

# The Earth's Crust

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## Overview

**Topic:** Geology, parts of the Earth. This lesson has students recall prior knowledge of the continents and oceans and extend their learning into more scientific explanations of their formation and continuing change including plate tectonics and the parts of the Earth's interior. This lesson can also lead into a lesson on volcanoes.

## Length of Lesson

3 45-minute periods (1 each for previewing, viewing, and post-viewing activities)

## Video/Technology Hardware & Software

*Bill Nye the Science Guy* #112 The Earth's Crust  
Computer Lab

Software Application: SuperPrint

CD ROM: 3D Atlas

Software Application: ClarisWorks Draw

(Extensions) Internet Site: *Volcano World* @

<volcano.und.nodak.edu/>

## Learning Objectives

The student will be able to:

- identify the Earth's continents and oceans (Va. SOL Science 5.7)
- understand how the Earth's surface is constantly changing (Va. SOL Science 5.7)
- demonstrate the concepts of plate tectonics (Va. SOL Science 5.7)
- diagram a model of the Earth's interior (Va. SOL Science 5.7)
- develop basic technology skills (Va. SOL Computer/Technology 5.2)
- communicate through application software (Va. SOL Computer/Technology 5.4)

## Materials and Teacher Preparations

- preset template of continents and oceans on SuperPrint (optional)
- "World" beach ball
- paper and pencil for each student
- 1 hardboiled egg per group of 4 students
- blackboard or chart paper and markers (for chart for Viewing Activities 3)
- set of continental plates puzzle pieces for each group of 4 students (template attached)  
Directions: Enlarge puzzle pieces by 150-200% to make templates. Trace each piece on a different color paper, one set for each group of four. Store each set in a gallon size ziplock bag.

## Preparatory/Pre-Viewing Activities

1. This first activity allows students to recall their prior knowledge of the continents and oceans.

Have students label the continents and oceans on the computer using a draw program like SuperPrint. If preferred, a template can be made ahead of time so students can click and drag the labels to the appropriate places from a key and then color code the key and continents using the paint bucket.

For an off-computer activity: Give students a world map and have students label and color the oceans and continents.



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2. This second activity gives students a good perspective of the proportion of the amount of water to land on our Earth.

Toss a "World" beach ball or basketball to each student one at a time. Direct students to announce where their left pinky is when they catch the ball, on land or on water. Have one student tally the marks on the board. When the whole class has had a turn, figure out the ratio. It should be between 1:3 or 1:4 in favor of the oceans.

## Focus for Viewing

Explain to students that today Bill Nye is going to help us learn more about how the Earth's surface is formed, and about the interior of the Earth as well.

### Pause vs. Stop

When using a video interactively with students, teachers need to decide when to use **PAUSE** and when to use **STOP**. **PAUSE** the video when the anticipated discussion or activity will take less than two minutes. **STOP** for longer periods. Pausing for too long at one time can cause video heads on the VCR to become clogged which may require cleaning to correct.

## Viewing Activities

1. **Focus:** Introduce the video, *Bill Nye the Science Guy* #112. Ask students to listen as the video begins to answer the following question: How do the Earth's crust and what is under or inside the Earth's crust differ? **START** the video just after the intro and the "brought to you by" commercial. **PAUSE** the video right after the explanation that the surface of the Earth is solid and what is underneath it is melted, molten rock. Have students answer the focus question.

2. **Refocus:** How do we know that underneath there is molten lava? Take answers, but don't confirm. Listen to the video to see if this is right?" **RESUME** the video to confirm (hopefully) the

answer of volcanoes. **PAUSE** the video after the bread demonstration. Confirm or discuss the correct answer.

3. **Activity:** On the chart paper or blackboard, draw a two-column chart with columns labeled "Parts of the Earth" and "Characteristics." The teacher may need to discuss what the word "characteristics" means. Tell students that we will be filling in the chart as we watch the video. When the next viewing activities are through the complete chart may look something like this:

Parts of the Earth	Characteristics
inner core	solid iron
outer core	iron & other metals
mantle	molten rock
crust	rock and dirt

Note: I find charts help the visual learners focus in more on what to look for in the video, especially when a lot of information is presented at one time as with Bill Nye.

4. **Refocus:** In the next segment, the parts of the Earth and what they are made of or described as will be explained. Listen carefully so that you can contribute to this chart." **RESUME** the video. **PAUSE** the video after the explanation of the model. Have students fill in what they can on the chart.

5. Students may not have heard all of the information . . . Bill always goes so fast. **REWIND** the video and **REPLAY** the segment repeatedly to finish the chart.

6. **Refocus:** Have students watch for Bill to set up for an experiment. **RESUME** the video and continue for a short segment until after Jenna says, "An egg? Come on in." **STOP** the video. Ask students to predict what Bill might want with a boiled egg.

7. **Activity:** Hand out the boiled eggs. Challenge students to figure out what an egg has to do with the chart on the board. Direct students to break open the eggs. Discuss their findings and correlations.

