


# Deep Sea Hydrothermal Vent Explorations

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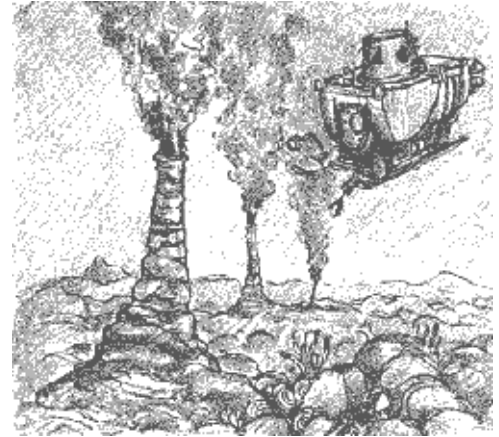
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### Introduction


### Unit 1: Plate Tectonics

#### 1. Reunite Pangaea


Students examine 10 pieces of evidence for the theory of plate tectonics and then use these as guides in cutting apart a modern map and reconstructing the super-continent of Pangaea. 




#### 2. Slippin' and Slidin' - Plate Tectonics

A student reading with embedded questions summarizes the evidence supporting the theory of crustal plate movement. 

#### 3. The Ocean Floor

This reading further explains the mechanisms behind plate tectonics and describes some of the technology oceanographers use to map the ocean bottom and outlines major ocean floor features. 

#### 4. Packages: 3-D Earth Model

Students create a three-dimensional cross-section of the earth's crust. 

#### 5: Ocean Floor Features

Students locate on a map a wide range of sea floor structures and then identify the geological activity that created each structure.

### Unit 2: Hydrothermal Vents

#### **Section One: What Are Hydrothermal Vents?**

#### 6. Deep Sea Hydrothermal Vent Slide Show

A slide show prepared by Veronique Robigou from the University of Washington provides students with hydrothermal vent images

#### 7. Creating Hydrothermal Vent Chimneys

Students supersaturate a solution and observe the precipitate that forms, a process analogous to the formation of vent chimneys.

Alternative lab: **Hydrothermal Vent Formation**

The creation of hydrothermal vent chimneys is simulated by precipitation of salt from a saturated solution.

8. Hot Water – Hydrothermal Vent Plumes and Fluid Dynamics Analysis

This demonstration shows how the temperature gradient at a vent creates a plume that rises and disperses. Students apply this and previous lab work to an analysis of how fluids flow through a vent system.

**Section Two: Navigation And Engineering- How Scientists Get To Hydrothermal Vents**

9. Navigating Deep Sea Vents - Alvin Dive Log, Part 1

Students use map reading skills and calculations from transponder data to navigate on paper around a hydrothermal vent field.

10. Deep Sea Dive Simulation - Alvin Dive Log, Part 2

Students continue navigating around a hydrothermal vent field, but this time they simulate a dive in simple classroom models of ALVIN.

**Section Three: Hydrothermal Vent Organisms**

11. Hydrothermal Vent Biology

Students try their hand at the same process scientists are going through as they observe vent organisms and try to infer their identity and natural history.

**12. Hydrothermal Vent Food Webs**

Students use information about hydrothermal vent organisms and their own organizational and artistic skills to depict a hydrothermal vent food web.

**13. Symbiosis in the Deep Sea – Three-Level Guide**

This question guide leads students through a Scientific American article explaining the creation of hydrothermal vents and the chemosynthetic food webs that form around the vents.

**14. The Mating Game**

Students play game show contestants in this fun activity reviewing the adaptations of vent creatures.

**Production Credits**

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*Below, you'll find helpful resources for use with the above activities.*

**Activity 1 Reunite Pangaea**

*Tsunami article*

**Activity 2 Slippin' and Slidin' - Plate Tectonics**

*Make your own Earth and tectonic globes instructions*

*Make your own Earth globe*

*Great-Circle indicator*

*Make your own tectonic globe*

*Seafloor spreading model ds9u1res5*

*Seafloor spreading model animation ds9u1res6*

*Ocean trenches model ds9u1res7*

**Activity 3 The Ocean Floor**

*Construct a globe*

*Earth globe*

*Great Circle indicator*

**Activity 4 Ocean Floor Features**

*Ocean floor features diagrams*

*North Atlantic Bathymetric map*

*World Bathymetric map*

*Atlantic Bathymetric map*

*Island Bathymetric map*

*Volcano model*

**Activity 7 Hydrothermal Vent Formation**

*Deep sea research images*

*Vents and the Salty Sea article*

*Deep sea chimneys*

*Deep-sea drilling*

*Vent life*

**Activity 11 Hydrothermal Vent Biology**

*Tube worm and clam images*

*Sulfide worm and plume worm images*

*Spider crab and fish images*

*Sea spider and limpet images*

*Mussel and snail images*

*Mat bacteria and plume bacteria images*

*Fossil model*

## **Activity 12 Hydrothermal Vent Food Webs**

*Deep-sea exploration*

*Vents article*

*Vent chimneys*

*Vent exploration*

*Sea floor exploration*