Standards

This kit addresses specific standards from the following:

National Science Education Standards

Science in Personal and Social Perspectives: population growth, natural resources, environmental quality, natural and human-induced hazards, science and technology in local national and global challenges.

History and Nature of Science: science as human endeavor, nature of scientific knowledge, historical perspectives.
Science as Inquiry: Understandings about scientific inquiry.
Life science: Interdependence of organisms, behavior of organisms.
Unifying Concepts and Processes: Evidence, models and explanation.

National Council for the Social Studies:
Social studies programs should include experiences that provide for the study of:

- culture and cultural diversity;
- the ways human beings view themselves in and over time;
- people, places, and environments;
- individual development and identity;
- interactions among individuals, groups, and institutions;
- how people create and change structures of power, authority, and governance;
- global connections and interdependence and
- the ideals, principles, and practices of citizenship in a democratic republic.

National Council of Teachers of English:

- to apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate print and non-print texts and
- to apply knowledge of media techniques, figurative language, and genre to critique and discuss print and non-print texts.

This kit also addresses many of the core learning skills that have been identified as essential skills for the **21st Century Literacy**, specifically:

- Information and media literacy skills: analyzing, accessing, managing, integrating, and evaluating information in a variety of forms and media.
- Critical thinking and systems thinking: exercising sound reasoning in understanding and making complex choices, understanding the connections, conflict and change among systems.

Finally, the activities foster group discussion skills, and can be easily linked to related lessons in other disciplines such as art, economics or multicultural studies.

Access Materials:
Slides, Video, Audio and Print
All materials for this kit are available for free at **www.projectlooksharp.org**. These include the PowerPoint slide shows, video and audio clips, and all PDF materials. Educators will need access to a computer and digital projector or large monitor so that the class can identify key details in each slide. Teachers may want to print and review the lesson and make copies of student readings and assessments prior to instruction.

In some lessons, students will be asked to view media documents individually or in small groups in preparation for a class presentation. In these instances, a note will appear in the directions of the ***Teacher Guide*** explaining: *To access student materials, go to the* **Student Materials** *section from the Project Look Sharp homepage,* www.projectlooksharp.org.

Mobile non-Internet based versions are also available with the purchase of a digital media device, which includes a master PDF of the kit and all specified media within lesson folders. This device can be purchased through the Ithaca College Bookstore. Access the bookstore through our website:

www.projectlooksharp.org

INTRODUCTION

How to Use these Materials

Kit Conception

The seven lessons in this kit are meant to be used in conjunction with the first volume of the sustainability curriculum, *Media Constructions of Sustainability: Food, Water and Agriculture*, which explores some of the same issues presented here, but from the wider geographic context of North America. Lessons 20-26 in the second volume, *Media Constructions of Sustainability: Finger Lakes*, focus on a particular region - the Finger Lakes within central New York. These lessons serve as both an extension to Lessons 1-19 in the prior kit and also as a model for teachers who wish to develop their own regionally-based media literacy lessons on sustainability. Since issues of food, water and agriculture are inherently local in application and understanding, we encourage teachers to consider the particular ways in which their watersheds and foodsheds have been represented in the media. We want to model the ways in which these media representations can be used to teach both critical awareness of media messages and content information about food and water concerns.

Lesson Selection

Although some teachers may teach this curriculum in its entirety, most will elect to choose certain lessons that are best suited to their teaching objectives. We encourage teachers to carefully review the *Table of Contents* and two-page *Lesson Plans* in this curriculum and the *Media Constructions of Sustainability: Food, Water and Agriculture* companion kit in order to determine which lessons might work best for their individual purpose. Certain themes run throughout these lessons: social justice, climate change, energy, economics and the unintended consequences of human interaction with the environment. We encourage teachers to introduce students to the concept of "systems thinking" as a way to integrate these concepts throughout their teaching of this kit.

Getting Started

It might be worthwhile to start each lesson by asking students to stop and reflect on where their current ideas about a particular aspect of food, water and agriculture come from and whether or not their sources are credible, complete or fair. For example, prior to beginning *Lesson 24, Hydro-fracking: Media & Credibility*, you might ask students: "What do you know about hydrofracking?" "Where did you get that information?" "Were the sources of your knowledge reliable?" "How do you know?"

In lessons where students are asked to work individually or in pairs on media decoding, it might be helpful to begin with a full-class decoding (see *Lesson 4* in *Media Constructions of Sustainability: Food, Water and Agriculture* for more information). Your introduction to media decoding should be open-ended, often asking many more questions than those included on the *Student Worksheets* on in the *Teacher Guide*. For some lessons, teachers may want to begin the decoding process with a general question, such as "What do you notice in this document?" or "What are we looking at here?" and then proceed to a deeper analysis before providing background information. Such general questions can help the teacher discover what students know about the topic or media form prior to the decoding, in addition to setting the stage for student participation in a constructivist dialogue about what students see and what they know.

In constructivist decoding practice, teachers typically pose a series of complex questions rather than providing answers or analysis. For example, in discussing the possible source of a particular media document, teachers should accept all evidence-based answers while eventually providing the correct answer. Teachers should try to affirm evidence-based answers (e.g. "I can see why you would think that") while probing for multiple interpretations (e.g. "Does anyone have a different reading?").

Curriculum Elements

Each lesson has a two-page *Lesson Plan* that includes objectives, vocabulary, media forms, materials, time needed and lesson procedures. The *Teacher Guide* begins with a *Lesson Introduction* introducing the topic and lesson objectives to the students followed by step-by-step lesson procedures. In certain instances, long lessons like *Lesson 23: Onondaga Lake* have been broken into several different activity sections, each of which can be used independently.

Most lessons include *Media Sample Questions & Answers* in the *Teacher Guide*, which include probe questions asking students to apply their knowledge of science, history and media for each media document. *Possible Answers* are included to model evidence-based responses that address key scientific, historical and media literacy concepts and information. However, there is rarely one right answer to any of these interpretative questions, and the teacher should encourage multiple readings and a diversity of responses as long as students present evidence to back up their interpretations. It is important that students recognize that all people do not interpret media messages in the same way. It is also important to encourage students to begin to ask their own media literacy questions, especially as they become more familiar with this form of critical analysis.

Further Questions and *Extended Activities* prompt students to move beyond media-based analysis to discuss issues, make personal connections, conduct follow-up research or take social action. Teachers can add their own questions to these suggestions as a means to encourage big picture understanding. The documents provide an opportunity for teachers to investigate fundamental questions about how we come to know about food, water and agriculture and how sustainability themes such as social justice, climate change, energy and economics intersect with one another.

Connections link each lesson (L) with abbreviated references to specific other lessons in this kit and in *Media Constructions of Sustainability: Food, Water and Agriculture*.

Time and Coverage

The time it takes to deliver these lessons will vary depending upon student knowledge, the experience of the teacher with media decoding and these materials, the amount of additional information delivered and further questions asked, and how many of the media documents the teacher uses. Although teachers may sometimes need to edit the number of documents used, they should avoid the temptation to sacrifice student interaction for content coverage. The power of these lessons emerges when students actively apply their knowledge, identify evidence, articulate their interpretations, analyze authorship and point of view, and discuss meaningful issues.

Do-It-Yourself Tips

With this kit we are introducing a series of online guides for educators who want to create their own media literacy lessons. You can find a link to the do-it-yourself guide on the Project Look Sharp homepage to assist teachers as they compose media literacy lessons using media documents created within your particular region.

Do No Harm

One of the key requirements of this constructivist pedagogy is to pay deep and constant attention to the power of words and images both to heal and to harm. The issues raised in this kit can provoke powerful emotions from students (for example, in response the consequences of climate change). It is essential for teachers to monitor the emotional climate of the class and be willing to ask, "How are you feeling?" It is also essential that the teacher create a setting in which personal sharing of feelings will not be obstructed by laughter, side comments or crosstalk that can hurt individuals and make it harder to discuss the sensitive issues that are at the core of this kit.

INTRODUCTION

Media Literacy and Democratic Citizenship

The founders of the United States articulated the need for a literate citizenship as core to the development of a deep and enduring democracy. We live in an age when the most influential messages about pressing social issues and events are delivered through mass media, such as television, magazines and the Internet. Most students use the Internet as their primary source of information, yet few have any formal training in assessing the credibility of information in the media. It is essential to the success of our democracy that young people consciously and consistently analyze and evaluate media messages. They need to be taught to seek out current, accurate, and credible sources of information; they need to understand the influence of media messages on their understanding of the world; and they need training in identifying and using various techniques for communicating messages in different media forms. Without these critical skills, we risk losing the diversity and freedom of thought that underpins a culture of true democracy.

Collective Reading of Media Messages

This curriculum is based on the classroom practice of collective reading, in which the teacher leads the class through the process of decoding images, sounds and text as a way of developing a range of critical thinking skills while teaching core knowledge. This constructivist approach encourages the development of moral reasoning as students clarify their own interpretations, listen to the analyses of their peers, and discuss ethical issues. Decoding of the documents in this curriculum will help train students to distinguish fact from opinion, analyze point of view and identify bias, interpret historical documents, and use evidence to back up a thesis. The classroom decoding process is particularly effective in involving students who rarely share their opinions about print-based material, including students with reading disabilities, visual learners, and students for whom English is a second language. The teacher should consider calling on students or going around the room to ensure participation by all students in the collective reading process.

Encouraging Multiple Readings

Although the *Teacher Guides* for each lesson include possible answers to the questions, the teacher should encourage multiple readings and a diversity of responses for most of the questions posed. It is important that students give evidence in the document to explain their conclusions. Occasionally a question has only one right answer (e.g., "who created this video?"), and students should learn to distinguish between objective and subjective questions. The suggested answers given in the scripts are intended to reflect typical responses that address key scientific, historical and media literacy concepts and information. However, it is important that students recognize that all people do not interpret media messages the same way. Depending upon each reader's background, including life experience, age, gender, race, culture, or political views, he or she may have very different interpretations of a particular text. The collective reading experience provides the opportunity to explore these differences and discuss the important concept that readers interpret messages through their own lenses.

Reading Bias

A major theme of these materials is the recognition that all media messages come from a particular point of view and have a bias that reflects the intent and perspective of the producer and sponsor. With these materials, teachers can train students to recognize bias and point of view. The teacher should encourage students to ask critical questions about any media messages encountered inside or outside the classroom using the *Key Questions To Ask When Analyzing Media Messages* found at **www.projectlooksharp.org**.

Bias in this Curriculum and in the Classroom

This series of lessons, like all media, also has a point of view and a bias. As teachers use the lessons, they may identify opinionated language, selective facts, missing information, and many other subjective decisions that went into constructing this view of sustainability. The same questions within this sustainability curriculum also apply to this media construction: Who produced this curriculum for what purpose and what is its bias? Teachers and students could and should be asking critical questions about the editorial choices that went into constructing these lessons. For instance, why did we choose to focus on certain topics, but not others? And, what is your evidence for these conclusions? When using these materials teachers will make their own decisions of what to include and to edit, what questions to use and what issues to avoid.

All of these decisions, both by the creators and users of the curriculum, will influence the view of sustainability that students receive. Teachers should encourage students to thoughtfully analyze and discuss the stories, the perspectives, and the biases celebrated and criticized within our own classrooms. Those skills and practices are core to an educated democratic citizenship.

Additional Resources

For more information about media decoding download these documents from the project Look Sharp website:

- ***Key Questions to Ask When Analyzing Media Messages***
- ***Tips for Media Decoding***
- ***Core Principles for Media Literacy Education***

Fair Use of Media Documents

The classroom critique of political and cultural documents (e.g., paintings, TV news clips, excerpts from films, web pages) is essential to the development of core literacy skills in our media saturated democracy. To enable educators to fulfill the mission of teaching these core civic objectives, Project Look Sharp has created media literacy integration kits using a variety of different media documents for critical analysis in the classroom. Project Look Sharp provides these media documents and lessons free of charge for the purpose of commentary, criticism, and education as provided for by the fair use clause of the US Copyright Act of 1976. The documents in this curriculum are presented for the purpose of direct critique and are solely to be used in an educational setting.

For more information about fair use in Media Literacy Education, go to the Media Education Lab at Temple University at:

www.mediaeducationlab.com

Lesson 20: Climate Change, Agriculture & Sustainability


Printed Documents


Video Clips

LESSON PLAN

Climate Change, Agriculture & Sustainability

Lesson Objectives:

- Understand the current and potential impacts of climate change on agriculture and water resources in the Finger Lakes region of New York State.
- Understand the role of agricultural practices in contributing to climate change.
- Identify potential responses to climate change as it affects food, water and agriculture.
- Analyze the role of media in public understanding of climate change as it affects food, water and agriculture.

Vocabulary:

biochar, bioenergy, biogas, biotechnology, carbon pool, carbon sequestration, *ClimAID* report, deforestation, food security, greenhouse gas (GHG) emissions, heat stress, manure management, methane capture, mitigation, perennial crop, polyculture, stress tolerant trait, three sisters garden, tillage, value added product, water management

Media: government synthesis report, blog, Web page, summary of a nongovernmental organization text report, internet news video, university webcast, online video clips

Materials Needed:

Activity 1

- Four-page *Teacher Guide: Activity 1*
- Two-page *Student Reading: Document 1* (ClimAid)
- One-page *Student Worksheet: Document 1* (ClimAid)
- One video clip (Access online or via Lesson 20 digital media folder)

Activity 2

- Fourteen-page *Teacher Guide: Acitvity 2*
- Two-page *Student Reading: Document 2* (Monsanto)
- One-page *Student Worksheet: Document 2* (Monsanto)
- Two-page *Student Reading: Document 3* (Worldwatch)
- One-page *Student Worksheet: Document 3* (Worldwatch)
- Two-page *Student Worksheet: Video Clips*
- Six video clips (Access online or via Lesson 20 digital media folder)

Time: Activity 1: 30 minutes, not including in-class reading time
Activity 2: 60 minutes, not including in-class reading time and video viewing time

Lesson Procedures

Activity 1

- Present the *Lesson Introduction* to the class.
- Distribute the *Student Reading 1: Document 1* and the *Student Worksheet: Document 1* from ClimAid.
- Direct students to read *Document 1* and complete the top portion of the worksheet.
- Play Video Clip 1 and have students fill out the bottom part of the worksheet.
- Lead a discussion on the *ClimAid* report's conclusions regarding the current and potential impacts of climate change on agriculture and water resources in the Finger Lakes region. Discuss the effectiveness of television news reporting and other media forms in communicating complex messages.

Activity 2

- Distribute the *Student Reading: Document 2* and *Student Worksheet: Document 2* from Monsanto.
- Direct students to read *Document 2* and complete the worksheet.
- Distribute the *Student Reading: Document 2* and *Student Worksheet: Document 3* from Worldwatch.
- Direct students to read *Document 3* and complete the worksheet.
- Lead a discussion on how agricultural practices in the Finger Lakes contribute to climate change.
- Divide the class into six groups to analyze six video clips from the Finger Lakes and identify possible means to change agricultural practices in order to mitigate climate change.
- Distribute the *Student Worksheet: Video Clips.* Have the groups watch their assigned video, complete their worksheet and identify key points to present based on their worksheet.
- Play the videos for the class as each group explains how the model in their assigned video responds to climate change in the Finger Lakes. As students present their video analysis, have the rest of the class take notes on their worksheet about the best agricultural practices and the best approaches to communicate these models to the public.
- After the presentations, lead a discussion on the best strategies in agriculture to mitigate climate change and the best approaches to educate the community about the issue.
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Climate Change, Agriculture & Sustainability: Activity 1

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

How are climate change and farming interrelated? The reality of climate change makes it ever more difficult for farmers to predict how to deal with changing circumstances within and above the soil. In the past, farmers could often look at a *Farmers Almanac* and know what they could expect for the coming growing season. Today, farmers are uncertain about almost everything: When will the first and last frost come? What crops can tolerate the changing patterns of rainfall and drought? What new weeds and insects will they need to contend with? Climate change changes agriculture. This is the new reality for farmers and for all of us who rely on farmers to survive.

It is also true that farming itself contributes to climate change. The carbon footprint of agriculture is heavy. Greenhouse gases are emitted in almost every stage of conventional farming practices. From the fossil fuels required to produce fertilizer, herbicides and pesticides to the methane released by livestock, from the diesel fuel burned in combines to the gasoline used to transport produce to the market, agriculture accelerates climate change.

This lesson asks you to study the ways in which agriculture in the Finger Lakes is impacted by climate change and the ways in which Finger Lakes agriculture contributes to climate change. You will consider how agricultural research and farming practices might help mitigate or lessen the impacts of climate change. Finally, you will be asked to consider the role of media in clarifying or confusing these complex issues.

3. Distribute the *Student Reading: Document 1 (ClimAid)* and the *Student Worksheet: Document 1 (ClimAid)*. Explain that the reading is a summary of the 2011 report, *Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation*. Researchers from Cornell University, Columbia University and the City University of New York for the New York State Energy Research and Development Authority (NYSERDA) wrote the report. It includes climate change adaptation strategies for water resources, coastal zones, ecosystems, agriculture, energy, transportation, telecommunications and public health. This excerpt is from the agriculture section of the report.

[NOTE: The* Student Reading *could be assigned as homework.]

6. Direct students to complete the reading and fill out the top portion of the worksheet. Remind students that when providing four anticipated impacts of climate change, they should cite directly from the text excerpt.

7. Lead a discussion of the first document using the *Media Sample Questions & Answers* in the *Teacher Guide*.

Document 1

Responding to Climate Change In New York State: The ClimAid Integrated Assessment for Effective Climate Change Adaptation
Cynthia Rosenzweig, et al.
2011

Media Sample Questions & Answers

1) What is the main message in this report excerpt?

Possible Answer: Climate change is affecting agriculture in New York State, but there are strategies that help New York farmers adapt to the impacts of climate change. Major agricultural markets in crops, livestock and wine grape production are particularly at risk. However, some opportunities for new crops and markets will open up due to climate change.

2) List four anticipated impacts of climate change on farming in the Finger Lakes

Possible Answers:

- "Increased summer heat stress will negatively affect cool-season crops and livestock"
- "Increased weed and pest pressure (are) associated with longer growing seasons and warmer winters"
- "Water management will be a more serious challenge…due to increased frequency of heavy rainfall events, and more frequent and intense summer water deficits"
- "Agriculture is sensitive to the volatile and rising costs of energy, a challenge that climate change is likely to exacerbate"
- "Climate change is likely to exacerbate current trends towards consolidation into fewer, larger farms, especially in the dairy sector"
- "Without proactive development of non-chemical approaches, increased pesticide and fertilizer use could harm sensitive environments, such as streams and rivers"
- Wine grape crops are vulnerable to "Increasing temperatures at the beginning of winter…can raise the probability of midwinter damage. In late winter or early spring …a prolonged warm period may lead to premature budding and increased vulnerability to spring frost"

6. Explain to students that you will show Video Clip 1, "Experts Urge Action in NYSERDA Report." This clip was televised in November, 2011 and appeared on Rochester's *Your News Now (YNN)*, a local news channel in the Finger Lakes, following the release of the *ClimAid* report.

7. Play the clip and have students fill out the bottom portion of the worksheet.

8. After students have completed their worksheets, lead a discussion using the *Media Sample Questions & Answers* in the *Teacher Guide* below.

Video Clip 1

"Experts Urge Action in NYSERDA Report," "1:51 min. clip
November 16, 2011
News clip

Media Sample Questions & Answers

1) What is the main message in this report excerpt?

Possible Answer: Scientists have released a report saying that, as a result of climate change, New York faces both opportunities and risks, many of these associated with extreme weather events. The report suggests that immediate action be taken toward possible solutions involving increased monitoring and preparedness.

2) You read an excerpt from the written document on which the report is based. What important information is left out of this news report?

Possible Answer: The report leaves out many of the particular ways in which climate change will affect agriculture, specifically impacts related to summer heat stress on crops and livestock, rising energy costs, consolidation of farms, chemical contamination and grape vulnerability. It omits specific adaptation strategies for farmers in response to climate change. It also leaves out specific projections as to losses in milk production and pursuant loss of profits.

3) Does the video footage enhance viewers' understanding of the concerns addressed in the report? Why or why not?

Answer: It does not. Although it adds some visual imagery of floods and snow and includes images of several of the report authors, it does not add additional, deep understanding of the findings in the report.

8. Lead a discussion on the NYSERDA report's conclusions regarding the current and potential impacts of climate change on agriculture and water resources in the Finger Lakes region. Probe questions include:
    - **What are some particular ways in which Finger Lakes agriculture is affected by climate change?**
    - **What are some opportunities for new developments in Finger Lakes agriculture due to climate change?**
    - **Why should the impact of climate change on New York agriculture be of concern to people who do not live in rural areas?**
    - **What feelings and thoughts arise as you learn about rapid and unpredictable changes in weather patterns and food production capacities?**

9. Discuss the effectiveness of television news reporting in communicating complex messages. Probe questions include:
    - **Based on your reading, what important information was left out of the TV news report?**
    - **What did the news reporter and editors do to increase interest in the story?**
    - **Do you think that televised news coverage helps or hinders public understanding of this complex story? Why?**
    - **What advantages and drawbacks do each of these media forms have in reporting on this story?**
        - The entire 252-page NYSERDA report
        - The 51-page NYSERDA report summary
        - The one-minute and 46-second televised news report
        - A tweet about the NYSERDA report

[NOTE: **Activity 2** ***begins with two readings:*** **Student Reading: Document 2 (Monsanto)** ***and*** **Student Reading: Document 3 (Worldwatch).** ***Both readings have a corresponding worksheet:*** **Student Worksheet: Document 2 (Monsanto)** ***and*** **Student Worksheet: Document 3 (Worldwatch).** ***The readings and worksheets could be distributed and assigned as homework at the end of*** **Activity 1.** ***For more information about the readings and worksheets, see*** **Activity 2.*]***

Responding to Climate Change in New York State: The ClimAid Integrated Assessment for Effective Climate Change Adaptation

Cynthia Rosenzweig, et al.

Document 1

This excerpt is from a 2011 synthesis report for the New York State Energy Research and Development Authority written by researchers from Cornell University, Columbia University and the City University of New York. Most of the excerpt is from the four-page section on agriculture.

Responding to Climate Change in New York State

Climate change is already beginning to affect the people and resources of New York State, and these impacts are projected to grow. At the same time, the state has the potential capacity to address many climate-related risks, thereby reducing negative impacts and taking advantage of possible opportunities.

ClimAID: the Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State was under- taken to provide decision-makers with cutting-edge information on the state's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge…(ii)

Agriculture: Key Climate Impacts

Increased summer heat stress will negatively affect cool-season crops and livestock unless farmers take adaptive measures such as shifting to more heat-tolerant crop varieties and improving cooling capacity of livestock facilities.

Increased weed and pest pressure associated with longer growing seasons and warmer winters will be an increasingly important challenge.

Water management will be a more serious challenge for New York farmers in the future due to increased frequency of heavy rainfall events, and more frequent and intense summer water deficits by mid to late century.

Opportunities to explore new crops, new varieties, and new markets will come with higher temperatures and a longer growing season.

Context

The agriculture sector in New York State encompasses more than 34,000 farms that occupy about one-quarter of the state's land area (more than 7.5 million acres) and contribute $4.5 billion annually to the state's economy. A large majority of New York agriculture is currently rain-fed without irrigation, but summer precipitation is currently not sufficient to fully meet crop water needs most years. Economic pressures have led to consolidation into fewer, larger farms, particularly in the dairy industry. The costs of adapting to climate change may intensify this trend. Agriculture is sensitive to the volatile and rising costs of energy, a challenge that climate change is likely to exacerbate (28).

Adaptation Options

A changing climate presents challenges and potential opportunities for New York State farmers. Responding will necessitate both on-farm and state-level strategies.

Operations, Management, and Infrastructure Strategies

- Change planting dates, varieties, or crops grown.
- Increase farm diversification.
- Improve cooling capacity, including the use of fans and sprinklers in dairy barns.
- Increase control of pests, pathogens, and weeds and use new approaches to minimize chemical inputs.
- Develop new crop varieties for projected New York climate and market opportunities.
- Invest in irrigation and/or drainage systems.

Larger-scale Strategies

- Develop decision tools to assist farmers in determining the optimum timing and magnitude of investments to cope with climate change.

Co-benefits

There are several opportunities for reducing greenhouse gas emissions with agriculture adaptation options, including improved manure management, generation of on-site energy, increasing the use of soil organic matter, and using nitrogen fertilizer more efficiently.

Changes for the Grape Industry

New York's grape harvest ranked third in the nation in 2007, with the crop valued at nearly 50 million dollars. In recent years, however, challenges associated with cold injury to crops have cost the state's agriculture industry millions of dollars. Increasing temperatures at the beginning of winter reduce cold hardiness and can raise the probability of midwinter damage. In late winter or early spring (after the winter-chilling requirement has been met), an earlier arrival of spring or a prolonged warm period may lead to premature budding and increased vulnerability to spring frost. Projections indicate a slight increase in the potential for spring frost injury in Concord grapes (29).

Particularly Vulnerable Groups

Dairy milk production and the productivity and/or quality of some cool-season crops such as apples, potatoes, and cabbage will be particularly vulnerable to increases in summer heat stress. Adaptations such as improving cooling capacity of dairy barns or changing varieties or crops are straightforward but will not be cost-free or risk-free. For example, the state could lose some favorite varieties of apples, such as McIntosh and Empire, for which it currently has national recognition, and have to replace them with more heat-tolerant varieties.

Smaller farms may have less information and training and less capital to invest in adaptation strategies such as stress-tolerant plant varieties, increased chemical and water inputs, and enhanced livestock cooling. By adding to already severe competitive pressure, climate change is likely to exacerbate current trends towards consolidation into fewer, larger farms, especially in the dairy sector.

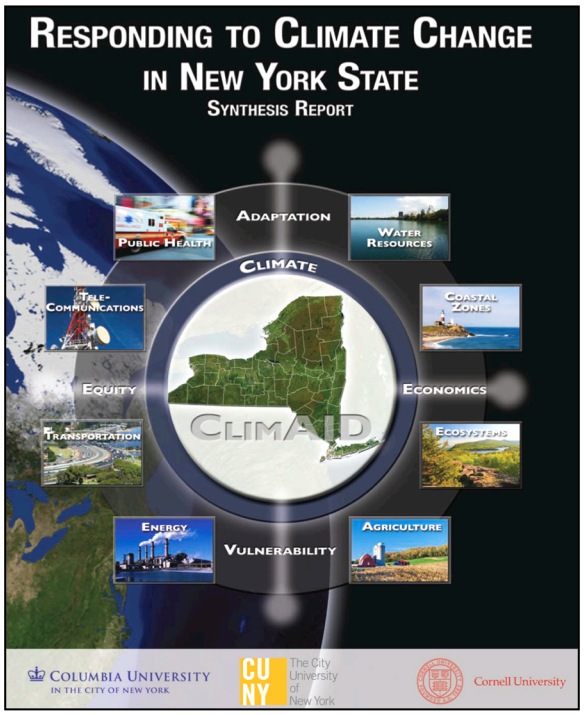
Farms specializing in cool-season crops may have challenges finding appropriate new varieties that meet both production demands and market expectations. Without proactive development of non-chemical approaches, increased pesticide and fertilizer use could harm sensitive environments, such as streams and rivers (30).

Dairy Heat Stress

Heat stress has both short- and long-term effects on the health and performance of dairy cattle, depending on severity and timing of the stress. Short-term impacts include decreases in feed intake and milk production. Under heat stress, cows spend less time resting and more time standing and walking. A decrease of 1 hour of resting time is associated with a decrease of 2 to 3 pounds of milk produced per cow. Severe heat stress can cause lameness and poor reproductive performance (calving), with subsequent long-term negative effects on milk production. While short-term responses can be partially reversed after a heat wave, long-term effects are less easily reversed.

By the 2080s, the magnitude of annual N.Y. milk production decline associated with heat stress is projected to increase six-fold compared to current heat stress-related declines. Economic losses associated with the projected increase in heat stress range from $37 to $66 per cow per year. These ClimAID estimates took into account only short-term heat stress effects. They did not consider the potential long-term effects of severe stress on milk production, so they may underestimate losses.

Modifying feeding and providing adequate water can help reduce heat stress in cows but cannot substitute for improving cooling capacity in dairy barns (for example, through improved ventilation, high airspeeds directly over the cows, and sprinkler systems). Many ventilation systems are inherently more cost-effective when deployed for larger barns. Small farms that cannot afford these kinds of adaptation measures will be most vulnerable to the impacts of warming (31).



What are the messages about agriculture and climate change in this report cover?

Words surrounding the image of New York State include (clockwise): Climate, Adaptation, Economics, Vulnerability, Equity.

Student Worksheet: Document 1 (ClimAid)

NAME _____ **DATE** _____

Document 1: ***Responding to Climate Change in New York State: The ClimAid Integrated Assessment for Effective Climate Change Adaptation***

What is the main message in this report excerpt?

Cite four anticipated impacts of climate change on farming in the Finger Lakes.

1._____

2._____

3._____

4._____

Video Clip 1: "Experts Urge Action in NYSERDA Report," ***Your News Now***

What is the main message in this report excerpt?

You read an excerpt from the written document on which the report is based. What important information is left out of this news report?

Does the video footage enhance viewers' understanding of the concerns addressed in the report? Why or why not?

TEACHER GUIDE

Climate Change, Agriculture & Sustainability: Activity 2

[NOTE: The two readings,* Student Reading: Document 2 (Monsanto) *and* Student Reading: Document 3 (Worldwatch) *could be distributed and assigned as homework at the end of* Activity 1. *Additionally, the worksheets,* Student Worksheet: Document 2 (Monsanto) *and* Student Worksheet: Document 3 (Worldwatch), *could also be distributed and assigned as homework.

This activity also contains an online component where students view video clips. Teachers should designate computer lab time to complete the online portion of the assignment. Additionally, teachers will need to project the video clips during the lesson and the student presentations.]

1. Organize and make copies for the class activities.

2. Introduce Activity 2:

Activity 2 Introduction

In this activity, you will read two excerpts written by two different organizations interested in the relationship between climate change and farming. Then, you will complete a worksheet that asks you to conclude how these organizations construct messages about that relationship. You will use direct evidence (quotations) from the excerpts to support your ideas.

The first excerpt is from the Monsanto-sponsored blog, *ImproveAgriculture.com* and is titled, "Our Perspective: Climate Change Challenges." The second excerpt is from an online summary published by Worldwatch.org that outlines the 2009 *Worldwatch Report #179: Mitigating Climate Change Through Food and Land Use*. Both excerpts conclude with information about the mission and nature of each organization.

As you read and complete the worksheets, you will need to use your powers of reasoning and prior knowledge about the causes of climate change to answer the questions. For instance, if you know that greenhouse gases contribute to climate change and if you know that certain farming practices result in greenhouse gas emissions, then you can assume that those practices contribute to climate change.

3. Distribute and direct students to complete the *Student Reading: Document 2* and *Student Worksheet: Document 2*. Remind students that they must provide direct quotes (evidence from the text) to support the two messages about climate change and agriculture in the document.

   [NOTE: Students could read independently and complete the worksheet in groups.]

4. Lead a discussion of *Document 2* using the *Media Sample Questions & Answers* in the *Teacher Guide* on the following pages.

Document 2

"Our Perspective: Climate Change Challenges"
***ImproveAgriculture.com*, a Monsanto-sponsored blog**
Posted by Produce More Conserve More
March 30, 2010

Media Sample Questions & Answers

1) Provide two messages from the text concerning how farming contributes to climate change. For each message, give evidence from the text to support your answer.

Possible Answer: Clearing forest for farmland releases CO^2.
Evidence: "Many human activities have some potential impact on climate: deforestation, irrigation, air pollution, and fossil fuel consumption are all examples."

Possible Answer: The use of fossil fuels in transport adds to greenhouse gas emissions.
Evidence: "Many human activities have some potential impact on climate: deforestation, irrigation, air pollution, and fossil fuel consumption are all examples."

Possible Answer: The use of fossil fuels in pesticide production is a carbon emission process.
Evidence: "Fossil fuel consumption associated with the production and application of conventional pesticides."

Possible Answer: Greenhouse gas emissions from nitrogen-based fertilizers add to atmospheric carbon.
Evidence: "Reduce the GHG-emissions and other undesirable environmental effects of fertilizer use."

2) List three ideas from the text about how farming practices can help to moderate climate change.

Possible Answer: From the section entitled, "How Can New Agriculture Technology Help Address the Needs?"

- Modern crop breeding techniques create higher crop yields from freeing more land for conservation
- Using solar energy via ag biotechnology
- Reduced tillage increasing crop yields
- Development of genetically modified crop traits
- Increasing the efficiency of nitrogen inputs

3) Read the text from *ImproveAgriculture.com*'s "About" Web page and explain how the Monsanto-sponsored blog's proposals dealing with climate change reflect their organizational mission.

Possible Answer: As a "leading global provider of technology-based solutions and agricultural products," Monsanto's solutions to climate change all point to "new agricultural technology," which they advertise to the global market via this blog.

5. Distribute and direct students to complete the *Student Reading: Document 3* and the *Student Worksheet: Document 3*.

   [NOTE: Students could read independently and complete the worksheet in groups.]

6. Lead a discussion of *Document 3* using the *Media Sample Questions & Answers* in the *Teacher Guide* below.

Document 3

"Worldwatch Institute's summary of *Mitigating Climate Change Through Food and Land Use: Worldwatch Report 179"*
Worldwatch.org
2009

Media Sample Questions & Answers

1) Provide two messages from the text concerning how farming contributes to climate change. For each message, give evidence from the text to support your answer.

Possible Answer: Tractors burn fossil fuel.
Evidence: "Agricultural soils can be managed to reduce emissions by minimizing tillage"

Possible Answer: The production of nitrogen fertilizers releases greenhouse gases.
Evidence: "Agricultural soils can be managed to reduce emissions by…reducing use of nitrogen fertilizers"

Possible Answer: Livestock release methane, a greenhouse gas, through digestive processes.
Evidence: "Livestock-related emissions of carbon and methane now account for 14.5 percent of total greenhouse gas emissions"

Possible Answer: Clearing of forest and grassland for farming adds to greenhouse gas.
Evidence: "Deforestation, land clearing, and forest and grassland fires are major sources of greenhouse gas emissions"

Media Sample Questions & Answers Cont'd

2) List three ideas from the text about how farming practices can help to moderate climate change.

Possible Answer:

- Minimize tillage
- Reduce use of nitrogen fertilizer
- Prevent soil erosion
- Add biochar to soil
- Switch to perennial crops
- Capture livestock methane for biogas production
- Control fires with community control efforts
- Pay for climate services
- Restore vegetative cover on degraded land

3) Read the text from the Worldwatch Institute's "Mission" Web page and explain how the Worldwatch Institute's proposals dealing with climate change reflect their organizational mission.

Possible Answer: The proposed solutions reflect Worldwatch's intention to develop "innovative solutions to intractable problems, emphasizing a blend of government leadership, private sector enterprise, and citizen action that can make a sustainable future a reality." The solutions require intervention from the government, corporate and civilian sectors working together.

7. Lead a discussion on the role of agriculture as practiced in the Finger Lakes and how agriculture contributes to climate change.
   Probe questions include:
   - **Given the information delivered in the *ClimAID* report and these two documents, how does Finger Lakes agriculture contribute to climate change?**
   - **Do you think that agriculture in the Finger Lakes plays a significant role in climate change or not? Why?**

8. Explain to students that they will work in groups to view a short video clip (less than four minutes). Then, they will present their analysis of how agricultural research and farming practices in the Finger Lakes can help to lessen the impacts of climate change to the class.

9. Divide the class into six groups and assign each group one of the six video clips:
   Video Clip 1: "Jobs Coming to Seneca Depot"
   Video Clip 2: "The Science Behind the Three Sisters"
   Video Clip 3: "Tapestry Garden/Women Transcending Boundaries"
   Video Clip 4: "Incubating Up-Start Farmers"
   Video Clip 5: "Rochester Roots: Let's Dig In"
   Video Clip 6: "The Promise of Biochar"

10. Distribute the *Student Worksheet: Video Clips* to each student. Explain how students can access their assigned video clip in the *Student Materials* section on the Project Look Sharp homepage, www.projectlooksharp.org.

    [NOTE: Teachers should provide in-class computer lab time for students to view their videos. Additionally, teachers may want to share the brief* Introduction *information below for each video clip in the* Teacher Guide *with each group.]

11. After the teams have completed their worksheet analysis, explain that you will play each video clip for the whole class before each group presentation. Before playing each clip, describe each one using the *Introduction* information in the *Teacher Guide*. Following each video clip, ask the assigned group to explain how their model can help mitigate the impacts of climate change in the Finger Lakes. Use the *Media Sample Questions & Answers* in the *Teacher Guide* to help facilitate the student presentations on each video.

12. On the backside of the worksheet, students should take notes on each group's best models for agricultural adaptation to climate change and the best way to communicate these models according to their video clip. Pause after each presentation for students to take notes.

Video Clip 1

"Jobs Coming to Seneca Depot," 2:19 min. clip
March 24, 2008
Internet news clip

Introduction

This news clip aired March 24, 2008 on the Time Warner Cable news channel, *Your News Now* (YNN), in Rochester.

Media Sample Questions & Answers

1) What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?

Possible Answer: Cultivating soybeans and canola for bioenergy production to replace gasoline is an "environmentally friendly" way to create jobs in the shell of an old army depot.

2) What techniques does the video producer use to communicate these messages?

Possible Answer: This is a standard voice-over news piece with quick clips and images of the people and the setting involved in the initiative. The narrator tells the audience about the positive nature of the project.

Video Clip 2

"The Science Behind the Three Sisters," 2:16 min. clip
May 31, 2011
University webcast

Introduction

This is an excerpt from a seven-part online video series featured on CornellCast titled, *First Peoples, First Crops*. Cornell professor Jane Mt. Pleasant presents the series and focuses on the Iroquois planting technique known as "the three sisters," or the intercropping of corn, beans and squash.

Media Sample Questions & Answers

1) What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?

Possible Answer: The Iroquois three sisters planting technique is a polyculture systems approach that mimics natural communities. It makes crops more resilient and able to adapt to climate-change disruptions. The beans (legumes) in the system provide "free nitrogen" and replaces the need for nitrogen fertilizers, which require fossil fuels for production and transport.

2) What techniques does the video producer use to communicate these messages?

Possible Answer: The producers chose to film the professor in casual clothing standing next to a three sisters planting in the summer time to illustrate the real world application of Iroquois agricultural knowledge. This was a choice to challenge a more stereotypical representation of a science professor in a lab coat speaking in a laboratory or classroom and removed from the subject of their lecture.

Video Clip 3

"Tapestry Garden/Women Transcending Boundaries"
2:55 min. clip
February 2010
Online video

Introduction

This slideshow was created during the spring planting and growing season and uploaded by PeaceScribes. On its YouTube channel, PeaceScribes describes its efforts as "combining images, music, movement and poetry to draw together our diverse human family in harmony with nature" ("About PeaceScribes").

Media Sample Questions & Answers

1) **What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?**

Possible Answer: Working together to build deep bed gardens among women, children and men from different backgrounds appeals to common spiritual values and the collective joy in working the soil with many hands. The cooperation and creativity unleashed by this work enhances community resiliency in the face of unknown challenges posed by climate change.

2) **What techniques does the video producer use to communicate these messages?**

Possible Answer: The producers elected to forego narration in order to highlight the combined power of images, music and spiritual quotations. The slideshow title suggests that the construction itself is a means to communicate a weaving (tapestry) of women of diverse backgrounds (women transcending boundaries).

