

Nova's Geological Journey: The Rock Cycle Challenge

Learning objective: To understand, identify, and explain the formation of igneous, sedimentary, and metamorphic rocks, and the processes involved in the rock cycle.

Nova the owl has discovered a collection of mysterious samples during her night-time explorations. Use the word bank to classify each rock sample based on its formation process. For the 'Greater Depth' section, provide a scientific justification for your classification.

Word bank: Igneous · Sedimentary · Metamorphic · Magma · Pressure · Weathering · Erosion · Compaction · Crystallisation

1. Nova finds a rock made of layers of sand and pebbles squashed together over millions of years. Identify the rock type and explain how the process of 'compaction' created it. (2 marks)

2. A dark, glassy rock was formed when lava cooled rapidly on the surface of the Earth. Name this rock type and justify why it lacks visible layers or fossils. (2 marks)

3. Explain why metamorphic rocks are rarely found on the surface of the Earth until after significant erosion has occurred. (2 marks)

4. Compare and contrast how sedimentary rocks and igneous rocks are formed. What is the fundamental difference in their 'ingredients'? (2 marks)

5. What might happen to a sedimentary rock if it were pushed deep underground into the Earth's mantle? Describe the transformation process. (2 marks)

6. If you were a geologist, why would you look for crystals within a rock sample to determine if it is intrusive or extrusive igneous rock? (2 marks)

Draw: Draw a diagram of the Rock Cycle, showing the movement from magma to igneous rock, the process of weathering into sediment, the formation of sedimentary rock, and the transition into metamorphic rock via heat and pressure.



Extension challenge: Imagine you have discovered a 'new' type of rock in your garden. Write a short scientific report describing its physical properties (hardness, permeability, texture) and theorise which part of the rock cycle it represents.