

Look at a diagram of the rock cycle and use it to help you answer the following questions.

1) State the three types of rock.

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2) Magma and lava are both molten (melted) rock. What is the difference between them?

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3) What is the name of the process that wears away existing rock?

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4) Each rock type has different features. Tick the correct column for each feature to show which rock type it refers to.

Type of rock			
Formed from sediment that is squashed			
Formed from lava or magma			
Formed by the action of heat and pressure on existing rocks			
Sometimes contain fossils			
Type of rock usually found near the surface			
Often found in volcanic areas			
Crystals can often be seen in the rock			

- 5) Igneous rocks can form both outside and inside volcanic mountains. The size of the crystals in them varies. Select the best word to complete each sentence.
- a) Molten rock that cools outside a volcano forms large/small crystals.
 - b) Molten rock that cools inside a volcano forms large/small crystals.
 - c) Molten rock that cools outside a volcano will cool slowly/quickly.
 - d) Molten rock that cools inside a volcano will cool slowly/quickly.
 - e) In conclusion, the slower the rate of cooling, the larger/smaller the crystals.

- 6) *Granite is a rock with large crystals, whereas basalt is a rock with small crystals. Suggest how they are formed.

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- 7) Why would you not expect to find fossils in metamorphic and igneous rocks?

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- 8) * Describe how weathering can eventually produce igneous rock in the rock cycle.

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Teaching notes

These questions were designed to be used with the diagram 'The Rock Cycle' and were designed for the Edexcel GCSE specification. However, they could be used with other diagrams of the same concept. Some modification of the questions may be necessary in this case.

Questions which are designed to provide more challenge are marked with an asterisk.

Suggested answers:

- 1) Sedimentary, metamorphic and igneous
- 2) Magma is found inside the Earth's surface, lava is found on the outside.
- 3) Weathering
- 4) The completed table should read:

Type of rock	Sedimentary	Metamorphic	Igneous
Formed from sediment that is squashed	✓		
Formed from lava or magma			✓
Formed by the action of heat and pressure on existing rocks		✓	
Sometimes contain fossils	✓		
Type of rock usually found near the surface	✓		
Often found in volcanic areas			✓
Crystals can often be seen in the rock			✓

- 5) The following words should be chosen:
 - a) Molten rock that cools outside a volcano forms small crystals.
 - b) Molten rock that cools inside a volcano forms large crystals.
 - c) Molten rock that cools outside a volcano will cool quickly.
 - d) Molten rock that cools inside a volcano will cool slowly.
 - e) In conclusion, the slower the rate of cooling, the larger the crystals.

- 6) Both are igneous rocks as they contain crystals.

They have been formed from molten rock.

Granite will have formed from magma.

Granite will have formed under the Earth's surface / inside a volcano as it has larger crystals so has cooled more slowly.

Basalt will have formed from lava.

Basalt will have formed on the Earth's surface / outside a volcano as it has smaller crystals so has cooled more quickly.

- 7) Fossils would be destroyed by the high temperatures needed to create the molten rock that creates igneous rock and the high heat and pressure needed to form metamorphic rock.
- 8) This would likely be an extended question on the Edexcel GCSE specification, and therefore worth 6 marks.

Suggested mark scheme:

1-2 marks: Recognises that weathered rock can (be transported and squashed to) become sedimentary rock. Little use of scientific vocabulary, poor written communication.

3-4 marks: Also describes how sedimentary rock or metamorphic rock becomes igneous rock when it is melted. Use of scientific vocabulary, reasonable written communication but there may be errors e.g. in spelling.

5-6 marks: Shows a clear understanding that these processes are part of a rock cycle e.g. explaining that igneous rock could again be weathered and the cycle could start again OR gives a more detailed explanation of how igneous rock is formed (e.g. some detail of from magma / lava, inside / outside, crystal size). Thorough use of scientific vocabulary, very good written communication although it need not be perfect.

Suggested model answer:

Sediment from a rock at the surface is worn away by weathering and transported in a river. The sediment falls to the bottom and is squashed as more layers build up, making it into sedimentary rock. This sedimentary rock may in turn become metamorphic rock if it is put under heat and pressure. Either of these rock types can then become igneous rock if the rock is hot enough for it to melt. When this molten rock solidifies, it can become igneous rock. Where the molten rock (magma) stays inside the Earth's surface, it will cool slowly and become igneous rock (with large crystals), but where the molten rock (lava) cools quickly outside the Earth's surface, it will become igneous rock with smaller crystals. The igneous rocks that form could once again be weathered and be made into new rocks - this would complete the rock cycle.