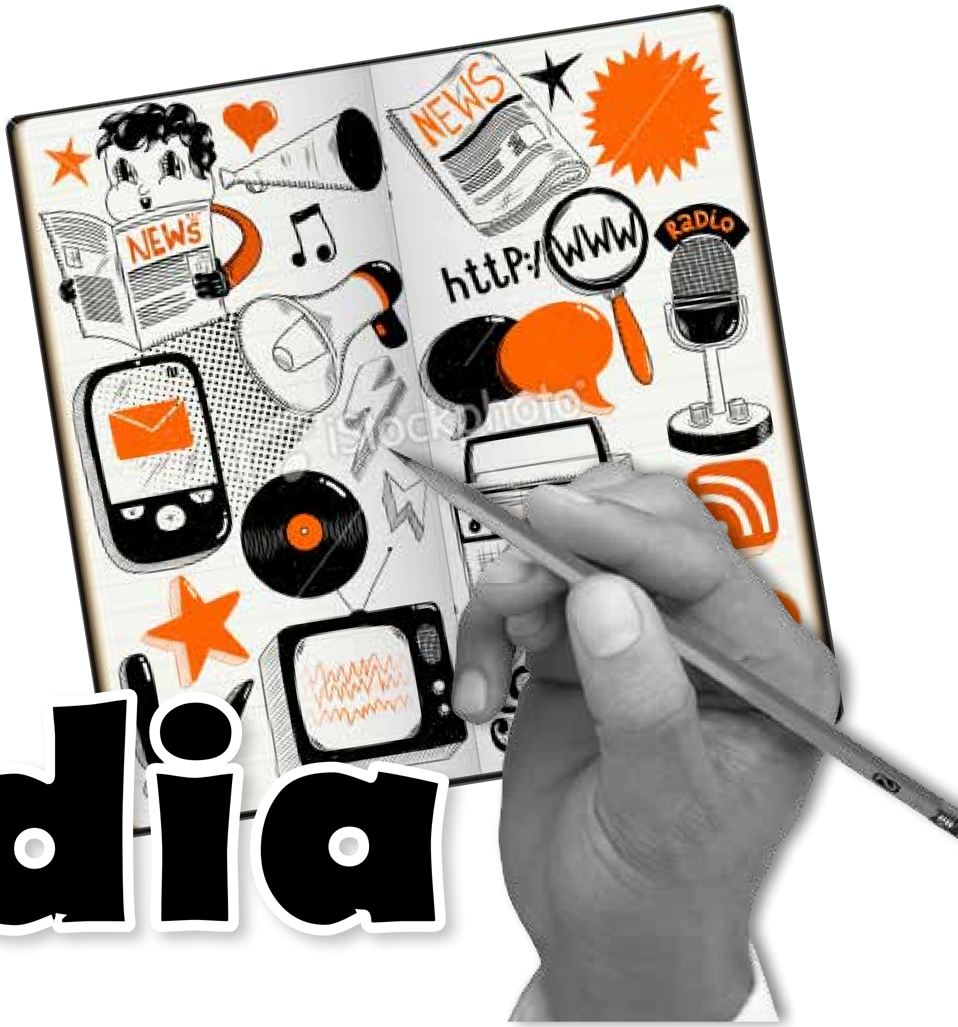
Teaching Critical Thinking Through Media Literacy



by Chris Sperry

Today more than ever, our students want their school experience to be relevant. They live and learn in a media-saturated environment where information abounds, but wisdom is often lacking. As teachers, we must tie our science curricula to students' real-life experiences: When our students see the utility of scientific thought and reason in helping them make sense of their world, then our classrooms will be truly relevant.

I had the opportunity to work with teams of librarians and science teachers throughout upstate New York in the 2010–11 school year to develop lessons and units that integrate critical thinking and media literacy into the secondary science curriculum. In this article I introduce many of the engaging media-literacy lessons these educators developed, piloted, and evaluated, and synthesize from their approaches the most salient opportunities for integrating 21st-century skills into the core science curriculum. Most of the lessons referenced in this article are accessible at *www.projectlooksharp.org*, where hundreds of media-literacy lessons and related materials are available, all for free.

Training in media-literacy integration

In preparation for lesson development, the teams were given a one-day training in integrating media literacy and critical thinking into secondary science. They were introduced to the National Association for Media Literacy Education's *Core Principles of Media Literacy Education in the United States*

Strategies for integrating media literacy and critical thinking

- Analyze scientific fact versus fiction in the media
- Conduct lab experiments on claims found in the media
- Evaluate conflicting views on controversial topics
- Analyze the sources of information in your classroom
- Produce media based on research, analysis, and evaluation

(2007) and *Key Questions to Ask When Analyzing Media Messages* (2010). We also looked at a variety of media production tools for the classroom (Project Look Sharp 2012a) and models for integrating media production into secondary science. We coached each team through the development and implementation of their projects and held a session where participants practiced using the classroom methodology we call *constructivist media decoding* (described below). In the spring, teams presented and evaluated their projects.

