

Grade Six: Plate Tectonics

6.11 Density of Granite and Basalt

Lesson Concept Density of basalt and granite affect the formation of landmasses on Earth.

Link Mountain formation in Lesson 6.10 is dependent upon the density of the crust.

Time 120 minutes (Lesson can be divided into two sessions maintaining the order of the lesson.)

Materials

Per Group (groups of 4-5)

100 ml graduated cylinder
50 ml of water
Empty cup
Towel
Basalt and Granite samples (that will fit in graduated cylinder)
Gram scale
Calculator

Individual

H1 Density Record handout
H2 Density of the Continental Crust and Oceanic Crust handout

Advance

Preparation Gather materials
Duplicate handouts

Teacher Note: Granite and Basalt rocks have different densities. Small sample size or inaccurate measurements using the displacement process for volume may not reveal accurate density measurements. One option for limiting discrepancies is to average all group results. The second option is to use an average density of granite and basal from a property scale and complete a class table for analysis of the data.

Procedure:

Engage (5 minutes) *Basalt and granite are found in the layers of the Earth.*

1. Hold up two rocks: basalt and granite. Ask students: What do you notice about the two different rocks?
2. Explain that basalt and granite are the major rock types found in the layers of the Earth. You saw differences, but there are more differences that you can't see that we can explore.

Explore/Explain (45 minutes) *Density of a rock can be found using the equation $D=M/V$.*

3. Distribute rock samples. Have students examine and discuss rocks at their tables.
4. Explain that students are going to find the density of each rock.
5. Have students predict: Which rock(s) are more/less dense than water.
6. Give each group a graduated cylinder with 50ml of water and the Density Record handout.
7. Have students drop basalt into the graduated cylinder and record the difference between the new water level and 50ml. This represents the volume of the rock.
8. Have students do the same with granite and record their results on the recording handout.
9. Have students weigh each rock using a gram scale. (If you do not have gram scales, weigh the rocks in advance and give the weight to the students). This is the mass of the rock.
10. Have students record each weight on their recording handout.
11. Remind students how to calculate density. ($D=M/V$) then calculate the density of the rocks and record on their handout.
12. Ask students to compare their actual results to their predictions.
13. Discuss students' results and record on a large chart that shows the results of all groups.
14. Discuss:
 - a. Which rock was more dense than the other? How do you know?
 - b. What did you discover about the density of Earth materials?

Explain (20 minutes) *A rock's density determines its location in the Earth's layers.*

15. Distribute the Density of the Continental Crust and Oceanic Crust handout.

16. Ask students to individually label which rock (basalt or granite) they think is continental crust and which rock is oceanic crust based on their results from the density lab.
17. Ask students to justify their labels with an explanation that includes the following words: less dense, more dense, water, basalt, granite, oceanic crust and continental crust.

Evaluate ***(5 minutes) A rock's density determines its location in the Earth's layers.***

18. Collect Density of the Continental Crust and Oceanic Crust handout and use the handout as an evaluation of students' understanding

Density of Rocks Found in Layers of Earth

Directions: Predict which rock is more or less dense.

1. I think basalt is _____ dense because _____
 _____.

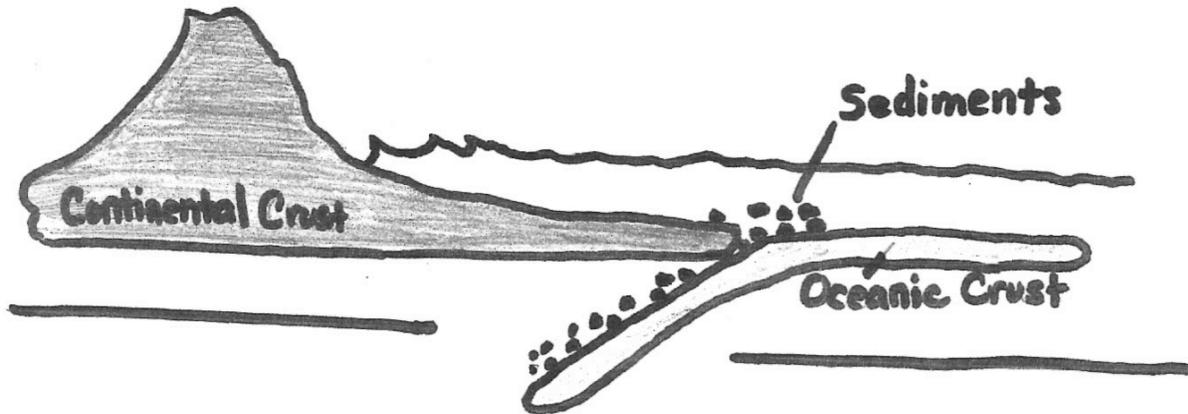
2. I think granite is _____ dense because _____
 _____.

Directions: Fill in the table with your results.

	Mass	Volume	Density	More or Less Dense
Basalt				
Granite				

Density of the Continental Crust and Oceanic Crust

Directions: Label the continental crust and oceanic crust with the rock (basalt or granite) that you think you would find in that part of the crust.



Directions: Use the words below to explain in a paragraph why you put your labels where you did in the picture above.

more dense	less dense	continental crust	oceanic crust
basalt	granite	water	
