



Exploring the Prinz Eugen Indiana Jones Goes Underwater Lesson Plan

by Mellie Lewis

Jonathan Bird travels to Kwajalein Atoll in the South Pacific to explore the sunken German Nazi heavy cruiser Prinz Eugen. The Eugen was surrendered to the United States at the end of World War II only to be used as a target for two atomic bomb tests at Bikini atoll in 1946. The Eugen survived the atomic bomb tests and was taken to Kwajalein Atoll where it unexpectedly sunk. Risking the dangers of wreck exploration, Jonathan documents the condition of a ship that survived two atomic bomb blasts.

Science Lesson: Indiana Jones Goes Underwater! Based on Webisode 10

Grade Level: 6-8

Time: One to two (45-55 min) class periods, plus time for student research.

Introduction

In this lesson students will research shipwrecks and then work in teams to create the story of a shipwreck. Students will create artifacts that might have been found at the shipwreck site and bury these artifacts as they might have appeared at the original site in a tub or aquarium filled with sand and water. Students will explore another team's site and photograph, video, or draw a picture of the site then grid, tag and excavate the artifacts. Acting as marine archaeologists, students will record information about each item as they excavate and analyze it. Finally, they will present their findings to the other teams of marine archaeologists.

Prior Knowledge

- Students should have familiarity of using the Internet as a research tool.
- Students should have familiarity with using a grid as a tool for map making.

Science Standards

National Science Education Standards

Science As Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Physical Science

- Properties and changes of properties in matter

Science and Technology

- Abilities of technological design
- Understandings about science and technology

Science in Personal and Social Perspectives

- Natural hazards
- Science and technology in society

History and Nature of Science

- Science as a human endeavor

Ocean Literacy Principles

Principle #6: The ocean and humans are inextricably interconnected.

Principle #7: The ocean is largely unexplored.

Objectives

- Draw inferences about a shipwreck given information on the location and characteristics of artifacts from the wreck.
- Use a grid system to document the location of artifacts recovered from a model shipwreck site.
- Identify and explain types of evidence and expertise that can help verify the nature and historical content of artifacts recovered from shipwrecks.



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Indiana Jones Goes Underwater - Page 1

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Background

Archeology is the study of past civilizations and their ways of life. The goal of archeology is to understand these ways of life, not merely to describe their remains. Marine archaeology is the branch of archaeology that deals with the recovery of ancient objects found beneath the sea, as shipwrecks or remains for submerged islands, and with the techniques of underwater exploration, excavation, and retrieval. Shipwrecks provide a great source for learning about the past. Shipwrecks are time capsules. Their remains have the potential to tell us what people did at a very specific time. If a ship sank in 1759, everything on board came from 1759 or earlier. The clothing, eating utensils, tools, navigational instruments, cargo, and personal items found on a shipwreck, and the ship itself, tell us the story of how people lived and worked at a certain time in the past. Underwater archaeologists can also interpret the sunken artifacts and tell us how the ships were built and why they sank. Ancient shipwrecks found in the Mediterranean reveal the trade routes of the ancient Greeks and Romans.

Marine archeological activities are different from salvage or treasure hunting activities whose primary goal is collecting objects and artifacts.

Most marine archeological investigations involve six major steps:

1. Historical research in the library or on the Internet, reading the journals of sailors, the captains diary, the ship's log, maps, newspaper articles, and other records.
2. Search to locate the target site. Visual searches can be done in shallow water where it is easy to see the bottom. Visual searches can be done from an airplane, by looking over the side of a boat, or by divers using self-contained underwater breathing apparatus (SCUBA). If the search area is large, in deep water, or in water with low visibility, electronic equipment such as magnetometer or side scan sonar can help locate shipwrecks.
3. Marine archaeologists go underwater and map the entire shipwreck exactly as it appears. They take measurements and make detailed drawings of the site and the wreck. These drawings, along with underwater video and photographs, are later pieced together to form a complete picture of the shipwreck.
4. Marine archeologists analyze data collected during the investigation step and "decode the clues" provided by physical evidence from the target site.
5. Marine archaeologists do not remove artifacts from shipwrecks for souvenirs. However, they may remove a few special artifacts for study or to place in a museum. Because these artifacts have been wet for many years, they must first be treated to prevent decay. Preservation of artifacts is expensive and takes a lot of time. That is why marine archaeologists remove only what they need for research.
6. Marine archaeologists share the shipwreck information they have uncovered by writing reports, preparing manuscripts for publication in scientific journals, books, or creating web sites.