The teachers found that the media-decoding process engages all students in a rigorous, accessible, and relevant methodology for critical thinking about science information. In their evaluation of the project, the teachers commented that the media-decoding process helped engage students who were not typically involved: "Every level of student wanted to respond [to the decoding questions]." "The kids stayed on and continued the discussion after the bell rang." "Even my 'trouble' students raised their hands and had good comments!"

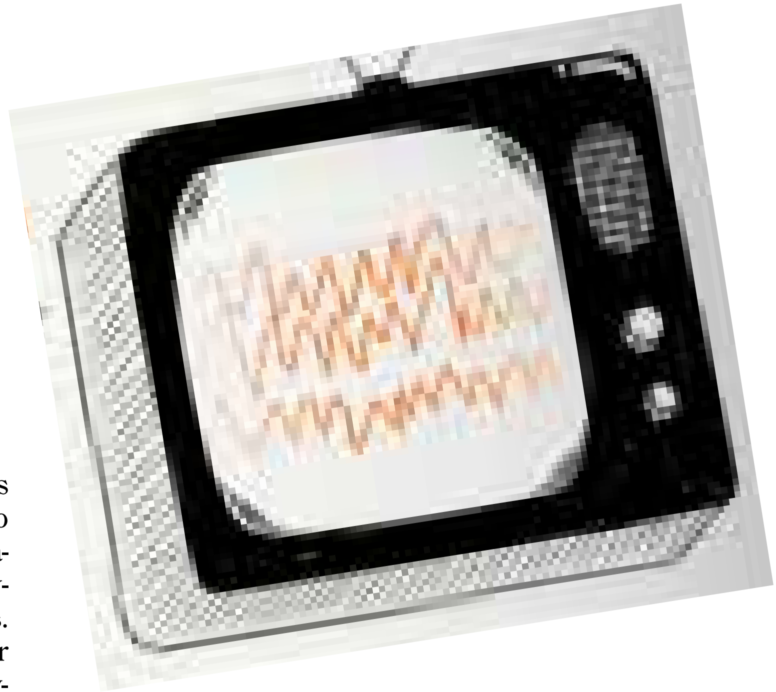
Constructivist media decoding

Media decoding uses carefully selected documents (film excerpts, web pages, TV commercials, etc.) for classroom analysis that includes the application of core scientific knowledge and the development of critical-thinking skills. For example, during a unit on climate change, one teacher led her class through an analysis of the messages, techniques, and information in a short clip from the film *The Great Global Warming Swindle*, which presents a climate skeptic's perspective. The class then compared facts in the film with a graph from the U.S. Climate Change Science Program that presents contradictory information from government scientists and responded to questions about sourcing, credibility, and bias. The class then followed a similar process in evaluating a clip from Al Gore's film, *An Inconvenient Truth*. These activities are laid out in lesson 4 in the free online curriculum kit "Media Construction of Warming Global" (see Resources).

Constructivist media decoding in the science classroom trains students to carefully examine information and messages in different types of media; to interpret meaning while applying knowledge and identifying document-based evidence; to ask a consistent set of questions about all media messages that address sourcing, meaning, and credibility; to draw well-reasoned conclusions after weighing the evidence, evaluating different interpretations, and reflecting on their own biases; and to share their observations and conclusions and defend their analysis. The teachers saw this technique as a way of teaching inquiry related to everyday messages in the media.

In *The Teacher's Guide to Media Literacy*, Scheibe and Rogow write, "Science and media literacy education share a deep grounding in the process of inquiry. Like media literacy, science education emphasizes careful observation and the use of evidence to support conclusions" (2012). They go on to cite Jarman and McClune (2007), who have identified a set of skills and orientations that are supported by media literacy that includes the following:

- reaching conclusions based on the logical and skillful analysis of information,
- a willingness to revise conclusions based on evidence,
- the ability to explain one's reasoning clearly so that others may test your arguments, and
- the importance of assessing the credibility and accuracy of sources.



