

WHAT IS A CONGLOMERATE?

Science Concept:

Conglomerates are made of pieces of other preexisting rocks that have been eroded, deposited, and cemented (lithified) to form a new rock. (Rock cycle)

Objectives:

The student will:

- describe the formation and the components of a conglomerate rock;
- make observations, inferences, and generalizations about conglomerate rocks; and
- write a description with a labeled illustration of a conglomerate rock.

GLEs Addressed:

Science

- [6] SD1.1 The student demonstrates an understanding of geochemical cycles by exploring the rock cycle and its relationship to igneous, metamorphic, and sedimentary rocks.
- [6] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Writing

- [6] W2.2.4 The student writes for a variety of purposes and audiences by using diagrams, charts or illustrations with captions or labels in research projects or extended reports.

Vocabulary:

angular - relating to or measured in angles; pertaining to quantities related to a revolving body that are measured in reference to its axis of revolution

cemented (lithified) - cementation is one of the processes that work together to turn sediment into sedimentary rock (lithification). Mineral-laden water percolates through sediment with open pore spaces. The spaces are gradually filled by minerals precipitating from the water, binding, or cementing, the grains together

conglomerate - a sedimentary rock made of rounded rock fragments, such as pebbles, cobbles, and boulders, in a finer-grained matrix. To call the rock a conglomerate, some of the constituent pebbles must be at least 2 millimeters (about 1/13th of an inch) across

deposition - the accumulation of material dropped because of a slackening movement of the transporting medium, e.g., water or wind.

erosion - removal of material by water, wind, or ice. As soon as a rock particle (loosened by weathering) moves, by some flowing agent such as air, water or ice, it is erosion

fossil - any remains, impression, or trace of a living thing of a former geologic age, as a skeleton, footprint, etc.

rock cycle - refers to how rocks are recycled from igneous to sedimentary to metamorphic and back to igneous again. The study of plate tectonics provides an explanation for how this happens

rounded - reduced to simple curves; made round (spherical or globular)

sediment - the word geologists use for loose, uncemented pieces of minerals and rock that come in all sizes and go by common names like sand, boulders, clay, silt, pebbles, and cobbles

sedimentary rock - sedimentary rocks are formed from pre-existing rocks and minerals or pieces of once-living organisms. They form from deposits that accumulate on Earth's surface. Sedimentary rocks often have distinctive layering or bedding

WHAT IS A CONGLOMERATE?

Materials:

- Conglomerate rocks
- Sand
- Gravel
- Clay
- Silt
- Marbles
- Pebbles
- Freshly broken rocks
- Fossils
- Shells
- Organic material
- Metal washers
- Metal filings
- Pint-size bottles with lids
- Water
- Magnifying glasses
- Timer or stop watch
- Plastic grocery bags or containers to collect items listed in scavenger hunt list
- Digital camera (one per group)
- Plaster of paris
- Small bowls
- Science notebooks
- STUDENT INFORMATION SHEET: "Scavenger Hunt List"

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up

Process Skills: observing and describing

1. Divide students into small groups. Ask each group to select a scribe, or select one for them.
2. Distribute a conglomerate rock to each group. Explain groups will have three minutes to write as many observations as they can about the rock. Set the timer, or note the clock, and tell groups to start.
3. At the end of three minutes, tell groups to stop. Explain groups will now have three minutes to infer how the rock was formed. Set the timer, or note the clock, and tell groups to start. At the end of three minutes, tell groups to stop.
4. Ask groups to share their observations and inferences with the class.
5. Use the following questions to guide class discussion and pre-assess student knowledge:
 - a. What components did you observe in your conglomerate rock?
 - b. Are all of the components the same size? Same color? Same texture? Same shape?
 - c. How do you think this rock was formed?
 - d. Where do you think the pieces (sediment) came from? How did this happen?
 - e. What would happen if all of the pieces were large?
 - f. Have you ever found this kind of rock outside of the classroom? Where?
6. After discussion, instruct students to update their science notebooks.