Video Clip 4

"Incubating Up-Start Farmers," 1:44 min. clip
July 26, 2011
Internet news clip

Introduction

This is a news clip that aired on the cable news channel WBNG Binghamton in July, 2011.

Media Sample Questions & Answers

1) What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?

Possible Answer: The focus on producing local food and training beginner farmers can help communities move toward self-sufficiency as climate change makes it difficult to transport food over vast distances. The concentration on food access and eliminating food deserts addresses the critical question of which people suffer most as food systems are stressed.

2) What techniques does the video producer use to communicate these messages?

Possible Answer: The producers of this news report use familiar techniques, such as an introduction by an anchorman and hand-held microphone interviews by a reporter on the scene. The producers also use production techniques designed to suggest a "deeper look" at the problem. These include the anchor's mention that this is part of an ongoing series on the future of food, the use of close-up camera angles from the field level and tight shots of onions and peppers to convey the impression of digging deep for meaning in the soil itself.

Video Clip 5

"Rochester Roots: Let's Dig In," 3:15 min. clip
May 28, 2009
Online video

Introduction

This production was created by Rochester Roots, a nonprofit community organization committed to "creating a locally sustainable food system that ensures community food security" ("Home").

Media Sample Questions & Answers

1) **What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?**

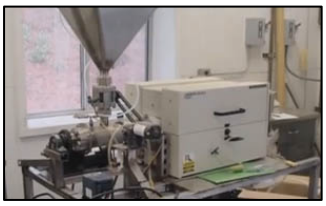
Possible Answer: Educating young people and sharing fresh produce in community markets enables people to learn practical skills and develop associations that extend understandings about agriculture to wider populations. These relationships and practices help communities become more resilient and self-reliant in times of climate challenge. Local efforts to nurture soil through composting and to develop local value added products further extend community capacity.

2) **What techniques does the video producer use to communicate these messages?**

Possible Answer: The producers of this video are targeting families and children in their production by using the voice and words of a young girl to drive the story. The images of children working in the garden and the animated butterfly add to the appeal, inviting young people and their families to see themselves as potential participants in this project.

Video Clip 6

"The Promise of Biochar," 3:23 min. clip
2008
Documentary



Introduction

This brief documentary film was produced for the International Biochar Initiative for use in discussions about climate change mitigation strategies. Johannes Lehmann, Cornell professor in the Department of Crop and Soil Sciences, is the primary narrator in the video.

Media Sample Questions & Answers

1) **What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?**

Possible Answer: Biochar is an ancient indigenous strategy for soil enhancement that uses the process of pyrolosis to return carbon to the soil. Biochar is a bioenergy system that becomes "carbon negative" by sequestering carbon in the soil, offering the promise of reducing carbon in the atmosphere while nurturing degraded soils during a time of climate change.

2) **What techniques does the video producer use to communicate these messages?**

Possible Answer: The filmmakers use the familiar technique of a "talking head" interview with a professor to explain the scientific background while illustrating the professor's points with images of biochar machines, tractors tilling the soil and biochar pellets. The conclusion includes images of factory smokestacks, the Amazon River, the sun and green plants to convey the "promise of biochar" to turn industrial pollutants into environmental protection.

13. After all the groups have presented, lead a discussion on the best agricultural strategies to mitigate climate change.
    Probe questions include:
    - **Which strategies seemed most likely to result in reduced greenhouse gas emissions?**
    - **Which strategies seemed to take into account the needs of the human community including people of varied economic means, rural and urban populations and people of different cultural backgrounds?**
    - **Which strategies seemed to take into account overall environmental protection?**
    - **Which strategies seemed most likely to be politically feasible?**
    - **Which strategies seemed most likely to be economically sustainable?**

14. Discuss which strategies present the best approaches to community education on the issue.
    Probe questions include:
    - **Which production techniques are most likely to engage public interest: interviews with experts, testimony from citizens, or appeals from children?**
    - **Which strategies seem less effective in conveying the message?**

[NOTE: Teachers should consider consulting lessons in Project Look Sharp's curriculum kit* Media Construction of Global Warming *for extensive lessons related to climate change and accuracy, currency, credibility, sourcing and bias in media reporting on the issue. More information and free downloads are available on the Project Look Sharp website:* www.projectlooksharp.org.*]

FURTHER QUESTIONS

Analyzing Media Messages

Compare the capacity of different media forms for the exchange of complex ideas. For instance, which media forms (the readings or the videos) most helped you to understand the complexities related to climate change and agriculture? Why?

In what media venue are you most likely to encounter media representations related to climate change and agriculture? Where are you least likely to encounter such representations?

Self Reflection

Some historians have likened the challenges of the early 21st century to those of the 1930s.
How was your family affected by the twin economic and environmental crises of the 1930s with the Great Depression and the Dust Bowl? How can you find out if you do not know?

Who among your friends and family is open to discussions about the impacts of climate change on our food supply? Who is not open to such discussions? Why?

How do your personal food choices connect with climate change mitigation? For instance, how do diets based on meat, vegetarian or vegan choices differently effect greenhouse gas emissions? How might acquiring food from a supermarket, a farmers market and a home garden differently affect your carbon footprint?

Underlying Values and Motives

How does an organization's stance on human-induced global warming affect its reporting on agricultural efforts to mitigate climate change?

In 1862, the United States Congress passed legislation providing for the sale of government-owned land to universities with a charge of broad-based education and public benefit. These land grant universities such as Cornell in New York state established "extension systems" to "extend" the resources of those universities to the general public. **What is the closest cooperative extension system to your community and what information does it offer on climate change and agriculture?**

Is the impact of climate change on farming more likely to lead to international and global-based solutions or local and regional-based solutions? Why?

How does the prospect of peak oil influence policy options on climate change mitigation?

EXTENDED ACTIVITIES

Conduct a historical study of your region to understand pre-fossil fuel era models that dealt with locally adapted crop species, tillage, soil fertilization, weed and pest control and that provided for resiliency in face of unexpected weather in your area.

Research examples in your region of agriculture that attempts to dramatically reduce fossil fuel use, yet remain highly productive. Look for places that emphasize organic, permaculture or agro-ecology practices. Visit a site for a workday, to conduct an interview, or make your own media document relating to climate change mitigation via agricultural models.

In 1940, New York State passed legislation for the creation of county Soil and Water Conservation Districts. This followed the establishment of a federal conservation agency to address the nation's problems caused by the Dust Bowl. The legislation empowered local soil and water conservation districts to carry out and promote soil and water conservation programs. Interview a representative from your County Soil and Water Conservation District to discover how soil and water resources are impacted by local farming practices and by global climate change.

Climatologists suggest that "extreme precipitation events" are more likely due to climate change. Create a research project to study recent news reports of such events and subsequent flooding in your area. What percentage of reports mention climate change as a possible cause and how is this link characterized? How does the ownership of the news source affect the nature of the reporting?

Invite community members to your class for a dialogue about climate change and agriculture as it affects your community. Be sure to include a wide range of participants who will collectively allow for a truly systemic view of the problems and opportunities (for example, large- and small-scale farmers, extension agents, home gardeners, academic experts).

Research and report on the potential and the pitfalls of biofuel production in your region to determine if and how biofuels fit into a sustainable bioregional farm and forest economy.

Connect with Bioneers.org, an organization of social and scientific innovation, to find out when the next Bioneers conference is happening and how you can participate.

CONNECTIONS

L6, 7, 9, 10, 16, 17, 19, 20, 21, 25, 26
(local food)

L6, 7, 10, 15, 16, 17, 19, 20, 21, 25
(organic & conventional farming)

L6, 7, 9, 19, 20, 21, 25
(urban agriculture)

L 6, 7, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26
(food security)

L3, 6, 8, 9, 14, 16, 17, 18, 19, 20, 24
(fossil fuel)

L3, 6, 9, 11, 16, 17, 18, 19, 20
(climate change)

L2, 6, 7, 9, 10, 12, 13, 14, 15, 18, 20, 24
(film & video)

L14, 16, 18, 20, 23, 24
(news reporting)

L2, 3, 8, 9, 16, 18, 20, 22, 23
(text-based media)

"Our Perspective: Climate Change Challenges"
ImproveAgriculture.com, a Monsanto-sponsored blog
Posted by Produce More Conserve More
"About"
Web page on *ImproveAgriculture.com* blog

Document 2

This excerpt was posted on March 30, 2010 to Monsanto's blog:

Why New Ag Technologies Are Needed Now
There is no question that global warming is now underway. In its May 2008 report entitled, The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity, the U.S. Climate Change Science Panel reported that, "numerous, substantial impacts of climate change on U.S. natural resources are already occurring … these are likely to become exacerbated as warming progresses." The report goes on to highlight the very significant challenges to agriculture:

- With increased CO2 and temperature, the life cycle of grain and oilseed crops will likely progress more rapidly. But, as temperature rises, these crops will increasingly begin to experience failure.
- The marketable yield of many horticultural crops – e.g., tomatoes, onions, fruits – is very likely to be more sensitive to climate change than grain and oilseed crops.
- Climate change is likely to lead to a northern migration of weeds and many insect pests. Many weeds respond more positively to increasing CO2 than most cash crops, particularly C3 "invasive" weeds.
- Disease pressure on crops and domestic animals will likely increase, as a result of earlier springs and warmer winters.

New technologies are needed now to confront these challenges. Significant progress is already being made through the application of modern crop breeding techniques, biotechnology, and innovative partnerships – both within industry and between industry and other stakeholders – academia, government researchers, and NGO's. However, artificial barriers are still preventing the widespread adoption of the very technologies that could help meet the challenges already presented by climate change. This brief summary is intended to define the key terms, present the facts about global warming, and highlight the needs that new ag technologies can meet now…

Are People Causing Global Warming?
Many human activities have some potential impact on climate: deforestation, irrigation, air pollution, and fossil fuel consumption are all examples. Evidence is mounting that the net effect of man-made GHG emissions have become dominant over the past 40 years, leading to the accelerating warming trend that is now evident…

What Will this Mean for Agriculture?
Increasing CO2 and temperature will continue to have some short term benefits, but in the long run crop yields and livestock productivity will suffer, due to the an increasing frequency of stress-related losses. Insects, weeds, and disease are all likely to spread northward through the US, increasing the challenge. Of course, demand for agriculture outputs is already at unprecedented levels, and this is unlikely to modify in the foreseeable future due to world population growth, changing food preferences, and the demand for renewable fuels.

How Can New Agriculture Technology Help Address the Needs?
Society will increasingly demand not only greater quantities of agriculture products, including food, feed and fuel, but it will demand that agricultural production systems are able to demonstrate an overall profile that is sustainable. Food security, environment, public health, and socio-economic factors will remain key priorities. There are several ways in which new ag technologies will do this:

- Modern crop breeding techniques help keep pace with climate change and drive higher yield, which reduces land requirements for agriculture, potentially making more land available for conservation.
- Ag biotechnology provides the means to produce crop protection systems by solar energy, avoiding the fossil fuel consumption associated with the production and application of conventional pesticides.

- Ag biotechnology can reduce the need for tillage, provides increased yields, and decreases the chance of yield loss as a result of weather-related stress.
- Several climate-related stress tolerant traits, such as drought tolerance, are now in development, which further help protect and advance yield gains.
- Nitrogen use efficiency is also a key trait that has the potential to significantly reduce the GHG-emissions and other undesirable environmental effects of fertilizer use.

The efficiency gains in agricultural systems that result from the application of new agriculture technologies will lead to more production on less land, and collectively reduce the amount of resources needed per unit of production.

This 2011 excerpt is from Monsanto's "About" Web page on their *Improve Agriculture* blog:

Monsanto Company is a leading global provider of technology-based solutions and agricultural products that improve farm productivity and food quality. We are focused on enabling both small-holder and large-scale farmers to produce more from their land while conserving more of our world's natural resources such as water and energy.

Agriculture is at the center of many pressing world issues. Innovation in agriculture can provide solutions. We created www.ImproveAgriculture.com so that people would have a comprehensive resource for information about the challenges we face and the solutions that are available. We welcome your thoughts and opinions.

What are the messages about agriculture and climate change in Monsanto's logo for their *Improve Agriculture* blog?
Words around the logo (clockwise): Conserving, Improving Lives, Producing.

Student Worksheet: Document 2 (Monsanto)

NAME _____ **DATE** _____

Document 2: Web pages from *ImproveAgriculture.com*, a Monsanto-sponsored blog

Provide two messages from "Our Perspective: Climate Change Challenges" regarding how farming contributes to climate change. For each message, quote evidence from the text to support your answer.

Message:
Evidence:

Message:
Evidence:

List three ideas from the text about how farming practices can help to moderate climate change.

1._____

2._____

3._____

Read the text from *ImproveAgriculture.com*'s "About" Web page and explain how the Monsanto-sponsored blog's proposals dealing with climate change reflect their organizational mission.

Worldwatch Institute's summary of *Mitigating Climate Change Through Food and Land Use: Worldwatch Report 179*
Worldwatch.org
"Mission" Web page
Worldwatch.org

Document 3

This following is an online summary of the report, *Mitigating Climate Change Through Food and Land Use* written by Sara J. Scherr and Sajal Sthapit and published by the Worldwatch Institute in 2009.

Land makes up a quarter of Earth's surface, and its soil and plants hold three times as much carbon as the atmosphere. More than 30 percent of all greenhouse gas emissions arise from the land use sector. Thus, no strategy for mitigating global climate change can be complete or successful without reducing emissions from agriculture, forestry, and other land uses. Moreover, only land-based or "terrestrial" carbon sequestration offers the possibility today of large-scale removal of greenhouse gases from the atmosphere, through plant photosynthesis.

Five major strategies for reducing and sequestering terrestrial greenhouse gas emissions are:

• **Enriching soil carbon**. Soil is the third largest carbon pool on Earth's surface. Agricultural soils can be managed to reduce emissions by minimizing tillage, reducing use of nitrogen fertilizers, and preventing erosion. Soils can store the carbon captured by plants from the atmosphere by building up soil organic matter, which also has benefits for crop production. Adding biochar (biomass burned in a low-oxygen environment) can further enhance carbon storage in soil.

• **Farming with perennials**. Perennial crops, grasses, palms, and trees constantly maintain and develop their root and woody biomass and associated carbon, while providing vegetative cover for soils. There is large potential to substitute annual tilled crops with perennials, particularly for animal feed and vegetable oils, as well as to incorporate woody perennials into annual cropping systems in agroforestry systems.

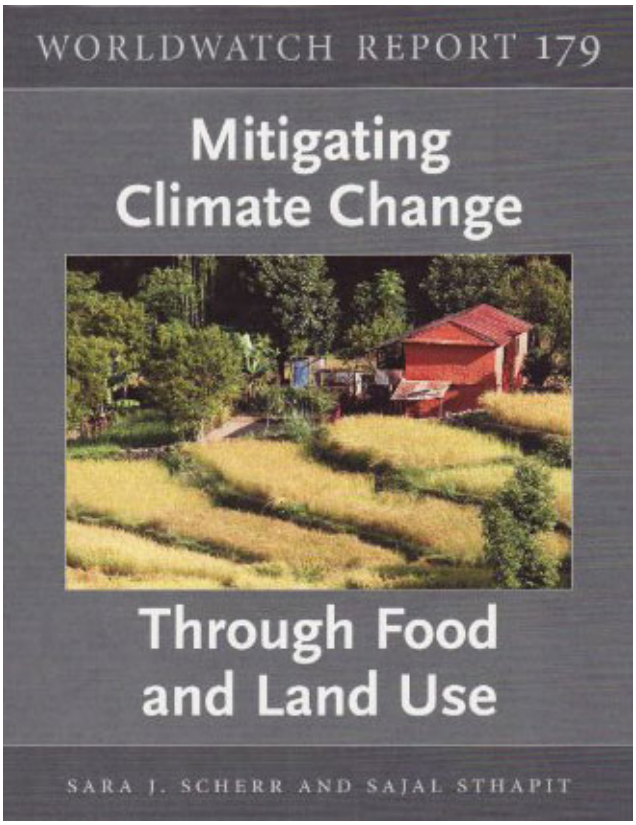
• **Climate-friendly livestock production**. Rapid growth in demand for livestock products has triggered a huge rise in the number of animals, the concentration of wastes in feedlots and dairies, and the clearing of natural grasslands and forests for grazing. Livestock- related emissions of carbon and methane now account for 14.5 percent of total greenhouse gas emissions—more than the transport sector. A reduction in livestock numbers may be needed but production innovations can help, including rotational grazing systems, manure management, methane capture for biogas production, and improved feeds and feed additives.

• **Protecting natural habitat**. The planet's 4 billion hectares of forests and 5 billion hectares of natural grasslands are a massive reservoir of carbon—both in vegetation above ground and in root systems below ground. As forests and grasslands grow, they remove carbon from the atmosphere. Deforestation, land clearing, and forest and grassland fires are major sources of greenhouse gas emissions. Incentives are needed to encourage farmers and land users to maintain natural vegetation through product certification, payments for climate services, securing tenure rights, and community fire control. The conservation of natural habitat will benefit biodiversity in the face of climate change.

• **Restoring degraded watersheds and rangelands**. Extensive areas of the world have been denuded of vegetation through land clearing for crops or grazing and from overuse and poor management. Degradation has not only generated a huge amount of greenhouse gas emissions, but local people have lost a valuable livelihood asset as well as essential watershed functions. Restoring vegetative cover on degraded lands can be a win-win-win strategy for addressing climate change, rural poverty, and water scarcity.

Agricultural communities can play a central role in fighting climate change. Even at a relatively low price for mitigating carbon emissions, improved land management could offset a quarter of global emissions from fossil fuel use in a year. In contrast, solutions for reducing emissions by carbon capture in the energy sector are unlikely to be widely utilized for decades and do not remove the greenhouse gases already in the atmosphere. To tackle the climate challenge, we need to pursue land use solutions in addition to efforts to improve energy efficiency and speed the transition to renewable energy.

Yet so far, the international science and policy communities have been slow to embrace terrestrial climate action. Some fear that investments in land use will not produce "real" climate benefits, or that land use action would distract attention from investment in energy alternatives. There is also a concern that land management changes cannot be implemented quickly enough and at a scale that would make a difference to the climate.



What are the messages about agriculture and climate change in this report cover?

This excerpt is from the Worldwatch Institute's "Mission" Web page:

Mission
Worldwatch Institute delivers the insights and ideas that empower decision makers to create an environmentally sustainable society that meets human needs. Worldwatch focuses on the 21st-century challenges of climate change, resource degradation, population growth, and poverty by developing and disseminating solid data and innovative strategies for achieving a sustainable society.

History
Founded in 1974 by farmer and economist Lester Brown, Worldwatch was the first independent research institute devoted to the analysis of global environmental concerns. Worldwatch quickly became recognized by opinion leaders around the world for its accessible, fact-based analysis of critical global issues. Now under the leadership of population expert and author Robert Engelman, Worldwatch develops innovative solutions to intractable problems, emphasizing a blend of government leadership, private sector enterprise, and citizen action that can make a sustainable future a reality.

Student Worksheet: Document 3 (Worldwatch)

NAME _____ **DATE** _____

Document 3: Web pages from *Worldwatch.org*

Provide two messages from the "Mitigating Climate Change Through Food and Land Use" summary regarding how farming contributes to climate change. For each message, quote evidence from the text to support your answer.

Message:
Evidence:

Message:
Evidence:

List three ideas from the text about how farming practices can help to moderate climate change.

1._____

2._____

3._____

Read the text from the Worldwatch Institute's "Mission" Web page and explain how the Worldwatch Institute's proposals dealing with climate change reflect their organizational mission.

Student Worksheet: Video Clips

NAME _____ **DATE** _____

Video Analysis: Access the videos in the *Student Materials* section on the Project Look Sharp homepage, www.projectlooksharp.org.

Video Clip Title:

_____

What agricultural research or farming practices are noted that might help mitigate the impacts of climate change?

What techniques does the video producer use to communicate these messages?

Class Presentations: Video Clips

Use the space below to note information on the best models for agricultural adaptation to climate change and the best approaches to communicating these models to the public.

Video Clip Title:

Notes:

Video Clip Title:

Notes:

Video Clip Title:

Notes:

Video Clip Title:

Notes:

Video Clip Title:

Notes:

Lesson 21: Bioregional Economy

LESSON PLAN

Bioregional Economy


Printed Documents


PowerPoint Slideshow

Lesson Objectives:

- Students will understand the concept of a bioregion, the concept of just and sustainable economic development and the integral connection between development, justice, and bioregions.
- Students will research natural resource enterprises within the Finger Lakes (e.g. value-added farm products, small farm produce, non-timber forest products, agri-tourism).
- Students will evaluate and present examples of sustainable economic development within the Finger Lakes region that use and support the particular natural capacities of the region and the employment needs of its residents.
- Students will identify essential qualities for sustainable economic development.

Vocabulary:

agri-tourism, bioregion, Building Bridges, commodity, community supported agriculture (CSA), ecoregion, forest product, Haudenosaunee (Iroquois) confederacy, high tunnel agriculture, National Agricultural Biotechnology Council, natural resource enterprise, relocalized food system, Southern Tier Regional Economic Development Council, value-added product, worker cooperative

Media: various (student-selected)

Materials Needed:

- Five-page *Teacher Guide*
- Four-page *Student Reading: Bioregional Economy*
- One-page *Student Handout: Presentation*
- One-page *Student Handout: Reflection Paper*
- 14 slide PowerPoint slideshow (Access online or via Lesson 21 digital media folder)

Time: 90+ minutes, depending on time for in-class reading, research, and presentations

[NOTE: Teachers may want to coordinate with library or technical support staff for in-class lab research time or assistance.]

Lesson Procedures

- Present the *Lesson Introduction* to the class.
- Brainstorm what the terms "bioregional economy," "just and sustainable economic development" and "natural resource enterprises" mean.
- Distribute and have students read the *Student Reading: Bioregional Economy*.
- Distribute and go over the *Student Handout: Presentation*.
- Show the sample PowerPoint presentation.
- Have students choose the natural resource enterprise that they will research.
- Direct students to research and evaluate examples for just and sustainable economic development within their chosen natural resource enterprise in the Finger Lakes region. Students will assess the effectiveness of these examples in sustaining human and environmental systems.
- Have each student present their findings to the class using media documents produced by the enterprises they have chosen.
- Lead a discussion on the ways in which media messages and language choices deepen or confuse our understanding of complex economic questions.
- Go over the *Student Handout: Reflection Paper*. Have students write a reflection paper on: **What are the essential qualities required for sustainable economic development of natural resource enterprises within the Finger Lakes bioregion?**
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Bioregional Economy

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

We often think about economy as it relates to statistics – gross domestic product, quarterly earnings, unemployment figures, etc. The word "economy" comes from the Greek words for "house" (oikos) and "manage" (nemo). This lesson asks you to look at economy from the sense of home, place, or where one lives in the world - one's bioregion. It asks you to think about what is required to "manage one's house" in the original Greek sense of "economy," while taking into account the long-term well-being of humans and other species that live within that house. You will be asked to study business enterprise models related to the natural resources or assets of the Finger Lakes. Then, you will draw your own conclusions about how best to design a just and sustainable economy rooted in this bioregion.

3. Brainstorm what the terms "bioregional economy," "just and sustainable economic development" and "natural resource enterprises" mean. If students are unfamiliar with these phrases, you might break them down into individual words and establish definitions on the prefix and suffix level. For instance, you might write "bio" and ask what that prefix refers to and then do the same with "region" before putting the components together to arrive at a collective consensus about the meaning of "bioregional economy" (e.g., living-place-house-manage).

   [NOTE: These terms are defined with specific examples for students on the first page of the* Student Reading.*]

Definitions

Bioregional economy: a "natural" unit that describes the self-sustaining capacity of a region by its ecologically-based boundaries and by its patterns of cultural heritage and settlement

Just and sustainable economic development: economic development that values short- and long-term community well-being as its driven goal, rather than production, consumption and profit; the "community" served by this economic development encompasses all people, including traditionally marginalized populations, as well as non-human species

Natural resources enterprises: businesses that function by using the natural resources available in a specific area; these businesses may manufacture, harvest, process, package, and market land-based or water-based resources

4. Distribute and have students read the *Student Reading: Bioregional Economy* either as an in-class assignment or for homework.

5. Lead a brief discussion about the reading. Sample probe questions include:
   - **Given the various ways we understand the word "bioregion," which definitions seem clearest to you?**
   - **What did you learn about the history of natural resource enterprises in the Finger Lakes that you did not know before?**
   - **Which of the strategies for bioregional economy were you familiar with and which were you not familiar with?**
   - **What would you like to know more about following the reading?**

6. Distribute and go over the *Student Handout: Presentation*.

7. Present the sample PowerPoint presentation on culinary oil enterprises in the Finger Lakes. The PowerPoint demonstrates the required key points as described in the *Student Handout: Presentation*. Explain that students should be ready to provide more detail than the example, especially regarding historical background, effectiveness and media analysis.

   [NOTE: The last slide of the PowerPoint features the list of natural resources enterprises and example products, which helps students review and brainstorm research topics.]

8. Help students decide which natural resource enterprise to choose for their study. You might want to list, chart, or diagram types of enterprises as you brainstorm possible enterprises. Point out that examples can be found on the first page of the *Student Reading*.

Value-added agricultural products	**Extended season cropping**	**Small farming production**	**Agri-tourism businesses**	**Non-timber forest products**
wine	raspberries	restaurants	winery tours/bed and breakfasts	mushrooms
cheese	tomatoes	farmers' markets	corn mazes	walnuts
jam	peppers	CSAs	you-picks	blueberries
salsa	cucumbers		cider making	medicinal herbs
pesto			farmers' markets	
yogurt				

8. Determine whether students will work on their presentations individually or in groups. Have students research and evaluate examples for just and sustainable economic development within their chosen natural resource enterprise in the Finger Lakes.

   [NOTE: Be prepared to help students locate online information about natural resource enterprises. You may want to encourage students to seek help from librarians and media center specialists for the research portion of this lesson.]

   Encourage students to include concerns related to justice and inclusion as well as environmental protection. Research questions might include:
   - **What are the working conditions and wages of the workers in this enterprise?**
   - **Do leaders of this enterprise represent different racial and ethnic backgrounds?**
   - **What practices does the enterprise employ to assure that the soil or forest will thrive, regenerate itself and be available for future productivity?**

9. Have each student or group present their findings to the class using the specifications on the *Student Handout: Presentation*.

10. After all the presentations, lead a discussion on the ways in which media messages and language choices deepen or confuse our understanding of complex economic questions. Probe questions include:
    - **Which enterprise-produced documents were especially helpful in communicating complex ideas about environmental protection and social equity?**
    - **Which documents made these ideas more difficult to comprehend?**
    - **What are the various purposes of the documents you have seen in the presentations?**
    - **In discussing just and sustainable development, which words might you choose and why: resource or asset, industry or enterprise?**

    [NOTE: Teachers may want to reference* Key Questions to Ask When Analyzing Media Messages *in the* Resources *section of this curriculum to help students decode their media documents.]

11. Review the *Student Handout: Reflection Paper*. Have students write a reflection paper on the following question:
    What are the essential qualities required for sustainable economic development of natural resource enterprises within the Finger Lakes bioregion?

FURTHER QUESTIONS

Analyzing Media Messages

Who might benefit from and who might be harmed by the media documents you have seen in the class presentations? Explain.

Which message most interested you and what kind of actions might you take in response to that message?

Which message most disturbed you and what did you learn about yourself from your interpretation?

Self Reflection

What natural resource enterprises have you participated in?

Which new natural resource enterprises would you like to participate in?

How would you describe the bioregion to which you belong?

What are some improvements that you might suggest for the natural resource enterprises within your bioregion?

Underlying Values and Motives

How can indigenous knowledge about living within a specific region help us develop a just and sustainable bioregional economy in the 21st century?

How can job creation based on economic equity and ecological sustainability become a viable economic development strategy?

In what ways is our commodity-based agricultural system impacted by the reality of climate change? Peak oil? Economic inequality?

How has the practice of "economic development" gone hand in hand with resource depletion? Is it possible to imagine a type of economic stability that is not based on resource depletion?

The Southern Tier of the Finger Lakes region lies above Marcellus shale deposits and is covered with forested hills. **How will these hills be used in a bioregional economy? Should they be a resource for extracting natural gas from hydrofracking wells? Should they be used for managed firewood harvests for home heating? Should they be allowed to remain as forested sanctuaries for carbon sequestration and biodiversity?**

EXTENDED ACTIVITIES

Select a pre-21st century natural resource enterprise to study. Create a presentation (PowerPoint, poster, video, etc.) that will communicate messages about how this historic enterprise might inform our current efforts toward developing sustainable bioregional economies.

Trace how the historic wealth in your area is connected to the success of natural resource enterprises. For example, use county historical society records to research the former owners of grand old homes in your town to see how their original builders and owners made their money. How many of the 19th century fortunes in your county were made from natural resource enterprises? How many in the 20th century?

Visit your area historical museum to find out what agricultural or home economics inventions were discovered in your region. In particular, consider inventions that assisted in the growing, harvesting or preserving of food. Explore media representations of these inventions. Make your own media message (blog, YouTube video, Facebook page, etc.) informing others about this part of your bioregional heritage.

Stage a debate about the concept of growth and "green development." Have debate teams take on propositions supporting zero growth economics as well as steady growth economics.

Interview members of your bioregion who take different positions on bioregional economy. Ask them how they plan to work with others who have different views and values on these issues.

Use the "Building Bridges" Web page of the Dorothy Cotton Institute to begin a discussion in your community about ways in which "equity (can become) the preferred driver of both economic development and ecological sustainability, and prioritizes jobs for low-income people both in the city and in rural towns" ("About 'Building Bridges'").

http://www.dorothycottoninstitute.org/learn/about-building-bridges/

CONNECTIONS

L6, 7, 9, 10, 16, 17, 19, 20, 21, 25, 26
(local food)

L6, 7, 10, 15, 16, 17, 19, 20, 21, 25
(organic & conventional farming)

L6, 7, 9, 19, 20, 21, 25
(urban agriculture)

L 6, 7, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26
(food security)

L6, 7, 10, 12, 14, 15, 16, 21, 26
(agrarian cultures)

L7, 8, 10, 12, 15, 16, 17, 18, 21, 25
(work & labor)

L6, 7, 13, 14, 17, 18, 19, 21
(advertising)

Bioregional Economy

What is a bioregion?

Kirkpatrick Sale, author of *Dwellers in the Land: The Bioregional Vision,* defines the word "bioregion" as:

> The natural region is the bioregion...It is any part of the earth's surface whose rough boundaries are determined by natural characteristics rather than human dictates, distinguishable from other areas by particular attributes of flora, fauna, water, climate, soils, and landforms, and by the human settlements and cultures those attributes have given rise to. The borders between such areas are usually not rigid—nature works of course with flexibility and fluidity—but the general contours of the regions themselves are not hard to identify by using a little ecological knowledge (55).

The Finger Lakes bioregion, as Sale suggests, has fluid boundaries. One might define it by its various watersheds (Oneida, Chenango, Seneca, etc.), most of which eventually drain into Lake Ontario. It can also be delineated by the native nations of the Haudenosaunee (Iroquois) confederacy, including the Cayuga, Onondaga and Seneca, who have inhabited this area for many centuries. The federal Environmental Protection Agency defines natural regions as ecoregions. Finger Lakes ecoregions include the Finger Lakes uplands and gorges, the glaciated low Allegheny plateau, the Ontario lowlands and the Erie Ontario Lake Plain. Northern Arizona University's regional map of North America's place-based food traditions locates the Finger Lakes within wild rice nation and maple syrup nation ("Renewing America's Food Traditions"). Whether defined by waterways, indigenous cultures, ecoregions or food traditions, the Finger Lakes bioregion is rich in human and natural resources and makes up a complex and dynamic living system.

What are Natural Resource Enterprises?

According to the National Association of State Development Agencies, a natural resource enterprise is "a business endeavor engaged in producing, harvesting, manufacturing, processing, storing, packaging or marketing agricultural, forestry, fishing or related goods" (273). Some of the natural resource enterprises at work in the Finger Lakes region include:

- **Value-added agricultural products** such as wine, cheese, jam, salsa, pesto, yogurt and culinary oil;
- **Extended season cropping** using high tunnels for fruit and vegetable crops such as tomatoes, raspberries, peppers and cucumbers;
- **Small farming production** for local-food restaurants, farmers markets and community supported agriculture (CSAs);
- **Agri-tourism businesses** including winery bed-and-breakfasts, you-picks and cider-making operations;
- **Non-timber forest products** such as maple syrup, mushrooms, walnuts, blueberries and medicinal herbs.

Finger Lakes Natural Resource Enterprise History

Prior to European settlement, the Haudenosaunee (Iroquois) peoples developed natural resource enterprises that allowed for the sustainable supply of food and trade goods with other native nations. They provided food security for their people with local Finger Lakes foods, including agricultural production based on the three sisters (corns, beans and squash), hunting (deer, rabbit, and beaver), fishing (salmon, trout and eel) and harvest of forest products (mushrooms, berries and nuts). Their "value-added" products included corn husk baskets, succotash stew, cornbread and tools fashioned from deer antlers (NMAI 10-11).

The Haudenosaunee calendar revolved around celebrating the natural resource rhythms of the year, with festivals devoted to maple syrup tapping, strawberry picking, green corn ripening and harvests. At each festival, thanks would be given for the great gift of the natural world bounty that sustains all life.

> **From the Haudenosaunee Thanksgiving Address:**
> With one mind, we turn to honor and thank all the Plant Foods we harvest from the garden. Since the beginning of time, the grains, vegetables, beans, and berries have helped the people survive. Many other living things draw strength from them, too. We gather all the Plant Foods together as one and send them a greeting of thanks. Now our minds are one.
> (NMAI 10).

A visit to a Finger Lakes farmer's market in the 21st century provides opportunities to use dollars to trade for some of the very same items that the Haudenosaunee offered in trade five hundred years earlier. And today Iroquois people continue to reclaim and develop natural resource enterprises to support their enduring cultures.

When the French and English arrived in the Finger Lakes in the 16th century, Iroquois hunters traded the furs of beaver and otter for axes, cooking pots, wool and guns. Natural resource enterprises began to move

from an exchange that remained mostly in the Finger Lakes to a new position within a transnational and a trans-Atlantic commodity market. Items produced from natural resources within the Finger Lakes, such as beaver hats, became products in the streets of London and Paris. Conversely, wool and glass beads produced in Britain became part of the raised beadwork and high collars on Iroquois clothing. What was gained and what was lost in this exchange became a matter of discussion on both sides of the Atlantic.

Frontier Self-Sufficiency

Between the 18th and 21st centuries, natural resource enterprises in the Finger Lakes once again transformed, moving from a local and regional supply web to a national and international commodity. Historian Elmer Otterbein Fippin wrote about the original, self-sufficient local market for farm produce in New York state in his 1921 book, *Rural New York*:

> In the pioneer days in America, a large part of the manufacturing was thus undertaken on the farm and in the home. Not only simple food products and preserves were made there, but the cloth for the family wardrobe was manufactured from the wool and flax grown on the farm which was carded, spun into yarn and woven, colored and made up in the home. The corn and wheat were ground in the farm mill, which was frequently a custom mill. Lumber was taken from the farm woodlot and sawed in the neighborhood mill for the buildings. The rural family, and especially the rural community, was largely self-sufficient in the manufacture of the things by its members (271).

Following the Beans to Market

To follow this transition from self-sufficiency to international commodity over centuries, we can look at one natural resource enterprise that has had a rich and complicated history in the Finger Lakes region: beans. According to the Agricultural Marketing Resource Center, the commercial, dry edible bean industry started in the mid-1800s in New York state (Schumacher, Boland, and Huntrods). At the time, beans were a good item for food security in the winter pantry of any home due to their long shelf life and flexible preparation options. Dried beans could add protein nourishment to any stew, soup or baked bean recipe. They also traveled well in large bags by coach, the main way that produce was transported in the early 19th century.

Things began to change for the Finger Lakes bean market with the advent of the Erie Canal in the 1830s and the transcontinental railroad shortly thereafter. These new transport channels meant that other producers could compete for markets that previously were mostly local. By the first decades of the 20th century, New York had lost its dominance within the bean market. In 1921 Elmer O. Fippin reported:

> Both dry beans and green peas are important crops and are grown in the Finger Lakes region of Western New York. In the production of beans New York is third, with an acreage of 116,000. Michigan and California lead with three-fourths of the total for the country, New York being the only other state with more than 100,000 acres. (165)

Technology to the Rescue

In the years after the Civil War, the Finger Lakes region was home to several experiments in food preservation. One of the most successful experiments was a small canning business started by Simeon and Edgar Curtice in their Rochester grocery store. Their goal was to find a way to preserve and market the surplus fruit and vegetables that they could not sell in their store. In 1900, C.F. Burns in Alton, NY began packing dried apples and beans for sale. These two firms were among many small Finger Lakes enterprises that were able to use the new technology of canning to extend the reach of their fruit and vegetable operations ("Birds Eye Foods, Inc."). This capacity became especially lucrative during World War II as the US government signed contracts with many small canning companies in upstate New York to provide food for troops fighting overseas (Pro-Fac Cooperative).

Once the war contracts ended, it was difficult for these small operations to turn a profit and many companies failed. The Curitice and Burns companies were able to survive by merging with one another. In 1961, the growers who supplied Curitice-Burns with fruits and vegetables formed a new cooperative that they called Pro-Fac, short for producers and facilities because the cooperative not only supplied raw materials, but also owned the production facilities (Pro-Fac Cooperative).

Pro-Fac grew rapidly and eventually acquired Birds Eye, a business founded by Clarence Birdseye (also a New Yorker). Birdseye witnessed Eskimos using ice, wind and temperature to freeze fresh fish; subsequently, he used similar techniques to preserve

fruits and vegetable through a flash freeze method (Birds Eye). Curitice-Burns and Birds Eye became so profitable that they were targeted by larger companies bidding to purchase their company.

By 2012, Pro-Fac moved toward liquidation after selling its interest in Birds Eye Foods to Pinnacle Foods and distributing its stock to its members. (ProFac Cooperative). As had happened four centuries before with the Haudenosaunee, a small, regionally-based natural resource enterprise of growing and selling beans became successful enough to trade on the national and then international market. Eventually, it was overtaken by the demands of an ever-expanding commodity market and was no longer based in the Finger Lakes region where it originated.

What is a Sustainable Bioregional Economy?

This question must be answered in the 21st century if the Finger Lakes is to thrive once again as a region containing a wealth of natural and human resources. Advocates will come up with different answers to this question based on the primary values they bring to their work. For example, advocates who focus on environmental issues are often concerned with topics such as climate change, peak oil, resource depletion and soil conservation. Advocates focused on social equity will center their work on food security, creating jobs for all and ensuring affordable, sustainably grown local foods are easily available in all homes and neighborhoods. Advocates who concern themselves with free market solutions focus more on profit, productivity and scalability, which often leads to large monocrop operations that can be marketed in as wide a geographic range as possible.

Is it possible to create a just and sustainable bioregional economy that takes all of these perspectives into account? The following are some of the arguments from Finger Lakes groups and individuals who are working to answer these key questions.

