

Smaller and Rounder – Teacher Notes

As rock material (sediment) is moved along by wind or by water, it becomes smaller and rounder. This is because of collisions with each other and with the surface along which they are moving. If students have waded in fast flowing streams or in the wash at the edge of the sea they may be aware of feeling the sand and pebbles beside their ankles bouncing and rolling in the energetic water flow.

Student Activity



Experimental group

Control group

Materials

- Sugar cubes (about 8 per student/ group)
- A piece of old newspaper
- A large jar/ container with a lid
- Group of energetic students

Method

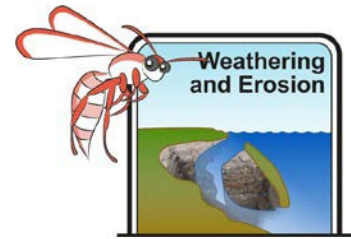
1. Either select one group of students to demonstrate to the rest of the class or organise students into groups. Students should:
2. Collect sugar cubes.
3. Lay out the newspaper.
4. Set a few cubes aside as the “Control Group” against which any change is measured.
5. Place the other cubes into the container. Ideally, they should only fill about one quarter of the space.
6. Shake the container for two minutes. Tip the contents of the container out onto the newspaper. Draw the changes in the “Middle” column of the table.
7. Return the contents to the container. Shake the container for another two minutes. Tip the contents back onto the paper. Draw the changes in the “End” column of the table.

Observations

Describe the changes to the cubes after they were shaken for 4 minutes (at the end). **Their shape changed. Their edges became rounder and the corners were rounded and not angular.**

Was this a “Fair Test”? Explain your answer. **No. We could not control how hard and how often each person shook the container.**

How could you make this test more fair? **Use a machine, like a paint shaker or stone tumbler, to agitate the cubes equally.**



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Results

Beginning	Middle	End
		

Student's drawings should demonstrate a decrease in size and an increase in roundness from beginning to end.

Discussion

This activity is a model to find the effect of tumbling rocks along a river. It takes most small rocks hundreds of years to tumble their way from the top of a river all the way to the mouth (to sea). What do you think would happen to a jagged (or angular) rock during its journey from the top of the river to sea?

It would become smaller and rounder the further it travelled.

Use your knowledge



The sediments (broken bits of rock) on the left were found along a creek bed in the Hamersley Ranges. The large ones are 5cm long.

Do you think they had travelled (been eroded) for a long distance from their source? Explain your answer.

They are not far from source as the clasts are large and very angular.

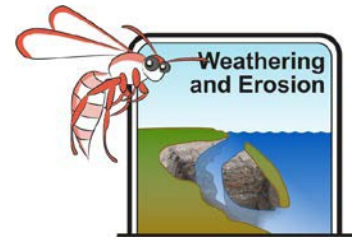
EXTENSION - And Down They Go!

Students repeatedly roll clay cubes down a ramp. This activity shows the material removed from the cubes by friction with the ramp

Materials

- Plasticine cubes or clay cubes ($\sim 1 \text{ cm}^3$). The Art team may have old clay that they are happy to give you. These are easier to erode.
- A concrete or hard based ramps (accessibility ramps are fine)
- A hose and water or buckets of water and a broom.

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Method

1. Cut eight cubes from the clay.
2. Repeatedly roll them down the slope of the ramp.
3. Observe any changes to the cubes.
4. Once the material is becoming obviously rounded and smaller stop the activity.
5. Hose off any clay left on the ramp.