WHAT IS A CONGLOMERATE?

Explore

Process Skills: predicting, observing, describing, and inferring

7. Distribute a plastic bottle to each group and display the sediments. Explain groups should choose at least five sediments, making sure to include sediments of a variety of sizes and densities.
8. Place sediments in the bottle and simulate a depositional environment. Fill the bottle one-third to half full with sediments and the remainder of the bottle with water. Explore how the sediments are deposited and predict the order in which sediments will settle out.
9. Ask student to record their predictions, investigations, and results in their science notebooks.

Generalize

Process Skills: observing, inferring, describing, and making generalizations

10. Discuss the following questions with the class:
 - a. Which sediments were deposited first? Why do you think that happened?
 - b. Did all our your sediments settle to the bottom? Why do you think that happened? (NOTE: This will depend on the length of settling time.)
 - c. What do you think caused the differences (in settling rate)?
 - d. How would your observations connect with sedimentary rocks and conglomerates?
 - e. How were the different sediments formed (erosion, weathering)?
 - f. What processes would cause sediments to be deposited?
 - g. What would happen if all of the sediments were large?
 - h. What do you think distinguishes a conglomerate from other sedimentary rocks?
 - i. What holds a conglomerate together?
 - j. Can you describe a candy bar that resembles a conglomerate?

Apply

Process Skills: observing, classifying, inferring, making generalizations

11. If at all possible, take the students outside to explore different sediments, and locations where erosion and deposition are taking place.
12. Distribute a STUDENT INFORMATION SHEET: "Scavenger Hunt List," digital camera, and bags to each group. Direct students to collect the items in their bags and also take pictures of those items as specified.
13. Upon return, ask students to compare and contrast their materials to find similarities and differences. Ask students to justify their choices.
14. Ask groups to show their photos. Ask the other students to identify whether the area is a depositional or eroding environment.
15. Choose four or five of the sediments collected and combine in a bowl with plaster of paris to create a model of a conglomerate rock.
16. As the rocks "set up," instruct students to document their findings in their science notebooks.

Extension Idea:

Students may start a class rock collection, identifying different kinds of sedimentary rocks.

WHAT IS A CONGLOMERATE?

RUBRIC

Assessment Task:

Create a drawing/illustration of a conglomerate rock. Label at least three components. Describe your interpretation of the formation of the rock including at least two details. Please make sure to include at least one observation, one inference, and one generalization.

Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student describes the formation and components of a conglomerate rock.	[6] SD1.1	The student names two or fewer components of a conglomerate rock and describes only part of its formation.	The student names at least three components of a conglomerate rock and describes its formation with two details.	The student names four or more components of a conglomerate rock and describes its formation with three or more details.
The student makes observations, inferences, and generalizations about conglomerate rocks.	[6] SA1.1	The student makes an observation, inference, and/or generalization about conglomerate rocks, or does not attempt.	The student makes at least one observation, inference, and generalization about conglomerate rocks.	The student makes multiple observations, inferences, and generalizations about conglomerate rocks.
The student writes a description with a labeled illustration of a conglomerate rock.	[6] W2.2.4	The student may write a description. Details may be inaccurate. The student may create an illustration that is not labeled or has incorrect labels.	The student writes a description with two details and creates an illustration that has three correct labels.	The student writes a description with three or more details, and creates an illustration that has four or more correct labels.



NAME: _____

SCAVENGER HUNT LIST

Directions: Locate and collect the following items

- A rounded pebble
- A recently broken rock
- A conglomerate
- A sedimentary rock
- An easily broken rock
- A hard rock
- A shiny rock
- A fossil
- Organic material
- Sand
- Silt
- Mud

Take a photograph of each of the following:

- An area that is eroding
- An area where material is being deposited
- An area that looks like a conglomerate, but is not cemented (lithified)
- A footprint