Business Can Lead the Way

In 2011, the Regional Economic Development Council of the Southern Tier released its *Strategic Economic Development Plan: 2011-2016*. The plan highlighted the role of business and university research in developing natural resource industries in the region:

> The Southern Tier is rich in natural resources and agricultural expertise. The region's abundant land, water, quality soil and agricultural entrepreneurism have historically enabled thriving agri-businesses and agricultural scientific innovation…Agricultural economic development can be achieved through product development, business infrastructure development and the use of new technology. Start-up farm operations, value-added processing and marketing, and new product development can all contribute to new job creation in the rural economy and in the small communities of the Southern Tier. (Regional Economic Development 16, 90)

Agri-Tourism is the Answer

Life in the Finger Lakes is a magazine that **"**re-introduces its readers to this special New York State region each passing season" through articles celebrating agricultural tourism (*Life in the Finger Lakes)*. "Reaping the Harvest," an article written by Peggy Haine, focuses on how to enjoy harvests in the Finger Lakes:

> There are also plenty of opportunities to reap the benefits of harvest, free of hard labor and uncertainties, and to enjoy the technicolor displays, and experience the hospitality of small-town New York on a smaller scale. Along nearly any highway you'll find farm stands offering just-picked fruits and vegetables, amber honey and maple syrup, and eggs still chicken warm…And, while you're at it, don't miss stopping at Finger Lakes wineries. At last count there were over 60, with a few new ones popping up every year. At harvest festivals in places like Hunt Country Vineyards in Branch-port, and Casa Larga Vineyards in Fairport, you actually get to stomp grapes. Could there be a better way to celebrate the harvest? (Haine)

Produce Food in Local Agrarian Villages

Binghamton citizen Karl North describes himself as "a student, a farmer, a business owner, and a teacher" on the homepage of his website (North). In his series on "Visioning County Food Production," he concluded with the following analysis:

> Three types of area agriculture (are) needed to sustain a county population of 100,000: urban, peri-urban, and rural. Of these, rural agricultural systems will be of primary importance. Urban and peri-urban gardens can provide quantities of fresh vegetables and fruits, but only rural farms have the space to grow enough of the

starchy staples like potatoes, grains, beans, and rice that have historically supported urban population densities. Moreover, only rural farms can supply enough of the materials like oils, fibers, and wood that are basic necessities in our cold climate. Agrarian villages, not the urban center, will again become the heart of a relocalized county food system in the coming years (North, "Part Six: Rural Agriculture").

Worker Cooperatives Create a Just Economy

Cooperative organizer Joe Maraffino and Sustainable Tompkins president Gay Nicholson articulated their thoughts on the nature of a sustainable bioregional economy in the article, "Worker Cooperatives Can Revitalize Our Economy" in the *Tompkins County Weekly*:

> Leaders in the sustainability movement believe that the most promising economic development strategy available may be a focus on economic justice. This would reduce poverty and increase tax revenues, strengthen democracy and the sense of a shared future, reduce the tax burden for social services, and increase support for investments in education and public infrastructure. All of these are part of a viable and sustainable local economy…South of Rochester, one of the oldest worker cooperatives in the country, the 35-year-old, and $18 million per year food processor Once Again Nut Butter has grown and created jobs despite regional closures and layoffs. (Marraffino and Nicholson)

Sustainable Human Rights & Ecojustice Values

Participants in the Building Bridges workshops presented the key concerns for a sustainable future based on equity, environment and economy in their "New Vision Statement for a Socially Just and Ecologically Sound Local Economy in the Tompkins County Region:"

> Our economy supports the well-being of everyone who lives or works in Tompkins County including previously marginalized communities and individuals. This means:
> - We have full employment at a wage that sustains a high quality of life.
> - Our workforce development and preparation systems are efficient, effective and ensure that everyone who wants to work will find a job.
> - We invest our money locally and support local businesses and entrepreneurs.
> - Local money and skills are used to the degree possible.
> - Housing is affordable, safe, and energy efficient. (The Dorothy Cotton Institute)

Federal Funding for BioTech Research

In 2007, the Cornell University-based National Agricultural Biotechnology Council (NABC) issued *Agriculture and Forestry for Energy, Chemicals and Materials: The Road Forwar*d for developing value-added products. Chairperson Anthony M. Shelton and President Ralph W.F. Hardy describe the council's hope for "opportunities for agriculture and forestry to be the basis for a hybrid bio-/petro-based economy with 100+ billion gallons of transportation fuel and value-added chemicals and materials produced from domestic biomass, and a structure for attainment" (qtd. in National Agricultural Biotechnology Council).

On its website, NABC urges public funding:

> …to expeditiously bring these benefits to human healthcare, we need a structure that integrates food and agricultural research as a full partner in the national health-research mission. Current national funding for research on food and agriculture must be expanded substantially to ensure timely delivery of preventive benefits. This investment is justifiable in terms of the cost savings that will result from disease prevention. A 10% cost reduction would save over $200 billion every year ("Food and Agricultural Research").

Which Strategy Will You Choose?

The path to a just and sustainable bioregional economy is uncertain. Will it be based in business models, agri-tourism, relocalized food production, worker cooperatives, human rights and ecojustice values or the federal funding of biotechnology research? Will the path include elements from these categories or will it strike out on new terrain altogether? How will plans deal with the critical issues of environment, equity and growth? These are the questions to which you are invited to respond in this lesson on envisioning an enduring economy based on the natural resource enterprises of the Finger Lakes bioregion.

Student Handout: Presentation

RESEARCH

Research and evaluate examples of sustainable economic development within one natural resource enterprise in the Finger Lakes region. For a definition of "natural resource enterprise" and examples of businesses, review the first page of the *Student Reading*.

Which natural resource enterprise will you focus on?

_____

The first research component of this project asks you to provide a historical background on your natural resource enterprise. Next, you will analyze at least two specific examples of businesses that fit your natural resource enterprise in the Finger Lakes. Additionally, you will identify and analyze at least one media document per specific example. Finally, you will assess the overall effectiveness of the natural resource enterprise in the Finger Lakes through your business examples. As you research your enterprise, be sure to document where you found your information.

RESEARCH CHECKLIST

- ❒ Provide **historical information** about your natural resource enterprise in the Finger Lakes
- ❒ Profile **at least two specific examples** of your enterprise in the Finger Lakes
- ❒ Select **one or more media documents created by each of your examples** (Web pages, videos, flyers, or advertisements on television, online, or in print)
- ❒ **Assess the effectiveness of your natural resource enterprise** in supporting the natural capacities and the employment needs of the Finger Lakes region
- ❒ **Discuss any flaws** within this enterprise using evidence from your specific examples
- ❒ **Create an MLA Works Cited page** recording your research sources and media documents.

PRESENTATION

You will create an in-class presentation based on your research. Choose a presentation medium that will inform and interest your audience. Consider the media documents for your examples when you design your presentation (PowerPoint, handouts, Prezi, blog, etc.).

Your presentation should include (in any order):

- Historical background of your natural resource enterprise
- Examples of the enterprise
- Media document analysis for each example of the enterprise
- Assessment of the natural resource enterprise's effectiveness
- MLA Works Cited page

Student Handout: Reflection Paper

Use the information you have gathered through your own research and the other in-class presentations concerning bioregional economy in the Finger Lakes to write a **reflection paper** on the following question:

What are the essential qualities required for sustainable economic development of natural resource enterprises within the Finger Lakes bioregion?

In your essay:

- Define the term "natural resource enterprise"
- Define the term "economic development"
- Describe **at least three essential qualities** for sustainable economic development within the Finger Lakes
- Consider how your three qualities **meet environmental concerns** (such as climate change, peak oil, resource depletion, soil conservation)
- Consider how your three qualities **meet concerns about equity** (such as food security, living wages jobs, worker safety, equal access to resources)
- Reflect on how your research may have affected your personal worldview and values regarding participation in your local economy

Lesson 22: Watershed Stakeholders

LESSON PLAN

Watershed Stakeholders


Video Clips


PowerPoint Slideshow


Printed Documents

Lesson Objectives:

- Students will understand the importance of watersheds in the Finger Lakes region.
- Students will analyze the role of maps in conveying stakeholder interests in watersheds.
- Students will identify the purpose and target audience for diverse media documents.
- Students will identify the impacts of different stakeholders on surrounding watersheds.
- Students will articulate their individual roles as watershed stakeholders.

Vocabulary:
Erie canal, evaporation, hydrofracking, hydrologic cycle, infiltration, irrigation, Marcellus shale, microclimate, precipitation, runoff, slickwater process, stakeholder, surface flow, transpiration, underground flow, uptake, watershed

Media: educational online videos, maps, government publication, newsletter article, newspaper article, website article

Materials Needed:
Activity 1
- Four-page *Teacher Guide: Activity 1*
- Two-page *Student Worksheet: The Hydrologic Cycle*
- Three video clips (Access online or via Lesson 22 digital media folder)

Activity 2
- Fourteen-page *Teacher Guide: Activity 2*
- Two-page *Student Reading: Watershed Protection in the New Millennium*
- One-page *Student Worksheet*: *Watershed Protection in the New Millennium*
- Four-page *Student Reading: Stakeholders in the Watershed*
- Two-page *Student Worksheet*: *Stakeholders in the Watershed*
- Two-page *Student Assessment*: *You as a Stakeholder*
- Nine slide PowerPoint slideshow (Access online or via Lesson 22 digital media folder)

Time: Activity 1: 50 minutes
Activity 2: 60 minutes, not including time for reading and writing

Lesson Procedures

Activity 1

- Present the *Lesson Introduction* to the class.
- Distribute *Student Worksheet: The Hydrologic Cycle*.
- Play each video clip, pausing after each clip to allow students to fill out the corresponding portion of their worksheet.
- After students have logged their responses for each video clip, lead a discussion about target audience, the impact of sounds and graphics, and purpose for each media message.

Activity 2

- Present the *Activity 2 Introduction* to the class.
- Distribute the *Student Reading: Watershed Protection in the New Millennium* and the *Student Worksheet: Watershed Protection in the New Millennium*. Have students complete the reading and worksheet.
- Facilitate a discussion about stakeholder involvement in watershed management.
- Project the eight PowerPoint slides of historical and current maps illustrating examples of watershed stakeholder interests. Use the *Media Sample Questions & Answers* in the *Teacher Guide* to probe for how the maps show stakeholders interests in watershed.
- Distribute the four-page *Student Reading: Stakeholders in the Watershed*, which includes four separate text excerpts. Distribute the two-page *Student Worksheet: Stakeholders in the Watershed*. Have students complete the readings and accompanying worksheet.
- Discuss stakeholder interests and their impact on watershed quality using the *Media Sample Questions & Answers* in the *Teacher Guide*.
- Distribute and review the *Student Assessment: My Role as a Stakeholder*.
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Watershed Stakeholders, Activity 1

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

The hydrologic cycle and watersheds support our lives, yet often we are unaware of our place within them. This lesson will introduce you to the concept of watersheds and their importance in the Finger Lakes. You will analyze videos, maps, and text excerpts to understand reasons why stakeholders are interested in watersheds and the effects that stakeholders can have on their watersheds. You will also consider how media producers consider target audience and purpose as they construct media messages. By the end of the lesson, you will be able to articulate your personal role as a watershed stakeholder.

3. Distribute *Student Worksheet: The Hydrologic Cycle*. Explain that students will watch three videos related to the hydrologic, or water cycle, made by Ithaca-based Finger Lakes filmmakers Philip Wilde and Ann Michel. These videos were made about similar themes, but were constructed in unique ways and for different purposes in order to communicate with particular audiences. Explain that they will have time after viewing each video to fill in the corresponding part on the worksheet.

4. Play Video Clip 1: "The Hydrologic Cycle without Sound or Graphics" and give students time to respond to the two questions on the first page of their worksheets.

5. Review the first two questions on the first page of the worksheet using the *Media Sample Questions & Answers* on the following page of the *Teacher Guide*.

Video Clip 1

"The Hydrologic Cycle without Sound or Graphics,"
2:39 min.
November 6, 2011
The WorldWide Hydrologic Cycle Project

Media Sample Questions & Answers

1) Who do you think the target audience might have been for this video production?

Answer: C
It was made for a multi-lingual and cross-cultural audience.

What is your evidence?

Evidence: The lack of graphics and sound encourages people to translate this video into any language and any musical style.

[NOTE: Encourage students to speculate about possible target audiences, making clear that it is likely that all four of the possible audiences listed on the worksheet might appreciate this film.]

2) Draw a complete diagram of the hydrologic cycle based on what you learned from the video. Be as specific as possible.

Possible Answers: Ask for volunteers to share their diagrams. If possible, project the volunteers' diagrams for the whole class to see.

What processes did you identify in your diagram and what did you name them?

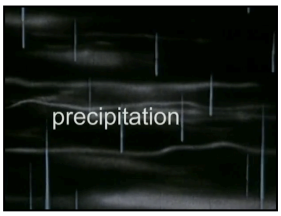
Possible Answers: Encourage students to describe their diagrams. Answers include: ***precipitation*, rain, runoff, flow, transpiration, evaporation**.

6. Play Video Clip 2: "The Hydrologic Cycle." Explain that this is a version of the video they have just seen, but this time including soundtrack and graphics. Ask students to make particular note of new impressions that come across with these added elements. Give the students time after playing the video to respond to questions 3-5 on page two of their worksheets.

7. Review questions 3-5 using the *Media Sample Questions & Answers* in the *Teacher Guide*. Probe questions to deepen understanding are also included for question 5.

Video Clip 2

"The Hydrologic Cycle"
2:37 min.
November 5, 2011
The WorldWide Hydrologic Cycle Project



Media Sample Questions & Answers

3) After watching the video for a second time with audio and graphics, add any new information your hydrologic cycle diagram on the first page of this worksheet.

Possible Answers: Answers will vary. Ask students to share new information that they added to their diagrams after viewing the second video. Vocabulary from the video includes: ***precipitation***, ***runoff***, ***surface flow***, ***infiltration***, ***underground flow***, ***uptake***, ***transpiration*** and ***evaporation***.

4) The soundtrack includes narration, music and sound effects. List or describe specific phrases, instruments and sounds that you remember hearing.

Possible Answers:
Phrases: "Son, time to join the hydrologic cycle."
"See, son, that's the hydrologic cycle."

Instruments: harp, timpani (drums), bassoon (wind instrument), strings

Sounds: lightning strike, splash, shout, crashing wave, flowing water, sucking, sizzling

5) In what ways is your experience of the video changed by the addition of a soundtrack?

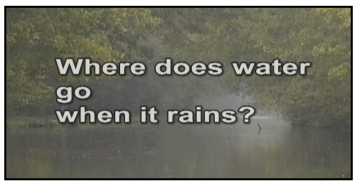
Possible Answers: Answers will vary. Encourage students to think about the impact of sound in audiovisual recordings.
Probe questions include:

- **How do instrumentation, sound effects and narration impact emotion?**
- **How do instrumentation, sound effects and narration impact physical sensation?**
- **How do instrumentation, sound effects and narration impact understanding?**
- **Do you think the video might be more appealing to the multi-language and cross cultural target audience with the addition of sound and graphics?**

8. Play Video Clip 3: "Where Does Water Go When it Rains?" Explain that this video uses elements from the first video, but was made for a different purpose and target audience. Ask students to consider the purpose of this video and its message to watershed stakeholders. After playing the clip, give students time to respond to Questions 6 and 7 on their worksheets.

9. Review Questions 6 and 7 using the *Media Sample Questions & Answers* in the *Teacher Guide*.

Video Clip 3



"Where Does Water Go When it Rains?"
3:57 min.
July 10, 2010
Consortium of Universities for the Advancement of Hydrologic Science

Media Sample Questions & Answers

6) What do you think the purpose might have been for this video production?

What is your evidence?

Answer: B
It was made to explain the need for environmental observatories to the general public.

Evidence: Encourage students to speculate about why they selected the purpose they did. The video covers basic concepts, such as the water cycle and watershed systems that help explain to the public why environmental observatories are necessary. The focus on measurement of water flow rates and the capacity for these measurements to help plan human activities suggests that weather stations provide information that is essential for communities to manage watershed resources.

7) According to the video, who lives in a watershed? What does this message say about why watershed awareness is important?

Possible Answers: Everyone lives in a watershed. The narrator suggests that watershed awareness is important as a means to better understand:

- the potential of flooding or landslides from tree harvest and land development,
- whether different patterns of development can reduce environmental risk,
- how agriculture and construction might impact water quality.

10. Explain that in *Activity 2*, students will use their knowledge of the hydrologic cycle to analyze the roles of community members in the Finger Lakes area.

Student Worksheet: The Hydrologic Cycle

NAME _____ **DATE** _____

Video Clip 1: "The Hydrologic Cycle without Sound or Graphics"

1) Who do you think the target audience might have been for this video production?
   a) It was made for preschool children.
   b) It was made for people who cannot read.
   c) It was made for a multi-lingual and cross-cultural audience.
   d) It was made for general theater-going audience for a Walt Disney Studio film.

   What is your evidence?

2) Draw a complete diagram of the hydrologic cycle based on what you learned from the video. Be as specific as possible.

Video Clip 2: "The Hydrologic Cycle"

3) After watching the video for a second time with audio and graphics, add any new information your hydrologic cycle diagram on the first page of this worksheet.

4) The soundtrack includes narration, music and sound effects. List or describe specific phrases, instruments and sounds that you remember hearing.

   Phrases:

   Instruments:

   Sounds:

5) In what ways is your experience of the video changed by the addition of a soundtrack?

Video Clip 3: "Where Does Water Go When it Rains?"

6) What do you think the purpose might have been for this video production?
   a) It was made to teach fundamental hydrology to university earth science classes.
   b) It was made to explain the need for environmental observatories to the general public.
   c) It was made as an advertisement for the water company sponsors of a television science program.
   d) It was made to introduce hydrology to middle school general science classes.

   What is your evidence?

7) According to the video, who lives in a watershed? What does this message say about why watershed awareness is important?

TEACHER GUIDE

Watershed Stakeholders, Activity 2

1. Organize and make copies for the class activities.

2. Write the phrase "watershed stakeholder" on the board lead the class in a discussion on what the phrase might mean. Give a few examples of who might be watershed stakeholders (wine makers, agriculturalists, tourists and industries supporting Finger Lakes tourism, etc.).

3. After the class has brainstormed a working definition of "watershed stakeholder," introduce Activity 2:

Activity 2 Introduction

In this activity, you will read and answer questions about a short excerpt from the introductory section of a 2001 guide published by the US Environmental Protection Agency entitled, *Getting in Step: Engaging and Involving Stakeholders in Your Watershed*. Following this introductory reading, you will analyze eleven media documents related to watershed stakeholders in the Finger Lakes. Finally, you will assess your role as a local watershed stakeholder.

4. Distribute the *Student Reading: Watershed Protection in the New Millennium* (Document 1) and accompanying *Student Worksheet: Watershed Protection in the New Millennium*. The page layout has been preserved in the reading to help students consider the construction of the guide as they discuss watershed stakeholders. Remind students that they should cite directly from the text as they define who a stakeholder is, why stakeholders are important, and when they provide evidence for their conclusions about the construction of the guide.

5. After students have completed the worksheet, review their responses using the *Media Sample Questions & Answers* in the following pages of the *Teacher Guide*.

Document 1:
"Watershed Protection in the New Millennium"
Getting in Step: Engaging and Involving Stakeholders in Your Watershed
Charlie MacPherson and Barry Tonning
2001

Media Sample Questions & Answers

1) How does the reading define a stakeholder?

Possible Answer: "This guide defines a stakeholder as a person (or group) who is responsible for making or implementing a management action, who will be affected by the action, or who can aid or prevent its implementation."

2) According to the document, why is stakeholder involvement important?

Possible Answer: "Stakeholder processes are used most often to support and complement legally required actions such as achieving water quality standards, protecting drinking water supplies, restoring habitat, and generally making the nation's waters fishable and swimmable. Another important aspect of stakeholder involvement is utility. If you convene a group and don't somehow include their input in the process or product, they'll likely wonder why they wasted their time with you."

3) Which of these best describes the target audience of this document?

Answer: A
Workers in agencies at all governmental levels who are responsible for water management

What is your evidence?

Evidence: "This guide is intended primarily for federal, state, tribal, and local agency personnel involved in watershed management activities."

4) What is the purpose of this guide?

Answer: D
To engage the public in supporting government regulations related to watershed protection

What is your evidence?

Evidence: "The purpose of this guide is to provide the tools needed to effectively engage stakeholders to restore and maintain healthy environmental conditions through community support and cooperative action…The guide can also help private organizations interested in recruiting stakeholders and involving stakeholders in local or regional watershed efforts."

6. Explain to students that now you will explore watershed stakeholder interests by viewing another media form: maps.
   Why are maps considered a form of media?
   Possible answers:
   - Maps communicate messages to a remote audience
   - Maps use technology to exchange information (print, web, phone)
   - Maps use visual images and words to convey messages

7. Project the first PowerPoint slide and reiterate the definition of a "watershed stakeholder."
   Definition: A watershed stakeholder is a person or group who is impacted by changes in the watershed and who is responsible to help restore and protect the watershed.

8. Continue to project the eight media documents in the PowerPoint and decode them using the *Media Sample Questions & Answers* in the *Teacher Guide* below.

Document 2:
French map of the Finger Lakes region, c. 1657
Nova Francia acurata delineatio
Francesco Bressani

Media Sample Questions & Answers

1) Where are the Finger Lakes on this map?

Possible Answer: They can be seen in the center between Lake Ontario and the lodge.

2) Who might have made this map and for what purpose?

Possible Answer: This is a French map from 1657 that shows New World peoples and geography for a European audience.

Explain that according to the Stonybrook University map library archive, Italian Jesuit missionary Franceso Bressani created this map in 1657 for inclusion in his history of the Jesuit missions in Canada.

3) According to the map, who are the watershed stakeholders?

Possible Answer: Native American people, probably from the Iroquois confederacy.

4) Why might the watershed be important to them?

Possible Answer: The watershed provides transportation (canoes), sustenance for their primary animal prey (fishing and hunting) and irrigation for crops (woman with planting stick in fields at center).

Media Sample Questions & Answers

Media Sample Questions & Answers

1) Where are the Finger Lakes on this map?

Possible Answer: They can be seen in the center within the area inscribed by the three red lines.

2) Who might have made this map and for what purpose?

Possible Answer: The map was made by New York State Engineer and Surveyor Van Rensselaer Richmond and shows the capacity and reach of the new canal system.

3) According to the map, who are the watershed stakeholders?

Possible Answer: The people who maintain and used the Erie Canal.

4) Why might the watershed be important to them?

Possible Answer: The watershed provides transportation for people who wanted to travel between New York communities in the early 19th century through the extensive Erie Canal system portrayed in the map and diagrams.

Document 4:
"Finger LakesLand" Postcard, c. 1960s
Scott Studios

1) Who might have made this map and for what purpose?

Possible Answer: This was a postcard from the early 1960s designed for tourists visiting the Finger Lakes region.

2) According to the map, who are the watershed stakeholders?

Possible Answer: The tourist industry and citizens who engage in recreational activities related to the Finger Lakes.

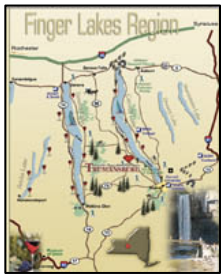
3) Why might the watershed be important to them?

Possible Answer: The watershed draws tourist dollars through the lure of boating, fishing, sailing, canoeing, water skiing, swimming and visits to parks and waterfalls.

9. Explain to students that now you will explore watershed stakeholder interests in four contemporary maps. Students should be prepared to provide evidence for their responses based on the text, images, or diagrams from each map.

10. Project the first contemporary map (Document 5). Continue to facilitate media document decodings using the *Media Sample Questions & Answers*.

Document 5:
"Map of the Trumansburg, Upstate NY Finger Lakes Region," 2012
***TrumansburgSelect.com*, "Gem of the Finger Lakes Wine Region"**



Media Sample Questions & Answers

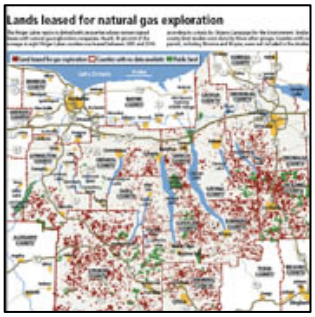
1) According to the map, who are the watershed stakeholders?

Possible Answer: Wine growers and the tourism industry
Evidence: Wine growers are indicated by the image of glass of wine and grapes at bottom left and the glasses of wine used as map key symbols. The tourism industry is indicated by the top bar "Bed and Breakfast Getways" and by the images of waterfalls, binoculars, golfers and bicyclists.

2) Why might the watershed be important to them?

Possible Answer: For wineries, large bodies of water keep the temperature consistent so there is a longer growing season for grapes because freezing temperatures are moderated. For the tourist industry, the watershed provides beautiful scenery through the waterfalls and protected waterfront parklands.

Document 6:
"Lands leased for natural gas exploration"
October 9, 2011
DemocratandChronicle.com



Media Sample Questions & Answers

1) According to the map, who are the watershed stakeholders?

Possible Answer: The natural gas exploration industry, landowners who have signed leases for gas drilling and environmental groups
Evidence: The natural gas industry and landowners with leased land are represented by the red dots. Environmental groups are referenced in the text above the map (Citizens Campaign for the Environment).

2) Why might the watershed be important to them?

Possible Answer: The natural gas exploration companies need vast quantities of water in the hydrofracking process proposed for drilling in the Finger Lakes area of the Marcellus shale deposits. Residents of the area, whether they are lease holders or environmentalists or both, rely on the watershed to provide clean drinking water and a healthy environment.

Document 7:
"Finger Lakes Region Location Map," 2012
HikingOhioParks.com

Media Sample Questions & Answers

1) According to the map, who are the watershed stakeholders?

Possible Answer: Hikers, boaters and state park visitors and employees
Evidence: Hikers are indicated by the source (Hiking Ohio Parks). Boaters are suggested by the inclusion of marine parks. Park visitors and employees are suggested by the tree symbols indicating state park lands.

2) Why might the watershed be important to them?

Possible Answer: Watersheds are important to people interested in recreation and natural land protection as demonstrated by the large number of parks situated along the Finger Lakes, Lake Ontario (top border) and rivers on this map. Natural water features, such as waterfalls and gorges, draw tourists to the area to help support the park system.

Document 7:
"New York orchards directory," 2012
OrangePippin.com

Media Sample Questions & Answers

1) According to the map, who are the watershed stakeholders?

Possible Answer: Apple growers and consumers of apples
Evidence: Apple orchards are indicated by the green apple symbols and consumers are referenced in the text box at top right encouraging visitors to call first before traveling to the orchards.

2) Why might the watershed be important to them?

Possible Answer: Apple trees require lots of water to grow and need to be in an area with dense, moist soil as indicated by their position near lakes on the map.

11. Distribute *Student Reading: Stakeholders in the Watershed* and accompanying *Student Worksheet: Stakeholders in the Watershed*. The reading contains four separate text excerpts relating to specific watershed stakeholders identified in the maps of the Finger Lakes. Remind students that they should cite directly from the text as they discuss each stakeholder and relate each reading to their prior knowledge and concepts learned in *Activity 1*.

12. After students have completed the worksheet, review their responses using the *Media Sample Questions & Answers* in the following pages of the *Teacher Guide*.

Document 9:
"Finger Lakes Wineries: The Wide and Deep Waters of Seneca Lake"
Jeff Blackwell
March 2, 2010

Media Sample Questions & Answers

1) According to this reading, why are wine makers interested in the watershed? Provide evidence from the reading to support your answer.

Possible Answer: Seneca Lake provides an ideal microclimate for grape growing.
Evidence: "The depth of the lake and the churning of its water…(create) a microclimate friendly to cool-climate grapes."

2) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

Possible Answer: Runoff may carry chemicals sprayed on the grapes into the watershed.

3) Do you think this article is a feature story, an editorial or an advertisement? Why?

Possible Answer: The article is presented in the *Democrat Chronicle* as part of a feature story series on Finger Lakes wine titled, "On the Trail: Finger Lakes Wine." It includes common elements of feature stories: personal narrative, quotes from "human interest" subjects and a news hook in the development of the wine industry. It also has aspects of an advertisement including references to specific businesses and quotes extolling the product such as the last line, "we make great wine."

Document 10:
"Water: Into the Wells"
Marcellus Shale: The Science Beneath the Surface
Kelly Cronin
November 2011

Media Sample Questions & Answers

1) According to this reading, why is the natural gas exploration industry in the Finger Lakes interested in the watershed? Provide evidence from the reading to support your answer.

Possible Answer: Natural gas drillers need a great deal of water to do hydrofracking drilling.
Evidence: "It requires far more water to hydraulically fracture a well that travels horizontally through a gas-bearing layer than it takes to hydraulically fracture a vertical well – millions of gallons." "Most of the water used in natural gas production in the Marcellus Shale is used for hydraulic fracturing, but one other large water requirement is the water that is used to help drill the well itself."

2) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

Possible Answer: Water demands for hydrofracking may place a burden on communities with smaller tributaries. The chemicals used in the slickwater process could contaminate groundwater.

3) Do you think the information in this newsletter article is credible? Why or why not?

Possible Answer: The information is likely to be credible since it is published by a research institution associated with a major university. Organizations like the Paleontological Research Institution stake their reputation on providing honest and accurate information.

Document 11:
"Hiking"
FingerLakes.com

Media Sample Questions & Answers

1) **According to this reading, why are hikers interested in the watershed? Provide evidence from the reading to support your answer.**

Possible Answer: The natural features of the watershed have a great appeal for hikers.
Evidence: "The Finger Lakes are home to some of the most incredible scenic vistas in the northeastern United States. Plunging waterfalls and dramatic gorges provide the backdrop that draw hikers and outdoors enthusiasts to the trails of the Finger Lakes."

2) **Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?**

Possible Answer: Heavy pedestrian use could possibly affect the local watersheds through erosion; therefore, the park stewards can help preserve watersheds by preserving natural lands and allow overused trails to return to their natural state.

3) **Does this article target experienced, intermediate or novice hikers? How did you come to your conclusion?**

Possible Answer: Its target audience is all of these groups. By highlighting trails of varying degrees of difficulty, the author makes clear that hikers of all abilities can find a path to their liking in the Finger Lakes area.

Document 12:
"Establishing the High Density Supported Apple Orchard, Part 1: Site Selection and Preparation"
Ontario Ministry of Agriculture, Food and Rural Affairs

Media Sample Questions & Answers

1) According to this reading, why are apple orchard owners interested in the watershed? Provide evidence from the reading to support your answer.

Possible Answer: As with grapes, apples grow well in the microclimates near large lakes. Additionally, apples need good drainage and sufficient irrigation. **Evidence:** "It is important to choose a site for an apple orchard close to the moderating effect of a large body of water." "Availability of water for irrigation is another important consideration when selecting a planting location." "The removal of excess water from the soil profile is the form of drainage often forgotten by apple growers."

2) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

Possible Answer: Runoff may carry chemicals sprayed on the apples into the watershed.

3) Knowing where an article was published can provide a context for analyzing media documents. What are the clues in this text (not the bolded introduction to the text) that this was written for a Canadian audience, or neighbors of the Finger Lakes?

Possible Answer: "In Ontario, all successful apple areas are in proximity to one of the Great Lakes." In the section on irrigation amounts of water are given in centimeters rather than inches.

13. Follow with a discussion of stakeholder interests and impacts on the watersheds. Probe questions include:
    - **What are some common interests that stakeholders have in protecting watershed resources?**
    - **What are some of the potential impacts that stakeholders have on watershed quality?**
    - **Why is watershed awareness important?**
    - **Who should be concerned about watershed protection? Why?**

14. Distribute the *Student Assessment: Reflection Paper* and go over expectations in preparation for the students' final papers. Additional assessment ideas are included on the back page of the assessment.

    [NOTE: Teachers may want to have sample "letter-to the editor" or "opinion" pieces to use as models for the* Contacting a Watershed Stakeholder *additional assessment activity.]

FURTHER QUESTIONS

Analyzing Media Messages:

What other forms of media can inform you about watersheds?

Who are possible target audiences for the maps you viewed?

Why were the maps created? What is the intended purpose of each map?

This lesson included three primary media forms: videos, maps and text readings**. How does each media form compare in its ability to pique viewer interest and convey information?**

Self Reflection:

What is your watershed? How close do you live to a body of water?

How often have you discussed watershed interests and responsibilities in your family? In your school? Among your peers?

How would you rank these issues in order of importance: open access to the Internet, food security for everyone in your community, watershed protection, recreational opportunities for young people?

Underlying Values and Motives:

Which of the stakeholders had similar interests in the watersheds?

Which stakeholders have larger impacts on the watersheds?

The first map created by a French missionary in the 17th century conceptualized a watershed through geographical boundaries. The fifth map conceptualized a watershed through the grid layout of private property lines. **How does one's relationship to watersheds change when seeing watersheds by geographical boundaries as compared to seeing watersheds by private property lines?**

This lesson, as well as *Lesson 23: Onondaga Lake* and *Lesson 24: Hydrofracking, Media & Credibility*, explores who gets to determine use and treatment of primary natural resources. **How is the right to decide related to land sovereignty and economic privilege?**

EXTENDED ACTIVITIES

Discover if there is a watershed activist group in your area and contact them to see if there is anything you can do to help protect your watershed.

Plan a project to get community members together to protect your local watershed.

Create a presentation to give to community members or children to inform them about your local watershed and its importance.

Research several watersheds nearby to see if there are any reoccurring problems and what the roots of such problems might be.

Put together a photo collage of all the local bodies of water in your area. Show the importance of those bodies of water through the collage.

Research the different ways in which the small Finger Lakes communities near Hemlock Lake and Canadice Lake dealt with watershed rights during the cholera epidemics of the mid-19th century.

Study the water management plan mandates for Finger Lakes communities in the 1990s. Compare the ways that different communities were affected by these mandates in terms of the differences in hydrology (small lakes versus large lakes), the wealth of lake communities and state and municipal power dynamics. Which of these elements are determining factors in deciding how watershed will be maintained and used?

Explore the media representation of lake source cooling proposals in which Cayuga Lake water is used to cool the Cornell campus. Include letters to the editor, newspaper headlines and television news reporting in your analysis.

Create a presentation on the impact of invasive species of plants and fish on the Finger Lakes.

Local author and scientist Sandra Steingraber has researched the impact of agricultural chemicals on the health of people living in watersheds. Illustrate her findings with a media presentation of your own (Prezi, PowerPoint, video, etc).

CONNECTIONS

L 6, 11, 12, 13, 19, 22, 23, 24
(water rights)

L2, 6, 14, 15, 16, 18, 19, 22, 23, 24
(unintended consequences)

L2, 3, 8, 9, 16, 18, 20, 22, 23
(text-based media)

L2, 6, 7, 9, 10, 12, 13, 14, 15, 18, 20, 22, 24
(film & video)

"Watershed Protection in the New Millennium"
Charlie MacPherson and Barry Tonning
US Environmental Protection Agency

Document 1

This excerpt is from *Getting in Step: Engaging and Involving Stakeholders in Your Watershed,* a 2001 guide published by the United States Environmental Protection Agency.

Introduction:

Watershed Protection In the New Millennium

What's in the Introduction?

- Purpose of this guide
- What's inside?
- Why involve stakeholders?
- Each stakeholder group is unique!

No matter what you call it—cooperative resource management, civic environmentalism, a watershed partnership, place-based management, or environmental democracy—involving stakeholders in protecting natural resources is here to stay. Local residents are tired of talk and want action. National environmental groups acknowledge the power of activating and motivating people and institutions. The business community is beginning to embrace open, inclusive, performance-based environmental management systems to save money and improve performance. And government agencies are eager to work with partners to help restore and protect America's watersheds.

Successful watershed management involves—and benefits—everyone.

Stakeholder involvement in watershed issues has gained momentum in recent years because of the nature of water quality problems in our country. Thirty years ago, most water quality problems were linked to discharges from factories and wastewater treatment plants. Today, however, 40 percent of our nation's waters do not meet their water quality goals because of runoff from streets, farms, mines, yards, parking lots, and other nonpoint sources of pollution. Solving these problems requires the commitment and participation of stakeholders throughout our communities.

Stakeholder involvement is more than just holding a public hearing or seeking public comment on a new regulation. Effective stakeholder involvement provides a method for identifying public concerns and values, developing consensus among affected parties, and producing efficient and effective solutions through an open, inclusive process. Managing that process requires some attention to the logistics and synergies of creating and operating a team of diverse people pursuing a common goal.

This guide defines a stakeholder as a person (or group) who is responsible for making or implementing a management action, who will be affected by the action, or who can aid or prevent its implementation.

Purpose of this guide

The purpose of this guide is to provide the tools needed to effectively engage stakeholders to restore and maintain healthy environmental conditions through community support and cooperative action. This guide is intended primarily for federal, state, tribal, and

local agency personnel involved in watershed management activities. The guide can also help private organizations interested in recruiting stakeholders and involving stakeholders in local or regional watershed efforts.

What's inside?

This guide is meant to provide real-world information that you can apply to your situation. There are seven sections included in the guide. Each section builds on the previous one, but you may skip around to any topic. References to related information are indicated with a ☞.

The last section includes resource information, case studies, web sites, and other how-to guides related to watershed protection. Case studies are included throughout the guide to highlight success stories, to share some of the challenges, and to show that you are not alone. Wherever possible, a contact and phone number are provided.

Coalfield "bucket brigade" helping streams in Pennsylvania

Environmental consultant Bill Sabatose of the Little Toby Creek watershed in Pennsylvania periodically leads "bucket brigade" remediation projects that apply granular limestone to streams heavily impacted by acid drainage from abandoned coal mines. The limestone adds alkalinity as it tumbles downstream and dissolves, reducing acidity and raising the pH. The projects are both low-tech remediation activities and social outings, and they have achieved results that provide an important sense of making a difference in the watershed.

Stakeholder involvement enhances communication, cooperation, and shared responsibility.

Why involve stakeholders?

If you're responsible for developing and implementing a watershed management program, you need support from relevant stakeholders—those who will make decisions, those who will be affected by them, and those who can stop the process if they disagree.

Over the past 20 years, watershed managers have found a lot to like about involving interested parties in their work. Involving stakeholders

- Builds trust and support for the process and product
- Shares responsibility for decisions or actions
- Creates solutions more likely to be adopted
- Leads to better, more cost-effective solutions
- Forges stronger working relationships
- Enhances communication and coordination of resources

It is important to note that public involvement processes can greatly enhance watershed management efforts, but they can't override laws and regulations enacted by elected officials and public agencies. In fact, stakeholder processes are used most often to *support and complement* legally required actions such as achieving water quality standards, protecting drinking water supplies, restoring habitat, and generally making the nation's waters fishable and swimmable.

Another important aspect of stakeholder involvement is utility. If you convene a group and don't somehow include their input in the process or product, they'll likely wonder why they wasted their time with you. Make sure that the contributions of stakeholders are both recognized and used in some manner to aid the goals of the watershed program.

Student Worksheet: Watershed Protection in the New Millennium

NAME _____ **DATE** _____

After completing the "Watershed Protection in the New Millennium" reading, answer the following questions. Provide direct evidence from the text to support your answers.

1) How does this reading define a "stakeholder?"

2) According to the document, why is stakeholder involvement important?

3) Which of these best describes the target audience of this document?
   a. Workers in agencies at all governmental levels who are responsible for water management
   b. Directors of privately-owned water supply systems
   c. University students who are entering the field of hydrology
   d. The general public

What is your evidence?

4) What is the purpose of this guide?
   a. To encourage students at all levels to consider the importance of watershed management
   b. To challenge water rights activists to be vigilant in their monitoring of water companies
   c. To explain watershed management to people who may not know the concept
   d. To engage the public in supporting government regulations related to watershed protection

What is your evidence?

Student Reading: Stakeholders in the Watershed

"Finger Lakes Wineries: The Wide and Deep Waters of Seneca Lake"
Jeff Blackwell

Document 9

This article is from the Rochester *Democrat and Chronicle*. It was published on March 2, 2010 as part of a series entitled "On the Trail: Finger Lakes Wine."

Standing at the end of the pier on the shores of Watkins Glen, Seneca Lake stretches out before me like the footstep of an ancient giant — a glacier with an imprint 38 miles long and 3 miles wide.

