The New York TimesThe New York Times

Is That a Fact?

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Note: This lesson was originally published on an older version of The Learning Network; the link to the related Times article will take you to a page on the old site.

Overview of Lesson Plan: In this lesson, students investigate commonly-accepted scientific claims and gather evidence that supports or refutes them. They synthesize their learning by writing their own "Really?" columns modeled after those found in The New York Times's weekly Science Times section.

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Suggested Time Allowance: 1 hour

Objectives:

Students will:
1. Consider five commonly-accepted scientific claims and determine the sources of those assumptions; brainstorm additional claims.
2. Review the research on the relationship between eating carrots and eyesight by reading and discussing the article "Really? The Claim: Eating Carrots Improves Your Eyesight."
3. Gather evidence about common scientific claims.
4. Share their findings by writing articles modeled after the article read in class.

Resources / Materials:

-five large piece of poster board, prepared as described in the Warm-Up activity below (one per small group)
-markers (one per small group)
-pen/pencils
-classroom board
-copies of the article “Really? The Claim: Eating Carrots Improves Your Eyesight” (found online at http://www.nytimes.com/learning/teachers/featured_articles/20050503tuesday.html) (one per student)
-resources for researching health and science topics (computers with Internet access, textbooks, encyclopedias, library resources, etc.)

Activities / Procedures:

1. WARM-UP/DO-NOW: Prior to class, prepare five pieces of poster board by creating three columns on each, each column labeled with the following titles: “The Claim,” “True or False?,” and “Why Do You Think That?” In the “The Claim” column, write one of the following assertions (or create your own), making sure that each poster has a different focus:
-Sitting in the sun ruins your skin.
-Cracking your knuckles causes arthritis.
-Using aerosol hairspray destroys the ozone layer.
-Reading in the dark damages the eyes.
-The temperature of the earth is getting warmer.
Arrange desks in to five groups, and place one of these posters and a marker at each grouping. Upon entering class, students should divide themselves into the five groups, and each group should complete the following assignment, written on the board for easier student access: “On your desk, you will find a poster with a common scientific or health claim written on it. As a group, discuss this claim and decide, based on your existing knowledge, if you believe it is true or false. (If there is dissent in your group, indicate which students believe the statement is true and which students think it is false.) Then, in the third column, jot down examples of the evidence that support your claim. Also include the sources of your information (teachers, personal experience, etc.)”
After a few minutes, ask each group to appoint a spokesperson, who should then present the group’s ideas with the class. Why do students think there are so many

health and science claims that are seemingly constantly proven or refuted? How do scientists prove or disprove these claims? What are some additional claims that they can think of? List these claims on the board for use in a later activity. If necessary, provide some of the following suggestions to prompt further student brainstorming: eating spinach makes you strong; drinking coffee stunts growth; eating too much sugar causes diabetes; going outside with wet hair causes colds; eating chocolate causes acne. Help students to see that each claim has a cause and an effect.

2. As a class, read and discuss the article “Really? The Claim: Eating Carrots Improves Your Eyesight” (http://www.nytimes.com/learning/teachers/featured_articles/20050503tuesday.html), focusing on the following questions:

a. What scientific claim does the article address?

b. What initial statement does the article make about the validity of the claim?

c. What primary facts about carrots does the article include?

d. According to the article, under what conditions is poor vision rampant?

e. Why might people who eat carrots still need glasses?

f. In what ways does the article support the assertion that carrots improve eyesight, and in what ways do they not have any effect?

g. What was the purpose of the 1998 Johns Hopkins study? Who were the subjects? What were the findings?

h. Does the 2003 study at Brigham and Women’s Hospital in Boston support or refute the 1998 research? How?

i. What conclusion does the article draw with regards to the original claim?

3. Explain to students that today they will be gathering evidence about common scientific claims and writing articles modeled after the “Really?” column article read in class. Students will work individually or in pairs to conduct their research using all available classroom resources. Each individual or pair should select one of the claims written on the board in the Warm-Up activity. To guide their research, students should answer the following questions (written on the board for easier student access):

-What is the claim that you are attempting to prove or disprove?

-Look at the cause-and-effect relationship established by this claim. What basic facts does one need to know to understand this claim? (For example, if your claim is “milk builds strong bones,” what does one need to know about milk’s properties

and about the structure of bones that link these two parts of the claim together?)
-What evidence is there that either supports or refutes this claim? In other words, what research has been done on this topic, and what does it show?
-What is the "bottom line" about this claim? To what degree is it true or false?
4. WRAP-UP/HOMEWORK: Synthesizing the research conducted in class, each student or pair prepares a "Really?" column article about their claim. The article should state the claim as the headline, provide ample facts supporting or refuting the claim, and provide a bottom line summarizing the validity of the claim. Articles can be shared in a future class, and might be submitted to the school newspaper for possible publication.

Further Questions for Discussion:

-How do you know if information that you receive is true?
-When and why is it important to back up claims with evidence?
-How often do you conduct research on your own to determine if something you have heard or read is true? When do you not bother to research something?
-What sources can you consult to find evidence to back up information that you hear? How do you know if those sources are correct?

Evaluation / Assessment:

Students will be evaluated based on participation in the initial group exercise, participation in class discussions, and thoroughly researched and thoughtfully written articles supporting or refuting common scientific claims.

