THAR BE TREASURE: TEACHER GUIDE

Subject: Physical Science
Grade Level: Middle School
Last Updated: December 19, 2008

Case Summary

A group of friends go on a trip to celebrate their high school graduation. After finding a doubloon on the beach the friends plan a SCUBA trip to look for buried pirate treasure.

Credits

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Learning Objectives

At the end of the case students will be able to:

1. Explain how pressure is related to water depth.
2. Explain how temperature affects pressure.
3. Explain how density changes with depth.
4. Explain how light travels through water.
5. Explain how SCUBA diving is performed.
6. Explain the circumstances under which one gets the bends and why this occurs.

Georgia Performance Standards

S8CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works. (NSES Content Standard A)

a. Understand the importance of—and keep—honest, clear, and accurate records in science.

b. Understand that hypotheses can be valuable even if they turn out not to be completely accurate.

S8CS7. Students will question scientific claims and arguments effectively. (NSES Content Standard A)

a. Question claims based on vague attributions (such as "Leading doctors say...") or on statements made by people outside the area of their particular expertise.

b. Identify the flaws of reasoning in arguments that are based on poorly designed research (e.g., facts intermingled with opinion, conclusions based on insufficient evidence).

S8P1. Students will examine the scientific view of the nature of matter. (NSES Content Standard B)

c. Describe the movement of particles in solids, liquids, gases, and plasmas states.

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e. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).

S8P4. Students will explore the wave nature of sound and electromagnetic radiation. (NSES Content Standard B)

b. Describe how the behavior of light waves is manipulated causing reflection, refraction diffraction, and absorption.

c. Explain how the human eye sees objects and colors in terms of wavelengths.

d. Describe how the behavior of waves is affected by medium (such as air, water, solids).

Assessment

The students are to role-play this story as if they are the characters being interviewed by a local newscaster. The presentations are to demonstrate the students' knowledge of pressure, density, light, and work. The presentation should include information about physical science issues in SCUBA diving.

Implementation Strategy

This case can be implemented in five 60-minute class periods. A sample implementation plan is given below.

<u>Day 1</u>	
Read Scene 1	10 min
Data, Questions, Learning Issues	15 min
Read Scene 2	10 min
Data, Questions, Learning Issues	15 min
Research learning issues for homework	
<u>Day 2</u>	
Read Scene 3	10 min
Data, Questions, Learning Issues	15 min
Research learning issues	20 min
<u>Day 3</u>	
Read Scene 4	10 min
Data, Questions, Learning Issues	15 min
Research learning issues	20 min
Hand out assignment	
<u>Day 4</u>	
Group work on assignments	
<u>Day 5</u>	
Group presentations	

Resources

Australian Broadcasting Company. (1998). Oceans alive. Retrieved December 19, 2008 from http://www.abc.net.au/oceans/alive.htm

Seagraves, S. (2001). Under the sea. Retrieved December 19, 2008 from http://www.geocities.com/Athens/Atrium/5924/underthesea.htm

American Museum of Natural History. (2002). Dispatch from the deep: Pressure in the deep seas. Retrieved December 19, 2008 from http://www.amnh.org/education/resources/rfl/web/dsv/pressures.html

American Museum of Natural History. (2002). Dispatch from the deep: Light and dark in the sea. Retrieved December 19, 2008 from http://www.amnh.org/education/resources/rfl/web/dsv/light_dark.html