And the Band Played On: Teacher Guide

Subject: Biology
Grade Level: High School 9th -10th Grades

Case Summary
The authenticity of a violin thought to be the one played by the band leader of the Titanic as it sank has been stirring up quite a controversy for the last several years. After researching information relating to that controversy and spending time working with samples of waterlogged wood (such as the violin would have had), students will be able to understand why the violin has caused such a controversy. They will then apply this knowledge to evaluate the claims of the violin’s authenticity.

Credits
This case was written by Terry Davis (Teacher, South Cobb High School, Austell, GA) and Dianne Adams (Teacher, Lassiter High School, Marietta, GA)

Learning Objectives
At the end of the case, students will be able to...
1. Describe the structure of a plant cell wall.
2. Compare and contrast water-logged wood with dry wood
3. Evaluate evidence to determine authenticity of a waterlogged artifact.

Georgia Performance Standards
SCSh8. Students will understand important features of the process of scientific inquiry.
   Students will apply the following to inquiry learning practices:
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations’ hypotheses, observations, data analyses, and interpretations.
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.
   a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.
   b. Explain the impact of water on life processes (i.e., osmosis, diffusion).

Assessment
   • Student learning is assessed by a 2-column box-chart, lab questions and data tables (found in Student Materials), and a summary class discussion.

Implementation Strategy
   The case was developed for a ninth or tenth grade introductory level biology class. The case should be implemented for a total length of 3 days in 55 minute class periods. Students should work in groups of 3-4.

Day 1:
   • Students will view a video clip of a CBS news program, which gives a background on the violin and the controversy surrounding it [http://www.cbsnews.com/8301-505263_162-57580876/reputed-titanic-violin-to-be-put-up-for-auction/](http://www.cbsnews.com/8301-505263_162-57580876/reputed-titanic-violin-to-be-put-up-for-auction/)
   • After watching the video, students are asked to fill in a “What You Know/What You Need to Know” chart and the class discusses the results.
   • After a class discussion on the chart, students will begin using the internet to find a few of the learning issues brought up in the discussion. Valid sites that pertain to the violin controversy will be used for research. Students will work in groups of 3-4 to research 3 or 4 learning issues (one per group member). Research will be begun during the remainder of Day 1’s class period and completed for homework.

Day 2:
   • Students will get together with their group mates and share the information they found.
   • Each group will then report their findings to the class. After all groups have shared their information, box charts will be collected, and the class will discuss whether the violin seems to be authentic and why.

Day 3:
   • (40 Minutes) Students will perform the Water Logged Wood Lab and answer lab questions (found in Student Materials section.) Smith, T., Commander, J., Etre, K., & Stein, K. (2013) Waterlogged Wood Lab. Presented at The Science Behind Art Conservation Teacher Workshop, Emory University, July 8-12, 2013.
   • (15 Minutes) Class will discuss results and apply the results back to the violin’s authenticity claim.

© 2013, Terry Davis & Dianne Adams. Unauthorized use is prohibited. This material is based upon work supported by the Michael C Carlos Museum and the Howard Hughes Medical Institute Science Education Program award to Emory University award#52006923. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Howard Hughes Medical Institute or Emory University. This document and other resources are available at [http://carlos.emory.edu/](http://carlos.emory.edu/)
Resources

Understanding Waterlogged Wood (Better for Teachers)

Titanic
http://www.rmstitanic.net
http://www.titanicbelfast.com

Caring for Musical Instruments