Seneca is the largest and deepest of the Finger Lakes. It accounts for nearly half of the water contained by the chain of glacial lakes combined. And it is so large and so deep — more than 600 feet — that it might freeze only once in 100 years.

All this makes for fertile ground for growing grapes and sprouting wineries. Thirty years ago there were just a few small wineries along the broad shoulders of the lake. Now, nearly half of Finger Lakes wine producers call Seneca home.

"In 1993 there were 14 wineries on Seneca Lake," and now there are more than 50, said Scott Osborn, co-owner of Fox Run Vineyards on Seneca's Torrey Ridge. "People realize that Seneca Lake is just a great place to grow grapes."

The reason for the acclaimed fertility all has to do with terms such as "degree-days," "heat units" and "microclimate."

Seneca Lake is fed by underground springs and falls to a depth of 618 feet. The depth of the lake and the churning of its water keep the shoulders, rising up from the shores east and west, warmer in the winter and cooler in the summer — creating a microclimate friendly to cool-climate grapes.

"Because the lake is so much deeper and vaster (than other Finger Lakes), that lake effect of blunting the high temperatures and extreme low temperatures is enhanced here," said Paul Thomas, executive director of the Seneca Lake Wine Trail.

The Seneca wine-making business was developed in the beginning by growers such as Bill Wagner at Wagner Vineyards and Gene Pierce at Glenora Wine Cellars. But over the past two decades, the industry has expanded with the help of people outside the vineyard.

"If anybody had asked me in 1977 or 1985 if I ever would have thought that's what's here would have been here, I would have said absolutely not," said Gene Pierce, the managing owner of Glenora Wine Cellars. "It was 10 to 15 years ago when we began to see a little bit of what I would call the outside investor or a person who had another career who wanted to come into the business. That's what it took in California to make Napa Valley grow."

Dave Mansfield, former president of Corsair Display Systems LLC in Canandaigua, sold his company and opened Three Brothers Wineries and Estate near Geneva in 2007. He is one of a new generation of winery owners on Seneca Lake.

"I love the idea that it all starts with the grapes and how you take care of them," said Mansfield. "As opposed to the corporate world …there was a lot of meetings, there was formal clothes, lots of travel and a lot of headaches." The entire Finger Lakes wine region is expanding its reach into new markets and to the tables of new consumers. And Thomas likes to think there is a good reason for all the excitement and growth. "I'd like to think part of the reason is that we make great wine," he said.

Student Reading: Stakeholders in the Watershed

"Water: Into the Wells"
Kelly Cronin

Document 10

This excerpt is from a November 2011 article in the newsletter, *Marcellus Shale: The Science Beneath the Surface*, which is published by the Paleontological Research Institution affiliated with Cornell University.

What is "hydrofracking"?
High volume, slickwater horizontal hydraulic fracturing (hereafter, hydraulic fracturing) differs from conventional gas drilling in several important ways.

1) Fracturing. Hydraulic fractures are cracks created in rock formations by changes in fluid pressure. This can and does happen naturally, but it can also be induced by forcing fluid into rock formations at high pressures.

2) Horizontal drilling. For horizontal drilling, the well bore (the hole the well makes under the ground) is drilled vertically, then turns to travel horizontally through the target layer; thus, horizontal drilling. This allows each well to come in contact with, and therefore fracture, a larger amount of the formation. This is especially useful in thin layers, like the Marcellus Shale. It requires far more water to hydraulically fracture a well that travels horizontally through a gas-bearing layer it takes to hydraulically fracture a vertical well – millions of gallons compared to tens or hundreds of thousands of gallons – thus, high volume.

3) Slickwater. The term slick-water refers to the addition of chemicals to reduce the friction of the fluid relative to the well bore and the internal friction of the fluid itself, increasing the speed at which it can travel and de- creasing the amount of pressure required to pump the water down into the well to fracture the shale. Slickwater fracturing works well in shales under high pressure and with low permeability, like the Marcellus Shale…

How does Marcellus drilling compare to other water uses in New York State?
…The NYDEC (New York State Department of Environmental Conservation) estimates the total water use for a peak development year to be 9 billion gallons. At 9 billion gallons of water used per year, water withdrawn for Marcellus Shale drilling would account for 0.25% of all New York freshwater withdrawals in a given year and 0.95% of all water withdrawn for drinking and domestic use…

It is important to note, however, that although the total amount of water that would be required to develop the Marcellus Shale in New York is small in comparison to the total amount of water withdrawn in New York, not all water withdrawals have equal impact on watersheds and the overall environment. For example, withdrawing 4.3 million gallons of water from the mouth of the Susquehanna River would not have the same impact as removing 4.3 million gallons from the mouth of a small tributary…

Drilling and Water
Most of the water used in natural gas production in the Marcellus Shale is used for hydraulic fracturing, but one other large water requirement is the water that us used to help drill the well itself. This water is used to lubricate the drill bit and carry rock cuttings back to the surface. Industry estimates that 100,000 gallons of water are used in the drilling process, while the Groundwater Protection Council, estimates that it takes about 80,000 gallons of water to drill a well. 100,000 gallons of water would fill about 5 1/2 school busses. While this water is only a fraction of the amount used in hydraulic fracturing, it could be a disposal concern. Some drillers use only freshwater to drill, while others use additives.

Who governs water withdrawal in New York?
All of the surface water in New York State occurs in one of seventeen major river basins. All of the land that drains into a large river or one of its tributaries is part of that river's river basin. A watershed includes all of the land drained by a smaller stream; river basins are composed of watersheds. Nine of the 17 river basins are wholly or partially underlain by the Marcellus Shale; five are underlain by the Marcellus fairway, which is the area where gas companies believe gas extraction will be most profitable. Development will likely be concentrated in this fairway, but areas surrounding it will most likely see drilling as well…

Student Reading: Stakeholders in the Watershed

"Hiking"
FingerLakes.com

Document 11

This article on hiking was listed under the "Things to do in the Finger Lakes" Web page on FingerLakes.com.

The Finger Lakes are home to some of the most incredible scenic vistas in the northeastern United States. Plunging waterfalls and dramatic gorges provide the backdrop that draw hikers and outdoors enthusiasts to the trails of the Finger Lakes. Parks and preserves are dotted all around the region. Among our favorites is the 560-mile Finger Lakes Trail which runs from the Catskills to Alleghany State Park. You can pick up the Onondaga Trail (a branch of the main Finger Lakes Trail) near Tully, NY for fantastic hiking.

While there are no marked hiking trails on Otisco Lake, in surrounding Onondaga County, you'll find lots of prime hiking trails, including the 182-acre Baltimore Woods nature preserve which contains a system of nine trails and is open to the public.

At the southern end of Owasco Lake, in the village of Moravia, Fillmore Glen State Park is a favorite destination off the lake. These hiking trails afford some of the most magnificent views of gorges and waterfalls in all of the Finger Lakes. The trails around the Cowshead area are paved and easily accessible. The Gorge trail, North Rim and South Rim trails are moderately challenging, and all three afford great scenic views.

Near Skaneateles Lake, the Bear Swamp State Forest is great for hiking. Check out Carpenter's Falls, just north of the village of New Hope. The Bahar Nature Preserve has a nice 1.3 mile trail called Old Jug Path that follows an old road, so the hiking is easy.

When visiting Cayuga Lake, check out the Robert Treman State Park, just five miles south of Ithaca. This park offers some of the most scenic hiking trails in the area. The waterfalls, gorges, and rock formations in the park are well-known with outdoors enthusiasts. Use the upper park entrance and check out the Old Mill Falls, among others, and follow the Gorge Trail to Enfield Glen.

Near Seneca Lake, Watkins Glen State Park is a beautiful canyon with waterfalls galore, and it's very popular with visitors as a result. The hiking trails around Montour Falls are especially appealing to hikers. While you're there, be sure to check out the Queen Catherine Marsh and Havana Glen. The Interlaken Trail, a 12-mile marked trail that runs past two ponds and traverses varied terrain, is one of the trails to check out in the Finger Lakes National Forest. Less well-known, but certainly worth your time, is the Hector Land Use Area—it has 25 miles of hiking trails and a handful of camp sites. The Keuka Lake Outlet Trail, which connects Keuka Lake to Seneca Lake, is a great hiking trail that runs along abandoned railroad tracks from Penn Yan to Dresden. The five mile trail winds past old mills that have long since fallen into disuse and two stunning waterfalls that are very much still alive. The Keuka Lake State Park, near Penn Yan in Bluff Point, has some nice hiking trails and plenty of other attractions as well.

Rich with hilly trails and scenic vistas, the area around Canandaigua Lake has some of the best hiking in all of the Finger Lakes. The 900 acre Cumming Nature Center in Naples has six miles of hiking trails that wind through the expansive park. Onanda Park, just south of the town of Canandaigua, features some of the best views of gorges and waterfalls around Canandaigua. The Hi Tor Wildlife Management Area, just outside of Naples, has some trails that range from moderate to challenging, some that traverse steep and sometimes rocky terrain. For serious hikers, Hi Tor is the place to explore—you can make a multi-day hike of it in Hi Tor. For more sedate day hiking, visit the Ontario County Park in Naples.

Student Reading: Stakeholders in the Watershed

"Establishing the High Density Supported Apple Orchard, Part 1: Site Selection and Preparation"

Ontario Ministry of Agriculture, Food and Rural Affairs

Document 12

This is an excerpt from "Establishing the High Density Supported Apple Orchard" on the website of the Ontario Ministry of Agriculture, Food and Rural Affairs.

Orchard Location

Site considerations are crucial; so is the time spent in proper preparation. Every attempt must be made to select a site where dwarfing rootstocks with limited root systems will perform well. It is important to choose a site for an apple orchard close to the moderating effect of a large body of water. In Ontario, all successful apple areas are in proximity to one of the Great Lakes and benefit from the climate moderation provided by these large deep bodies of water. Because large bodies of water take a long time to change in temperature, temperature extremes are reduced in both the summer and winter. Their cooling effect in the spring delays the onset of bloom, lessening the risk of damage from spring frosts. In the fall their effect reduces the onset of cold temperatures and the damaging effect these can have on unharvested apples and on trees before they completely harden off…

Availability of water for irrigation is another important consideration when selecting a planting location. Dwarfing rootstocks have a limited root volume. Most of the roots that feed are located in the top 30 centimeters of soil profile. The M9 rootstock is much less tolerant of hot dry soils than the MM106 or a standard rootstock. A dependable supply of good quality water for irrigation is needed. The taking of this water must not have any long term implications to the local environment or short term regards concerning interference with other users. You should have an estimate of how much water might be needed. The location of the water supply (horizontal distance and vertical lift) will impact on the cost and design of the irrigation system.

A moisture equivalent of 2.5 cm of water per week from rain and/or irrigation is usually adequate to avoid drought stress. A source of water nearby that would be adequate for a growing season may well be necessary to grow dwarfing rootstocks successfully…

The range of soil and climate conditions that are acceptable for high density orchards is narrower than for lower density orchards. Even if a low density planting grew successfully on a location it may not be a good location for higher density plantings. A thorough knowledge of any previous orchard or other crop problems is a vital first step in assessing the suitability of your chosen site. With the considerable investment in a high density orchard, you must be able to bring the site up to the exacting requirements of a high density orchard, or seek an alternate site.

Soil Drainage

The removal of excess water from the soil profile is the form of drainage often forgotten by apple growers. Under no conditions should apple trees stand in water for more than one or two days. Root suffocation will occur under such circumstances resulting in tree injury and/or death. For trees to produce well on the dwarfing rootstocks used in high density plantings, the drainage must be nearly perfect. Improving drainage is most effectively done by tiling. Additional drainage from pockets of wet areas may be handled using raised beds after tiling is installed. Usually it is the heavier clay soils that require drainage improvement, but problems have also been encountered in orchards on sandy soils where the water table is high. Wet spots may be effectively drained using irregular patterns. Generally, a systematic drainage pattern is often required and on some sites the distance between tile lines may need to be as close as every tree row. Tile drainage should be installed before planting by a qualified contractor.

Student Worksheet: Stakeholders in the Watershed

NAME _____ **DATE** _____

Read the four documents that correspond with the stakeholder maps you just viewed and answer the related questions after reading each document. Provide evidence from the text to support your answers.

Document 9: "Finger Lakes Wineries: The Wide and Deep Waters of Seneca Lake"

1) According to this reading, why are wine makers interested in the watershed? Provide textual evidence from the reading to support your answer.

2) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

3) Do you think this article is a feature story, an editorial or an advertisement? Why?

Document 10: "Water: Into the Wells"

4) According to this reading, why is the natural gas exploration industry in the Finger Lakes interested in the watershed? Provide textual evidence from the reading to support your answer.

5) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

6) Do you think the information in this newsletter article is credible? Why or why not?

Document 11: "Hiking"

7) According to this reading, why are hikers interested in the watershed? Provide textual evidence from the reading to support your answer.

8) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

9) Does this article target experienced, intermediate or novice hikers? How did you come to your conclusion?

Document 12: "Establishing the High Density Supported Apple Orchard"

10) According to this reading, why are apple orchard owners interested in the watershed? Provide textual evidence from the reading to support your answer.

11) Based on the reading, the video "Where Does Water Go When it Rains?" and your prior knowledge, what effects may this stakeholder have on local watersheds?

12) Knowing where an article was published can provide a context for analyzing media documents. What are the clues in this text (not the bolded introduction to the text) that this was written for a Canadian audience, or neighbors of the Finger Lakes?

Student Assessment: Reflection Paper

Use what you have learned about watersheds and stakeholders to write an essay reflecting on your roles as a stakeholder in your local watershed.

IN YOUR ESSAY:

- Identify your local watershed. Be sure to use specific terminology and concepts from the three videos on the hydrologic cycle.
- Explain why your local watershed is important to you.
- Describe how you affect the watershed in your area. Use your analysis of the hydrologic cycle and information from the stakeholder maps to support your statements about your role as a watershed stakeholder.
- Discuss **three actions** you can take to protect your watershed. Consider how you might implement these actions on a larger scale to create a greater positive impact on your watershed. **What stakeholder partners might you enlist to work together for watershed protection?**

Student Assessment: Project Options

HYDROLOGIC CYCLE PROJECT

Use *The WorldWide Hydrologic Cycle Project* videos as inspiration to create your own media construction (diagram, poster, video, etc.) of the hydrologic cycle in your local watershed.

Each project should:

- Identify the featured watershed
- Reference specific terminology and concepts from the three videos on the hydrologic cycle
- Analyze the hydrologic cycle in the context of your local watershed:
    - **In what stage(s) of the hydrologic cycle are there protections in place to preserve the watershed? Are these protections based in the local community, within the state, or nationally?**
    - **How well do these protections preserve the watershed?**
    - **What additional precautions do watershed stakeholders in your community need to take in order to preserve the watershed better?**
- Based on your recommendation(s) to preserve the watershed, identify and research watershed stakeholders who might help you implement your precautions. Which stakeholder groups did you select and why?

Present your projects to the class and discuss recommendations to preserve your local watershed. The class could also present their projects to other students or even open presentations to the local community.

CONTACT A WATERSHED STAKEHOLDER

Brainstorm and research watershed stakeholders in your community. Select one stakeholder and write a "letter to the editor" or "opinion" piece reflecting on how this stakeholder is or is not contributing the preservation of your local watershed. As you research the stakeholder, consult a variety of news sources (print, online, televised/video reports) to understand current problems in the preservation of your watershed. Address these current problems in your letter to your stakeholder.

Alternatively, you could write a proposal to local watershed stakeholders outlining your recommendations from the *Hydrologic Cycle Project* (see above).

Lesson 23: Onondaga Lake

LESSON PLAN

Onondaga Lake

Printed Documents

Lesson Objectives:

- Students will understand the history of Onondaga Lake, including its period of pollution and its interdependence with the economic, cultural, health, and recreational needs of the human communities it supports.
- Students will understand different perspectives on restoring the health of Onondaga Lake based on concerns for economic development, cultural preservation, human health, ecosystem health, and community involvement.
- Students will take a stand on how to best help Onondaga Lake and its communities to become partners for their mutual and long-term well-being.

Vocabulary:

biocultural restoration, Clean Water Act, Community Health and Safety Plan, Environmental Protection Agency (EPA), groundwater, Haudenosaunee (Iroquois) Confederacy, Honeywell International, NY State Department of Environmental Conservation (DEC), Onondaga Environmental Institute, Onondaga Lake Superfund Site, Onondaga Nation, remediation, watershed

Media: newspaper article, website, presentation guide, public comments on a government initiative, brochure

Materials Needed:

Activity 1:

- Five-page *Teacher Guide: Activity 1*
- Four-page *Student Reading: "From Clean Lake to 'Witch's Brew'"*
- Two-page *Student Worksheet: History*

Activity 2:

- Six-page *Teacher Guide: Activity 2*
- One-page *Student Reading*: *Onondaga Lake Superfund Site*
- Four separate one-page *Student Reading: Four Perspectives*
- Four separate one-page *Student Worksheets: Four Perspectives*
- One-page *Student Assessment: Take a Stand*

Time: Activity 1: 30 minutes, not including reading time
Activity 2: 50 minutes, not including reading time

Lesson Procedures

Activity 1

- Present the *Lesson Introduction* to the class.
- Distribute and have students read the *Student Reading: "From Clean Lake to 'Witch's Brew.'"*
- Distribute and have students complete the *Student Worksheet: History*. Go over the worksheet answers as a class.
- Lead a discussion about storytelling techniques and how they may or may not change based on the story's medium.

Activity 2

- Distribute the *Student Reading: Onondaga Lake Superfund Site* and have students complete it in class or as homework.
- Distribute the *Student Reading: Four Perspectives*, which contains for separate text excerpts. Distribute the *Student Worksheets: Four Perspectives*. Direct students to complete the readings and fill out the corresponding worksheets.
- Go over the worksheets and lead a discussion about the *Student Readings* using the *Possible Answers* in the *Teacher Guide*.
- Lead a group discussion on the reasons that each group may communicate different concerns regarding economic development, cultural preservation, human health, environmental protection and community involvement.
- Distribute and review the *Student Assessment: Take a Stand* in preparation for the final paper.
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Onondaga Lake: Activity 1

[NOTE: This activity contains a variety of ways to access a newspaper article from the* Syracuse Post-Standard*, including a version available for viewing and downloading in a PowerPoint online. Depending on students' needs, teachers may want designate computer lab time to complete the online portion of the assignment.]

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

Water is the great sustainer of life. Great cities and civilizations have flourished by substantial bodies of water and became interdependent systems with them. When a city degrades its waterway to the point where all quality of life is endangered, residents need to discover a new, non-exploitative kind of relationship that can restore the whole system to health.

This lesson looks at the history of one body of freshwater, Onondaga Lake and its city, Syracuse, as a case study to explore how freshwater becomes degraded, and asks you to envision how we might return all water bodies and their companion cities to health. This lesson also invites you to consider the different ways in which various groups present their concerns about water quality based on their beliefs and values. Finally, you will be asked to take a stand on the best way to restore the health of Onondaga Lake while reshaping the relationship of the competing constituencies with each other and with the lake.

3. Distribute the *Student Reading: "From Clean Lake to 'Witch's Brew'"* and the *Student Worksheet: History*. Explain that the *Student Reading* is an article written by Robert W. Andrews in October of 1985 for the *Syracuse Post-Standard* newspaper. It was the first in a series of five articles about Onondaga Lake titled, *Onondaga Lake: A Paradise Lost?* Remind students that they should provide direct quotations when listing descriptive phrases on the first page of the worksheet.

   In order to answer the final set of questions on the worksheet, students will need to view the article as it first appeared in *The Post-Standard*. Students should first read the *Student Reading* and then view the original article in a variety of ways:
   1. Students can access the article from the *Student Materials* section on the Project Look Sharp website, www.projectlooksharp.org.
      [NOTE: If all students have access to the Project Look Sharp website, the* Student Reading *and* Student Worksheet *can be completed in-class or as homework. Alternatively, the* Student Reading *and first portion of the* Student Worksheet *could be assigned as homework, and the online portion of the worksheet completed in-class using computer lab time.]
   2. The article is available in PowerPoint form for free download from the Project Look Sharp website and can be projected for the entire class.
   3. The article is available in PowerPoint form on a CD (for hard copies of the curriculum kit only) and can be projected for the entire class.
   4. The article is reprinted on three separate pages in the *Resources* section of the kit and can be copied as a handout.

4. Determine the needs of your students and how they should complete the *Student Reading*, the *Student Worksheet*, and the online portion of the assignment. Once students have completed the worksheet, go over the answers as a class. Possible answers are included on the following two pages of the *Teacher Guide*.

Student Worksheet: History Answer Guide

NAME _____ **DATE** _____

In this exercise, you will study the history of Onondaga Lake as constructed by Robert Andrews' article, "From Clean Lake to 'Witch's Brew,'" which appeared in the *Syracuse Post-Standard* on October 14th, 1985. The article was the first of a five-part series called *Onondaga Lake: A Paradise Lost?*

You will be asked to consider the condition of the lake during the two historical periods presented in the article: the late 19th century and the mid-20th century. Then, you will be asked to identify the "heroes" and "villains" of the story as told by the writer. Finally, you will reflect on the design elements that the newspaper editors used in the effort to make this an engaging and informative article.

List at least three descriptive phrases used by the author to characterize the condition of Onondaga Lake in each time period.

Late 19th century (1870-1899):

1. "Grand resorts and hotels flourished, drawing thousands for weekend recreation – swimming, fishing and dancing"
2. "Onondaga Lake was a vibrant part of Syracuse"
3. "For children the lake resorts were a summer haven with swimming and fishing"
4. "In the winter Onondaga Lake offered ice-skating, ice boating and hockey"
5. "A salt spring along the lakeshore enabled salt production and economic prosperity"

Mid-20th century (1940-1969):

1. "A concoction as vile as found in any witch's brew"
2. "It stank. It looked dirty. People who went to the bottom emerged with thick black goo covering their feet and legs"
3. "Human excrement floated in the water"
4. "Onondaga Lake and its west shore: abandoned, written off and neglected"
5. "A slimy, miasmatic bog"
6. "The collapse of the Allied Chemical company dam covered a square mile in a thick wall of goo"

List at least five heroes and five villains in this story and the actions that the author ascribed to them.

Heroes and their heroic actions:

1. Daniel Jackson publicly condemned the lake's condition and rallied cleanup support from aboard the Saltine Warrior.
2. Those who built the new county sewage treatment plant.
3. Those who pushed for environmental laws including the creation of the state Dept of Environmental Conservation and the federal Ecosystem health Agency.
4. Norman Richards replanted the west shore with grasses, shrubs and wildflowers.
5. Walter Welch, Crandall Melvin and William Maloney formed the first cleanup group to lobby for lake preservation.
6. Samuel Sage sued companies for illegal pollution.

List at least five heroes and five villains in this story and the actions that the author ascribed to them.

Villains and their villainous actions:

1. Allied Chemical Company filled the lake with tons of sodium chloride, calcium chloride and mercury waste.
2. Crucible Steel dumped chromium waste.
3. Bristol Labs dumped organic waste from its penicillin plant.
4. Syracuse China dumped broken dishes into the lake.
5. The city of Syracuse used the lake as overflow for its sewage.
6. State and city officials refused to enforce pollution laws and made deals allowing dumping to continue.
7. Engineers encouraged using the lake to dispose of municipal sewage.
8. Politicians like Governor Dewey promised to clean the lake but failed to take action.
9. Newspapers failed to report the truth about the lake's condition.

Write a one-sentence summary of the main idea of the article:

Answers will vary. Possible answers include:

- Onondaga Lake was once a paradise, but it was ruined by 20th century industrial pollution.
- A series of villains polluted Onondaga Lake and a series of heroes worked to restore the lake to health.
- It is hard to know what the future will bring due to Onondaga Lake's history as both paradise and polluted mess.

View the article as it originally appeared in the Syracuse Post-Standard. To access the article, go to the *Student Materials* section on the Project Look Sharp homepage, www.projectlooksharp.org. **Identify three design elements (titles, images, text, maps, sidebars, layout, quotations, font, captions and icons) and explain how each reinforces the main idea of the article.**

Answers will vary based on the students summary of the main idea of the article. Students may select a variety of design elements to evaluate including:

Titles: *Onondaga Lake: A Paradise Lost?*, "From Clean Lake to 'Witch's Brew,'" "A Legacy of Abuse and Neglect for 'the Most Studied Lake In the Nation'" and "One Man's Memories of a Lake Gone Bad"
Images: Contemporary photos of a man sitting by the lake shore and of a boat entering the lake and an 1890 sketch of the Iron Pier
Maps: Map of lakefront ownership
Sidebar: Article on "One Man's Memories of a Lake Gone Bad"
Quotations: Harvey Baldwin, Syracuse's first mayor, on the beauty of the lake
Icons: 5 different icons for each of the article parts illustrating the introduction (lake and rivers), history (quill pen), pollution (spilling container), chemistry (drop into flask) and the future (sunrise behind lake).

5. Lead a discussion about storytelling and different media forms. Ask students to reflect on the nature of story telling as represented in the first installment of the *Onondaga Lake: A Paradise Lost?* series of newspaper articles.
   Probe questions include:
   - **What makes a compelling story in words?**
   - **Why did the author focus on "heroes" and "villains"?**
   - **Which of the design elements chosen by the newspaper editors were most helpful in supporting the author's storyline?**
   - **Were there elements that distracted from the story?**

   Ask students to compare and contrast new media forms of storytelling (YouTube, blogs, Twitter) and this older form, the newspaper feature story.
   Probe questions include:
   - **What are the advantages and disadvantages for each of these forms?**
   - **How has story telling changed across media platforms and how has it stayed the same since this story was first published in 1985?**

[NOTE: The next activity also includes a* Student Reading. *Teachers may select to assign the one-page* Student Reading: Onondaga Lake Superfund Site *as homework. In this case, the reading could be distributed at the end of* Activity 1. *For more information about the* Student Reading, *see* Activity 2.*]

"From Clean Lake to 'Witch's Brew'"

Robert W. Andrews
first in a five-part series *Onondaga Lake: A Paradise Lost?*

Syracuse Post-Standard
October 14, 1985

On the west shore of Onondaga Lake, a terraced hillside of chalky chemical waste rises 80 feet above the barren shore. Scattered patches of tangled brush cling to the white, spongy slope.

It is quiet here, and desolate. yet less than a football field away, cars and trucks rush past on Interstate 690. Across the way is the village of Liverpool. And off to the right, across the water, are the city skyline and the Carrier Dome.

It was along this shore in the 1890s that many of the grand resorts and hotels flourished, drawing thousands for weekend recreation – swimming, fishing, dancing, watching vaudeville or just enjoying the rides, games, and grand times.

One by one, the west shore resorts lost their allure. The fish population was decimated. Swimming became unsafe. And Allied Chemical Co. built a wall of waste on the shore.

For decades, the white hills of the west shore have been a visible metaphor for the lake over which they tower: a lake that will never come clean. At least that is the popular perception.

"A concoction as vile as found in any witch's brew" is how Daniel Jackson, a scientist and environmental crusader, described Onondaga Lake in the 1950s.

It stank. It looked dirty. People who went to the bottom emerged with thick, black goo covering their feet and legs. Human excrement floated on the water.

It was a lake little loved and often ignored. A letter to the editor in the 1950s urged that it be paved so the road to Baldwinsville would be shorter. Another, in the '60s, suggested it be filled with garbage.

Onondaga Lake and its west shore: abandoned, written off, and neglected.

How did it happen? And can such a lake ever be clean again?

During months of research and discussions with dozens of scientists, bureaucrats, politicians, and people who know the lake, *The Post-Standard* sought answers about Onondaga Lake – about its past, its present, and its future.

Among the answers that emerged:

- Allied Chemical Co., once Solvay Process Co., is by far the lake's worst polluter.

When the company began producing soda ash in 1884, the lake began to die. Within two decades, the fish population was decimated. As the lake's waters worsened, Allied built its enormous wall of waste on the west shore.

Since the 1880s Allied has literally been filling the lake with its waste – tons of sodium chloride and calcium chloride.

Scientists say that between 20 and 40 percent of the lake has been filled with Allied's waste in the past century, creating a 15- to 30-foot layer of gooey black muck on the bottom.

- Allied's other major contribution to the lake – 20 pounds of mercury a day for 18 years – was halted by the federal government in 970, and the mercury level began to drop. But to the bewilderment of lake scientists, recent tests have found a resurgence in that level. Until the mercury mystery is solved, it will not be safe to eat fish from Onondaga Lake.

• Despite Allied's leading role in the lake's decline, there's plenty of shame and blame to go around. Over the years, virtually everyone has polluted Onondaga Lake.

Crucible Steel dumped its chromium waste. Bristol Labs added organics from its penicillin plant. Syracuse China disposed of broken dishes there. In the 1950's, one estimate was that 139 industries used Onondaga Lake as their waste basin.

And, for decades, the city of Syracuse used the lake as a toilet. Even today, raw sewage flows directly into the lake on rainy days, when the city's antiquated wastewater system overflows.

• Year after year, the government agencies whose job it was to keep the lake clean refused to crack down on the blatant pollution. Often, they encouraged it.

Engineers in the 1920s wrote reports advising the city to use Onondaga Creek and Onondaga Lake as sewers on the theory that sewage would decompose entirely as it went from one end of the lake to the other. And city officials decided with little debate to do just that.

State officials failed to enforce state laws against pollution. Instead, the city and the state made quiet deals allowing Allied to continue despoiling the shoreline and to continue discharging waste into the lake.

Politicians - Gov. Thomas Dewey, in 1946, for one, made promises never fulfilled. Dewey promised lake improvements and action to protect Onondaga Lake against despoilment by any private company. Still, the pollution went on unabated, and local environmental crusaders blamed the governor for blocking legal action against Allied, which by then was one of the largest employers in the Syracuse area.

Newspapers mostly ignored the pollution and the growing wall of waste. When the Syracuse Post-Standard did write something in 1903, attempting to describe what was happening on the west shore of the lake, the story's relation to truth was remote.

• Onondaga Lake has been studied and restudied, prompting lake expert Robert Hennigan to call it "perhaps the most studied lake in the nation."

But still left unstudied are such key questions as: Why is deadly mercury still showing up in fish flesh? What other toxic chemicals are in the lake?

• Despite all this, Onondaga Lake has improved substantially from the slimy, miasmatic bog Syracuse knew in the 1950s.

The reasons are many: The tireless work of a handful of environmental crusaders, one generation leading to another. The county's new sewage treatment plant, which opened in 1979. And the impact of tough, new environmental laws, including the creation of the Environmental Conservation and the federal Environmental Protection Agency in 1970.

Scientists believe that, with Allied's scheduled plant closing next year, Onondaga Lake is entering a new era. It might eventually become reasonably clean and useful.

Already, they say, there are days each summer when bacteria levels are low enough that it is safe to swim.

A Place in History

Long before Solvay Process came to the west shore – before white men set foot in America - the Onondaga Indians fished and trapped along the shores of the lake.

When the Europeans arrived and began struggling for a foothold in the New World, the lake became a battlefield.

In 1615, a French force led by Samuel Champlain launched an unsuccessful invasion of

an Indian camp at the south end of the lake where Oil City is now, hoping to gain control of the lake, a crucial link in a system of inland waterways.

Years later, an enormous force – 2,000 French soldiers and Huron Indians in 400 canoes stormed into Onondaga Lake, intent on wiping out the Onondagas. It probably was the largest army ever gathered in North America up to that time, but it never saw battle. The Onondagas burned their village and fled into the woods, leaving the French with nothing. The invaders soon abandoned the site, and the Indians returned to the lake.

Around that time and for centuries thereafter, the lake's shoreline was marshy and mosquito-ridden.

The lake was larger than it is at present - much of what is now the city's west side was underwater. In 1822, the state lowered the level of the lake by making its Seneca River outlet deeper and wider. The lake receded from the shallow, marshy shoreline to roughly its present configuration. A road along the shore was built in 1878.

From then until the early 1900s, Onondaga Lake was a vibrant part of Syracuse.

People swam in it, fished in it, boated along its waters and took the trolley or the lake steamer to its west shore resorts – places with names like Lake View Point, White City, Rockaway Beach, and Maple Bay.

The resorts were places of romance. Couples could take the open-air, double decker streetcars to the Iron Pier resort. There you could dance on one of the area's largest floors.

For children, the resorts were a summer haven. There were hot dogs, ice cream, games and rides, as well as swimming and fishing. In the winter, Onondaga Lake was a place for ice-skating and ice boating, and someone always had a pick-up hockey game going.

As the lake was becoming popular toward the end of the 19th century, the industry that dominated its shore for a century began to decline. Where once Syracuse had a virtual monopoly on salt-making, it now was possible to mine salt elsewhere at a cheaper price.

Salt production was possible here because Syracusans discovered a salt spring along the lake shore: a well that tapped into a deep underground layer of salt that was formed in pre-glacial times. For 100 years, it was a multimillion-dollar business that dominated the local economy and made some Syracusans rich.

As the 1800s approached, a new industry rose along the lake shore. Twenty years after Solvay Process Co. was established, a burgeoning ice industry was banned because of impurities in the lake's water. And resorts began to fold.

From that time on, the soda ash company would control the lake's destiny.

A Handful of Heroes

Even in the darkest periods of the lake's decline, amid the misguided policy decisions and the simplistic assessments, there were a few heroes. Among them:

✓ Norman Richards, a professor at SUNY College of Environmental Science and Forestry, spent years in his spare time during the late 1960s and '70s lugging fertilizer and seeds to the terraced mountain of chalky waste on the west shore. He was determined to prove that plant life could grow there. Singlehandedly, he covered a substantial portion of the shore with grass, shrubs, and wildflowers.

✓ A trio of environmental crusaders took on Allied, the city and the county in the late 1940s and '50s. There was Walter Welch, a State Fair official; Crandall Melvin, a banker; and William Maloney, a real estate developer. Well before the

environment was a hot issue, the formed the lake's first cleanup group and lobbied hard during the lake's worst years.

✓ A decade later, civil engineering professor Daniel Jackson and chemist Samuel Sage followed in their footsteps. Jackson, often criticized by county officials who thought he went too far, used a boat denoted by Syracuse University called Saltine Warrior to rally and cajole support for Onondaga Lake cleanup efforts. Sage, to this day, wages a solidarity campaign using laws that allow citizens to sue, to keep companies from illegally polluting the lake.

Thanksgiving in Lakeland

What prompted the area's environmental awakening was a disastrous event on Thanksgiving Day 1943.

While residents slept, the dam holding back the Allied waste beds broke open. An 8-foot wall of goo, thicker than week-old mashed potatoes, flowed into the Lakeland neighborhood.

Everything for more than a square mile was inundated: homes, trees, the boulevard, even the State Fairgrounds.

From then on, people started taking a much closer look at what Allied was doing to the lake and its shore. Only recently, however, have scientists begun to understand the complex chemical nature of Allied's pollution. And not until Allied leaves will the company's full impact on the lake become clear.

For more than 100 years, the soda ash company has been loading up the lake with its waste. At first, the company dumped directly into the lake; now it channels the waste into the lake through the county's only sewage treatment plant.

Allied's discharges have made the water salty, heavy, and stratified and have robbed the lake of oxygen. For that reason, no fish can live on the lake's bottom, and some fish can't live anywhere in Onondaga Lake.

The pollutants also combine with algae to make the water extremely cloudy.

All the dumping has made the Onondaga Lake age quickly. It is normal that as lakes grow old they become shallow and cloudy. have too much algae and too little oxygen.

But in Onondaga Lake's case, the aging is not natural. The lake is aging prematurely because of all the pollution Syracusans have put into it.

Plenty of Grand Plans

Prospects for cleaning the lake depend partly on chemistry but mostly on economics and politics.

Some scientists say that with Allied's departure and a major effort to reduce sewage overflow, the future of the lake is bright.

There is already talk of a bathing beach. The county is pursuing plans to continue its bicycle trail along the west shore, making the lake the centerpiece of a trail that would go from one end of the county to another.

There is no shortage of grand ideas: A boat marina at the barge terminal area. A space needle restaurant on the west shore. Cafes and restaurants along Onondaga Creek. Fishing piers. A water park. Hotels and motels.

All have been proposed for the lake, its shore or the creek that feeds it.

Most await the answer to the basic question: Can Onondaga Lake ever be clean? (Andrews).

Student Worksheet: History

NAME _____ **DATE** _____

In this exercise, you will study the history of Onondaga Lake as constructed by Robert Andrews' article, "From Clean Lake to 'Witch's Brew,'" which appeared in the *Syracuse Post-Standard* on October 14th, 1985. The article was the first of a five-part series called *Onondaga Lake: A Paradise Lost?*

You will be asked to consider the condition of the lake during the two historical periods presented in the article: the late 19th century and the mid-20th century. Then, you will be asked to identify the "heroes" and "villains" of the story as told by the writer. Finally, you will reflect on the design elements that the newspaper editors used in the effort to make this an engaging and informative article.

List at least three descriptive phrases used by the author to characterize the condition of Onondaga Lake in each time period.

Late 19th century (1870-1899):

_____

_____

_____

Mid-20th century (1940-1969):

_____

_____

_____

List at least five heroes and five villains in this story and the actions that the author ascribed to them.

Heroes and their heroic actions:

1. _____
2. _____
3. _____
4. _____
5. _____

List at least five heroes and five villains in this story and the actions that the author ascribed to them.

Villains and their villainous actions:

6. _____
7. _____
8. _____
9. _____
10. _____

Write a one-sentence summary of the main idea of the article:

_____

_____

View the article as it originally appeared in the Syracuse Post-Standard. To access the article, go to the *Student Materials* section on the Project Look Sharp homepage, www.projectlooksharp.org. **Identify three design elements from the original article (titles, images, text, maps, sidebars, layout, quotations, font, captions and icons) and explain how each reinforces the main idea of the article.**

Element:_____

_____

Element:_____

_____

Element:_____

_____

TEACHER GUIDE

Onondaga Lake: Activity 2

[NOTE: Teachers may choose to assign the* Student Reading: Onondaga Lake Cleanup *as homework at the end of* Activity 1 *instead of distributing the reading and going over it in class at the beginning of this activity.]

1. Organize and make copies for the class. If students have not received the *Student Reading: Onondaga Lake Superfund Site* at the end of Activity 1, make copies for each student. Each text excerpt and the corresponding worksheets are located on separate pages.

2. Provide the class with background information about the *Student Reading: Four Perspectives*:

Student Reading: Background

The *Student Reading: Onondaga Lake Superfund Site* provides background information that will help you analyze the next four media documents in the following readings. The New York State Department released this information to explain how Onondaga Lake became listed as a state superfund cleanup site. This excerpt also describes how Honeywell International was required by the federal court to study and implement cleanup measures based on the actions of its "predecessor companies" or waste-dumping companies that were later acquired by Honeywell International.

The four text excerpts in the *Student Readings* are from groups with interest in the cleanup efforts, and include the Onondaga Nation, Honeywell International, the Greater Syracuse Chamber of Commerce, and the Onondaga Environmental Institute. These four excerpts will be the focus of student analysis on the *Student Worksheet: Perspectives* and the *Student Assessment: Take a Stand Paper*.

3. Distribute the four-page *Student Reading: Four Perspectives*, which includes four separate text excerpts. Direct students to read all four text excerpts in the *Student Reading*. Distribute the four *Student Worksheets: Perspectives*.

4. After students have read the text excerpts, have them complete the corresponding four *Student Worksheets: Four Perspectives*. Remind students that they should use direct textual evidence from each reading to support the issues they select on the corresponding worksheet. Additionally, note that some issues and evidence may overlap (for example, "human health" and "ecosystem health" might be two issues with the same textual evidence). In this case, students can check multiple issues on the worksheet and provide a single quote supporting them.

