THE DILEMMA: TEACHER GUIDE

Subject: Science
Grade Level: High School
Last Updated: February 28, 2008

Case Summary
How can teachers make learning the scientific method more fun? In a heated debate over who has the best science fair project, two students test their knowledge of scientific thought and terminology. Who knew learning about the nature of science could be so dramatic? This case also facilitates student interest/understanding of science fair projects or the case may be used as an introduction to the scientific method.

Credits
This case was written by Holly Carpenter (PhD student, Chemistry, Emory University, Atlanta, GA) and Adrienne Doanes (teacher, The New Schools of Carver: School of Technology, Atlanta, GA) fellows of the Emory University PRISM program (http://www.prism.emory.edu). Authors may be contacted at hecarpe@emory.edu.

Learning Objectives
1.  Explain how a scientific theory differs from a guess or an opinion.
2.  Define scientific law and give an example.
3.  Compare and contrast a scientific law and a theory.
4.  Compare quantitative and qualitative descriptions.
5.  Describe how a scientific model is used, and give an example.
6.  Describe a hypothesis and how it is used, and give an example.
7.  Define the scientific method.
8.  Use the scientific method to approach a problem.
9.  Define control, independent variable, and dependent variable. Give an example of each.
10.  Draw a graph that relates two variables.
11.  Define a bibliography and give an example.
12.  Compare and contrast tables and graphs as ways to organize data. Give examples of each as they are appropriate for demonstrating different data sets/types.

Georgia Performance Standards
SCSh 1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.
SCSh 2. Students will use standard safety practices for all classroom laboratory and field investigations.
SCSh 3. Students will identify and investigate problems scientifically.
SCSh 4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.
SCSh 5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.

SCSh 6. Students will communicate scientific investigations and information clearly.

SCSh 7. Students analyze how scientific knowledge is developed.

SCSh 8. Students will understand important features of the process of scientific inquiry.

National Science Education Standard A.

**Scientific Processes and Problem Solving**

1. Students use science process skills, including observation, classification, prediction, communication, metric measurement, inference, collecting and analyzing data.
2. Students use traditional reference materials to explore background and historical information regarding a scientific concept.
3. Students learn and use on a regular basis basic standard safety practices for laboratory or field investigations.

**Assessment**

Students will complete box charts and research learning issues for Scene 1. Students will develop science fair projects that address each of the learning issues. Problems, hypotheses, experimental design, experimental data, results, and conclusions will be graded as students complete each part. Their logbook as well as a research paper will be graded as well.

**Implementation Strategy**

Day 1: Scene 1 will be distributed and read aloud by the class. Students will break into small groups and complete box charts and research learning issues. Students will report back in small groups on learning issues and then discuss findings as a class with teacher feedback. Students will begin choosing questions/problems to research as science fair projects. Depending on the class format, students may be given several weeks to complete the final products that include the science fair project components listed under assessment above.

**Resources**


Internet Public Library. (2007). Kidspace @ the IPL. Retrieved October 27, 2007 from: [http://www.ipl.org/kidspace/browse/mas6000](http://www.ipl.org/kidspace/browse/mas6000)

http://www.all-science-fair-projects.com/