**Fossilisation**

The photograph shows a fossil of an animal.

Some of the statements in the boxes below link together to explain how this fossil was made.

**To talk about in your group**

1. Which statements are part of the correct explanation?
2. What is the correct order for the statements you have chosen?

**A**

Some parts of the animal decomposed.

**B**

The animal's remains were submerged in water.

**C**

The animal's remains were dissolved by water seeping through the rock.

**F**

The animal's remains were buried in sediment.

**E**

The material around the animal was compacted to form rock.

**D**

The animal died.

**G**

The animal's remains turned to rock.

**H**

The animal's remains were replaced by minerals.

*Biology> Big idea BVE: Variation, adaptation and evolution > Topic BVE1: Variation > Key concept BVE1.2: Changes in species over time – fossil evidence*

|  |
| --- |
| **Response activity** |
| **Fossilisation** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | The fossil record provides evidence that species change over time, but it is incomplete and there are limitations to the conclusions that can be drawn from it. |
| Observable learning outcome: | Recognise that all fossils are the mineralised remains of once-living organisms or of traces left behind by once-living organisms. |
| Activity type: | Ordering/sequencing, discussion |
| Key words: | fossils |

This activity can help overcome students’ misunderstandings about what can become a fossil and how the process occurs. It can be used in response to the following diagnostic question:

* Diagnostic question: Could it become a fossil?

**What does the research say?**

There is limited research into children’s understanding (and misunderstandings) of fossils, but Borgerding and Raven (2018) report findings from work with younger children (up to 6 years old), including:

|  |  |
| --- | --- |
| **Commonly understood:** | **Less commonly understood:** |
| * Fossils are not alive. * Fossils are found underground. * Inferences about body shape and size can be made from fossils. * Inferences about the habitats of fossilised organisms can be made from the locations in which fossils are found. | * All fossils have a biological origin – they are the mineralised remains of organisms that were once alive, or of traces left behind by organisms that were once alive. * Things other than bones and shells can become fossilised. * Non-mineralised remains such as skeletons are not fossils. |

In Borgerding and Raven’s study:

* Some of the children did not think that fossilised plants were fossils, perhaps because the children were not sure that plants are living organisms.
* Some of the children could not distinguish between rocks and fossils.
* Few of the children were aware that traces made by living organisms can become fossils, including for example faeces, burrows, footprints and feedings marks; children are probably most familiar with ‘body fossils’ (in which the body structures and tissues of an organism are replaced by minerals) and less familiar with ‘trace fossils’ and impressions left in sediments that become fossilised.
* The children were also not commonly aware that softer parts of organisms (i.e. parts other than bones, shells, teeth, claws and so on) can become fossilised in the correct conditions.

**Ways to use this activity**

Students should complete this activity in pairs or small groups. The focus of the activity should be on group discussion to reach a consensus on which statements to include in the explanation, and in what order they should appear. It is through the discussions that students can check their understanding and develop their explanations. Listening in to the conversations of each group will often give you insights into how your students are thinking.

After their discussions, each group should be prepared to report the key points of their discussion to another group, or to the class.

Students could cut out the statements from the worksheet to be sorted into the correct order.

*Differentiation*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Expected answers**

The expected sequence is:

D - The animal died.

A - Some parts of the animal decomposed.

F - The animal's remains were buried in sediment.

E - The material around the animal was compacted to form rock.

C - The animal's remains were dissolved by water seeping through the rock.

H - The animal's remains were replaced by minerals.

Statements B and G should not be used.

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: pixabay.com/PublicDomainPictures (220139)

**References**

Borgerding, L. A. and Raven, S. (2018). Children's ideas about fossils and foundational concepts related to fossils. *Science Education,* 102(2)**,** 414-439.