5. Facilitate a discussion of each excerpt using the *Media Sample Questions & Answers* and *Possible Answers* on the following pages of the *Teacher Guide*.

Document 1, Perspective 1:
Onondaga Nation's Vision for a Clean Onondaga Lake
Onondaga Nation Publication (Brochure)
April 2010

Media Sample Questions & Answers

1) What concerns are most valued in this document?

Possible Answer: cultural preservation, human health and ecosystem health

Evidence: "The Lake is the living sum of everything in its watershed: the fish, the people, the plants, the soils, the tributaries. Onondaga Lake provides water which should be safe for drinking." "We will be sure that the Lake is clean enough to drink the water and eat the fish, and clean enough for children to play and swim in the water. We will strengthen our culture and restore our trust in the Lake." It presents a systems perspective in which the needs of people and place as recognized as essential for the health of the entire system.

2) Why was this document made and who might benefit from the message?

Possible Answer: This was made for the purpose of educating people about the history and values of the Onondaga people. It might benefit those who seek spiritual and cultural foundations for water stewardship and especially the people of the Onondaga Nation.

Document 2, Perspective 2:
"Syracuse Area Remediation Progress"
Honeywell International website
January 11, 2012

Media Sample Questions & Answers

1) What concerns are most valued in this document?

Possible Answer: Human health, ecosystem health and community involvement

Evidence: "A Community Health and Safety Plan… describes the protective measures that are taken," "The Habitat Plan includes new wetlands, shoreline improvements, and a robust habitat layer," "Honeywell is committed to continued public input."

2) Why was this document made and who is the target audience?

Possible Answer: This was made for the purpose of letting the public know that Honeywell is keeping its commitments to cleanup. The target audience is the general public and public officials who monitor Honeywell's compliance with the court ordered cleanup.

Document 3, Perspective 3:
"Responsiveness Summary Comments"
Deborah Warner of the Greater Syracuse Chamber of Commerce
to the Environmental Protection Agency's National Remedy Review Board
January 12, 2005

Media Sample Questions & Answers

1) What concerns are most valued in this document?

Possible Answer: Economic development and community involvement

Evidence: "The faster the lake is cleaned up the more development and spin off jobs will occur." "Going forward, what assurances can the taxpayers be given…"

2) Why was this document made and how might different people understand this message differently?

Possible Answer: This was made for the purpose of communicating the Syracuse business community's interest in lake cleanup as an incentive for investment in business opportunities. People who support development of the lakeshore for tourism and recreation might applaud this message while those who desire preservation of wetlands in their natural state might object.

Document 4, Perspective 4:
"Re-imagining the Future of Onondaga Lake: A Presenter's Guide"
Onondaga Environmental Institute presentation
2010

Media Sample Questions & Answers

1) What concerns are most valued in this document?

Possible Answer: Cultural preservation and community involvement

Evidence: "Using the cultural goals and knowledge of the people to shape the restoration process," "If enough people participate in the Superfund remediation process…we can have a big influence on the decisions that are made."

2) Why was this document made and what kinds of actions might one take in response to its message?

Possible Answer: This was made for the purpose of encouraging the public to participate in the cleanup process. It was also created to support inclusion of the traditional environmental knowledge of the Onondaga Nation in the planning process.

6. As a class, reflect on the reasons that each group (Onondaga Nation, Honeywell International, Greater Syracuse Chamber of Commerce, Onondaga Environmental Institute) may communicate different concerns on economic development, cultural preservation, human health, environmental protection and community involvement.

   Consider the factors that any group might take into account whenever it decides to make public comments such as their:
   - **mission**
   - **economic interest**
   - **relationship to other groups**
   - **public relations**

   Have students reflect on which source they find most credible and why.

7. (Optional) Divide students into four teams and have teams debate cleanup strategies from the point of view of the four groups: the Onondaga Nation, Honeywell International, the Greater Syracuse Chamber of Commerce and the Onondaga Environmental Institute.

8. Distribute the *Student Assessment: Take a Stand* and go over expectations in preparation for the students' final paper.

FURTHER QUESTIONS

Analyzing Media Messages

Are these messages fact, opinion, or both? Explain using examples.

What techniques did each author use to persuade and inform?

What kinds of actions might people take in response to each of these documents?

How might different people interpret these messages differently?

The series *Onondaga Lake: A Paradise Lost?* was written in 1985 before the lawsuits that led to the cleanup efforts, whereas the other documents were created during the period of public comment on the cleanup proposal. **How does historical context shape the meaning of the newspaper article and the set of four documents? What form might future public analysis take?**

Self Reflection

Which of these documents moved you the most you and what did you learn about yourself from your response?

What bodies of water do you feel most connected to and why?

Which of these groups would you want to learn more about and why?

Underlying Values and Motives

How might the following concerns fit together into your picture of a healthy community: economic development, cultural preservation, human health, ecosystem health and community involvement? Which concerns speaks most directly to you?

On a scale of one to ten, with one being not important at all and ten being most important, how would you rank these concerns related to your watershed:

- **access to clean drinking water**
- **preservation of wetlands**
- **water-based recreation opportunities**
- **fishing**
- **equal access to the waterfront**
- **robust jobs and economic development**

In what ways may lakes be important to mental health and spiritual well-being?

How would you define "clean?" Is "clean" important? How long does it take for a lake of this size to be "cleaned up?"

EXTENDED ACTIVITIES

Use your state's Department of Environmental Conservation online mapping systems to look at Superfund and Brownfield sites near your community. Is there a correlation between these sites and the income levels of adjoining neighborhoods? What site is nearest to you? Did you know about it? What has been written about it?

Write a letter to one of the influential groups that is addressing Onondaga Lake pollution. In the letter, include your thoughts on why it is important to address such an issue, suggest new ways to address the problem, or ask them questions about points they do not cover in their media documents.

Research the current status of cleanup plans for Onondaga Lake and the most current opinions of the groups represented in this lesson about the cleanup process.

Research a different lake or body of water near to where you live to see if it has had any pollution problems. If there is a remediation program planned or underway, how broad of a range of constituents is engaged in the process?

Compose a personal narrative about a place that is important to you and how you would feel if it became heavily polluted or damaged.

CONNECTIONS

L 6, 11, 12, 13, 19, 22, 23, 24
(water rights)

L2, 6, 14, 15, 16, 18, 19, 23, 24
(unintended consequences)

L14, 16, 18, 20, 23, 24
(news reporting)

L2, 3, 8, 9, 16, 18, 20, 22, 23
(text-based media)

Onondaga Lake Superfund Site
New York State Department of Environmental Conservation

Student Reading

Excerpt from the New York State Department of Environmental Conservation's website, 2012.

Onondaga Lake Cleanup - Overview
Onondaga Lake is located in central New York adjacent to the city of Syracuse. The lake covers an area of 4.6 square miles, has an average depth of 35 feet and a maximum depth of 63 feet. Its volume is about 35 billion gallons. The lake is approximately one mile wide and 4.6 miles long, and receives water from a land area, or drainage basin, of approximately 285 square miles in area, almost entirely within Onondaga County, New York.

Brief History
Before the American Revolution, the area surrounding Onondaga Lake was the center of the Iroquois Confederacy. European immigrants settled the area throughout the 17th and 18th centuries due in part to the presence of salty springs around Onondaga Lake. After the Erie Canal was built in the early 1800s, the booming salt industry in and around the city of Syracuse attracted many people. In the 19th century, Onondaga Lake served as a popular tourist attraction. The lake was populated with beaches, resorts and amusement parks.

Use of the lake changed dramatically when the water and lake bottom sediments became polluted with municipal sewage waste and industrial pollution which resulted in low oxygen levels and elevated levels of nutrients, harmful microorganisms such as disease causing bacteria, and toxic contaminants. For over 125 years industrial and chemical operations disposed a variety of pollutants to the lake. At one time industry discharged approximately 20 pounds of mercury to the lake each day. As a result of this, surface water was contaminated with mercury, and sediments were contaminated with PCBs, pesticides, creosotes, heavy metals (including lead, cobalt and mercury), PHAs and volatile organic compounds such as chlorobenzene. Groundwater at many upland sites around the lake was also contaminated.

By the early 20th century, the lake's western shore was industrialized and polluted and the fishing and resort industry began to decline. By 1940 swimming in the lake was banned, and in 1972 fishing was banned. Onondaga Lake and related upland sites were added to the Federal Superfund National Priorities List (NPL) in 1994. The lake and related upland sites were also added to the New York State Registry of Inactive Hazardous Waste Disposal Sites (State Superfund Program).

In 1988 Atlantic States Legal Foundation (ASLF), a Syracuse-based organization providing legal and technical assistance to citizens and organizations dealing with environmental problems, filed a lawsuit against Onondaga County. ASLF alleged that Onondaga County's sewage treatment plant, Metro, and combined sewer overflow discharges were violating federal water pollution standards established under the Clean Water Act of 1972. The State of New York joined as a plaintiff, alleging that Onondaga County also violated the New York State Environmental Conservation Law. The parties settled the litigation in 1989 through a consent judgment, requiring the County to complete planning, design and construction of facilities to bring wastewater discharges from Metro into compliance with regulatory requirements.

In 1989 the State of New York filed a lawsuit against Allied-Signal, Inc. (Honeywell International, Inc. is the corporate successor of Allied-Signal) seeking to compel the company to clean up the hazardous substances that it and its predecessor companies had discharged into and around Onondaga Lake, and to pay damages for the destruction of natural resources. In 1992, the federal court approved a consent order requiring the company to conduct, subject to state supervision and approval, a comprehensive environmental study of the area and to evaluate the feasibility of various remedial alternatives (Department of Environmental Conservation).

Onondaga Nation's Vision for a Clean Onondaga Lake

Onondaga Nation
Native American nation whose land includes Onondaga Lake

Student Reading: Four Perspectives
Document 1, Perspective 1

Excerpt from an April 2010 online brochure published by the Onondaga Nation with funding from the Onondaga Environmental Institute.

The People
From time immemorial, our ancestors lived near Onondaga Lake. The Lake, its waters, plants, fish, shore birds, and animals are an intrinsic part of our existence. Long ago, the Peacemaker brought together the five Nations on the shores of Onondaga Lake to bury the weapons of war and form our government. The Grand Council of the Haudenosaunee Confederacy continues to this day to meet at Onondaga.

The Lake is the living sum of everything in its watershed: the fish, the people, the plants, the soils, the tributaries. Onondaga Lake provides water which should be safe for drinking. Fish and birds make their home in and around the Lake. Food and medicinal plants grow along the shores of the Lake. The Lake was a place for people to fish and hunt. It was a place for children to play and swim and learn. Delegations would arrive at Onondaga for Confederacy meetings by traveling along the Seneca River to Onondaga Lake.

We are carrying out our responsibility to the Lake. We have our own name for the Lake, one which conveys the respect and sacredness of the place and the proper relationship with it. Someday we hope to share this name with our neighbors.

We will work to remove the contamination from the Lake and surrounding land. We will be sure that the Lake is clean enough to drink the water and eat the fish, and clean enough for children to play and swim in the water. We will strengthen our culture and restore our trust in the Lake. We will take our children and grandchildren to important places around the Lake and teach them the proper names and stories for them.

On this we agree…

The Creator
Onondaga Lake is central to the Onondaga Nation's aboriginal territory, and is deeply sacred to the people of the Onondaga Nation. Beauty and tranquility are gifts of the Creator. The rhythms and cycles of a healthy lake cause the people living around it to reflect on the rhythms and cycles of their own lives. The Lake will take care of the Community just as the Community will take care of the Lake.

We will continue to strive for innovation and creativity in cleaning up the Lake. By being creative we show the Creator that we are learning what our responsibilities are. We don't show that we are responsible by doing the same things over and over, but by being innovative. We will bring our best minds to correcting and restoring Onondaga Lake.

We have now arrived at the place where we end our words. We would also invite all things of creation that can help us with our effort to clean up Onondaga Lake. We give thanks to all things of Creation. Of all the things we have named, it was not our intention to leave anything out. If something was forgotten, we leave it to each individual to send such greetings and thanks in their own way.

Now that we have said this, we will bring together all of our best thoughts, best knowledge and best understanding to send to the Creator of all things for the beauty that surrounds us. All of this is to remind humanity of our relationship to all living things.

On this we agree (Ransom and Spence).

Syracuse Area Remediation Progress

Honeywell International

Company that bought Allied Chemical and is legally responsible for cleaning up its waste

Student Reading: Four Perspectives
Document 2, Perspective 2

Excerpt from the homepage of Honeywell International's website, *Syracuse Area Remediation Progress,* 2010.

We have made great progress on the restoration of Onondaga Lake. Under the direction of the New York State Department of Environmental Conservation (DEC), Honeywell is working with hundreds of world class scientists, engineers and technicians to implement the Record of Decision (ROD) issued by the DEC and the U.S. Environmental Protection Agency (EPA) in July 2005. Extensive public input has been incorporated into project designs.

In 2010, we began the construction of the area that will hold material removed from the lake. Last year we started constructing a lakeshore cleanup support area and a pipeline that will transport material from the lake to the containment area. A Community Health and Safety Plan, reviewed by DEC and the New York State Department of Health (DOH), describes the protective measures that are taken during this construction. A separate Health and Safety Plan is being developed for lake cleanup operations, which are scheduled to begin this year. Air monitoring results are available here.

We have completed the underground barrier wall, which prevents the primary source of contaminated groundwater from reaching the lake. Groundwater collected is being treated and cleaned at the groundwater treatment plant before being piped back into the lake.

The DEC released the third of four major lake restoration designs in May 2010 and in January 2010 the agency released the draft Onondaga Lake Habitat Restoration Plan for public review. The Habitat Plan includes new wetlands, shoreline improvements, and a robust habitat layer for the bottom of the lake where remediation is required.

In April 2010, DEC, in consultation with DOH and EPA, posted answers to Frequently-Asked Questions about the plans to remove materials from the lake and pipe them to the containment area. And in June 2010, the EPA released an Onondaga Lake Human Health Risk Assessment related to the containment area.

Progress continues at other sites near the lake. In 2011, work began at Geddes Brook to transform 17 acres of land into a diverse new habitat for wildlife. The yearlong project will involve the removal of contaminated soil and invasive plants, and the planting of 50,000 native shrubs, flowers, and trees.

Wetlands around the old LCP plant in Geddes are filled with native species that are attracting wildlife. Twelve thousand newly-planted trees and native plants are now growing in these formerly contaminated wetlands. In 2005, Honeywell stopped the flow of mercury from this site by installing a five-story deep, underground cut-off wall, and removing more than eight tons of mercury from the soil through a new technology called "soil washing."

In coordination with the State University of New York College of Environmental Science and Forestry (SUNY-ESF), Honeywell has created a Shrub Willow Farm in Camillus by planting more than 200,000 shrub willows on 35 acres of Honeywell property. This rapidly growing plant creates a sustainable and effective vegetative cover while increasing biodiversity, promoting recreational opportunities and serving as a productive source of "green" energy and bio-fuels for the region.

Honeywell is committed to continued public input throughout our work. Two-way communication and opportunities for public engagement are critical to achieving a successful, sustainable restoration of the lake. As part of the Citizen Participation Plan (CPP), the Community Participation Working Group is meeting throughout the remediation and restoration work providing a forum to inform, receive input and discuss specific aspects of the design and construction of the lake restoration. Honeywell fully supports the implementation of the CPP (Honeywell International).

"Responsiveness Summary Comments"

Deborah Warner, Greater Syracuse Chamber of Commerce

Largest business organization in Central New York region where Onondaga Lake is located

Student Reading: Four Perspectives
Document 3, Perspective 3

Excerpt from Deborah Warner's comments submitted to the Environmental Protection Agency's National Remedy Review Board on the Onondaga Lake Superfund Site, January 12, 2005.

My name is Deborah Warner and I am Director of Government Relations at the Greater Syracuse Chamber of Commerce. We are the largest business organization in Central New York with more than 2,300 member firms employing more than 140,000 working men and women in our community…

Our chambers includes the Onondaga County Convention and Visitors Bureau. Although we already market the lake for a range of events, we are thrilled at the potential of visitors and events after the remediation is complete. Waterways are certainly a huge part of our tourism marketing efforts. Currently, to the naked eye, the activity along the shoreline of Onondaga Lake is a fabulous asset.

But the question remains from our out of town visitors, why is there no activity on the water? Imagine the tourism benefits when we can successfully host major fishing and boating events. When DestiNY (a large shopping mall) is built, the value of the lake to us in nearly inestimable. We urge final approval and implementation of this program as soon as possible. Many projects in and near Onondaga Lake are moving forward, particularly the more than $200 million inner harbor project [by the DestiNY team] we should see this year begin.

And the faster the lake is cleaned up the more development and spin off jobs will occur. Of course we can't ignore the economic impact of over $400 million over the next seven years in the local economy. We look forward to Honeywell being a valued member of the community for a long time.

I would also ask that in your remediation, you preserve development opportunities on the land that is reclaimed. We believe there will be very strong interest in additional development adjacent to the lake and don't want to lose or limit this economic potential.

I know our members want me to give you a vote of confidence in your work. The business community does not doubt the thoroughness or scientific acumen of the DEC and the EPA. We trust that you have not overlooked any aspect of the Remedial Investigation and Feasibility Study. And we trust in the monitoring programs that are part of the plan.

So we also speak tonight to the Honeywell representatives to voice our wish that they agree to the DEC proposal.

One last question we hope you'll be able to respond to as you go forward, and it's similar to a concern that the County Executive brought up. [The remediation plan is designed to be a permanent solution and will probably need monitoring for generations.] Going forward, what assurances can the taxpayers be given that if there's a failure in the cap or an engineered solution they will not be held responsible for such costs? If Honeywell no longer exists or has merged with another company, who will be responsible for costs in that event?

Onondaga Lake is a jewel for this community and the City of Syracuse. The lake is a resource that any city would envy. We gained a lot of notoriety as the most polluted lake in the land. Now we will have a new reputation as an example of state-of-the-art remediation of one of the largest Superfund sites in the nation. So we look forward to the earliest implementation possible and the support for the recommended [$449 million] plan the DEC has put forward. Thank you (qtd. in New York State Department of Environmental Conservation).

"Re-imagining the Future of Onondaga Lake: A Presenter's Guide"

Onondaga Environmental Institute

Nonprofit research and education organization located in Central New York

Student Reading: Four Perspectives
Document 4, Perspective 4

Excerpt from a presentation guide produced by the Onondaga Environmental Institute for the Onondaga Nation in 2010.

It's vital that we start talking about these issues now. If we take the time to start asking some difficult questions, then we will be more prepared when we are faced with a short time period in which to offer our comments on remediation and restoration plans. And if we can work to find some common ground before we are called upon to offer comments, then our voices will have greater impact with decision-makers.

…If enough people participate in the Superfund remediation process, the Natural Resource Damage Assessment and Restoration, and other local environmental planning, we can have a big influence on the decisions that are made.

The communities of the Onondaga Lake watershed have many local resources that we can share with one another to support our participation in this discussion.

For example, we have a remarkable opportunity to benefit from an exchange of environmental knowledge with the Onondaga Nation. The Onondagas have many centuries worth of knowledge about the functioning of the lake ecosystem and could contribute that knowledge to our collective remediation and restoration efforts.

One way our communities could achieve that kind of cross-cultural partnership would be through a process called biocultural restoration. Biocultural restoration involves bringing the people who live in a degraded landscape into active participation in the landscape's restoration. This is achieved by using the cultural goals and knowledge of the people to shape the restoration process.

Biocultural restoration has been used successfully across the country and around the world. Some researchers at SUNY ESF have argued that we have an opportunity to apply those successful practices right here at home.

The Internet is a valuable tool the community can use to share knowledge about the lake and ideas for its remediation and restoration. On your "Getting Involved" handout, you'll find the address for a new blog called "Revive Onondaga Lake." This site offers information about the lake, news updates, and event and meeting announcements. It also allows users to comment on blog entries and on an interactive map of Onondaga Lake.

We invite you to explore and use the resources on this website as you become involved in our community conversation about the lake.

Beyond the complex challenges of restoring Onondaga Lake lies the promise of a life-giving resource strongly interconnected with the lives of the people and other living things that call this place home. We can restore the lake, and our relationship to it, only through our active participation as members of its watershed community. As Bradley Powless of the Onondaga Nation has said:

"That's how you save the lake. You know that you're gonna be here and your children's children's gonna be here, and that you want the best for them. Your children are coming. And you tell your grandchildren, and you tell your relatives, and you think, 'Onondaga is our home.' And that's what makes it sacred to you. .... But until you have that within yourself, ... it's like a sidebar, Onondaga Lake as a sidebar, not as a part of" (Onondaga Environmental Institute).

Student Worksheet: Four Perspectives, Doc. 1

NAME _____ **DATE** _____

Document 1
Onondaga Nation's Vision for a Clean Onondaga Lake
Onondaga Nation

Select the issues that are most valued in this document and provide textual evidence from the document to support your conclusions. Some evidence will support overlapping issues, so you may need to check more than one issue.

Issue	Evidence
❒ Economic Development ❒ Cultural Preservation ❒ Human Health ❒ Ecosystem Health ❒ Community Involvement	
❒ Economic Development ❒ Cultural Preservation ❒ Human Health ❒ Ecosystem Health ❒ Community Involvement	
❒ Economic Development ❒ Cultural Preservation ❒ Human Health ❒ Ecosystem Health ❒ Community Involvement	

Why was this document made and who might benefit from the message?

Student Worksheet: Four Perspectives, Doc. 2

NAME _____ **DATE** _____

Document 2
Syracuse Area Remediation Progress
Honeywell International

Select the issues that are most valued in this document and provide textual evidence from the document to support your conclusions. Some evidence will support overlapping issues, so you may need to check more than one issue.

Issue	Evidence
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	

Why was this document made and who is the target audience?

Student Worksheet: Four Perspectives, Doc. 3

NAME _____ **DATE** _____

Document 3

"Responsiveness Summary Comments"
Deborah Warner, Greater Syracuse Chamber of Commerce

Select the issues that are most valued in this document and provide textual evidence from the document to support your conclusions. Some evidence will support overlapping issues, so you may need to check more than one issue.

Issue	Evidence
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	

Why was this document made and how might different people understand this message differently?

Student Worksheet: Four Perspectives, Doc. 4

NAME _____ **DATE** _____

Document 4
"Re-imagining the Future of Onondaga Lake: A Presenter's Guide"
Onondaga Environmental Institute

Select the issues that are most valued in this document and provide textual evidence from the document to support your conclusions. Some evidence will support overlapping issues, so you may need to check more than one issue.

Issue	Evidence
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	
❒ **Economic Development** ❒ **Cultural Preservation** ❒ **Human Health** ❒ **Ecosystem Health** ❒ **Community Involvement**	

Why was this document made and what kinds of actions might one take in response to its meaning?

Student Assessment: Take a Stand

Use the information you have gathered concerning the history of Onondaga Lake pollution and cleanup efforts to write a **persuasive essay** taking a stand on **how to best help Onondaga Lake and its communities become a healthy system** that works for all of its members both human and nonhuman. Your essay will use information gathered from the *Student Readings* and *Student Worksheets*.

BEFORE YOU WRITE:

- Consider which of the five different issues (economic development, cultural preservation, human health, ecosystem health and community involvement) are the most important to your plan to help Onondaga Lake become a healthy system.

IN YOUR INTRODUCTION:

- State your view on how to help Onondaga Lake and its communities come into greater balance
- Identify **three of the five issues** that you will focus on in the each of your body paragraphs

IN YOUR BODY PARAGRAPHS:

- Name the individuals, groups or communities that will benefit from your stand and state how they will be served
- Specify the individuals, groups or communities that might oppose your stand, why they might be opposed and how you might address their concerns
- Refer to **at least two media documents** to support your argument

Lesson 24: Hydrofracking, Media & Credibility


PowerPoint Slideshow


Video Clips

LESSON PLAN

Hydrofracking, Media and Credibility

Lesson Objectives:

- Students will apply information and critical thinking questions to the analysis of media messages about hydrofracking in the film *Gasland* and related documents.
- Students will identify the criteria for evaluating the credibility, accuracy and bias of sources concerning controversial issues.
- Students will reflect on their own biases and how they influence their perceptions of credibility.

Vocabulary:

ANGA (American Natural Gas Association), aquifer, Clean Water Act, Energy in Depth, EPA (Environmental Protection Agency), exemption, fracking, *Gasland*, gas lease, groundwater, hydraulic fracturing, hydrofracking, Josh Fox, Marcellus shale, natural gas

Media: scientific diagram, documentary film, online video, satirical television news program, Google search screen

Materials Needed:

- Fourteen-page *Teacher Guide*
- Fifteen slide PowerPoint slideshow
- Three video clips (Access online or via Lesson 24 digital media folder)

Time: 60-90 minutes

Lesson Procedures

- Brainstorm what the term "hydrofracking" means to students and where they have received information about it.
- Present the *Lesson Introduction* to the class.
- Project the PowerPoint and analyze diagrams illustrating the hydraulic fracturing drilling process within the water table geology.
- Play Video Clip 1 from the film *Gasland*. Analyze the construction for messages, techniques, sourcing, bias and accuracy using the *Media Sample Questions & Answers* in the *Teacher Guide*.
- Play Video Clip 2 from the online video "The Truth About *Gasland*." Analyze construction for messages, techniques, sourcing, bias and accuracy using the *Media Sample Questions & Answers* in the *Teacher Guide*.
- Play Video Clip 3 from *The Daily Show* interview with *Gasland* producer, Josh Fox. Analyze construction for messages, techniques, sourcing, bias and accuracy using the *Media Sample Questions & Answers* in the *Teacher Guide*.
- Project the PowerPoint Part 3: Credibility in a Google Search. Encourage students to question their own biases in judging the credibility of sources by analyzing the film clips and a Google search for the terms "Josh Fox" and "Gasland."
- Lead a class discussion on determining the criteria for assessing credibility, accuracy and bias of sources.
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Hydrofracking, Media & Credibility

1. Organize and make copies for the class activities.

2. Before you begin to introduce the lesson, it is important to find out what students know or think they know about hydrofracking. Make several columns on the board and ask students to collectively harvest their prior knowledge by asking:
   - **What is hydrofracking?**
   - **What are some of the positive things you have heard about the process?**
   - **What are some of the negative things you have heard about the process?**
   - **Where have you gotten your information about hydrofracking?**
   - **Do you think that your sources of information about hydrofracking have been credible or not and why?**

3. Introduce the lesson. The introduction below summarizes some of the contending arguments about hydrofracking and explains the intent of the lesson. Adapt the first paragraph based on information harvested from the students in step two.

Lesson Introduction

Hydrofracking is short for hydraulic fracturing, or a drilling process where energy companies pump high volumes of a water and chemical mixture into deep wells in order to release and capture natural gas trapped in geologic formations deep beneath the surface of the earth. Advocates of the process propose that hydrofracking, or "fracking," can be the cornerstone for a sustainable energy economy. They argue that the process is environmentally safe and that it provides energy independence from overseas oil, jobs for local workers and much-needed funds for local communities where drilling takes place. Critics of the process say that hydrofracking pollutes groundwater supplies and that natural gas is not the "clean energy alternative" advertised by the energy companies. They argue that any local jobs associated with hydrofracking will be short-lived and that the real profits will go to the companies, leaving the community to deal with the environmental and human fallout from what they see as a potentially disastrous alternative to locally controlled renewable energy technologies.

This lesson will not introduce you to all the pro and con arguments about hydrofracking. Rather, this lesson will ask you to question how we know what we know about a particularly contentious issue. Who is telling the truth and who is not? You will explore these questions by looking at diverse media documents including drilling diagrams, excerpts from the Academy Award nominated documentary *Gasland*, an industry response to the film posted on YouTube, a *Daily Show* interview with the film's producer and a Google search screen page. You will be asked to consider your own preconceived ideas about what sources are credible and what ones are not in order to become a more discerning consumer of media messages that relate to the sustainability of our energy systems, our watersheds and our communities. We will begin our analysis by comparing messages in two diagrams of the hydrofracking drilling process and consider the credibility of the source of each diagram.

4. Project the PowerPoint presentation, starting with *Part One: Credibility in Diagrams* (slides numbered 1-10). Lead a discussion using the *Media Literacy Questions & Goals* in the *Teacher Guide*.

   [NOTE: This is a preliminary exercise that invites students to consider source credibility and their own biases. Encourage students to freely present their opinions on these matters in a respectful environment.]

Media Literacy Questions & Goals
Slides 1-2

Media Literacy Question

Slide 1: "What is an Aquifer?"
Idaho Museum of Natural History, Idaho State University Web page

Media Literacy Question
Does this Web page strike you as a credible source? Why or why not?

Media Literacy Goals

Encourage a dialogue about what "credibility" means and how we can judge the credibility of media sources. Possible answers are included on *Slide 2*.

[NOTE: Teachers may want to review* Slide 13 *and* Key Questions to Ask When Analyzing Media Messages *to prepare for the discussion about credibility. The* Key Questions *document is on the introductory PowerPoint slide and in the* Resources *section of this kit. Teachers may also want to reference* Criteria for Examining the Credibility of Information on the Internet *and* Technical Strategies for Evaluating Websites*, which are also available in the* Resources *section.]

Slide 2: Possible Answers

Yes
It is probably a credible website because its URL indicates that it is from an **educational institution** (**.edu**). In this case, the website is from the **Idaho Museum of Natural History** (http://imnh) housed at Idaho State University (.isu).

On the bottom of the Web page, you can also see a link to Source Information that lets you know where the article information originated. The Source Information is presented on the next slide.

Slide 3

Media Literacy Question

Slide 3: "Sources & References"
From "What is an Aquifer?"
Idaho Museum of Natural History,
Idaho State University Web page

Discuss the credibility of the sources for the "What is an Aquifer" article.

Media Literacy Goals

Instructors should ask questions to spark conversations about the sources, including:

What media forms are on this sources list?
Discuss the sources list, noting the diversity of media, including books, websites, and even a coloring book.

Who published some of these sources?
Note the variety of publishing organizations, including the Idaho Department of Fish and Game, the Nature Conservancy, the Idaho Museum of Natural History and Idaho State University.

Slide 4

Slide 4 includes an excerpt from "What is an Aquifer?"

Slide 4: Excerpt from "What is an Aquifer?"

What is an Aquifer?
An aquifer is a body of saturated rock through which water can easily move. Aquifers must be both permeable and porous…

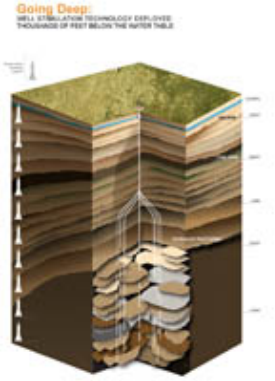
Why is Groundwater So Clean?
Aquifers are natural filters that trap sediment and other particles (like bacteria) and provide natural purification of the ground water flowing through them.

How is an Aquifer Contaminated?
An aquifer can be contaminated by many things we do at and near the surface of the earth. Contaminants reach the water table by any natural or manmade pathway along which water can flow from the surface to the aquifer… In general, any activity which creates a pathway that speeds the rate at which water can move from the surface to the water table has an impact.

Slide 5

Media Literacy Question

Slide 5: "Going Deep: Well Stimulation Technology Deployed Thousands of Feet Below the Water Table"
From *EnergyinDepth.org*
Independent Petroleum Association of America



What is the message in this diagram about the potential dangers of aquifer contamination from hydraulic fracturing drilling?

What is your evidence from the document?

Media Literacy Goals

Possible Answer: There is little danger to the aquifer.

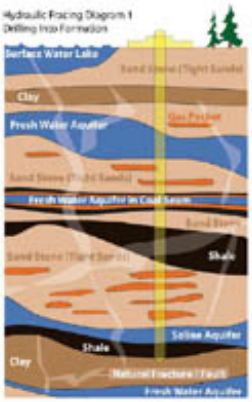
Evidence: The drill heads appear to be more than a mile beneath the aquifer, making it unlikely that the water table could be contaminated by the drilling process.

[NOTE: The source of the diagram is provided here for the teacher's information only. Students will be asked to guess the source of this diagram in Slide 7.]

Slide 6

Media Literacy Question

Slide 6: "Hydraulic Fracing Diagram 1: Drilling into Formation"
From *JourneyoftheForsaken.com*
Lisa Bracken



What is the message in this diagram about the potential dangers of aquifer contamination from hydraulic fracturing drilling?

What is your evidence from the document?

Media Literacy Goals

Possible Answer: There is significant potential danger to the aquifer.

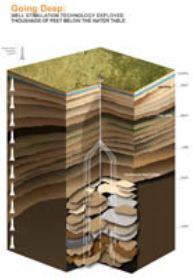
Evidence: The drill head appears to be located in a thin layer of shale and clay located between a saline aquifer and a fresh water aquifer. This makes it appear likely that chemicals from the hydrofracking process could penetrate into the aquifers and thus contaminate the water table.

[NOTE: The source of the diagram is provided here for the teacher's information only. Students will be asked to guess the source of this diagram in Slide 7.]

Slides 7-8

Media Literacy Question

Slide 7



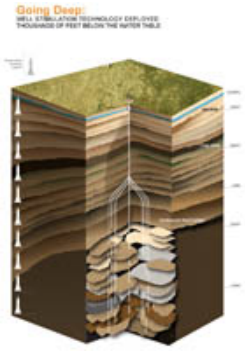
Which diagram was created by the natural gas industry and which by an opponent of hydrofracking?

What is your evidence in the document for your guess?

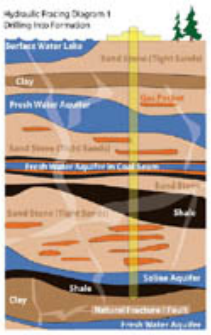
Media Literacy Goals

Have students discuss the media literacy questions in pairs or in the full class before showing the answer on the *Slide 8*.

Slide 8: Answers



Produced by Energy in Depth, a campaign mounted by the Independent Petroleum Association of America



Produced by Lisa Bracken, a hydrofracking opponent whose "Fracked Frank's Hydraulic Fracturing Primer" is on her website, *Journey of the Forsaken*

Slides 9-10

Media Literacy Question

Slide 9

What questions might you ask about these diagrams in order to judge their credibility?

Media Literacy Goals

Brainstorm questions before showing *Slide 10*, which lists several key media literacy questions related to credibility of sources.

Slide 10: Possible Questions to Ask

- **Who created the diagram?**
- **In what context was it used?**
- **Who paid for its use?**
- **What is the mission of the producer?**
- **When was it made?**
- **Are there texts or diagrams from other sources that confirm or challenge this interpretation?**

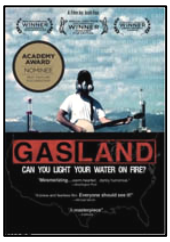
[NOTE: The next slide introduces the final exercise* (Part 3: Credibility in a Google Search) *and should not be projected until after you have completed the video clip analysis.]

5. Explain that students will now view three video clips about hydrofracking. For each clip, they will be asked to look for messages about hydrofracking, for techniques used to further each message and for evidence supporting whether or not they consider a source to be credible and why.

6. Play the three video clips. After each clip, lead a discussion using the *Media Sample Questions & Answers* in the following pages of the *Teacher Guide*.

Video Clip 1

***Gasland*, 4:18 min. clip**
2010
Documentary film



Introduction

Gasland, a documentary by Josh Fox, was nominated for a 2011 Best Documentary Feature Academy Award.

Media Sample Questions & Answers

1) **What are the messages about hydrofracking?**

Possible Answers: It will provide income for landowners who agree to lease their land for drilling; the process is exempt from many environmental protection laws; 596 chemicals, many of them toxic, are used in the process; vast amounts of water are required; the process threatens the watersheds of New York, Pennsylvania, Ohio, and West Virginia.

2) **What techniques are used to convey the message?**

Possible Answers: The narrator's steady voice is meant to be the one stable and reliable thread of information as a barrage of quick clips flood the screen. Information related to concerns about chemicals and water usage is projected as slides on the screen to underscore the narrator's dire message. Images of pristine mountains, rivers and geese illustrate the landscape that is threatened while the preceding images of barren gas well landscapes suggest what will happen if hydrofracking is allowed in the Delaware River watershed.

3) **Do you consider this to be a credible source? Why or why not?**

Possible Answers: Answers will vary. Some will argue that this is just one disgruntled critic's personal view, while others will say he is a courageous investigator fighting to save the earth by speaking truth.

Video Clip 2

"The Truth About *Gasland*," 4:12 min. clip
2011
Online video

Introduction

"The Truth About *Gasland*" was produced by ANGA, America's Natural Gas Alliance, a natural gas industry group, and posted to YouTube in 2011.

Media Sample Questions & Answers

1) **What are the messages about natural gas drilling in *Gasland*?**

Possible Answers: Natural gas is a highly regulated process; information about chemicals used in hydrofracking will be available; natural gas did not cause flammable tap water or fish kills; water used in the process is recycled; accidents are cleaned quickly; natural gas provides clean air, energy independence and jobs. *Gasland* is a flawed documentary, filled with mischaracterizations of the truth designed to encourage fear rather than fact-based knowledge.

2) **What techniques are used to convey the message?**

Possible Answers: A soothing female voice intends to reassure viewers. Repeated images of blue skies, green trees and happy families and a soundtrack of fast, upbeat string music highlight the positive messages about natural gas. Challenges to *Gasland's* assertions are underscored with quotes from media sources on color cards for emphasis. These elements contribute to a more rational, scientific media production that contrasts the more irrational, emotional *Gasland* production.

3) **Do you consider this to be a credible source? Why or why not?**

Possible Answers: Answers will vary. Some will say that this video is simply propaganda put out by the gas companies to paper over the harsh truths brought forward in *Gasland*. Others will argue for its credibility, citing the quotes from other sources debunking *Gasland* and the appeal for fairness from an industry that wants to help steward the environment and protect communities.

Video Clip 3

"Josh Fox," 4:00 min. clip
The Daily Show with Jon Stewart
June 21, 2010
Television clip

Introduction

This excerpt is from *Gasland* director Josh Fox's appearance on *The Daily Show with Jon Stewart*, Comedy Central's satirical news program.

Media Sample Questions & Answers

1) What are the messages about hydrofracking and industry criticisms of *Gasland*?

Possible Answers: Toxic materials released into the environment through the drilling process, which is exempt from federal environmental regulations, contaminate interconnected water systems. The natural gas industry hires public relations firms to smear *Gasland*.

2) What techniques are used to convey the message?

Possible Answers: The host Jon Stewart uses satirical questions to mock the gas industry while giving Fox an opportunity to respond to industry claims.

3) Do you consider this to be a credible source? Why or why not?

Possible Answers: Answers will vary. Some will argue that the *Daily Show* is entertainment made to make us laugh, while others say it uses satirical methods to expose deep truths that others refuse to explore.

7. Return to the PowerPoint and project the title slide, *Part 3: Credibility in a Google Search*. Explain that students will view a slide with six results from a Google search for the terms "Gasland" and "Josh Fox."

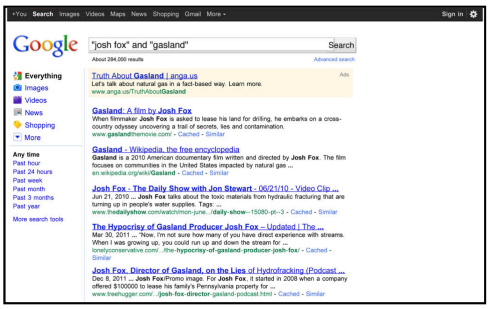
8. Project the Google search on *Slide 12*. Have students take a few minutes to discuss with a partner which sources they consider most credible, which they consider the least credible, and why.

