

'A world in a grain of sand' What can a grain of sand tell us about its past?

Introduce pupils to this extract from a poem by William Blake:

*'To see a World in a Grain of Sand
And a Heaven in a Wild Flower,
Hold Infinity in the palm of your hand
And Eternity in an hour.'*

From: *Auguries of Innocence* by William Blake (1805)

Ask pupils to think about how much a grain of sand can show us about the world, as they take part in the activity.
Then, place a grain of sand on the table.

Ask the pupils:

- In how many different ways could the grain of sand be eroded, transported and deposited in the classroom? *A person could pick up, move and put down the grain; you could move it along with your finger; you could tilt the table; you could blow the grain along with your mouth or a straw; you could wash it along with a cup of water.* Demonstrate these answers.
- In how many ways can grains be moved naturally outside? *By falling down from where they are, through gravity; by moving water, in rivers/streams or in the sea; by wind; by moving ice (i.e. glaciers and ice sheets). Sediment can also be moved by the activity of organisms. In recent years, more sediment is being moved by humans than by all the rivers on Earth;*



Figure 1: A grain of sand (Department of Geology, University of Leicester)

- What can we tell from this magnified version of a grain of sand? *The grain has rounded corners, so it must have been knocked around with other grains during transport, either by water or wind, and the corners were worn away;*
- What has a grain of sand been able to tell us? Have we been able to see 'a world in a grain of sand', as in the poem by William Blake? *(Expect individual answers)*

The back up

Title: 'A world in a grain of sand'

Subtitle: What can a grain of sand tell us about its past?

Topic: A 'thought experiment' on erosion, transportation and deposition.

Age range of pupils: 8 – 16 years

Time needed to complete activity: 5 minutes, or until interest wanes

Pupil learning outcomes: Pupils can:

- define the terms erosion, transportation and deposition;
- describe different ways in which sediment could be moved in the classroom;
- describe the ways in which sediment can be moved naturally.

Context: This activity can be used for all ages, to link their studies in science or geography with the medium of literature.

Following up the activity: (For younger ages)

Write a story or draw a cartoon about the life of Sandy Grain. Start with a grain of sand on a beach, and describe where it has come from and what will happen to it.

Follow the activity, *How many sand grains are there in a bucket – or on a beach?* (See Useful Links below)

Underlying principles:

- Definitions: Erosion is the picking up of solid material; transportation is the movement of sedimentary material; deposition is the laying down of solid material.
- Grains of sand can tell us much about their origin, whether lying loose on a beach or as constituents of sedimentary rocks.
- The composition of the sand, e.g. quartz, gives clues about the source rock.
- The degree of rounding of the grains reflects the nature of the processes of transport and deposition of the grains.
- Electron microscope analysis of sand grains may reveal further essential detail.

Thinking skill development: Construction is involved in applying previous knowledge. Metacognition is involved in relating a concrete object to the world of poetry. Applying learning from the activity to the real world is a bridging skill.

Useful links: See the video of this activity at: https://www.earthlearningidea.com/Video/Grain_s_and.html
https://www.earthlearningidea.com/PDF/363_Sand_grains_bucket.pdf
https://www.earthlearningidea.com/PDF/268_Geo-literature.pdf poems and stories inspired by all things 'geo'.

Resource list:

- a grain of sand
- an electron microscope picture of a grain of sand, as a photograph or on the interactive whiteboard

Source: Originally devised for the Earth Science Education Unit by Chris King and adapted for Earthlearningidea by Peter Kennett, both of the Earthlearningidea Team.

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