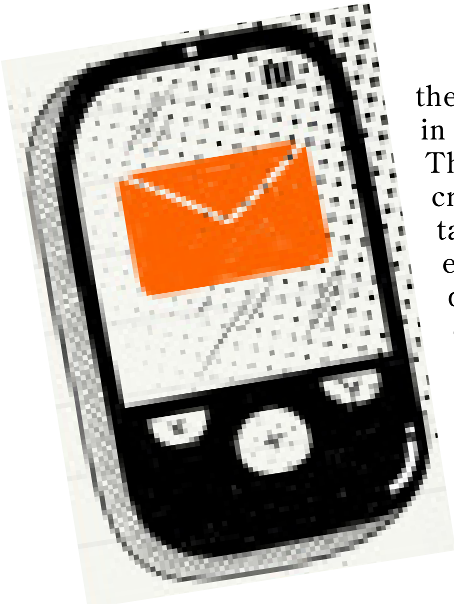
While the teachers identified the decoding process as key to teaching critical thinking, many struggled to shift their classroom practice from delivering information and giving their own interpretations to an inquiry-based approach that had students doing the analysis. The teachers needed to think of their students, rather than themselves, as the most effective vehicle for delivering key concepts and understandings to each other. This was made clear in the staff development practice sessions. Although most of the teachers came with good document-based questions (see NAMLE 2010), a minority knew how to probe for student understanding. For instance, in one practice session, a "student" made an astute interpretation about the inaccuracy of a particular media portrayal. This student clearly understood the scientific concept that the teacher was hoping to address. But the teacher merely praised the answer and went on. She did not take the opportunity to probe for understanding by asking, "What makes you say that?" or "What is your evidence in the document?" Through the probing process, students are pushed to explain their reasoning, understanding, and interpretation; apply scientific knowledge; and identify evidence in the document. Perhaps more importantly, the rest of the class hears an interpretation and understanding communicated by a peer.

Media literacy and science education

Another challenge we needed to address in the training was the concern about "taking time" from the science curriculum to incorporate media literacy and critical thinking. Although most teachers had this concern, they also recognized that they would be more successful in teaching core content to more students if they could spark interest, show the ways in which science connected to their students' lives, and have students apply scientific knowledge and principles to meaningful tasks. The lessons that they developed point to a number of areas where science education and media-literacy education most readily complement each other.

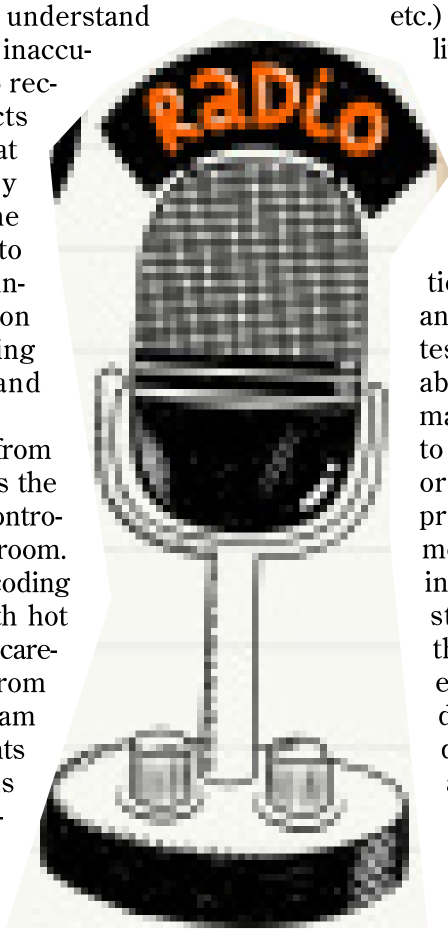
Many of the teams used popular cultural representations of science to make the connection between scientific information and students' everyday lives. For example, in a forensics class, students had to analyze excerpts from the TV show *CSI* for accurate and inaccurate representations of medical procedures. Another team began an Earth science unit by showing the dramatic opening scene from the TV movie *10.5: Apocalypse*, which depicts a range of catastrophic natural disasters. The class went on to study tectonics, faults, earthquakes, tsunamis, and volcanoes. At the end of the unit, the class watched the clip again, and students were assessed on their ability to identify accurate and inaccurate information in it. The follow-up discussion explored the filmmakers' choices and why they might have sacrificed scientific accuracy for dramatic effect (e.g., the tsunami breaking as a vertical 50-foot crest rather than as a 50-foot rise in sea level). Another lesson had students identify advertising techniques in food commercials while relating product ingredients to food-pyramid recommendations.