   [NOTE: Teachers may want to reference* Criteria for Examining the Credibility of Information on the Internet *and* Technical Strategies for Evaluating Websites *in the* Resources *section of this curriculum to better facilitate a discussion on credibility.]

Media Literacy Questions & Goals
Slides 12-13

Media Literacy Question

Slide 12: Excerpts from Google search for "Josh Fox" and *Gasland*



At first glance, which sources would you consider more credible and which sources would you consider less credible and why?

Media Literacy Goals

Have students identify the key questions one should ask when assessing credibility in the media. Use *Slide 13* to reinforce key concepts in assessing the credibility of information.

Slide 13: Possible Answers

Tips for judging the credibility of a media source

- **Identify the source, its funding and mission and speculate on how that may influence the information**
- **Assess and verify the currency and accuracy of information**
- **Reflect on how one's own bias may influence one's judgments about the credibility of the information**
- **Seek, compare and evaluate the information from diverse sources**

9. Lead a discussion about which of these media sources is most credible and why. Probe questions include:
   - **What is your basis for judging credibility of sources?**
   - **Are you open to the possibility that sources you mistrust may sometimes be accurate?**
   - **Are you open to the possibility that sources you trust may sometimes be inaccurate?**
   - **How can you fact check conflicting stories such as the ones you have just heard?**
   - **What did you learn about yourself from an honest review of your preconceptions?**

FURTHER QUESTIONS

Analyzing Media Messages

How does the mission of the media producer affect the message in the media document?

What role does information concerning the financial support of a media producer play in understanding media messages?

What information was left out of each document that might be important to know?

Which of these forms do you consider to be media, which are not, and why: a diagram posted on a website, a diagram you draw at home, a video posted to YouTube, a video taken on your smart phone, a web search page, a list of materials on your library's desktop monitor.

Self Reflection

Where is the nearest hydrofracking operation to where you live? How can you find out if you do not know?

What did you learn about yourself from your interpretation of these media documents?

How is energy production connected to the water you drink?

Who among your friends and family has spoken about natural gas drilling? What is their opinion about hydrofracking?

Underlying Values and Motives

The producers of "The Truth About *Gasland*" state in the video that we have "the responsibility to develop this natural resource with a constant sense of stewardship to the land." Is this true?

Josh Fox in *Gasland* argues that natural gas drilling in the Marcellus shale region will mean that the Delaware River basin that "for my whole life has been protected" is at risk of becoming a national sacrifice area with the production of natural gas. Is this true?

How can we decide what to believe when two well-made film productions argue for such different conclusions?

How can you find out who paid for the production of *Gasland* and "The Truth About *Gasland*?"

Sustainability ideally joins together a short term and a long-term perspective on supporting community well-being. Do you see ways to meet short-term and long-term needs around energy issues in the Finger Lakes? If so, how might you get different people you know to agree on this as a value and as a realistic possibility?

EXTENDED ACTIVITIES

These documents present hydrofracking as viewed by one industry group, the American Natural Gas Association, and by one independent filmmaker, Josh Fox. In the Finger Lakes, there are other industrial groups, such as the wine and tourism industries as well as government agencies in transportation, health, environmental protection and economic development at city, county, and state levels with interests in this issue. Select several stakeholders from these or other groups and research their perspective on the risks and benefits of hydrofracking.

Create and defend a presentation on your own position on the place of hydrofracking in developing a sustainable energy and water management system.

Find and compare representations of hydrofracking in the popular media. Look for examples in music, television programming, newspaper editorials and magazine covers.

Dr. Robert Howarth, Professor of Ecology and Environmental Biology at Cornell University, has conducted a full life-cycle analysis of greenhouse-gas emissions from shale gas development relative to existing fossil fuel and alternative renewable energy sources. Study his results and the responses to his conclusions within the scientific community. Report on this research to your class.

Assemble a panel on hydrofracking with diverse members of your community. Be sure to include people with different stakeholder perspectives and different points of view concerning the practice.

Create a timeline that charts the emergence of hydrofracking as a media issue in your region. Use search tools to track down when the earliest information about the practice was reported and show the order as different media forms entered the dialogue thereafter.

CONNECTIONS

L 6, 11, 12, 13, 19, 22, 23, 24
(water rights)

L3, 6, 8, 9, 14, 16, 17, 18, 19, 20, 24
(fossil fuel)

L2, 6, 14, 15, 16, 18, 19, 23, 24
(unintended consequences)

L2, 7, 11, 13, 17, 19, 24
(creative arts)

L2, 6, 7, 9, 10, 12, 13, 14, 15, 18, 20, 24
(film & video)

L14, 16, 18, 20, 23, 24
(news reporting)

Lesson 25: Sustainable Food Security Systems

LESSON PLAN

Sustainable Food Security Systems


PowerPoint Slideshow

Lesson Objectives:

- Students will understand components of sustainable food security systems as represented in specific examples from the Finger Lakes.
- Students will analyze and evaluate Finger Lakes models for food security through the lenses of access, culture, employment, environment, health, ownership, scale and worker safety.
- Students will draw their own conclusions regarding the essential components for creating sustainable food security systems, including their role in such systems.
- Students will relate food systems to their personal food choices and options.

Vocabulary:

agricultural land footprint, agroecosystem, carbon footprint, commodity, community garden, community supported agriculture (CSA), cooperative extension, culturally appropriate food, ecovillage, efficiency of scale, energy descent, entrepreneur, farmers market, food bank, food desert, food justice, food miles, food security, food sovereignty, food stamps, foodshed, hunger relief program, land trust, locavore, market gardener, migrant farmworker, peak oil, raised bed gardening, staple food, urban farm, United States Department of Agriculture (USDA)

Media: news article, press release, web page, blog, magazine article, fact sheet, report

Materials Needed:

Activity 1

- Two-page *Teacher Guide: Activity 1*
- Four-page *Student Reading: Sustainable Food Security Systems*
- Eight separate two-page *Student Handouts: Food Security Lenses*

Activity 2

- One-page *Teacher Guide: Activity 2*
- 33 slide PowerPoint slideshow (Access online or via Lesson 25 digital media folder)

Activity 3

- Four-page *Teacher Guide: Activity 3*
- 33 slide PowerPoint slideshow (Access online or via Lesson 25 digital media folder)

Time: Activity 1: 40 minutes
Activity 2: 50 minutes
Activity 3: 60 minutes

Lesson Procedures

Activity 1

- Present the *Lesson Introduction* to the class.

- As a class, brainstorm what "food security" and "food sovereignty" mean. Give students about ten minutes to freewrite and reflect on what food security and food sovereignty mean to them.

- Distribute and have students read the *Student Reading: Sustainable Food Security Systems*. Lead a discussion about approaching sustainable food systems through different "lenses."

- Divide the class into eight groups (one for each lens) and assign each group a lens to analyze for the rest of the lesson.

- Distribute one of the eight lens-specific handouts, *Student Handout: Food Security Lenses* to each group. Direct the groups to provide one additional question pertaining to their assigned lens.

Activity 2

- Give students about ten minutes to freewrite on their food choices for that day (or the previous day) and why they have made them.

- Direct students to return to their lens group. Have the eight groups evaluate their assigned media documents in the PowerPoint using the four questions from their *Student Worksheet*.

- Provide time for students to plan their in-class presentations on their media documents and questions for their lens.

Activity 3

- Direct students to return to their lens group and provide extra time for them to finish planning their in-class presentations if needed.

- As the students present their media documents, project the PowerPoint slides for the whole class.

- Lead a discussion with the whole class on the key question: **What are the essential components of a sustainable food system?**

- Following the whole class discussion, give students about ten minutes to freewrite on how the information in this lesson may influence their food choices in the future and how their personal food choices affect the relationship between where they live and their community's food security.

- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Sustainable Food Security Systems, Activity 1

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

This lesson will introduce you to the concepts of food security and food sovereignty. Using examples of Finger Lakes food projects, you will analyze the effectiveness of food security systems through lenses of **access, culture, employment, environment, health, ownership, scale and worker safety**. At the end of the lesson, you will draw your own conclusions regarding the essential components for creating sustainable food security systems and relate food systems to your personal food choices and options.

3. Brainstorm what "food security" means. Then, ask students what they think "food sovereignty" might mean. Encourage wide-ranging visions of the necessary ideas, values and practices that might result in making a community more "food secure."

Definitions

Food security: ensures that food is available and accessible to all community members through a system that supports dignity and fairness for everyone

Food sovereignty: the right for communities to determine and control their food systems (agricultural, livestock, fisheries, etc.) and food choices, as opposed to having these systems and choices regulated by market forces

4. Give students ten minutes to freewrite and reflect on the meaning of the terms "food security" and "food sovereignty."
   Probe questions include:
   - **How are these terms related? How are these terms different?**
   - **What does food security and food sovereignty mean to you?**
   - **What is the importance of food security and food sovereignty?**
   - **What are some obstacles to food security and food sovereignty?**

   Teachers may choose to collect and evaluate students' freewriting after the activity.

5. Distribute and have students read the *Student Reading: Sustainable Food Security Lenses.* Alternatively, the reading may be assigned for homework.

6. Lead a discussion about the concept of "lenses" and how lenses can help examine sustainable food security systems from a variety of perspectives.

7. Divide the class into eight groups, or one for each food security lens. Assign each group to one lens.

Lens 1: Access	Lens 5: Health
Lens 2: Culture	Lens 6: Ownership
Lens 3: Employment	Lens 7: Scale
Lens 4: Environment	Lens 8: Worker Safety

8. Distribute one of the eight *Student Handouts: Food Security Lenses* to each of the groups. There are eight separate worksheets (one for each lens). Explain that students will use their worksheet to analyze three media documents specific to their lens and develop a presentation on their lens for the whole class.

9. Give students time to review the two lens-specific questions on their worksheet. Direct students to add at least one additional open-ended question for their assigned lens. (Help students focus on questions that do not answer simply in "yes" or "no.") Remind students that the *Student Reading* may help inspire other questions pertaining to their lens. The question they create, in addition to the three questions provided, should be part of the content of their presentations.

10. Remind students that they will need their *Student Worksheet* for the following activities.

Sustainable Food Security Systems

What does "food security" mean? That depends on whom you ask. The ConAgra Foods Foundation is the charitable arm of a large packaged foods corporation. ConArga Foods Foundation defines food security as "the condition of having regular access to enough nutritious food for a healthy life" (Cook and Jeng 9). The Community Food Security Coalition is a large North American membership organization composed of groups engaged in the issue of food security. Their website defines community food security according to Mike Hamm and Anne Bellows:

> [It] is a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice. (qtd. in "What is Community Food Security?")

Food sovereignty is the preferred term of the International Planning Committee for Food Sovereignty. This global network of small food producers contends that

> Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. ("Définition de la souveraineté")

You can see from these definitions that "food security" and "food sovereignty" are concepts that require looking at whole systems from a wide variety of perspectives. ConAgra looks at food security through the lenses of *access* and *health*. The Community Food Security Coalition looks through the lenses of *safety* and *culture*. The International Planning Committee for Food Sovereignty looks through the lenses of *environment* and *ownership*. This lesson challenges you to consider concerns of food security and food sovereignty in the Finger Lakes in a systemic way, taking into account all these perspectives in order to return to the essential question of how your family, school and community will relate to food today and in the future.

Historic Legacy of Sustainable Food Production

There have been times in the not-too-distant past when food security was a reality for most of the people living in the Finger Lakes region. Five hundred years ago, the nations within the Iroquois (Haudenosaunee) Confederacy cultivated the "three sisters" – crops of corn, beans and squash – hunted for wild game, harvested forest crops and fished from the abundant lakes ands streams using technology that they had developed over centuries of living in place. The white settlers of the 18th and 19th centuries in the Finger Lakes region had a thriving local and regional agriculture system that provided for the needs of local communities (Nicholson). Grains (rye and buckwheat), fruit (apples and grapes), and vegetables (potatoes and corn) were grown, harvested and traded with transport along the lakes and eventually along the Erie Canal. Value-added products such as cider, wine and maple syrup were made for consumption and trade during this early period (Fippin 288). Small fisher-farmers were able to become relatively self-sufficient with the proceeds of rich soils and clear water (North, "Peri-urban Agriculture").

Contrasting Lenses Through Which To View Security

A lens is simply a pathway through which something can be seen or understood. It can also be described as a perspective for viewing an issue that is influenced by a particular mindset or focus. There are many different lenses through which we might view concerns about the sustainability and equity of our collective food systems. Within each lens there are also different perspectives based on who is seeing and who is reporting. In this lesson you will be introduced to eight lenses to analyze and evaluate food security in the Finger Lakes.

This reading introduces you to each lens, and presents two different views of models of food security in the Finger Lakes as seen through each lens. As you weigh the contrasting examples, consider the diverse values, intentions and economic interests of the organizations behind each model.

The Lens of Access

Who has access to good food and how do they get it? Why do some populations have less access to healthy food? How do the answers to these questions drive different solutions to the problems of access?

One example of access is through a food bank, a place where food is contributed and made available to those in need. One way that the Food Bank of the

Southern Tier addresses food insecurity is through its Operation Frontline (OFL). With support from food industry corporations, such as Wegmans Food Markets and Tyson Foods, OFL provides "low-to-moderate income individuals with the skills they need to increase their healthy eating options" (Food Bank 6).

Gardens 4 Humanity, a project of Cornell Cooperative Extension of Tompkins County, provides a different approach to access. This group supports the creation of educational and community gardens as a means to fulfill its mission as "a community-driven organization that promotes economic, personal, and neighborhood empowerment through urban gardening and local farm connections" ("Gardens"). The group focuses on creating a network of neighborhood-based community gardens and garden coordinators who are skilled in educating about the structural barriers that have limited food access for low income people and people of color.

The Lens of Culture

How do food systems relate to cultural heritage? A Finger Lakes project that centers on cultural connections to food is the Iroquois White Corn project, which is based at the historic Seneca community of Ganondagan (south of Rochester). The intent of the project is to "plant, process, and sell white corn… [and] educate visitors about the cultural, nutritional, and spiritual importance of white corn to the Haudenosaunee" ("Corn at Ganondagan").

The Refugee Resettlement Program, operated by Catholic Charities of Onondaga County, uses a distinctly different approach to the lens of culture. The program helps newly arrived immigrant find apartments in the Syracuse area. Helen Malina, program director of the Center for New Americans, says that the program seeks to make refugees feel at home by making "sure the apartment is set up and the fridge is full culturally appropriate food and there's a hot meal ready for them to eat" (qtd. in DeMaria).

The Lens of Employment

In what way can food systems provide sustainable community jobs? The National Agricultural Biotechnology Council, a consortium of twenty-six major agricultural research and educational institutions in the US and Canada, is based on the Cornell University campus in Ithaca. The council proposes that "agricultural research and development will take the lead in providing the technology for a biobased economy in the 21st Century" ("NABC Vision Statement"). Such jobs will be held by highly skilled scientists based in college research labs.

Broome sees increase in residents using food stamps

Numbers due to poor economy, easier access to program

In 2007, 95 out of every 1,000 Broome County residents used food stamps, a number that has steadily risen ever since.

As of July, 147 individuals per thousand in the county received help from the New York State Food Stamp (FS) Program – and that was before the floods, which forced still more people to seek help.

Administered by the U.S. Department of Agriculture, and known also as the Supplemental Nutrition Assistance Program (SNAP), the Food Stamp program issues monthly electronic benefits that come in the form of an EBT (Electronic Benefit Transfer) card, which replaced actual paper food stamps. Eligibility is determined by income, family size and other factors.

Agil Gopinath, who came to Binghamton from India nearly six years ago, supplements his EBT allotment of about $200 a month with trips to the Catholic Charities

What does this article from the *Elmira Star-Gazette* suggest about what is needed for food security in the Finger Lakes? (The article title reads: "Broome sees increase in residents using food stamps.")

Other Finger Lakes initiatives believe that the future lies in "green jobs" training for youth. The VINES project (Volunteers Improving Neighborhood Environments) received a grant in 2011 from the city of Binghamton to train a dozen young people from the area in the process of growing and selling produce. As a part of the program, they will be introduced to local farmers and work on an urban farm ("Summer Youth Program").

The Lens of Environment

Do food systems degrade, protect or restore the environment? The Finger Lakes region is known both for the natural beauty of its environment and for the strength of its higher education systems. Two very different research projects tying food security to climate change highlight the distinct ways in which different agronomists (soil and plant scientists) approach the same environmental problem.

In 2005, Cornell graduate student Steve Culman received a grant to

> compare the diversity and community structure of soil bacteria and fungi in a prairie with an annual grain system. This knowledge will help us manage and sustain soil fertility in the perennial polycultures of natural systems agriculture. (qtd. in "Research Projects")

Culman's type of research marks a paradigm shift toward using nature itself as a model for farming, a practice that some scientists believe is essential for reducing the enormous carbon footprint of fossil-fuel based modern farming methods.

Other researchers at the same university believe that exploring genetically modified grains is the best way to deal with the impacts of climate change. According to a 2002 article in *Cornell News*, molecular biologists Ajay Garg and Ray Wu have pioneered a new strategy

> to genetically engineer rice and other crops to make them more tolerant of drought, salt and temperature stresses, while improving their yields. 'World population continues to increase at an explosive rate, our arable land is deteriorating, fresh water is becoming scarce and increasing environmental stresses pose ever more serious threats to global agricultural production and food security,' notes Wu. 'Anything we can do to help crop plants cope with environmental stresses will also raise the quality and quantity of food for those who need it most.' (Segelken)

The Lens of Health

Do food systems ensure the good health of all in the community? Sodexo, the corporation that supplies dining room services for Ithaca College, Hobart and William Smith College and other Finger Lakes institutions, recognizes student health as an important part of its mission in providing food for students in the region. Sodexo's "Balanced Mind, Body and Soul program… supports Sodexo student-customers with the latest in nutrition and health information to promote balance through healthy living" ("Nutrition and Wellness").

The city of Rochester takes a comprehensive look at food systems health in its 2011 report: *Rochester, N.Y. – From Blight to Bright: Urban Agriculture and Community Gardening Feasibility Study A Vision for a More Sustainable Future*. The report envisions Rochester as "a city where health is based on exercise, diet and disease, prevention [and] a city where a diet of clean healthy, mainly locally grown food is considered the norm for every resident" (*Urban Agriculture and Community Gardening* 1).

The Lens of Ownership

Who makes decisions about who will control food security? At an institutional level sometimes food system decisions include community efforts. At Cornell University, the Farmers' Market "is a venue for students, staff, community members, faculty and administrators to come together over fresh, local food" (*Farmers' Market*). Vendors include college-associated groups, like the campus orchard and a student-run farm, as well as local enterprises, such as a food co-op, a small dairy and a Vietnamese restaurant.

At the community level, corporations are often called on to support grassroots efforts. In Elmira, Fortuna Energy has underwritten the cost of constructing the raised bed vegetable garden located on the grounds of the Food Bank of the Southern Tier. Fortuna is a natural gas exploration company hoping to drill for gas in the Twin Tiers area of the Finger Lakes. Upon donating a check to the Food Bank for the project, company president Judy Harding said

> Gardens are an excellent way to provide much-needed fresh food for those in need, while also allowing community members to contribute in non-monetary ways like planting, watering and weeding. (qtd. in Carey 3)

The Lens of Scale

Can food security exist in large-scale national and international models? Is bigger better? Is smaller viable? As with the other lenses, the answer to these questions depends on whom you ask.

Synergy LLC Dairy Production Partners explains its history on its "Synergy's Story" web page:

> Synergy, LLC was formed in 1999 for the purpose of providing a large-scale production partner to the emerging nutraceutical and bio-pharmaceutical industries for those companies interested in deriving products from the bovine species. ("Synergy's Story")

Synergy argues that it can leverage its large pool of investor dollars to provide food security in the form of financial backing for struggling enterprises. One example demonstrating the advantages of large-scale investments is Synergy's acquisition of a distressed dairy in Covington, New York. The dairy "had tremendous facilities and resources, but needed additional capital and cattle to generate profitable production" ("Opportunities – Projects").

Synergy's faith in the "bigger is better" approach stands in contrast to another dairy operation that puts its faith in the idea that "small is beautiful." Rose Marie Belforti is co-owner of Dexter Dairy, another relatively new enterprise in the Finger Lakes region. Her twelve-acre dairy with small Dexter cows allows her to practice her belief in small scale. She says:

> Our hope is that Dexter cattle will be a solution to renewed interest in alternative ways to farm as we begin to trend back to local family-run operations and away from large corporate factory farming. People are demanding fresh wholesome foods, and the local small-scale dairy can provide for these needs. (qtd. in "A Dexter Dairy!")

The Lens of Worker Safety

Are farm workers safe and protected as they help provide for community food security? No matter how technologically advanced, every food system requires some degree of human labor to bring food from farm to table. In the Finger Lakes, those involved in farm labor include everyone from migrant laborers picking grapes for the wine harvest to owners of small farms involved in community supported agriculture; from corn researchers bagging tassels to farm kids on tractors, many individuals work in agriculture.

Two sister organizations devoted to enhancing farm worker safety in the Finger Lakes and beyond take different approaches to this challenge. The Northeast Center for Agricultural Health has created a database to provide information on farm related injuries and fatalities in the region by studying Emergency Medical Service ambulance reports emerging from visits to farm locations in ten upstate New York counties. The 2007 study indicated that two particular sources of injury – horses and tractors – accounted for nearly half of all agricultural injuries in the study counties ("Injury Surveillance").

What does this Ithaca poster suggest about what's needed for food security in the Finger Lakes?

Information from such studies help the New York Center for Agricultural Medicine and Health decide where to direct its farm safety workshops for agribusinesses and youth groups like 4-H clubs and Mennonite schools around the Finger Lakes region ("Farm Safety Trainings").

Applying a Lens Analysis to Your Community

As you proceed with this lesson, consider the food security needs closest to you – within your body, your family and your community. Which lenses seem most important to you and why? Which seems least important and why? You should also consider other lenses that are not included on this list. For instance, how might food security look as viewed through the lens of animal health, technological capacity or peak oil?

Finally, you should consider the ways in which different media sources have constructed these messages about food. Who made each message and for what purpose? Who paid for the message and who might benefit or be harmed by it? Is this message credible and why do I think that? With practice, these questions can become part of our regular "habits of inquiry" by becoming part of our awareness each time we view or hear a media message.

Student Handout: Food Security Lenses
Lens 1: Access

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Access

1. **How do the patterns of access differ between lower-income neighborhoods and those with more wealth?**

2. **What is being done to increase access to create an inclusive system?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 2: Culture

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Culture

1. **How well does the food system provide culturally acceptable food to diverse peoples?**

2. **How could a food system better include different cultural preferences?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 3: Employment

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Employment

1. **How much do different jobs created by the food system pay and can a worker afford to buy good food?**

2. **How are young people, former inmates and the chronically unemployed getting training to help prepare them for future employment in the food sector?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 4: Environment

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Environment

1. **In what ways does this food system restore soil fertility as well as seed and crop diversity?**

2. **How does this food system educate the community about the impact of food choices on ecosystem health and climate stability?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 5: Health

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Health

1. **What are some of the nutrients necessary for health and how does this food system provide for them?**

2. **What systems are in place to educate shoppers about positive food choices in small and large food stores?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 6: Ownership

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Ownership

1. **How does the control of the food system affect community self-reliance?**

2. **What programs are in place to help low-income people acquire land and training to get started in the food production business?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 7: Scale

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Scale

1. **If distant food systems fail, how does the scale, diversification and design of this system allow it to persist or fail?**

2. **How do government subsidies and incentives for large-scale producers compare with those for small-scale producers?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

Student Handout: Food Security Lenses
Lens 8: Worker Safety

STEP 1: DEVELOPING QUESTIONS

For this lesson, you will work with your group to analyze three media documents as they relate to your assigned food security lens. **A lens is a pathway through which something can be seen or understood.**

Two questions specific to your lens are listed below. These questions help voice the concerns of your group's lens. Add at least one **open-ended question** (a question that does not have just "yes" or "no" for an answer) for your lens. Use the *Student Reading* to help brainstorm ideas for your question.

Worker Safety

1. **What are the potential dangers facing farm workers in providing community food and what protections in place for them?**

2. **What special protections are provided for migrant and young workers?**

3.

Concluding Question: Why is it important to include this lens in any analysis of the sustainability of food security systems?

STEP 2: MEDIA DOCUMENT ANALYSIS

Using the three questions from the first page of this handout, your group will prepare for an in-class presentation that includes an analysis of **one or more of your media documents**. All media documents are available in a PowerPoint in the *Student Materials* section of the Project Look Sharp home page, www.projectlooksharp.org. Media documents are organized in the PowerPoint alphabetically by lens.

Your group should do a **close reading of each document from start to finish** and look for **textual and visual evidence** that reveals the fundamental concepts of your lens.

STEP 3: IN-CLASS PRESENTATION

After analyzing your media documents, determine which document(s) best address the fundamental concepts of your lens and design a presentation using the three questions from the first page of this handout. Once you have selected your media document(s), coordinate with your instructor so that you can project the correct PowerPoint images during your presentation.

Your presentation should:

- ❒ **Introduce the concerns addressed by your lens.**
  (e.g. "Our team focused on the lens of access which has to do with whether people really have the ability to obtain fresh and healthy food where they live…")
- ❒ **Communicate your three questions to the class** (you may consider writing these on the board or projecting them questions during the course of your presentation).
- ❒ **Include your selected media document(s)** (coordinate with your instructor).
- ❒ **Briefly describe your media document(s):** Who created this message and for what purpose? How do you know?
- ❒ **Summarize how your selected document(s) address the concerns of your lens.**
  (e.g. "This document shows that access to food is …")
- ❒ **Provide visual and textual evidence from the document that supports your analysis.**
  (e.g. "We can see the importance of access in this document in the lines that say…")
- ❒ **Conclude by answering: Why it is important to include this lens in any analysis of the sustainability of food security systems?**
  (e.g. "The issue of access is important when looking at food security systems because…")

TEACHER GUIDE

Sustainable Food Security Systems, Activity 2

[NOTE: This activity contains media documents available for viewing and downloading in a PowerPoint online. Teachers should designate computer lab time to complete the online portion of the assignment.]

1. As a class, review the eight lenses from the *Student Reading* in *Activity 1*. List the eight lenses on the board so students can reference the lenses in the next step.

Lens 1: Access	Lens 5: Health
Lens 2: Culture	Lens 6: Ownership
Lens 3: Employment	Lens 7: Scale
Lens 4: Environment	Lens 8: Worker Safety

2. Give students ten minutes to write and reflect on the food choices they have made over the course of one day and why.
   Probe questions include:
   - **What foods did you eat in the last twenty-four hours?**
   - **Did you have a choice to eat these foods? Why or why not?**
   - **What factors influenced your food choices? Are these factors similar or different from the eight food lenses in this lesson?**
   - **Who did you eat with in the last twenty-four hours? How did the people you eat with influence your food choices?**

   Teachers may choose to collect and evaluate students' freewriting after the activity.

3. Direct students to return to their lens group. Each group will evaluate three media documents for their lens using the four questions from their worksheet. The media documents for each lens are available online in a PowerPoint. Explain how students can access the *Student Materials* section on the Project Look Sharp home page, www.projectlooksharp.org. Teachers should designate computer lab time for the groups to read their media documents.

4. Following the document analysis, give students time to plan their presentation using the *Student Worksheet*. Explain that if groups require more planning time, they can finish planning at the beginning of the next activity. Remind students that they will need to communicate which media document(s) will be in their presentation so that you can project the PowerPoint for the whole class during *Activity 3*.

TEACHER GUIDE

Sustainable Food Security Systems, Activity 3

[NOTE: Teachers will need to project the PowerPoint images to the class during the student presentations.]

1. Direct the students to return to their lens group. If the groups are not finished planning their presentations, provide them with more planning time. Remind students that they will need to communicate which media document(s) will be included in their presentation so that you can project the PowerPoint for the whole class.

2. Project the corresponding PowerPoint slide(s) of the media document(s) as each group presents. You may want to show all three slides for each lens or simply project the media document(s) that the team has chosen to analyze. Media documents are organized alphabetically by lens in the PowerPoint slides.

3. After all the groups have presented, lead a summary discussion with the entire class:
   - **What are the essential components of a sustainable food system?**
   - **In what ways do the food system components positively influence each other?**

4. After the discussion, give students ten minutes to freewrite on how the information in this lesson may influence their food choices in the future.
   Probe questions include:
   - **How do my personal food choices affect the relationship between where I live and the food security in my community?**
   - **What steps can I take to make my community more food secure?**

   Teachers may choose to collect and evaluate students' freewriting after the activity.

FURTHER QUESTIONS

Analyzing Media Messages:

How do we challenge mass media messages that encourage poor eating habits?

Which of the documents most encouraged you to take action? Why?

Which of the documents did you find the most disturbing? What can you learn about yourself from your reaction to that document?

Were all the documents equally credible? Why or why not?

Self Reflection:

Who might be a safe person with whom to share some of the reflections in your food journal?

What would it be like to live in a food system where 75% of the food comes from local sources?

Who among your friends and family provides a good example of making food choices consistent with his or her beliefs about food security?

How are your food choices shaped by media messages?

Underlying Values and Motives:

Which of the lenses are most central to concerns about poverty and economic inequality?

Which of the lenses are most central to concerns about peak oil and climate change?

How are concerns about social justice and environmental stewardship connected?

The International Planning Committee for Food Sovereignty says that the idea of food sovereignty

> …puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers. ("Définition de la souveraineté")

How does the lens of *ownership* help clarify the distinctions between food security and food sovereignty?

In what way do the traditional value systems of indigenous and land-based farming cultures support food security?

How can the skills and knowledge of newly immigrated farmers be a resource for food security initiatives?

EXTENDED ACTIVITIES

Using a systems analysis approach, have students create concepts maps for a sustainable food security system. Explain that their concept maps can take the form of diagrams, thematic outlines, sketches or written narratives. Their concept maps should synthesize information from the other groups' presentations, along with material from any in-class writing. Whatever form students choose for their concept maps, students should investigate the interdependence or mutual influences of the many factors that make up a sustainable food system.
[NOTE: Examples of concept maps can be found in the five* Student Worksheets: Civil Society Definitions *in* Lesson 3 *of* Media Constructions of Sustainability: Food Water and Agriculture.*]

Map food accessibility in your community. Where are the food stores? Where are the farmers markets? Where are the food deserts? Does everyone have equitable access to healthy food? Does your community grow enough food to feed all its members? Use the "Food Environment Atlas" on the USDA's website to help you identify key concerns about food access in your county.

Create and compare content from online documents that include the phrases "systems thinking" and "food security" using wordles on a website like **www.wordles.net**.

Make a collective meal using awareness gained from your study of the food security lenses. Which foods will you choose? Whom will you invite to share the meal? Where will you offer it? How much regional or local food can be used to make this meal? Consider the form of the meal offering. Should it take the form of a banquet or an Iron Chef competition? A benefit or a potlatch? What are the various sources for food: food pantries for low-income folks, dumpsters for freegans, local farms and farmers markets for locavores, gourmet delicatessens for connoisseurs?

Study the historical impact of the introduction of industrial food systems into your community. How did people eat in your community prior to industrial food systems? Can the legacy of past localized food systems provide a window into the future of food security?

Imagine a community in which people decided en masse to change their habits to increase the producer base for good local food. Make a media production (PowerPoint, poster, video, blog, etc.) of what you see. Share your production with others in a way that extends access and invites comments from people you do not already know.

Look at your family's grocery receipts for one week. What does it say about the food choices your family makes? What influences your family's food choices?

Research one of the following food security projects in upstate New York and produce a short media presentation (PowerPoint, poster, video, etc.) for the class showing how it might apply in your area: Massachusetts Area Project in Buffalo, the Youth Farm Project in Ithaca and Syracuse Grows.

CONNECTIONS

L6, 7, 9, 10, 16, 17, 19, 20, 21, 25, 26
(local food)

L6, 7, 10, 15, 16, 17, 19, 20, 21, 25
(organic & conventional farming)

L6, 7, 9, 19, 20, 21, 25
(urban agriculture)

L 6, 7, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26
(food security)

L7, 8, 10, 12, 15, 16, 17, 18, 21, 25
(work & labor)

Lesson 26: Traditional and Industrial Farming

LESSON PLAN


PowerPoint Slideshow

Traditional and Industrial Farming

Lesson Objectives:

- Understand that contemporary farming is made up of diverse philosophies, tools and practices that include traditional and industrial approaches.
- Identify examples of these approaches through analysis of two Finger Lakes agricultural products, corn and dairy farming.
- Analyze and evaluate different perspectives on how to best farm for job creation, profitability, productivity, nutrition, genetic preservation, cultural continuity, energy efficiency, environmental health, animal welfare and climate stabilization.
- Reflect on how judgments about the credibility of media sources influence our ability to arrive at well-reasoned conclusions about how we get our food.

Vocabulary:

agribusiness, artisanal cheese, biofuel, boutique dairy, Columbian Exchange, concentrated animal feeding operation (CAFO), conventional farming, crop biodiversity, ethanol, genetic diversity, genetically modified (GMO) seed, heirloom seed, heritage breed, hybrid seed, Iroquois white corn project, locavore, National Agricultural Biotechnology Council, open pollinated seed, proprietary trait, Seed Savers Exchange, staple food, three sisters agriculture, traditional ecological knowledge, yield

Media: web page, online news articles, book, report, social media web page, blog

Materials Needed:

Activity 1

- Two-page *Teacher Guide: Activity 1*
- Four-page *Student Reading: Learning from Traditional and Industrial Histories*
- Two-page *Student Handout: Media Producers' Mission Statements*
- One-page *Student Worksheet*
- 21 slide PowerPoint slideshow (Access online or via Lesson 26 digital media folder)

Activity 2

- Twelve-page *Teacher Guide: Activity 2*
- 21 slide PowerPoint slideshow (Access online or via Lesson 26 digital media folder)

Time: Activity 1: 50 minutes, not including in-class reading time
Activity 2: 60 minutes

Lesson Procedures

Activity 1

- Present the *Lesson Introduction* to the class.
- Distribute and have students complete the *Student Reading: Learning from Traditional and Industrial Histories*.
- Divide the class into four groups: traditional corn farming, industrial corn farming, traditional dairy farming and industrial dairy farming. Distribute the *Student Handout: Media Producers' Mission Statements* and *Student Worksheet*.
- Have each group review four different media documents representing their assigned farming practice using the online PowerPoint. Groups will use the worksheet to prepare to advocate for their approach to either traditional or industrial farming. Groups will discuss their judgments about the credibility of these media sources and the basis for their judgments and use at least one media document during their presentation.
- Provide time for students to plan their in-class presentations on their media documents.

Activity 2

- Direct students to return to their groups and provide extra time for them to finish planning their in-class presentations if needed.
- Have groups present to the class, advocating for traditional or industrial farming practices, identifying the key components of these practices. As students present, project the PowerPoint image of their media document(s).
- Direct students to write briefly on the relative value of traditional and industrial farming practices for job creation, profitability, productivity, nutrition, genetic preservation, cultural continuity, energy efficiency, environmental health, animal welfare and climate stabilization.
- Lead a discussion on sustainable farming practices that employ elements from traditional to industrial practices. Make note of the range of contemporary innovations that enhance the productivity and efficiency of traditional practices while limiting the negative impacts of industrial practice.
- Lead a discussion assessing the credibility of media documents. Discuss how prior judgments may shape beliefs and biases about media credibility.
- (Optional) Discuss the *Further Questions* and investigate the *Extended Activities*.

TEACHER GUIDE

Traditional and Industrial Farming, Activity 1

[NOTE: This activity contains media documents available for viewing and downloading in a PowerPoint online. Teachers should designate computer lab time to complete the online portion of the assignment.]

1. Organize and make copies for the class activities.

2. Introduce the lesson:

Lesson Introduction

In this lesson you will analyze examples of corn and dairy farming in the Finger Lakes in order to understand the diverse philosophies, tools and practices that distinguish traditional and industrial farming. At the end of the lesson you will draw your own conclusions regarding how each approach can be part of a strategy for farming for these measures: the creation of living wage jobs with healthy working conditions, profitability that fairly distributes wealth, productivity that does not deplete essential resources, adequate and balanced nutrition, preservation of genetic diversity, energy efficiency, environmental health, animal welfare and climate stabilization. Finally, you will consider how judgments about the credibility of media sources influence our ability to arrive at well-reasoned conclusions.

3. Ask students, "What words come to mind when you hear the concepts "traditional farming" and "industrial farming?" Make a list on the board.

4. Distribute and have students complete the *Student Reading: Learning from Traditional and Industrial Histories*. Lead a brief discussion about what students have learned about each of these types of farming practice.

5. Divide the class into four teams:
   - **Traditional corn farming**
   - **Industrial corn farming**
   - **Traditional dairy farming**
   - **Industrial dairy farming.**

   (Each team will analyze four media documents about their particular type of farming and present their decoding to the class.)

6. Distribute one *Student Handout: Media Producers' Mission Statements* and *Student Worksheet* to each student or to each group. Students can access their group's media documents from the *Student Materials* section on the Project Look Sharp website, www.projectlooksharp.org. Each media document is in the PowerPoint and organized by the four groups (traditional and industrial corn farming, traditional and industrial dairy farming). Teachers should provide in-class computer lab time for students to view their media documents online.

7. Each team will work together to evaluate four media documents related to their assigned farming practice. They will use their worksheets to prepare for an in-class presentation where they will argue that their assigned farming practice is the best approach to sustainable agriculture. No single media document will address all the advocacy points bulleted on the *Student Worksheet*. Remind students to directly support each advocacy point they identify with a quote.

Advocacy Points

- **Job creation**
- **Profitability**
- **Productivity**
- **Nutrition**
- **Genetic preservation**
- **Cultural continuity**
- **Energy efficiency**
- **Environmental health**
- **Animal welfare**
- **Climate stabilization**

The *Student Handout: Media Producers' Mission Statements* should be used to help answer the first worksheet question related to the credibility of sources.

8. Circulate as each group reviews their four media documents and uses the *Student Worksheet* as they prepare to advocate for the sustainability of traditional or industrial corn or dairy farming. Remind groups to discuss their judgments about the credibility of their media sources and the basis for their judgments in addition to evaluating their approach based on the ten-point advocacy criteria outlined on the worksheet.

[NOTE: Teachers may want to reference* Criteria for Examining the Credibility of Information on the Internet *and* Technical Strategies for Evaluating Websites *in the* Resources *section of this curriculum to better facilitate discussions about credibility.]

9. After completing the worksheet, students should determine the order of their presentation, which media document(s) (at least one document) they would like to analyze, and delegate responsibilities for the presentation. Students should cite directly from their media document(s) to support their advocacy points of choice. Remind students that they will need to communicate which media document(s) will be included in their presentation so that you can project the PowerPoint for the whole class. Explain that if groups require more planning time, they can finish planning at the beginning of the next activity.

Learning from Traditional and Industrial Histories

How do we choose the philosophies and practices that will guide sustainable agriculture in the 21st century? There are many measures to consider when evaluating best farming practices, including:

- **Economic Development:** How productive and profitable is this type of agriculture? How energy efficient is it? How many jobs does it create? How much does it source from and supply the local economy?
- **Human and Animal Health:** How does this kind of farming provide essential nutrients for everyone in the community? How well does it treat workers and animals? How effectively does it minimize the use of hormones and antibiotics that may diminish long-term animal health?
- **Biological and Cultural Diversity:** How does this practice preserve the genetic stock of plants and animals? How does it preserve the diversity of local native species? How does it support continuity for all human cultures? How well does it provide foods that support the cultural preferences of the major ethnic groups of the area?
- **Environmental Wellbeing:** How well does this farming technique preserve and restore soil health and local ecosystems? How well can it adapt to rapid and unpredictable climate changes?

