

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/
- 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.

Facilitator Guide

Some possible questions:

- Why would the violin not be mentioned in the original report?
- What would seawater do to the violin?
- Is the immersion in water the cause for the condition of the violin?
- Was the violin immersed in seawater or only near it?
- Why do experts question the violin?
- What happened to the violin after Mariah Robinson died?

Resources

Understanding Waterlogged Wood (Better for Teachers)

<http://www.nara.accu.or.jp/elearning/2004/waterlogged-woods.pdf>

Titanic

<http://www.rmstitanic.net>

<http://www.titanicbelfast.com>

Caring for Musical Instruments

<http://www.cci-icc.gc.ca/caringfor-prendresoindes/resources-ressources-eng.aspx?ident=15>

And the Band Played On

Day 1:

1. View the 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/

After watching the video, Fill in the following chart.

Box Chart 1

What You Know	What You Need to Know/Learning Issues
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

2. After a class discussion on the chart, 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 should be used for research. You 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. Bring your research with you to class tomorrow.

Day 2

1. Get together with your group mates and share the information you found. Have one student record the information in the space below as everyone discusses his or her findings. You will share your group's information with the rest of the class. Once all groups have presented their information, the class will decide whether the violin seems to be authentic and why. You may continue writing findings on the back of this page.

Group's Findings:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

5. Describe the effects of placing wood in water for an extended period of time.

6. Many wooden artifacts are recovered from underwater conditions, like the violin from the Titanic. What is the effect of waterlogging on the artifact?

7. Can you give 2 other examples of authentic wooden artifacts that may have been recovered from watery conditions? These objects should could from museums.

8. Using the following website, read the article on the recent discovery of an ancient underwater cypress forest. http://www.huffingtonpost.com/2013/07/08/ancient-underwater-forest-discovered-alabama_n_3562730.html

Summarize this article in one paragraph and then list 5 questions you have about the wood in this forest.

Turn your questions in when you are finished.

Resources

Titanic

<http://www.rmstitanic.net>

<http://www.titanicbelfast.com>

Caring for Musical Instruments

<http://www.cci-icc.gc.ca/caringfor-prendresoindes/resources-ressources-eng.aspx?ident=15>