**8. Refocus:** Listen for Bill's (and Jenna's) explanation of the egg. **RESUME** the video. **STOP** the video after Bill's explanation and Jenna says, "Don't you have a show to get back to?" Compare/confirm the video's explanation of the egg demonstration with the students' observations.

**9. Activity:** Have students at this time sketch a diagram of the Earth, including the four parts from the chart. Explain to students that this sketch will be used for a computer activity later on.

Meanwhile, fast forward the video to the end of the geyser experiment performed by the little girl with the big red glasses.

**10. Refocus:** When the students are finished with their sketches, ask if anyone knows what plate tectonics is. Tell them to listen for confirmation or the explanation of plate tectonics in the next segment. (Possibly write the term on the board.) **RESUME** the video. **PAUSE** the video after Jenna says "Science." Have students tell what plate tectonics is, explain the term Pangaea, and discuss how plate tectonics has changed the continents over time.

**11. Refocus:** Ask students if they know what "subducted" means. Ask students to listen for the meaning of subducted (if no students could answer that question) and how it relates to plate tectonics. **RESUME** the video to just after "Check it Out." **STOP** the video. Discuss the relevance of subduction to plate tectonics.

**12. Activity:** Hand out the puzzle pieces to each group of four students. Have the groups try to figure out how the pieces fit together to form Pangaea.

**13.** Meanwhile, fast forward the video to the second time the large word CRUST appears. Then prep the 3D Atlas CD ROM. Choose the Continents and the Physical Globe options to start.

**14. Refocus:** When students have finished with the puzzle, focus their attention to the 3D Atlas. Ask students to listen for the explanation of plate tectonics on the 3D Atlas. Under Other Globes, go through Continental Drift and the Tectonic Plates segments. Discuss.

**15. Refocus:** Have students recall, according to Bill, where volcanoes will show up on the map. (A little in from the plate edges.) Under the 3D Atlas display select volcanoes. This will confirm their answer for the most part. Students may note that Hawaii is not on a plate collision. (Explanation of that situation can be saved for a follow-up lesson on volcanoes.)

**16. Refocus** the students back to the video. Ask students to look for, in this last segment of the video, how scientists know the core is solid. **PLAY** the video to the end of this experiment and **STOP** the video and discuss. (Option: Preview this experiment ahead of time and either have the students or the teacher conduct a demonstration of the experiment instead of showing the video.)

**17. Refocus:** As a review to this lesson or as an introduction to a subsequent lesson on volcanoes, ask students to listen for facts and terms which they learned in the lesson. **PLAY** the music video at the end of this Bill Nye program. **STOP** the video and review terms quickly.

## Post-Viewing Activities

**1. Hands-on computer activity:** Using ClarisWorks Draw, have students diagram a model of the Earth including a brief description of each of the parts of the Earth. Students may use their sketches from the video segment to aid them.

## Assessment

The students' post-viewing activity can be used to formally evaluate their knowledge of the Earth's interior and the computer objectives.

Class participation during the viewing activities, including the puzzle activity, can be used to informally evaluate the other objectives.

### Extensions

**Science:** Check out these other instructional videos covering 5th grade geology SOL:

***Bill Nye the Science Guy***

- #316 Volcanoes
- #144 Rocks and Soil
- #407 Caves
- #212 Earthquakes

***Reading Rainbow***

- #23 Hill of Fire
- #66 The Magic School Bus Inside the Earth

***The Magic School Bus* #14 . . . Blows Its Top**

**Computers/Internet:**

- The diagram of the Earth and the oceans and continents can be used in a more extensive Hyperstudio project on Geology.
- Check out the CD ROM, *Earth Quest*. It is a great geology resource on rocks and minerals, volcanoes, mining, earthquakes, and more!
- Follow up with an exploration of the internet site Volcano World at <[volcano.und.nodak.edu/](http://volcano.und.nodak.edu/)>. The "Ask a Volcanologist . . . Top 101 Frequently Asked Questions" section is exceptionally good, with photos or diagrams with every question.

### About the Author

**Barbara Huneycutt**

Barbara Huneycutt is a teacher of ten years, currently teaching at Walker Upper Elementary School in Charlottesville. She is the 5th-6th grade Technology Specialist and the Director of the Walker Science, Technology, and Math Academy. Prior to teaching at Walker she taught third grade for seven years. Barbara was the 1996 Virginia Teacher of the Year and is the current Executive Director of the Virginia Chapter of the National State Teachers of the Year. She received her B.S. in Journalism from the University of North Alabama and her M. T. degree in Elementary Education at UVA. Barbara has presented at many NTTI and other technology workshops and served on various committees at the local, state, and national level. In her spare time Barbara enjoys spending time with her husband, Jim, who is also a

teacher, and her 12-year-old and 6-month-old sons. She enjoys photography, cooking, and gardening.

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## Pangaea

Directions: Enlarge puzzle pieces by 150-200% to make templates. Trace each piece on a different color paper, one for each group of four. Store each set in a gallon size ziplock bag. Pieces should fit together as in the small picture at right.