One way to measure the prospects for best farming practices in the 21st century is to analyze those that have come before. While this does not account for the innovations of the sustainable agriculture movement in the last half-century, it is nonetheless an important foundation. This lesson will explore the principles of farming practices by examining the philosophies and tools in traditional agriculture and industrial agriculture.

What is Traditional Agriculture?

This lesson defines traditional agriculture as the farming tools, philosophies and practices that arose in the era before fossil fuels. In the Finger Lakes region, our remembered practices of traditional agriculture begin with the traditional ecological knowledge of the Iroquois peoples and, in particular, their technique of planting the three sisters (corn, beans and squash) in a poly-cropping complex "where agriculture and horticulture and human culture meet" (Lewandowski 91).

For the Iroquois, the sustenance of the body is coupled with the sustenance of the community. Native women worked together to prepare the fields, plant, cultivate and harvest the crops. Then, these crops were celebrated in a ceremonial fashion by the entire village, along with the hunters' bounty that the men brought back from the forest.

These farmers were and still are agronomists who know the soil and who select seeds to enhance the production of native plants. They spread and strengthen the genetic diversity of staple food plants. Five hundred years ago, they shared their agricultural knowledge with European settlers and continue to do so today.

The agricultural genius and carefully cultivated lifestyle of these indigenous farmers spread globally through what is known as the Columbian Exchange. The exchange of plants, animals, peoples, germs and knowledge between the new world and the old world is a central theme in Charles Mann's book, *1493: Uncovering the New World Columbus Created*. In his book, Mann suggests "to ecologists, the Columbian Exchange is arguably the most important event since the death of the dinosaurs" (6). For Finger Lakes agriculture, the Columbian Exchange meant that corn, squash and turkey from Iroquois fields and new world forests became staple foods in parts of Europe, Asia and Africa while wheat, apples and cattle became a part of diets throughout the Americas.

The exchange of foods was so extensive that modern efforts to preserve traditional plants and animals include the preservation of the non-native species that were first exchanged in the early transatlantic trade routes five hundred years ago. Over a half millennium, farmers involved in the Columbian Exchange in the Finger Lakes have labored to save heirloom seeds by selecting, saving and trading in informal ways, hand-to-hand and farmer to farmer. Today, this same process takes place in participatory breeding groups like the Seed Savers Exchange.

Universities also work with traditional seed selection and propagation techniques in an effort to promote crop biodiversity. In Geneva, New York, this conservation takes place at the Plant Genetic Resources unit, a joint project of Cornell University and the US Department of Agriculture. The unit's mission is to preserve the germplasm of apples, grapes and cherries. Here scientists use both traditional and newly developed techniques to keep hundreds of different fruit species alive. At the southern end of neighboring

Cayuga Lake, the Northern Organic Vegetable Improvement Collaborative and scientists at Cornell's Department of Plant Breeding and Genetics work with area farmers in participatory plant breeding programs to cultivate open pollinated seeds. Open pollinated seeds are traditional, naturally reproducing seed varieties that have been grown and selected for desired traits by farmers for thousands of years (Green Haven). These kinds of seeds are dynamic and adapt as the local ecosystem changes.

Livestock breeders also have followed this same ancient model in an effort to preserve traditional heritage breeds of poultry, cattle, sheep and pigs in a time when fewer and fewer breeds are raised by large livestock operations. Today, the American Livestock Breeds Conservancy (ALBC) lists the Cayuga duck as one of the breeds it seeks to preserve.

It is unclear whether the Cayuga duck is descended from a wild duck native to the Finger Lakes or from British ducks imported in the 19th century. According to the American Livestock Breeds Conservancy, "the breed was raised in large numbers on duck farms in New York until the 1890s when the Pekin duck came to dominate the duckling market in the big cities" (ALBC).

Pioneer-era farmers expanded on the traditional ecological knowledge of indigenous agronomists, like the Iroquois, by using a wide variety of animals as a source of power for working the land. Their livestock provided manure for soil enrichment and food for the farmers and communities they served. The cultivation of these heritage breeds allowed for reliance on local resources for nearly all farm inputs and created a market for nearly all farm products.

In a time when the carbon footprint of food is an issue of global concern, locavores have an ever-increasing number of options to purchase foods grown in their region. Many traditional crops find their way to the marketplace in the growing number of farmers markets throughout the Finger Lakes region. Boutique butchers and dairies sell meat and artisanal cheeses, yogurts and other value added products made from heritage livestock breeds that are raised on local pasture. In this way, the legacy of the three sisters agronomists continues in the 21st century.

What is Industrial Agriculture?

This lesson defines industrial agriculture as the farming tools, philosophies and practices that arose during the fossil fuel era, particularly after World War II when chemical-based inputs – fertilizers, herbicides and pesticides – were developed for sale. In the space of two generations, new technologies and an abundance of oil allowed farmers to move from small, diversified family farms worked by horses and oxen to huge monocrop operations worked by a fleet of giant combines. The United States' agricultural policies of the 1960s encouraged farmers to get big or get out. Those that grew used a newly emerging global market to cultivate and sell vast fields of corn, wheat and soybeans for export. The marketing of grab-and-go foods encouraged beef farmers to develop concentrated animal feeding operations (CAFOs) to feed great quantities of corn and soybeans to fast-growing young calves in order to supply the increasing demands of fast food culture ("Fast Food and Animal Factories…").

Scientists worked together with corporate marketers to develop new growing technologies that would allow companies to profit and grow from the opportunities in the postwar consumer marketplace. Hybrid seeds were developed to increase yield when used in combination with the new input products and lots of water. Unlike open pollinated seeds, hybrid seeds planted from the second generation will not reproduce to incorporate the desired traits of the parent. The economic advantages for corporations were that hybrid seeds, fertilizers, herbicides and pesticides would need to be purchased annually by the farmer. For the farmer, the advantages were an increased yield and effective capacity to suppress weeds and control insects in the short term.

In the Finger Lakes, groups like the National Agricultural Biotechnology Council at Cornell worked to support "the potential role of public, government and private institutions…to facilitate the deployment and acceptance of genetically-modified crops in a second Green Revolution…for improving agriculture and helping to feed and clothe the world" (McCutcheon 1). Research scientists at large seed companies like Monsanto and DuPont worked to develop genetically modified seeds (GMOs) with proprietary traits or particular characteristics that are owned by the corporation and available for sale through their products. These genetic manipulation techniques can be used to develop corn traits for insect resistance and can boost milk production through genetically engineered growth hormones in cows.

Unlike traditional agriculture, which tends to be small, local and community-based, industrial agriculture is large, international and corporate-based. Industrial agriculture always seeks new markets for its products through global agribusiness opportunities. For example, new markets have been developed for corn through the proliferation of corn sweeteners in a wide array of food and home-based products. Ethanol, a biofuel made from corn, is another example of the ways in which a traditional food crop, maize, was developed for new uses and profits in the 20th century marketplace.

Where do traditional and industrial farming fit in 21st century agriculture?

Although there are many aspects of past agricultural practice that can be of use in a new millennium, there are also serious concerns raised about the capacities and consequences of these long-established practices. Some industrial agriculture proponents argue that traditional agriculture can never provide the yields required to feed a growing human population. Others supporters of industrial farming say that traditional agriculture is not sustainable in the contemporary marketplace, unable to compete against large-scale agribusiness on the open market and unable to attract workers in a type of farming that is labor-intensive and physically exhausting.

Critics of industrial agriculture argue that it destroys the health of the environment by depleting soil fertility through constant monocrop planting, polluting groundwater with chemical runoff, and generating huge amounts of the potent greenhouse-gas methane from the way that animals are factory-raised. Other critics warn of the dangers of the unforeseen consequences of untested genetic engineering technology. Some say that farmers are crippled by dependence on corporate products and held hostage to a volatile market.

As we imagine agriculture in an uncertain future that includes the realities of climate change, peak oil and international economic instability, some suggest that traditional and industrial models both have a place at the table. They urge a blend of scientific and technological innovation that takes into account the wisdom of elders who have lived successfully on the earth for millennia. At the same time, there are new techniques from the sustainable agriculture movement to consider, some of which draw from the philosophies and practices of both traditional and industrial agriculture. These sustainable innovations and extensions include the Land Institute's perennial polyculture experiments, permaculture design systems ranging from bio-intensive urban homesteads to forest farming, biological pest control (including integrated pest management), rotational grazing, vermiculture in intensive growlight food production in indoor environments, vertical farming and rooftop farming in urban areas and season extension using hoop houses, high tunnels, moveable greenhouses. There are also different ways of organizing farm to community exchange through community supported agriculture (CSAs), food hubs and community food stores on wheels (Lowy 18).

Innovations arising from the sustainable and local food movements of the last half-century have created the potential to improve the efficiency of food production, reduce decreasing greenhouse emissions, along with increasing soil health, seed and crop diversity, and creating local jobs.

Permaculture

The rapidly growing practice of permaculture builds on indigenous practices from around the world, and the lessons learned from the elegant efficiency of the natural systems right around us. Permaculture farming designs food production systems to optimize the beneficial connections between animals, plants, humans and the elements of the specific environment in which they exist. In this "closed loop" approach, the waste from one part of the system becomes food for another part, just as it naturally would in a forest or lake. Very little extra transportation or energy is required to make the system work. The *Growing Power* movement, based in the Milwaukee, Wisconsin, has been training people in inner cities across the country to build aquaponic greenhouses where the beneficial interactions between vegetable and fish species create such a high yield that the process is becoming a significant source of both fresh food and employment in surrounding neighborhoods ("Aquaponics").

Perennial Polyculture

The Land Institute's research on farming using perennial polycultures shows how to dramatically reduce energy use and soil disruption, yet produce high yields. They achieve these yields by developing robust strains of perennial staple crops, such as grains and beans, which do not require annual tilling.

Extending the Growing Season

Through improved methods for extending the growing season, farmers in northern climates like the Finger

Lakes can generate and store local food for months longer, consequently increasing their own viability as an enterprise and the self-reliance of the region.

Combining the use of landscape cloths, deep mulching, cold frames, "high tunnels," hoop houses, greenhouses and superefficient coolers, farmers have dramatically increased the possibilities of four-season farming without having to make large capital investments.

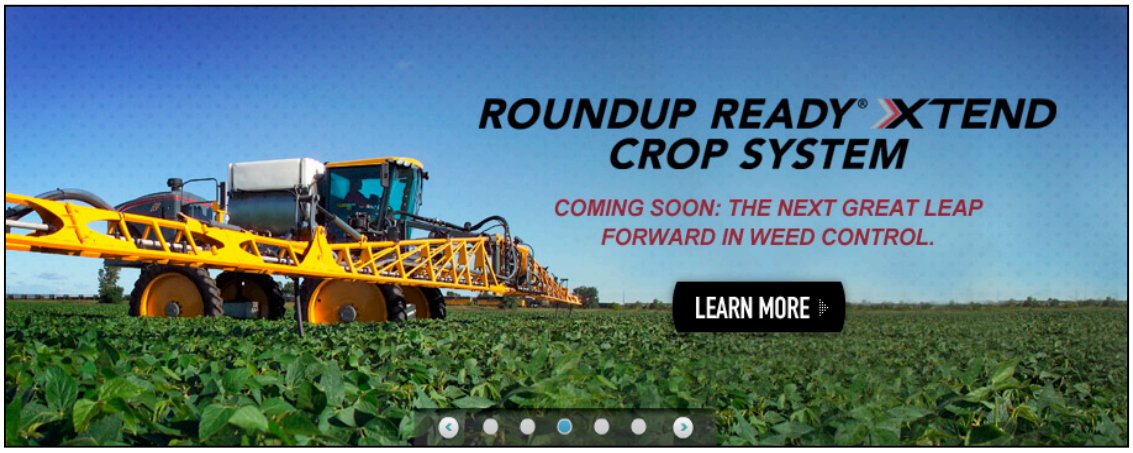
Urban Agriculture

Urban agriculture has seen a proliferation of community gardens and farmers markets, rooftop farms on major public buildings, vertical gardens on walls and multiple floors of tall buildings, and aquaponic greenhouses springing up in the midst of devastated neighborhoods. It has become an important component of regional food systems in a very short period of time.

Urban homesteading has become an increasingly popular movement, with apartment dwellers raising sprouts and micro greens in stacks of grow-lit shelves, root crops in container gardens on porches, and fruit trees behind south facing windows. Homes with more space around them use permaculture principles to integrate small animal farming with growing crops. By combining the best of traditional and industrial farming, with the relatively low-cost innovations of contemporary agriculture, the possibilities of food systems that are both just and sustainable has become a more achievable vision.

In this lesson, you will learn about the ways farmers practice traditional and industrial agriculture in the dairy and corn farming sectors within the Finger Lakes. You will be invited to consider which of these ideas and practices can be of use in developing a truly sustainable agriculture for the 21st century and beyond.

What are the messages about traditional and industrial agriculture in these web pages?



Media Producers' Mission Statements

Traditional Corn Farming

1. **"About Us."** ***Iroquois White Corn*****, http://iroquoiswhitecorn.com/**
   Vision: "White corn is central to healthy lives and healthy communities of the Haudenosaunee."
   Mission: "The Iroquois White Corn Project grows, processes, and sells heirloom corn and creates programming for nutrition, community, and education in order to support Ganondagan, the Haudenosaunee, and the friends of both."

2. **"Introductory Issue" (Dec. 1999),** ***Corn Culture*****, http://www.cornculture.info/**
   "For all of us in the Americas who have inherited the corn culture this is a common meeting place, a market of seeds and ideas, an encyclopedia of knowledge, and a forum for our discussion of our past and common future."

3. **"Blog Directory."** ***T Magazine (New York Times)*** **blog, http://www.nytimes.com/interactive/blogs/directory.html#blogStyles**
   "Spanning the universe of fashion, design, food, travel and culture."

4. **"What is RAFT?"** ***Center for Sustainable Environments and Northern Arizona University*****, http://www.environment.nau.edu/raft/what.htm**
   "Renewing America's Food Traditions [RAFT] is a coalition of seven of the most prominent non-profit food, agriculture, conservation, and educational organizations dedicated to rescuing America's diverse foods and food traditions…The coalition was formalized…to support a synergy between these partners and local, tribal, or regional groups of producers in their on-going work of safeguarding and revitalizing authentically American foods."

Industrial Corn Farming

1. **"About GateHouse Media."** ***MPNnow.com*****, http://www.gatehousemedia.com/about**
   "GateHouse Media's business model is to be the preeminent provider of local content and advertising in the small and midsize markets we serve. Our portfolio of products, which includes 431 community publications and more than 405 related websites and six yellow page directories, serves over 299,000 business advertising accounts and reaches approximately 10 million people on a weekly basis."

2. **"Corporate Responsibility."** ***Syngnta*****, http://www.syngenta.com/global/corporate/en/about-syngenta/corporate- responsibility/Pages/corporate-responsibility.aspx**
   "Syngenta is one of the world's leading companies with more than 26,000 employees in over 90 countries dedicated to our purpose: Bringing plant potential to life...Our products help farmers produce higher and better yields, grow crops that are more resilient in harsher climates, and conserve limited resources."

3. **"The Long Look."** ***Pioneer*****, http://www.pioneer.com/home/site/about/business/commitment/long-look**
   "We strive to produce the best products on the market. We deal honestly and fairly with our employees, customers, seed growers, sales force, business associates and shareholders…We give helpful management suggestions to our customers to assist them in making the greatest possible profit from our products."

4. **"Advertise with NewsChannel 9."** ***9WSYR.com*****, http://www.9wsyr.com/content/contact/advertise.aspx**
   "NewsChannel 9 offers local advertisers the opportunity to reach a targeted, local audience with integrated on-air/online campaigns. We possess an unmatched power of promotion, driving viewers from on-air to online and back again."

Traditional Dairy Farming

1. **"Welcome to Finger Lakes Dexter Creamery!"** ***Finger Lakes Dexter Creamery, LLC*** **http://www.kefircheese.com/about.html**
   "My husband Tim and I have a great interest in the promotion and conservation of Dexter cattle. We are equally enthusiastic about the health benefits of kefir culture. We make small batches of Kefir cheese every Monday, Wednesday and Friday, and milk our Dexter cows all year."

2. **"Small Farms."** ***Cornell University Cooperative Extension*****, http://cce.cornell.edu/AG/SUSTAINABLEAGRICULTURE/Pages/SmallFarms.aspx**
   "The Cornell Small Farms Program works to enhance educational programming, research, and services for New York's small farm families…Projects and resources include Small Farms News Service; beginning farmer assistance; statewide work teams on livestock processing, local markets, and grasslands utilization; research on small farm clusters and regional food systems; and professional development training for educators and service providers."

3. **"Snofarm Dairy.** ***Snofarm*****, http://snofarm.com/index.php**
   "Snofarm Dairy produces wholesome, environmentally friendly milk from our thirty heritage varieties of cow…Snofarm is owned and operated by Calvin, Jean, and Jonathan Snow. The Snow family first began farming in Tompkins County in 1816, producing dairy and poultry products from the 1860s onward…We have made our mark by introducing sustainable crop and livestock methods to our legacy-rich land."

4. **"Digital: The Intersection of Influence and Wealth."** ***The Wall Street Journal*****, http://www.wsjmediakit.com/digital/**
   "The Wall Street Journal Digital Network (WSJDN) is the Web's largest publisher of original business news and financial information. Led by two of the most respected Internet brands, WSJ.com and MarketWatch, WSJDN offers editorial coverage and innovative advertising solutions that are second to none."

Industrial Dairy Farming

1. **"Dairy History: 'Then and Now.'"** ***Twin Birch Dairy, LLC*****, http://www.twinbirch.net/DairyHistory.htm**
   "…Today, Dirk, son Greg and Herdsman Pat Kehoe, successfully manage 26 full-time employees, 2,050 total head of cattle and 2,500 acres of land. While much has changed on the farm, much has not. Twin Birch Dairy still strives to be environmentally conscious by keeping abreast of all farm related issues such as watershed use, strip cropping techniques (to inhibit erosion) and nutrient management plans."

2. **"History."** ***Cortland Standard*****, http://www.cortlandstandard.net/aboutus.html**
   "The Cortland Standard, the only daily newspaper published in Cortland County, is observing its 143rd anniversary this year…The Cortland Standard has grown steadily with the population of Cortland County and with the rapid technological changes which have occurred over the years in the gathering and printing of news."

3. **"About Flakes Online."** ***Finger Lakes Community Forum*****, http://flakes1.wordpress.com/about/**
   "'Flakes' is our pet name for the Finger Lakes Community Newspapers. There are nine newspapers in the group and they are published weekly on Wednesdays…you are invited to comment on editorial entries to this blog or on any article that you have read in anyone of the FLCN papers."

4. **"Who We Are."** ***New York Animal Agriculture Coalition*****, http://www.farmskeepnygreen.org/**
   "The New York Animal Agriculture Coalition is focused on reconnecting the publics' understanding of and appreciation for animal agriculture through media engagement, public education and by fostering cooperation between industry stakeholders."

NAME _____ **DATE** _____

FARMING APPROACH: _____

Media documents can be accessed in the *Student Materials* section on the *Project Look Sharp* homepage, www.projectlooksharp.org.

QUESTION	DOCUMENT 1	DOCUMENT 2
1) List information about who produced this media document. Do you consider this source credible? Why or why not?	**TITLE:**	**TITLE:**
2) Using the list of ten **advocacy points**, check the points that support the sustainability of your traditional or industrial farming approach. Not all points will be present in each media document.	**Advocacy Points** ❒ Animal Welfare ❒ Climate Stabilization ❒ Cultural Continuity ❒ Energy Efficiency ❒ Environmental Health ❒ Genetic Preservation ❒ Job Creation ❒ Nutrition ❒ Productivity ❒ Profitability	**Advocacy Points** ❒ Animal Welfare ❒ Climate Stabilization ❒ Cultural Continuity ❒ Energy Efficiency ❒ Environmental Health ❒ Genetic Preservation ❒ Job Creation ❒ Nutrition ❒ Productivity ❒ Profitability
3) How does your farming approach best provide practice models for the advocacy points you circled in Question 2? Use direct evidence from each media document to support your advocacy points.		

FARMING APPROACH: _____

QUESTION	DOCUMENT 3	DOCUMENT 4
1) List information about who produced this media document. Do you consider this source credible? Why or why not?	**TITLE:**	**TITLE:**
2) Using the list of ten **advocacy points**, check the points that support the sustainability of your traditional or industrial farming approach. Not all points will be present in each media document.	**Advocacy Points** ❒ Animal Welfare ❒ Climate Stabilization ❒ Cultural Continuity ❒ Energy Efficiency ❒ Environmental Health ❒ Genetic Preservation ❒ Job Creation ❒ Nutrition ❒ Productivity ❒ Profitability	**Advocacy Points** ❒ Animal Welfare ❒ Climate Stabilization ❒ Cultural Continuity ❒ Energy Efficiency ❒ Environmental Health ❒ Genetic Preservation ❒ Job Creation ❒ Nutrition ❒ Productivity ❒ Profitability
3) How does your farming approach best provide practice models for the advocacy points you circled in Question 2? Use direct evidence from each media document to support your advocacy points.		

TEACHER GUIDE

Traditional and Industrial Farming, Activity 2

1. Direct the students to return to their group. If the groups are not finished planning their presentations, provide them with more planning time. Remind students that they will need to communicate which media document(s) will be included in their presentation so that you can project the PowerPoint for the whole class.

2. As a whole class, have each group make a brief presentation identifying the key components of their practice that suggests its sustainability. Each media document is in the PowerPoint and organized by the four groups (traditional and industrial corn farming, traditional and industrial dairy farming). Before each presentation, ask each group which document(s) they will analyze and project the document(s) during their presentation. Possible advocacy points and evidence are listed in the following pages of the *Teacher Guide*.

Traditional Corn Farming

Document 1: "History of Project"
***Iroquois White Corn and Ganondagan,* 2012**
Web page

Advocacy Points & Evidence

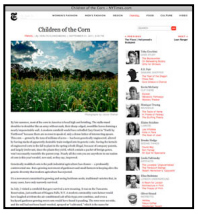
Advocacy Point	Evidence
Profitable	"Creating a sustainable market," "Stimulating demand"
Nutrition	"Concerned about Native nutrition and the epidemic of diabetes," "Model that could return…physical health"
Jobs	"He envisioned Haudenosaunee farmers supporting their families through primary jobs farming white corn"
Culture	"Model that could return…a spiritual nutrition to the Ongwehowne (Real People)"

Document 2: "Welcome to Corn Culture"
Frank Kutka
***CornCulture.com,* 2011**
Online newsletter

Advocacy Points & Evidence

Advocacy Point	Evidence
Productive	"Synthetic OP (open-pollinated) varieties, based on not two but eight or more parents, were bred that could yield as well as hybrids"
Genetic Preservation	"It is challenging and it is fun to go into the fields and see what nature has provided and which parents look the best for the next year"
Culture	"OP corn is much more than a contest with hybrids. It is an ancient heritage that closely bonds the grower with all the previous growers of this magnificent plant in one long chain"

Traditional Corn Farming



Document 3: "Children of the Corn"
Verlyn Klinkenborg
***T Magazine,* September 21, 2011**
Blog entry

Advocacy Points & Evidence

Advocacy Point	Evidence
Genetic Preservation	"A growing movement of gardeners and small farmers is keeping alive the genetic diversity that modern agriculture has rejected"
Culture	"Working to preserve culture and traditions of Native peoples"
Environment	"Working to preserve that which makes up our natural ecosystems and history for future generations"

Document 4: "Iroquois White Corn: A Culinary and Community Success"
Gary Paul Nabhan and Ashley Rood
***Renewing America's Food Traditions (RAFT),* 2004**
Book excerpt

Advocacy Points & Evidence

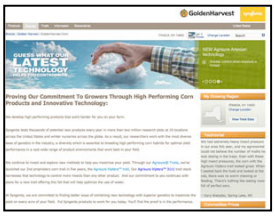
Advocacy Point	Evidence
Genetic Preservation	"Their combined efforts ensured the preservation of crop biodiversity"
Culture	"Encouraging Iroquois to continue traditional farming practices"
Productive	"Working in conjunction with the Collective Heritage Institute, Chefs Collaborative and other groups to market Iroquois White corn products"

Industrial Corn Farming

Document 5: "Corn prices: Sky-high by Fourth of July"
Morgan Wesson
***MPNnow.com,* July 3, 2008**
Online newspaper

Advocacy Points & Evidence

Advocacy Point	Evidence
Profitable	"America's leading cash crop, corn, is growing well in upstate New York"
Productive	"For the Finger Lakes and western New York crop farmers it's been a boom year"



Document 6: "Proving Our Commitment to Growers Through High Performing Corn Products and Innovative Technology"
Syngenta.com
Web page

Advocacy Points & Evidence

Advocacy Point	Evidence
Productive	"We continue to invest and explore new methods to help you maximize your yield."
Climate Stabilization	The image of the hand over the rain cloud represents human efforts to control uncertain climate as does the sidebar to the photo "greater control when moisture is limited."
Genetic Preservation	"Our researchers work with the most diverse base of genetics in the industry, a diversity which is essential to breeding high performing corn hybrids."

Industrial Corn Farming

Document 7: "New York State Winners – 2011 NCGA Yield Contest"
***Pioneer.com*, 2012**
Web page

Advocacy Points & Evidence

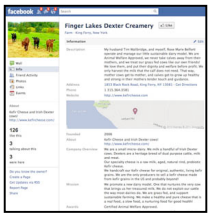
Advocacy Point	Evidence
Productive	The chart highlights farmers with the highest yields of corn plots entered in the contest.
Climate Stabilization	The chart axis for "strip till irrigation" and the reference to "insect protection gene" by the HX1 logo refer to water shortages and insect infestations that can accompany climate fluctuations.

Document 8: "Ethanol to Flow from Oswego County Plant"
***9WSYR.com*, July 10, 2010**
Online news article

Advocacy Points & Evidence

Advocacy Point	Evidence
Jobs	"The 60 new jobs represent a boost for Oswego County, which has one of the highest unemployment rates in the state"
Productive	"Help turn 30 million bushels of corn into 100 million gallons of ethanol"
Energy Efficiency	"Sunoco customers in Central New York could soon be fueling their rides with locally produced ethanol"

Traditional Dairy Farming



Document 9: "Finger Lakes Dexter Creamery"
Rose Marie Belforti
***Facebook.com*, November 18, 2011**
Social media web page

Advocacy Points & Evidence

Advocacy Point	Evidence
Animal Welfare	"We are Animal Welfare Approved, we never take calves away from their mothers, and we treat our grass fed cows like our own friends!"
Nutrition	"We make a healthy and pure cheese that is a real food, a slow food, a nurturing food for good health!"

Document 10: "Small and Versatile: Dairy Adapts to Changing Markets"
Adrienne Masler
New York Small Dairy Innovators, 2010
Report chapter

Advocacy Points & Evidence

Advocacy Points	Evidence
Adaptability	"They haven't made huge investments in infrastructure or equipment that would tie them to one type of production"
Nutrition	References to raw milk customers who reversed severe gum disease and customers who can digest enzymes in raw milk that aren't present in pasteurized milk
Profitable	"Growing demand for organic and locally-produced food," "Very happy with organic prices; the increase in income has helped them invest"

Traditional Dairy Farming

Document 11: "Our Philosophy"
***Snofarm.com*, 2006**
Web page

Advocacy Points & Evidence

Advocacy Point	Evidence
Animal Welfare	"Our cows approve of their working conditions…They are treated humanely"
Culture	The top image of the 1890s farm along with the title "Snofarm: A Modern Dairy Farm with History" suggests continuity of agrarian culture.
Energy Efficiency	Fossil fuel use is minimized since "90 percent of (the cattle's) food is produced on our farm."

Document 12: "Crop of Small Dairies Hits Market"
Melanie Grayce West
***Online.WSJ.com*, November 29, 2010**
Online news article

Advocacy Points & Evidence

Advocacy Point	Evidence
Profitable	"There is a huge resurgence of these small, artisanal cheese makers." Mr. Moore says locavores are changing the market. "They want a niche product that's different than what corporate America offers," he said."
Productive	"There was an approximate doubling of small dairy plants in New York over the last two years, to around 80 statewide. Thirty-four plant permits have been issued this year."

Industrial Dairy Farming

Document 13: "Our Operation"
Twin Birch Dairy
***TwinBirch.net*, 2003**
Web page

Advocacy Points & Evidence

Advocacy Points	Evidence
Productive	"Approximately 8,000 gallons of milk is produced each day (about 24,000 pounds of milk per cow per year)."
Animal Welfare	"Each calf has its own individual housing unit within the greenhouse. The greenhouse offers an excellent environment for healthy growth."

Document 14: "Dairy Plant Decision Expected by Oct."
Matthew Norji
***CortlandStandard.net*, September 20, 2011**
Online news report

Advocacy Points & Evidence

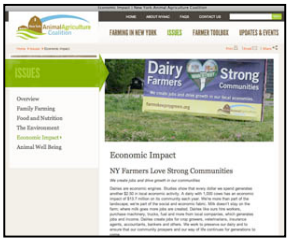
Advocacy Point	Evidence
Jobs	"A group of 28 large dairy farms is looking at the Finger Lakes East Business Park on Route 13 and two other sites in Cayuga County to build a 120,000-square-foot milk processing facility that would create up to 60 jobs."
Profitable	"Cayuga Marketing plans to build the facility 'to capture more of the consumer dollar while at the same time be able to control our hauling costs and farmer premiums.'"

Industrial Dairy Farming

Document 15: "Guest Opinion: In Defense of Dairy CAFOs"
Meg Gaige
***Flakes Community Forum*, May 15, 2008**
Blog entry

Advocacy Points & Evidence

Advocacy Point	Evidence
Environmental Health	"Dairy farmers make significant investments in systems and equipment to protect the environment," "Most dairy producers – regardless of farm size – live and work to protect the land, water, and air for their families, their communities, and future generations."
Culture	The title reflects the attention to the importance of community. The author's personal identification, "As a veteran agricultural reporter and member of a fifth generation dairy family that farms near Mecklenburg," indicates a pride in preserving agrarian cultural inheritance.



Document 16: "Economic Impact"
Farms Keep New York Green
New York Animal Agriculture Coalition
Web page

Advocacy Points & Evidence

Advocacy Points	Evidence
Jobs	"Where milk goes more jobs are created," "We create jobs and drive growth in our communities" on the billboard and top text
Profitable	"Every dollar we spend generates another $2.50 in local economic activity. A dairy with 1,000 cows has an economic impact of $13.7 million on its community each year."
Culture	"We work to preserve our dairy and to ensure that our community prospers and our way of life continues for generations to come."
Environmental Health Animal Welfare Nutrition	Concerns are listed in the left hand menu as "The Environment," "Animal Well-Being" and "Food and Nutrition."

3. After all the teams have presented, ask students to take fifteen minutes to write on the relative value of traditional and industrial farming practices in modeling sustainable farming philosophy and practice for the 21st century. Ask them to take into account at least three of the advocacy points for sustainability listed on their worksheet:
    - the creation of living wage jobs with healthy working conditions
    - profitability that fairly distributes wealth
    - productivity that does not deplete essential resources
    - adequate and balanced nutrition
    - preservation of genetic diversity
    - energy efficiency
    - environmental health
    - animal welfare and
    - climate stabilization

4. Lead a discussion on sustainable farming practices that employ elements from both traditional and industrial practices. Probe questions include:
    - **How would you summarize the perspective or worldview behind traditional agriculture?**
    - **How would you summarize the perspective or worldview behind industrial agriculture?**
    - **Which elements of these worldviews are essential to maintain in creating new models for 21st century sustainable agriculture?**
    - **Which elements of these worldviews might best be discarded and why?**
    - **What new techniques or ideas from the readings or from your own experience should be included in future models that fit neither traditional nor industrial models?**

5. Lead a discussion assessing the credibility of media documents. Discuss how prior judgments may shape beliefs and biases about media credibility. Probe questions include:
    - **Which media documents did you consider to be credible and why?**
    - **Which media documents did you consider not to be credible and why?**
    - **Did you have strong opinions about the value of traditional or industrial farming before reviewing the documents?**
    - **What do you learn about yourself in examining your judgments about credibility?**

FURTHER QUESTIONS

Analyzing Media Messages:

How were the values of the producers reflected in the media documents they created?

All of the media images in this lesson were found on the Internet. **Where would media images about farming practice have been found when your grandparents were in school?**

Which of the media messages inspired you to dig more deeply into questions related to sustainable farming? Why?

Self Reflection:

Do you think that the opinions of someone from a farming community should be more valued than those of city dwellers when making farm policy decisions? Why or why not?

What are some stereotypes that people have about farmers? What are your prejudices (pre-judgments) regarding people from farming backgrounds? Where did these prejudices come from?

Two hundred years ago, it is likely that most everyone in a school class had a friend or family member who was in the business of farming. **Do you know people who farm today? Have you visited a farm yourself? Have you worked on a farm? Why are people more disconnected from where their food comes from today than they were long ago?**

Underlying Values and Motives:

How would you articulate the primary values behind traditional farming? Behind industrial farming? Are these primary values fundamentally opposed to one another or can they be reconciled to a place of shared value?

Is it possible to place these values in a rank or order that prioritizes one over another when it comes to measuring the success of 21st century farming practice? Good jobs, environmental protection, animal welfare and human health. If so, how do you rank them? If not, how do you decide between competing values?

How can the skills and knowledge of newly immigrant farmers be a resource in creating models for 21st century farming practice?

How much is the scale of industrial farming a factor in assessing its positive and negative impacts?

EXTENDED ACTIVITIES

Research the diverse farming practices within different types of indigenous societies. For instance explore the diversity of indigenous agriculture by comparing agricultural practices among the Iroquois of the northeast, the Hopi of the southwest and the Anishinaabe of the Great Lakes.

Investigate corn and dairy farming practices in your region using a variety of media to learn a broad range of farming models. If possible also visit a traditional and industrial farming operation in your region either through existing tours or by special arrangement with the farmers. Compare the ways these different forms of farming are portrayed online or in person.

Use online sources and site visits to research the diverse contemporary farm practices that combine the productivity of industrial farming with the low impact of traditional farming.
Study the economics of big and small farming operations in your area. Reflect on how these methods complement or perhaps replace traditional and industrial methods.

Design a sustainable farm of the future that includes your way of integrating traditional, industrial and contemporary elements. Select a way to share this with others, inviting their feedback on your ideas.

The National Agricultural Statistics Service of the U.S. Department of Agriculture has a database that records agricultural production, sales and farm type broken out by county and state. Use the information in this database to make a graph that compares farms in your region by size and sales. Consider what measures the numbers about economics includes and excludes. Does it include the stability of food pricing and farm worker incomes? The number of living wage jobs created? The costs in environmental mitigation for pollution of soil and groundwater?

CONNECTIONS

L 6, 9, 10, 15, 16, 18, 19, 26
(seeds & crops)

L6, 7, 9, 10, 16, 17, 19, 20, 21, 25, 26
(local food)

L6, 7, 10, 15, 16, 17, 19, 20, 21, 25, 26
(organic & conventional farming)

L 6, 7, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26
(food security)

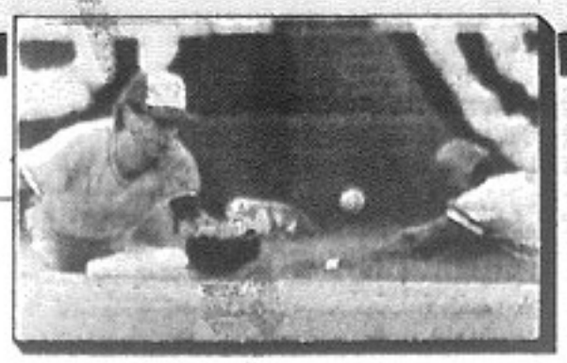
L6, 7, 10, 12, 14, 15, 16, 21, 26
(agrarian cultures)

Resources

BIG WIN

Cards Rip Dodgers; Royals Alive

— Sports Extra, Page C-1



LINES BLUR

One-Stop Financial Services

— Business Extra, Page D-1

157th Year, No. 29 METRO CLOUDY Rain possible; high 65. Weather: A-2.

THE POST-STANDARD

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SYRACUSE, N.Y. MONDAY, OCTOBER 14, 1985 25 CENTS

Cazenovia Parents Join Fight against 'Humanism'

By BRENDA CAWTHON

Parents who believe something they call "humanism" is creeping into classroom curricula are peering over teachers' shoulders in the Cazenovia School District.

Calling themselves "Citizens for Excellence in Education," about 50 parents have banded together to fight what they see as the steady erosion of their right to teach their children "traditional" moral values.

One member of the group has attended a career and home skills class that the group finds objectionable, and parents are reviewing lesson plans for that course and others.

Although parents in other local school districts have objected to specific courses from time to time, this is the first manifestation in Central New York of a national movement to scrutinize the moral content of daily lessons.

"What I'm concerned about is, I believe, a trend across the United States," said Linda Ragan, one of the organizers of the group.

"This is a humanistic view — it's looking into oneself constantly, and it presents the individual as the final arbiter of right and truth," said Susan Craig, another member of the organization. Craig said she believes such decisions are best made by God.

Teachers, administrators and other parents in Cazenovia are listening to the group's views but say they are comfortable with the classes offered.

"I don't think it's our job to tailor our curriculum to the beliefs of every single child," said Charles E. Read, principal of the Green Street Middle School. "These parents want to make sure we're not telling their children something that will confuse them, and I understand that. But it's not up to us to judge, and that bothers some of the parents who want us to be as conservative and judgmental as possible."

"All of this is subtle, so subtle that an excellent teacher may not catch it unless they take the time to study it," Ragan said.

Among other things, Ragan and her group object to classroom lessons that present children with a dilemma and encourage them to devise a means of solving it.

They claim exercises that school officials say are designed to help children learn about themselves and the decision-making process are "me-centered" and "anti-parent" because they encourage adolescent independence.

"It's like the teacher is becoming a group therapist," said Ragan, adding that she became concerned about Cazenovia's curriculum after reading "Child Abuse in the Classroom," a compilation of testimony offered by parents at a series of national hearings on education. The book was edited by Phyllis Schlafly, a conservative columnist and activist.

(Continued on Page A-9)

Bob Mahoney/THE POST-STANDARD

Ken Wentworth remembers the lake as it was when he swam and fished in it as a child. His reminiscences, Page A-11.

From Clean Lake to 'Witch's Brew'

First of five parts

By ROBERT W. ANDREWS

ONONDAGA LAKE A Paradise LOST?

On the west shore of Onondaga Lake, a terraced hillside of chalky chemical waste rises 80 feet above the barren shore. Scattered patches of tangled brush cling to the white, spongy slope.

It is quiet here, and desolate. Yet less than a football field away, cars and trucks rush past on Interstate 690. Across the way is the village of Liverpool. And off to the right, across the water, are the city skyline and the Carrier Dome.

It was along this shore in the 1890s that many of the grand resorts and hotels flourished, drawing thousands for weekend recreation — swimming, fishing, dancing, watching vaudeville or just enjoying the rides, the games and the grand times.

One by one, the west shore resorts lost their allure. The fish population was decimated. Swimming became unsafe. And Allied Chemical Co. built a wall of waste on the shore.

For decades, the white hills of the west shore have been a visible metaphor for the lake over which they tower: a lake that will never come clean. At least that is the popular perception.

"A concoction as vile as found in any witch's brew" is how Daniel Jackson, a scientist and environmental crusader, described Onondaga Lake in the 1950s.

It stank. It looked dirty. People who went to the bottom emerged with thick, black goo covering their feet and legs. Human excrement floated on the water.