Helpful Vocabulary

- Artifact:** A handmade object, such as a tool, or the remains of one, such as a shard of pottery, characteristic of an earlier time or cultural stage, especially such an object found at an archaeological excavation.
- Debris field:** The area in which the remains of anything broken down or destroyed is found.
- Marine Archaeology:** The branch of archaeology that deals with the recovery of ancient objects found beneath the sea, as shipwrecks or remains from submerged islands, and with the techniques of underwater exploration, excavation, and retrieval.
- Shipwreck:** The remains of a wrecked ship.

Materials For Each Student Group

- Computers with Internet access
- Modeling clay
- A variety of small objects with different shapes, including marbles, safety pins, hairpins, popsicle sticks, coins, metal and rubbers washers, screws, pencil stubs, wrapped hard candy, beads, cheap jewelry, etc.
- Plastic tub, disposable aluminum roasting pan, plastic shoebox, or aquarium
- Sand to make a 5cm to 8cm layer on bottom of container
- Water to fill container
- Plastic knives, spoons, forks
- Graph paper
- Drawing paper
- String
- Toothpicks
- Pencil/paper
- Magnet
- Camera

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Lesson Procedure

Begin class with a discussion of shipwrecks. What shipwrecks are students familiar with? Where are these shipwrecks located? Familiarize the students with the *Prinz Eugen* and its history.

Introduce the lesson by asking students why marine archaeologists study shipwrecks. Review the background information with students especially the six steps marine archaeological investigations follow.

Explain to students that as a group, they will work in teams to research shipwrecks from the Pacific Ocean, Atlantic Ocean, Mediterranean Sea, and the Great Lakes. Teams will select one shipwreck from their research study and create the story and site of this shipwreck in a tub or aquarium filled with sand and water. Encourage students not to select a famous shipwreck such as the *Titanic* since that will be too easy for other teams to guess. When finished, teams will explore another team's site to grid, tag, and excavate the artifacts. Students will record information about each item as they excavate and analyze it, and then present their findings to the other teams of marine archaeologists.

Follow Up Questions

- Why are shipwrecks found in lakes better preserved than those found in the ocean?
- How can sediment help in wreck preservation?
- What new technologies are being used today to find, research, and explore shipwrecks?
- How can wrecks give us more insight into history?

Going Further

- Research and write short biographical sketches of famous marine archaeologists.
- Read and discuss William Ryan and Walter Pitman's *Noah's Flood, The New Scientific Discoveries About The Event That Changed History*.

Answers to Follow Up Questions

- *Why are shipwrecks found in lakes better preserved than those found in the ocean?*

The most important reason is because the wood-eating “shipworm” (*Terredo navalis*) doesn’t live in fresh water. But in general, there are less organisms in fresh water to encrust and break down a wreck. Also, a lack of salt (which is corrosive) helps preserve iron-based metals in fresh water.

- *How can sediment help in wreck preservation?*

A wreck that is partially or completely buried in silt has greater protection against animals that encrust and break down wrecks. Some of the oldest wrecks ever recovered have survived because they were buried in silt.

See:

http://en.wikipedia.org/wiki/Maritime_archaeology

- *What new technologies are being used today to find, research, and explore shipwrecks?*

The *magnetometer* (a ship-drawn “metal detector” that finds large magnetic anomalies helps in finding steel ships. *Side-scan sonar* is used to make a three-dimensional “map” of the sea floor to find suspicious shapes that might be wrecks.

- *How can wrecks give us more insight into history?*

When a ship sinks, it’s a “time capsule” of that time, with artifacts, personal belongings, technology and artwork all in one place. If these items are preserved, they can later offer insight into history.