Many of the teams saw media literacy as a key methodology for training students to identify and analyze erroneous scientific facts. A number of teams created their own versions of Project Look Sharp's Facto or Fiction lesson (2012b), in which students survey each other about urban legends and



then analyze patterns in inaccurate beliefs. Three of the teams created lessons that targeted pseudoscience, tapping into the developmental interest of adolescents in exotic claims such as doomsday predictions that often have little factual backing. The science teachers noted that prior to the training, they regularly corrected misinformation but had no consistent methodology to help students reflect on the sources of their erroneous beliefs. With training, the instructors were able to teach students to identify and analyze the patterns in those misrepresentations, to understand the role of media in perpetuating inaccurate information, and to begin to recognize the psychological aspects of their own meaning making that reinforce erroneous beliefs. By the end of the year, many of the teachers began to ask students to critically decode the previously unquestioned sources of information in their own classroom, including documentary films, posters, and even textbooks.

Another pattern that emerged from the teacher/librarian projects was the use of media literacy to address controversial scientific issues in the classroom. Many of the teams used media decoding as a methodology for dealing with hot topics for which it was important to carefully evaluate conflicting views from a scientific perspective. One team developed a lesson where students evaluated the veracity of claims made on food websites, including the use of the terms *organic*, *natural*, *no preservatives*, and *pesticide-free*. Another team had students decode documentary film clips, websites, and political cartoons about stem cells before creating Prezi presentations expressing their own opinions about the merits of various perspectives in the debate. Two of the teams focused on the controversy in our region over the shale gas mining process known as fracking. Both teams trained students in the decoding process before using various documents (websites, documentary film clips, magazine articles, yard signs, lease agreements, etc.) to teach core content and information-literacy skills. Both teams concluded the unit with students creating their own media documents.



Some of the teams integrated lab components into their lessons, adding physical experimentation to students' evaluation of information. In one project, students practiced analyzing ads and packaging and then tested the validity of marketing claims about familiar projects (from waterproof mascara to toilet paper). They went on to create public service announcements or environmental impact statements for presentation at their science fair. The most complex projects progressed from introducing media/science analysis to students doing their own decoding, then engaging in original research and experimentation, culminating in media production and presentations that demonstrated knowledge, analysis, and evaluative judgments as well as creativity and personal engagement.

Nearly all the teachers used digital media production (e.g., Glogster poster presentations, Animoto video produc-

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In order to effectively teach students to critically analyze media representations, we must decode diverse media in our classrooms. Educators may legally repurpose a copyrighted document (film clip, website, advertisement, etc.) without permission for the purpose of classroom critique and analysis under the Fair Use provision of copyright law. Visit the Center for Social Media website (see Resources) for information and lesson plans about fair use.

tions) to engage students in fun, creative, and interactive ways. Teachers used wikis, blogs, and other Web 2.0 applications that enabled students to interact with each other and their teacher in presenting and evaluating information and each other's work. Some projects culminated in a final public performance of student work through class presentations (and assessments), demonstrations at science fairs, and publishing on the web. The teachers saw these highly participatory media-production activities, although time consuming, as key avenues for students to apply, internalize, and demonstrate scientific concepts and knowledge. In addition, students developed the analytical, critical-thinking, and creative capacities that are embedded in the science standards.

Conclusion

The similarity of these projects reflects the logical application of media-literacy approaches when integrating critical thinking about scientific issues into the classroom. Media decoding teaches a rigorous, well-reasoned, and reflective academic process, accessible to all students, that critically examines conflicting perspectives. Media production takes these skills a step further and asks students to engage in a complex and creative process of constructing their own media messages, typically after making judgments about the science and defining their own views about the issues. In the 21st century, these are no longer "elective" skills.

In the final evaluation of the initiative, many of the participants wrote about the high level of student engagement: "This got students involved who have no intrinsic motivation." "It really helps students use a different part of their brain than they're used to using at school!" "This was able to reach kids who were more 'English-/language-arts-type' students than just the typical 'science-type' students."

The philosopher George Santayana wrote, "Science is nothing but developed perception, interpreted intent, common sense rounded out and minutely articulated" (1936). Our students are actively developing their metacognitive capacities during middle school. Science education has the charge of helping them to rigorously and systematically evaluate the credibility of their own knowledge and beliefs. We can engage more students, and engage our students more, in this core objective when we connect our curriculum to their media-saturated world. ■

Acknowledgments

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Resources

Center for Social Media—*www.centerforsocialmedia.org/fair-use*

Media construction of global warming: A digital media literacy curriculum—*www.ithaca.edu/looksharp/?action=global_warming*

National Association for Media Literacy Education (leading organization for media literacy integration)—*www.namle.net*

Project Look Sharp (free lesson plans and curriculum kits for integrating media literacy and critical thinking into science)—*www.projectlooksharp.org*

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