It was a lake little loved and often ignored. A letter to the editor in the 1950s urged that it be paved so the road to Baldwinsville would be shorter. Another, in the '60s, suggested it be filled with garbage.

Onondaga Lake and its west shore: abandoned, written off, and neglected.

How did it happen? And can such a lake ever be clean again?

During months of research and discussions with dozens of scientists, bureaucrats, politicians and people who know the

(Continued on Page A-10)

Yugoslavia Won't Arrest PLO Suspect

The Washington Post

WASHINGTON — The Reagan administration, expressing anger at Italy's "incomprehensible" release of a Palestinian leader accused of masterminding the hijacking of an Italian cruise ship, said Sunday it anticipates that Yugoslavia also will reject U.S. demands for the arrest of Mohammed Abbas.

In Belgrade, Yugoslav officials made no official comment about the status of Abbas, who arrived there Saturday night after Italian authorities spirited him aboard a Yugoslav airliner at an airport near Rome.

But FBI Director William H. Webster said Yugoslavia has "declined to detain" Abbas, who was briefly in Italian custody after he and four accused hijackers were caught aboard an Egyptian airliner that was diverted to Sicily by U.S. Navy jets Thursday.

U.S. officials, noting Yugoslavia's close ties with the Palestine Liberation Organization, acknowledged that they have little hope that Yugoslavia will hold him until the United States can request his extradition.

Reports from Belgrade quoted a Yugoslav government spokesman, who declined to be identified, as saying, "We have good relations with the PLO, and we support the Palestinian cause. You can draw your own conclusions."

That indicated that the United States probably will be frustrated in its efforts to prosecute Abbas, whom it has called "one of the most notorious Palestinian terrorists," for his alleged role in planning and controlling the hijacking of the cruise ship Achille Lauro last Monday. An American citizen was shot to death before the four hijackers surrendered to Egyptian authorities.

The administration's determined pursuit of the hijackers has brought the United States into actual or potential conflict with three countries — Egypt, Italy and Yugoslavia — since

(Continued on Page A-4)

Fugitive A Veteran Infighter

The Washington Post

BEIRUT, Lebanon — The man wanted by the United States as the mastermind of the Achille Lauro hijacking is a veteran of the often bloody politics of the Palestinian movement who aligned himself with Yasser Arafat in 1983 when the Palestine Liberation Organization split.

Mohammed Abbas Zaida, codenamed Abu Abbas, told Egypt's Middle East News Agency in an interview in Belgrade Sunday that the four men who hijacked the ship were on a "suicide mission" aimed at Israel when they were discovered and were "forced" to seize the ship.

"Their mission was not to hijack the Italian ship or to threaten the lives of the passengers," Abbas was quoted as saying. "Their destination was the Israeli port of Ashdod for the purpose of carrying out a suicide mission" inside Israel.

Abbas in the interview — and the faction of the Palestine Liberation Front that he heads, in a statement here — repeated denials that the four gunmen were responsible for the death of American passenger Leon Klinghoffer.

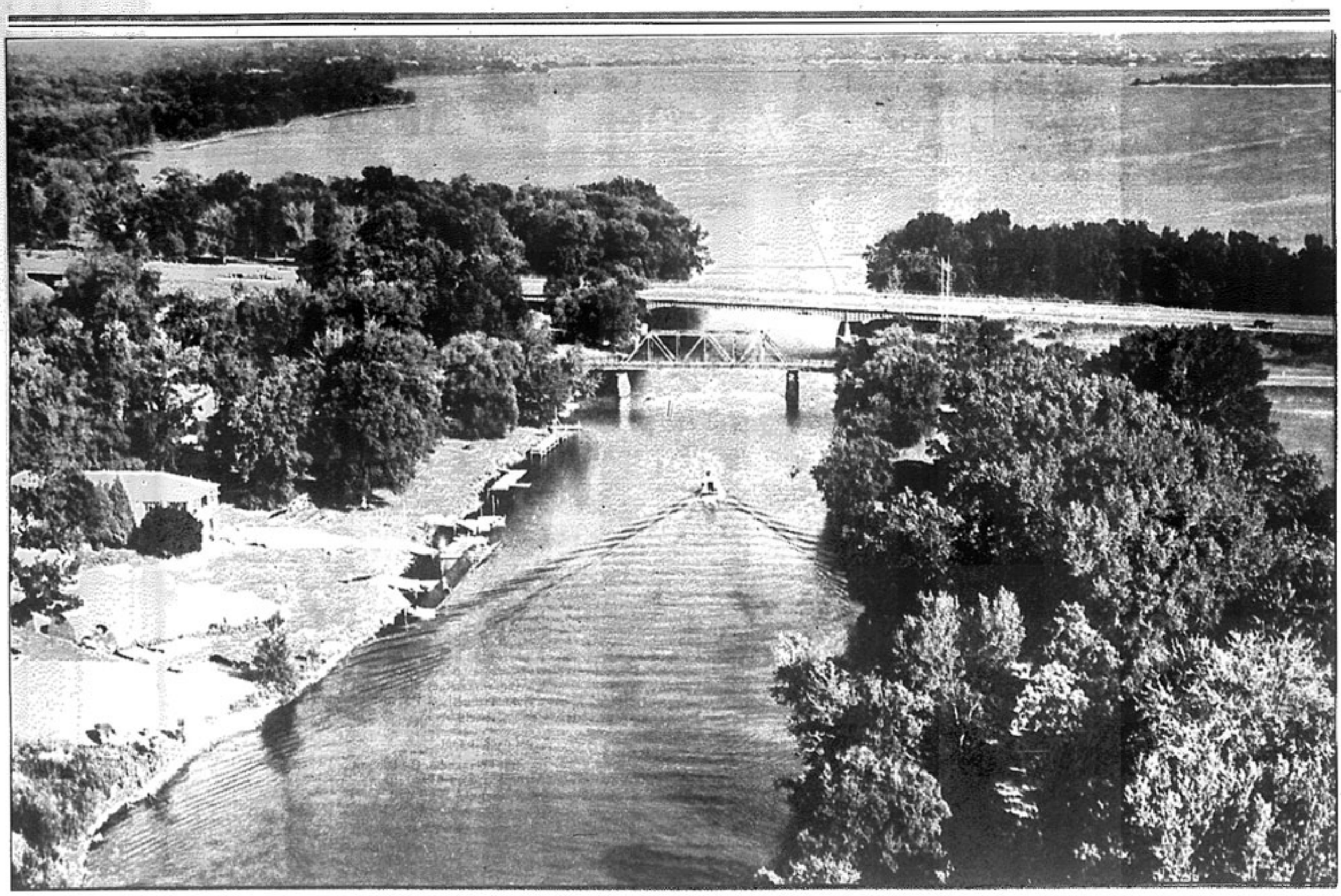
Abbas, who is believed here to have ordered, or at least persuaded, the four gunmen to return the Achille Lauro to Port Said Tuesday night, went on to play a central role in reaching the accommodation that led to the gunmen leaving the ship.

(Continued on Page A-5)

FIRST OF FIVE PARTS

"Our beautiful lake will present continuous villas ornamented with shady groves and hanging gardens and connected by a wide and splendid avenue that shall encircle its entire waters and furnish a delightful drive to the gay and prosperous citizens of the town who will, towards the end of each summer's day, throng to it for pleasure, relaxation or improvement of health."

— From a speech by Harvey Baldwin, first mayor of Syracuse, in 1847.



David Lassman/THE POST-STANDARD
A boat makes its way down the Seneca River at the northern end of Onondaga Lake. To the left is the Syracuse University boathouse. The city skyline can be seen at the top.

ONONDAGA LAKE A Paradise LOST?

Abuse Creates 'Witch's Brew'

(Continued from Page A-1)

lake, The Post-Standard sought answers about Onondaga Lake — about its past, its present and its future.

Among the answers that emerged:

● Allied Chemical Co., once Solvay Process Co., is by far the lake's worst polluter.

When the company began producing soda ash in 1884, the lake began to die. Within two decades, the fish population was decimated. As the lake's waters worsened, Allied built its enormous wall of waste on the west shore.

Since the 1880s, Allied has literally been filling the lake with its waste — tons of sodium chloride and calcium chloride.

Scientists say that between 20 and 40 percent of the lake has been filled with Allied's waste in the past century, creating a 15- to 30-foot layer of gooey black muck on the bottom.

● Allied's other major contribution to the lake — 20 pounds of mercury a day for 18 years — was halted by the federal government in 1970, and the mercury level began to drop. But to the bewilderment of lake scientists, recent tests have found a resurgence in that level. Until the mercury mystery is solved, it will not be safe to eat fish from Onondaga Lake.

● Despite Allied's leading role in the lake's decline, there's plenty of shame and blame to go around. Over the years, virtually everyone has polluted Onondaga Lake.

Crucible Steel dumped its chromium waste. Bristol Labs added organics from its penicillin plant. Syracuse China disposed of broken dishes there. In the 1950s, one estimate was that 139 industries used Onondaga Lake as their waste basin.

And, for decades, the city of Syracuse used the lake as a toilet. Even today, raw sewage flows directly into the lake on rainy days, when the city's antiquated wastewater system overflows.

● Year after year, the government agencies whose job it was to keep the lake clean refused to crack down on the blatant pollution. Often, they encouraged it.

Engineers in the 1920s wrote reports advising the city to use Onondaga Creek and Onondaga Lake as sewers on the theory that sewage would decompose entirely as it went from one end of the lake to the other. And city officials decided with little debate to do just that.

State officials failed to enforce state laws against lake pollution. Instead, the city and the state made quiet deals allowing Allied to continue despoiling the shoreline and to continue discharging waste into the lake.

Politicians — Gov. Thomas Dewey, in 1946, for one — made promises they never fulfilled. Dewey promised lake improvements and action to protect Onondaga Lake against despoilment by any private company. Still, the pollution went on unabated, and local environmental crusaders blamed the governor for blocking legal action against Allied, which by then was one of the largest employers in the Syracuse area.

Newspapers mostly ignored the pollution and the growing wall of waste. When the Syracuse Post-Standard did write something in 1903, attempting to describe what was happening on the west shore and in the lake, the story's relation to truth was remote.

● Onondaga Lake has been studied and re-studied, prompting lake expert Robert Hennigan to call it "perhaps the most studied lake in the nation."

But still left unstudied are such key questions as: Why is deadly mercury still showing up in fish flesh? What other toxic chemicals are in the lake?

● Despite all this, Onondaga Lake has improved substantially from the slimy, miasmatic bog Syracuse knew in the 1950s.

The reasons are many: The tireless work of a handful of environmental crusaders, one generation leading to another. The county's new sewage treatment plant, which opened in 1979. And the impact of tough, new environmental laws, including the creation of the state Department of Environmental Conservation and the federal Environmental Protection Agency in 1970.

Scientists believe that, with Allied's scheduled plant closing next year, Onondaga Lake is entering a new era. It might eventually become reasonably clean and useful.

Already, they say, there are days each summer when bacteria levels are low enough that it is safe to swim in the lake.

A Place in History

Long before Solvay Process came to the west shore — before white men set foot in America — the Onondaga Indians fished and trapped along the shores of the lake.

When the Europeans arrived and began struggling for a foothold in the New World, the lake became a battlefield.

In 1615, a French force led by Samuel Champlain launched an unsuccessful invasion of an Indian camp at the south end of the lake near where Oil City is now, hoping to gain control of the lake, a crucial link in a system of inland waterways.

Years later, an enormous force — 2,000 French soldiers and Huron Indians in 400 canoes — stormed into Onondaga Lake, intent on wiping out the Onondagas. It probably was the largest army ever gathered in North America up to that time, but it never saw battle. The Onondagas burned their village and fled into the woods, leaving the French with nothing. The invaders soon abandoned the site, and the Indians returned to the lake.

Around that time and for centuries thereafter, the lake's shoreline was marshy and mosquito-ridden.

The lake was larger than it is at present — much of what is now the city's west side was under water. In 1822, the state lowered the level of the water by making its Seneca River outlet deeper and wider. The lake receded from the shallow, marshy shoreline to roughly its present configuration. A road along the shore was built in 1878.

From then until the early 1900s, Onondaga Lake was a vibrant part of Syracuse.

People swam in it, fished in it, boated along its waters and took the trolley or the lake steamer to its west shore resorts — places with names like Lake View Point, White City, Rockaway Beach and Maple Bay.

The resorts were places of romance. Couples could take the open-air, double-decker streetcars to the Iron Pier resort. There, you could dance on one of the area's

(Continued on Page A-11)

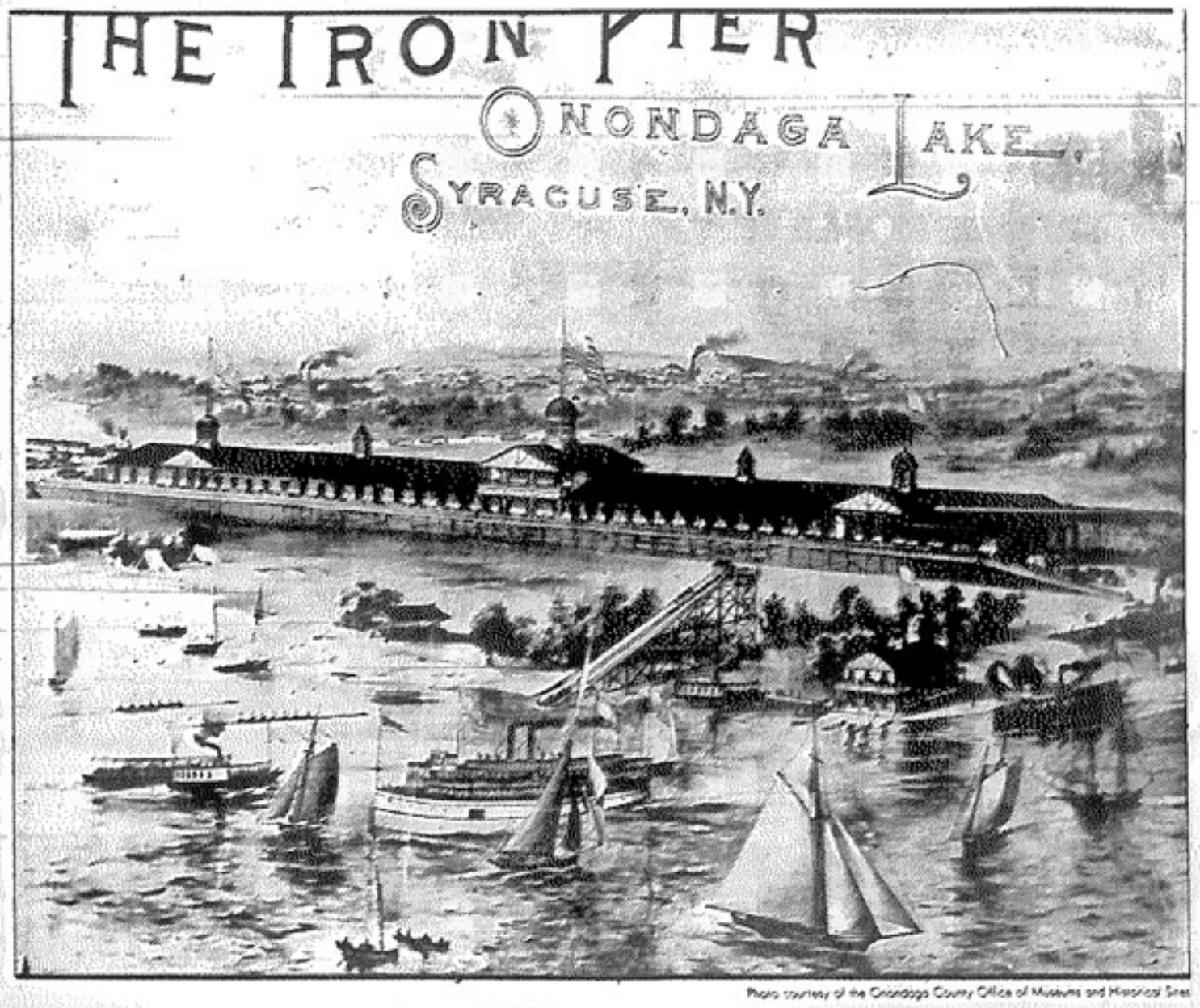
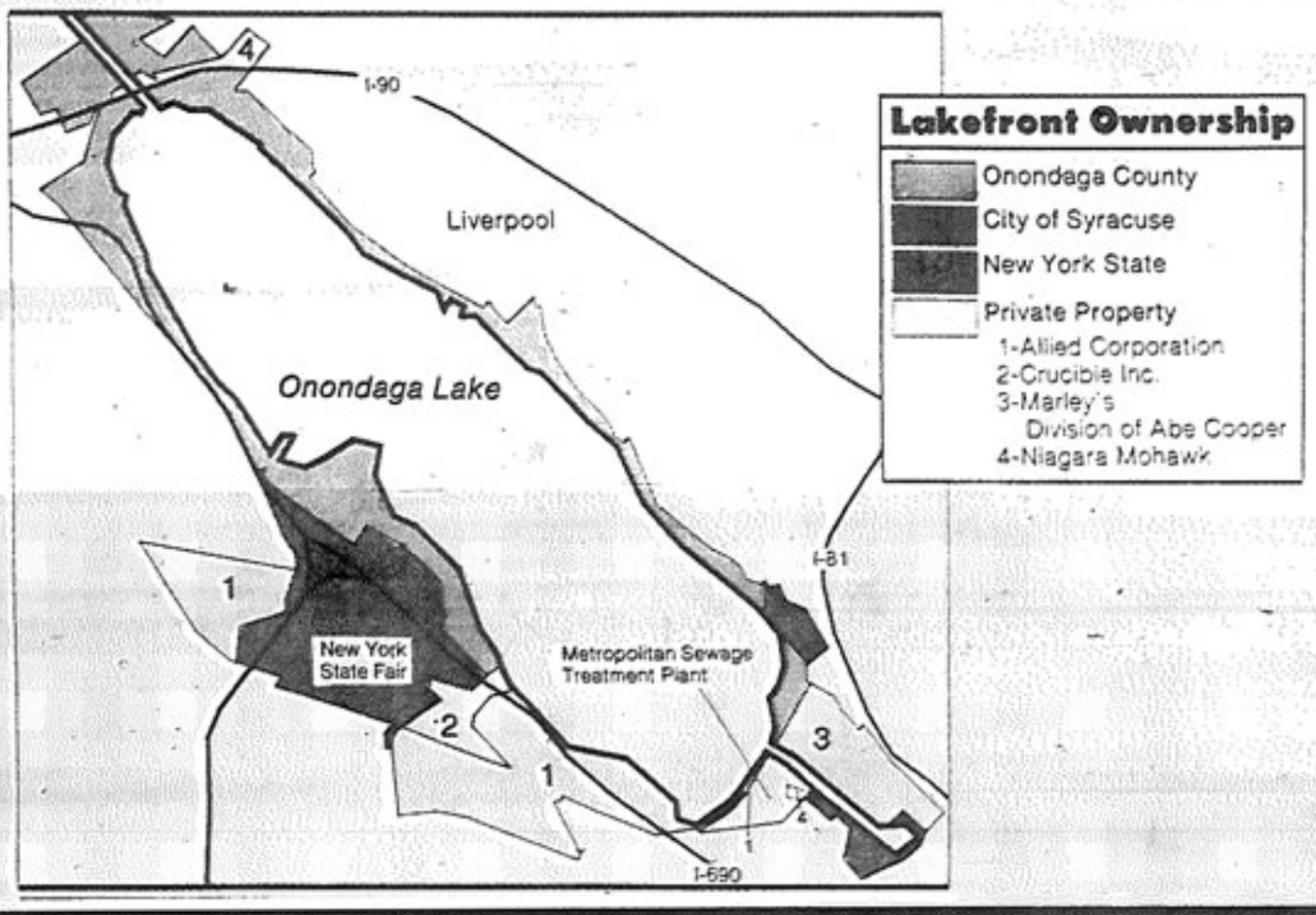
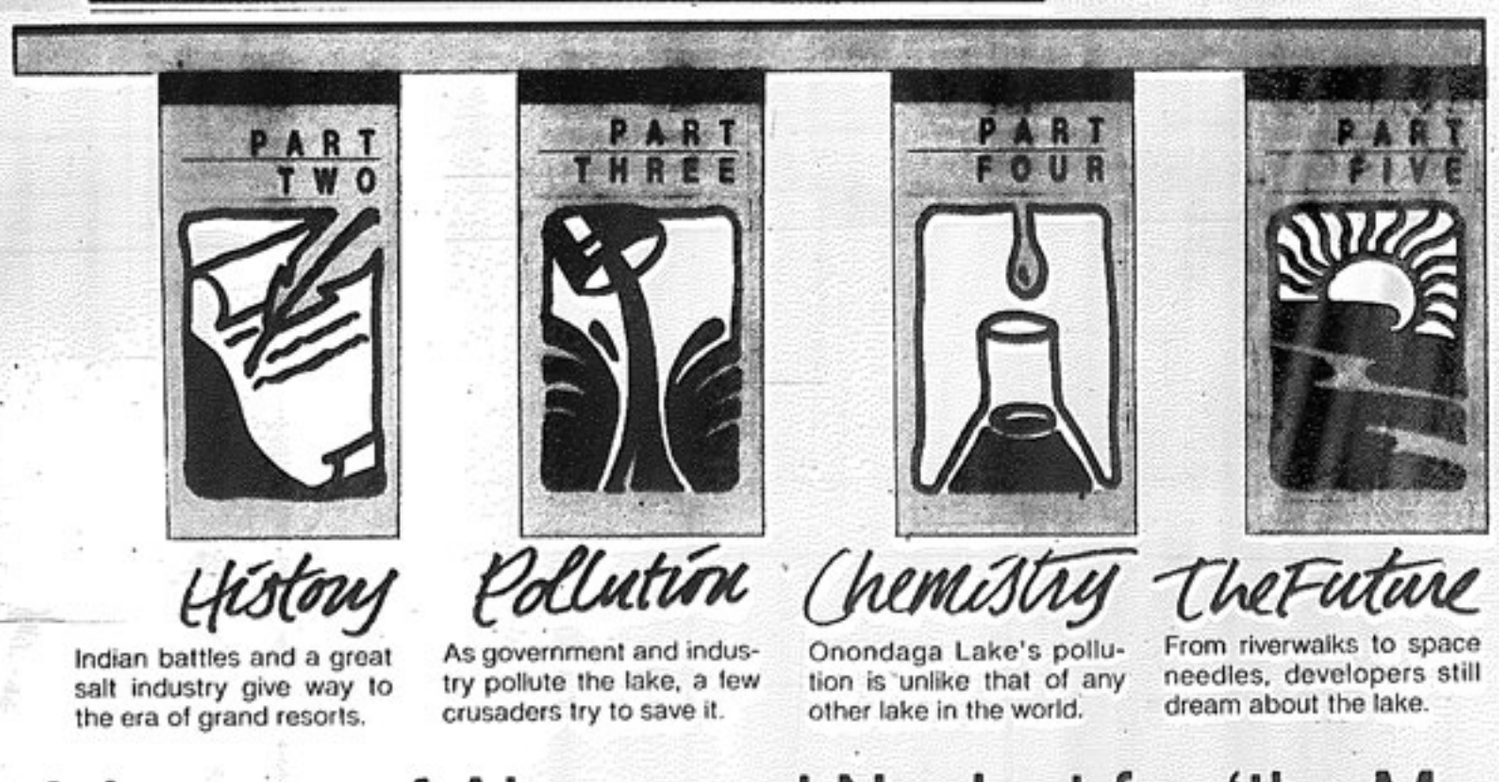


Photo courtesy of the Onondaga County Office of Museums and Historical Sites

An 1890 sketch of the Iron Pier. The resort, at the southern tip of the lake, featured a dance hall, a merry-go-round, games of chance and a toboggan chute into the lake. There were also canoes for rent.





History — Indian battles and a great salt industry give way to the era of grand resorts.

Pollution — As government and industry pollute the lake, a few crusaders try to save it.

Chemistry — Onondaga Lake's pollution is unlike that of any other lake in the world.

The Future — From riverwalks to space needles, developers still dream about the lake.

A Legacy of Abuse and Neglect for 'the Most Studied Lake in the Nation'

(Continued from Page A-10)

largest floors.

For children, the resorts were a summer haven. There were hot dogs, ice cream, games and rides, as well as swimming and fishing. In the winter, Onondaga Lake was a place for ice skating and ice boating, and someone always had a pick-up hockey game going.

As the lake was becoming popular toward the end of the 19th century, the industry that dominated its shore for a century began to decline. Where once Syracuse had a virtual monopoly on salt-making, it now was possible to mine salt elsewhere at a cheaper price.

Salt production was possible here because early Syracusans discovered a salt spring along the lake shore: a well that tapped into a deep underground layer of salt that was formed in pre-glacial times. For 100 years, it was a multimillion-dollar business that dominated the local economy and made some Syracusans rich.

As the 1900s approached, a new industry rose along the lake shore. Twenty years after Solvay Process Co. was established, a burgeoning ice industry was banned because of impurities in the lake's water. And the resorts began to fold.

From that time on, the soda ash company would control the lake's destiny.

A Handful of Heroes

Even in the darkest periods of the lake's decline, amid the misguided policy decisions and the simplistic assessments, there were a few heroes. Among them:

✓ Norman Richards, a professor at SUNY College of Environmental Science and Forestry, spent years in his spare time during the late 1960s and '70s lugging fertilizer and seeds to the terraced mountain of chalky waste on the west shore. He was determined to prove that plant life could grow there. Singlehandedly, he covered a substantial portion of the shore with grass, shrubs and wildflowers.

✓ A trio of environmental crusaders took on Allied, the city and the county in the late 1940s and '50s. There was Walter Welch, a State Fair official; Crandall Melvin, a banker; and William Maloney, a real estate developer. Well before the environment was a hot issue, they formed the lake's first cleanup group and lobbied hard during the lake's worst years.

✓ A decade later, civil engineering professor Daniel Jackson and chemist Samuel Sage followed in their footsteps. Jackson, often criticized by county officials who think he went too far, used a boat donated by Syracuse University called Saltine Warrior to rally and cajole support for Onondaga Lake cleanup efforts. Sage, to this day, wages a solitary campaign, using laws that allow citizens to sue, to keep companies from illegally polluting the lake.

Thanksgiving in Lakeland

What prompted the area's environmental awakening was a disastrous event on Thanksgiving Day 1943.

While west shore residents slept, the dam holding back the Allied waste beds broke open. An 8-foot wall of goo, thicker than week-old mashed potatoes, flowed into the Lakeland neighborhood.

Everything for more than a square mile was inundated: homes, trees, the boulevard, even the State Fairgrounds.

From then on, people started taking a much closer look at what Allied was doing to the lake and its shore. Only recently, however, have scientists begun to understand the complex chemical nature of Allied's pollution. And not until Allied leaves will the company's full impact on the lake become clear.

For more than 100 years, the soda ash company has been loading up the lake with its waste. At first, the company dumped directly into the lake; now it channels the waste into the lake through the county's sewage treatment plant.

Allied's discharges have made the water salty, heavy and stratified and have robbed the lake of oxygen. For that reason, no fish can live on the lake's bottom, and some fish can't live anywhere in Onondaga Lake.

The pollutants also combine with algae to make the water extremely cloudy.

All the dumping has made Onondaga Lake age quickly. It is normal that as lakes grow old they become shallow and cloudy, have too much algae and too little oxygen.

But in Onondaga Lake's case, the aging is not natural. The lake is aging prematurely because of all the pollution Syracusans have put into it.

Plenty of Grand Plans

Prospects for cleaning the lake depend partly on chemistry but mostly on economies and politics.

Some scientists say that with Allied's departure and a major effort to reduce sewage overflow, the future of the lake is bright.

There is already talk of a bathing beach. The county is pursuing plans to continue its bicycle trail along the west shore, making the lake the centerpiece of a trail that would go from one end of the county to the other.

There's no shortage of grand ideas: A boat marina at the barge terminal area. A space needle restaurant on the west shore. Cafes and restaurants along Onondaga Creek. Fishing piers. A water park. Hotels and motels.

All have been proposed for the lake, its shore or the creek that feeds it.

Most await the answer to the basic question: Can Onondaga Lake ever be clean?

Tomorrow: From French-Indian battles to the era of the grand resorts, Onondaga Lake has had a long and colorful history.

Bob Mahoney/THE POST-STANDARD

Liverpool native Ken Wentworth remembers the lake in good times and bad. "I hope we get it clean before I pass away," he says.

One Man's Memories Of a Lake Gone Bad

Ken Wentworth, a Liverpool native, recently taped his reminiscences about a childhood spent in and around Onondaga Lake.

My name is Ken Wentworth, age 65, old Liverpool resident. I've known the lake. I've fished it. I've swam in it. And before me, my father.

My father was an old canaler — born and raised in Liverpool . . . and he knew the lake when it was clean, and my grandfather before him. My father used to tell me about how they used to net whitefish in the lake.

Wintertime, there wasn't many whitefish because they all seemed to disappear. Whitefish had to be gill netted because they were, well, ah, I don't know if you know anything about whitefish. They were awfully tendermouthed and you couldn't catch 'em on the hook.

Always there were whitefishermen. All kinds. Used to make a living with it in fact. Used to take 'em into the city in a wheelbarrow and sell 'em.

A lot of people say it's carp. It wasn't. There was an Onondaga Lake whitefish. A beautiful fish. Like my dad used to tell me, they was fishing and everything was all right. In winter, they used to set their nets under the ice. They had a system.

One winter they didn't catch many. Next spring, there was no more whitefish. They disappeared over that one winter. My dad tells me a theory about that. We'll get back to that.

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But I remember the lake myself when it was clean. We used to swim in it; we used to fish down off Liverpool there. Perch, pike, bass, sunfish, bullheads. Everything. Eels. I've seen eels swimming along that Solvay Process. People complain about Solvay ruining the lake, well, they did put a lot of sediment into the bottom, I guess.

Along the shores, the shelf like, used to be full of grass, and this little creature used to grow in it. Dad called him a shrimp of some kind the fish used to eat. Well, the grass is all gone. No grass, no air in the lake. No air, less fish. Big vicious cycle. But I don't blame Solvay Process for all that. I mean, heck, you gotta give Syracuse a lot of blame for all the sewage they've been dumping in there. Now all that's changed because of the sewer plant they got down there . . . .

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I've known that lake all my life. I've flown over it, sailed it, ice boated it, the whole darn bit . . . .

I think the lake is stagnant. It needs to be aerated. It needs to be flushed, but there isn't any way to flush it now.

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Back to the whitefish mystery.

Dad was telling me about the whitefish and how they disappeared. That was the same year New York Central was putting the railway around the lake — down near Hiawatha Boulevard. One place they had trouble was the sink hole. They put carload after carload of fill into there before they could get a roadbed to sustain the tracks.

My father always believed that, in the wintertime, the whitefish went up an underground river, up in the hills somewhere, and when they blocked it off, they didn't come back next spring.

Now if you look at the whitefish, you can get the idea that it did live part of its time in the darkness, underground. I mean the pale pink eyes, the tender mouth. They look like a washed-out fish that didn't see much sunlight. The whitefish when they swam, swam in schools as if they didn't have too much of a sense of sight or something. Anyways, they filled in that which Dad thinks is a big river, must have been, such a big hole there, and that's the year the whitefish disappeared.

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It's a beautiful lake for rowing and sailing.

I don't like that fella Johst (former parks commissioner James). He made it into his private pond. Take a ride out there and see all the "don't" signs. Don't do this; don't do that. We used to ice boat down there. They won't let us ice boat. I used to like to sit down by the harbor, the Yacht Club, and watch the storms come in. I love a good storm. I sit in my car. They won't let you park down there unless you own a boat. That's a private enterprise now.

Go down Route 690 and you can't see the lake. The weeds are growing up there. If they'd only mow it a little bit or do something so people could appreciate the lake. One place where you can sit and watch the sun go down, watch the seagulls glide, and that's the little place down by the Salt Museum. They let you stay there. Even last Sunday, I was down there and that was full of cars, people enjoying the lake.

Even the picnic area. You got to be a young fella and be able to ride a bicycle or walk three or four miles to go on a picnic. That's no good. It's all right for kids but it's no good for us old people. We gotta forget about Onondaga Lake as far as pleasure is concerned unless we learn how to jog or something. Too late for that.

Ice boats was a lot of fun and we got in trouble. But those police they got there are all young kids and they make you come down and sign a paper with all their particular private rules you gotta go by. Hell, we knew more about ice boats than they ever would. Ice boats could come back if there was no private rules.

•••

Around State Fair week, that lake cleans itself up. We found anchors out there. Water is just crystal clear. Cruise along there. Once a year. Sure is beautiful. Only stays that way three or four days. Can even see beer cans at the bottom. Proves the lake is trying. Give it half a chance, I think it will do itself.

Up there on the Long Branch end, I wouldn't be afraid to go swimming now. I watched it all these years. Seen it get clean. Seen it get dirty.

Well, this is Ken Wentworth. Liverpool. Seventh family in Liverpool. Old canalers. I hope we get it clean before I pass away. Get out there and sail in some clean water again maybe, or sail with somebody. Before I go.

KEY QUESTIONS TO ASK WHEN ANALYZING MEDIA MESSAGES

www.projectlooksharp.org
www.namle.net

AUDIENCE & AUTHORSHIP	**AUTHORSHIP**	Who made this message?
	PURPOSE	Why was this made? Who is the target audience (and how do you know)?
	ECONOMICS	Who paid for this?
	IMPACT	Who might benefit from this message? Who might be harmed by it? Why might this message matter to me?
	RESPONSE	What kinds of actions might I take in response to this message?
MESSAGES & MEANINGS	**CONTENT**	What is this about (and what makes you think that)? What ideas, values, information, and/or points of view are overt? Implied? What is left out of this message that might be important to know?
	TECHNIQUES	What techniques are used? Why were those techniques used? How do they communicate the message?
	INTERPRETATIONS	How might different people understand this message differently? What is my interpretation of this and what do I learn about myself from my reaction or interpretation?
REPRESENTATIONS & REALITY	**CONTEXT**	When was this made? Where or how was it shared with the public?
	CREDIBILITY	Is this fact, opinion, or something else? How credible is this (and what makes you think that)? What are the sources of the information, ideas, or assertions?

ITHACA COLLEGE
Project Look Sharp

Criteria for Examining the Credibility of Information on the Internet

By Roger Sevilla, Project Look Sharp

AUTHORITY

DEFINITION: Author or sponsor of the site. Qualifications and reputation of the author/source. The authority and reputation of the source of the information will depend on the expertise, reputation and status of the source.	
QUESTIONS TO ASK	**CLUES TO LOOK FOR**
Is there an author? Is the page signed?	• A header or footer stating authorship or an email/postal address
Is the author qualified and/or reputable? An expert?	• The author's credentials • Information you find about the author through other searches or databases
Who is the sponsor?	• Sponsorship statement • An "about" link
Is the sponsor of the page reputable? How reputable?	• A link with information about the author or the sponsor • Who links to the site you are evaluating (Go to altavista.com, type in the search window **link:** *followed by all or part of URL.*) e.g. link:www.projectlooksharp.org
If the page includes neither a signature nor a sponsor, is there any other way to determine its origin?	• An "about" link • The URL • The domain and country codes • Try a "who is" search (Go to: http://www.networksolutions.com/en_US/whois/index.jhtml
Are there links that take you outside of the site?	• Frames, URLs different from the current site. (Try opening each link in a new page to see the true URL.)

ACCURACY

DEFINITION: Reliable and error-free information. Conformity to fact. Precision; exactness	
QUESTIONS TO ASK	**CLUES TO LOOK FOR**
Is the information reliable and error-free?	• Typographical errors, spelling mistakes, bad grammar • Credentials of the information provider
Is there an editor or someone who verifies/checks the information?	• Is the information part of a larger publication? • Can you find the home page and access editorial information?
Where doubt exists, can the information be cross-checked with a reliable source?	• Bibliographies, references • Verification with established, reliable sources

OBJECTIVITY

DEFINITION: Judgment based on observable phenomena and uninfluenced by emotions or personal prejudices.	
QUESTIONS TO ASK	**CLUES TO LOOK FOR**
Does the information show a minimum of bias?	• Who links to this site? (Go to www.altavista.com, type in the search window: **link**: *all or part or URL*) e.g. link:www.projectlooksharp.org
Is the page designed to sway opinion?	• A statement of the aims and objectives of the site (often in the "about this site" section)
Is there any advertising on the page?	• Advertising banners • Links to commercial sites selling products/services

CURRENCY

DEFINITION: Belonging to the present time, being in progress now: current negotiations, prevalent, especially at the present time.	
QUESTIONS TO ASK	**CLUES TO LOOK FOR**
Is the page dated?	• Date on the page (often at the bottom of the page, new articles may have the date at the top of the article).
If so, when was the last update?	• Is the date when the material was first written, first placed on the Web, or the date of when it was last revised?
How current are some of the links? Have some expired or moved?	• Click on links to pages inside and outside of the site. Do they work?

COVERAGE

DEFINITION: The extent or degree to which something is observed, analyzed and reported.	
QUESTIONS TO ASK	**CLUES TO LOOK FOR**
Is there an indication that the page has been complete and is not still under construction?	• "Construction" signs • Non-functioning links
If there is a print equivalent to the Web page, is there a clear indication of whether the entire work is available online or only parts of it?	• Is the date when the material was first written, first placed on the Web, or the date of when it was last revisited?
What topics are covered? How in-depth is the material?	• An index • A site map

Technical Strategies for Evaluating Websites

1. Study the URL

URL stands for "uniform resource locator" — the info shows up in the location bar in Netscape or Internet Explorer. A web page's URL address can help you identify the sponsor or source:

- Non-governmental and/or professional organization web pages: look for **org** (organization)
- Governmental web pages: look for **gov** (government)
- Corporate/business/for profit web pages: look for **com** (commercial)
- Educational institution web pages: look for **edu** (educational)
- Personal web pages frequently have a tilde (**~**), %, "users" or "people" in the URL and may include com, edu, or org

Be aware, though, that **there are always exceptions** so check the web page as well for additional clues. Frequently, these clues can be found at the top or bottom of a web page, or through a web page link.

2. What is the overall context of the page you are viewing?

Try truncating elements of the url to back up and see how the page "fits" into the overall site. Do this by starting at the right and erasing back to the left to the next /

Example: http://www.ibiblio.org/expo/deadsea.scrolls.exhibit/Library/psalms.html <--- erase psalms.html and press enter or return and you will see a "directory" or folder full of files, then try erasing Library. Keep repeating this process.

3. Where are you on the web?

Because the web allows for simple linking from one page to another, it is important to always know where you are. The use of frames compounds this problem.

One click and the info you are looking at is not really on "their" site. Notice if you pause over a hypertext link, the target url is shown at the bottom of the screen. PC browsers will let you right click on the link and "Open in New Window" — Mac users click and hold down and select a similar choice from the popup menu.

4. Does the page have overall integrity and reliability as a source?

Use a search engine like AltaVista to see who links to the page. Then visit some of those sites to see what they say about the page in question.

In AltaVista precede the URL by the term link: with no space after the colon.
Example. In search box enter: link:www.whitehouse.net

5. Who owns the domain name?

This may be helpful if there is no contact information on the page itself. Look up the domain registry page at the appropriate registry agency:

- For .com, .edu, .net, .org : http://www.netsol.com/cgi-bin/whois/whois
- For .gov (U.S. government) : http://www.whois.net
- For .mil (U.S. military) : http://www.nic.mil/cgi-bin/whois
- For Asian-Pacific : http://www.apnic.net/apnic-bin/whois.pl
- For European : http://www.ripe.net/perl/whois
- And the rest of the world: http://www.whois.net

For more information on credibility of websites, go to Berkeley's website:
http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html

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