Vocabulary:

baseless, beta carotene, coincidence, staple, scarce, rampant, deficiency, decline, placebo, cataracts

Extension Activities:

1. Using The Food and Nutrition section of the U.S.D.A. Web site (http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?navtype=SU&navid=FOOD_NUTRITION), research other foods that address specific ailments or parts of the body. For example, what other foods provide vitamin A or beta carotene? What foods or vitamins affect specific ailments or parts of the body? Create a resource book filled with tips for people with some health problems that might be in part remedied through dietary changes.

2. What is the placebo effect? Conduct research to find evidence of cases in which the findings suggested that a placebo had the same effect as the object of the study. Create a poster explaining the findings. What does this suggest about the how a person's state of mind affects physical health?
3. Create a "How It Works" poster on how beta carotene or vitamin A affects the eyes. What does it do to keep the eyes healthy?
4. As a class, read and discuss each week's new "Really?" column, available online at http://www.nytimes.com/pages/health/columns/index.html. Using the same methodology as practiced in the Warm-Up exercise, write the claim on the board and asks students to share their views on whether it is true or false; then read the column and discuss the findings. Do the evidence and bottom line support or refute students' initial assumptions?
5. What are some of the other columns found throughout The New York Times? Choose a column that interests you and follow it over the course of a month or longer. Clip each article and write a response in your journal. (Columns might include Science Q&A, Observatory, or Vital Signs in Science Times; Beliefs in the National section; White House Letter in the Politics section; Public Lives or Metropolitan Diary in the New York Region section; On Education in the Education section; or Playlist in the Arts section, among many others.)

Interdisciplinary Connections:

American History/Global History- Conduct research to find well-established historical theories that have been debunked due to new evidence or research. What was the initial theory? What was the evidence that proved it? What new evidence was discovered that altered the original findings? What is the new theory? Is it possible that new evidence can be found to refute this claim? Is there ongoing research in this area? Write a paper sharing your findings.
Journalism- Interview journalists from a local newspaper. How do they investigate claims or assertions for their articles? How do they ensure that they are providing readers with accurate information? Based on what you learn, write an article for student journalists utilizing some of the tips or suggestions from the professional journalists.
Media Studies- Choose a segment from a radio or television news program. Can you find evidence that supports and/or refutes the information provided in the news piece? Write an analysis paper that argues the validity of the news segment.

Be sure to include all evidence you gathered and to cite your sources.

Other Information on the Web:

Previous articles from the "Really?" column can be found in the Health section of NYTimes.com (http://www.nytimes.com/pages/health/columns/index.html).

Academic Content Standards:

Grades 6-8

Health Standard 6 – Understands essential concepts about nutrition and diet. Benchmark: Understands how eating properly can help to reduce health problems

Health Standard 7 – Knows how to maintain and promote personal health. Benchmarks: Knows personal health strengths and risks (e.g., results of a personal health assessment); Knows how positive health practices and appropriate health care can help to reduce health risks; Knows strategies and skills that are used to attain personal health goals

Science Standard 14-Understands the nature of scientific knowledge. Benchmark: Understands that questioning, response to criticism, and open communication are integral to the process of science

Science Standard 15- Understands the nature of scientific inquiry. Benchmarks: Understands the nature of scientific explanations; Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other

Science Standard 16- Understands the scientific enterprise. Benchmark: Knows ways in which science and society influence one another

Language Arts Standard 1- Demonstrates competence in the general skills and strategies of the writing process. Benchmarks: Uses style and structure appropriate for specific audiences and purposes; Writes expository compositions

Language Arts Standard 4- Gathers and uses information for research purposes. Benchmarks: Uses a variety of resource materials to gather information for research topics; Organizes information and ideas from multiple sources in systematic ways

Grades 9-12

Health Standard 6 – Understands essential concepts about nutrition and diet. Benchmarks: Understands how nutrient and energy needs vary in relation to gender, activity level, and stage of life cycle; Understands the reliability and

validity of various sources of food and nutrition information; Understands the role of food additives and their relationship to health

Health Standard 7 – Knows how to maintain and promote personal health. Benchmarks: Knows how personal behaviors relate to health and well-being and how these behaviors can be modified if necessary to promote achievement of health goals throughout life; Understands the short – and long-term consequences of safe, risky, and harmful behaviors

Science Standard 14-Understands the nature of scientific knowledge. Benchmark: Knows that scientific explanations must meet certain criteria to be considered valid

Science Standard 15- Understands the nature of scientific inquiry. Benchmark: Knows that conceptual principles and knowledge guide scientific inquiries (historical and current scientific knowledge influence the design and interpretation of investigations and the evaluation of proposed explanations made by other scientists)

Science Standard 16- Understands the scientific enterprise. Benchmark: Knows that creativity, imagination, and a good knowledge base are all required in the work of science and engineering

Language Arts Standard 1- Demonstrates competence in the general skills and strategies of the writing process. Benchmarks: Writes compositions that are focused for different audiences; Writes compositions that fulfill different purposes; Writes expository compositions

Language Arts Standard 4- Gathers and uses information for research purposes. Benchmarks: Determines the validity and reliability of primary and secondary source information and uses information accordingly in reporting on a research topic; Identifies and defends research questions and topics that may be important in the future

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This lesson plan may be used to address the academic standards listed above. These standards are drawn from Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education; 3rd and 4th Editions and have been provided courtesy of the Mid-continent Research for Education and Learning in Aurora, Colorado.

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