Rock Lab Clues

Use texture, tests, and formation history to identify rocks.

ESS.2A.4 "Investigate the physical and/or chemical characteristics of rock specimens to identify and categorize igneous, sedimentary, and metamorphic rocks. Include the processes that generate the transformation of rocks."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline how each rock category forms. Then circle two clues for each specimen, A through D, that help you identify it.

Four Specimens, Four Histories

1. A rock's appearance offers clues, but its formation process determines its category. Igneous rock forms when molten material cools and solidifies. Rapid cooling at the surface may leave tiny crystals or glass; slower cooling underground allows larger crystals to grow. Sedimentary rock forms when fragments settle, then become compacted and cemented, or when minerals precipitate from water. Layers, rounded grains, or fossils can support this identification. Metamorphic rock forms when an existing rock changes under heat and pressure without fully melting. Recrystallized minerals may line up in bands, though some metamorphic rocks have no bands. A single clue is rarely enough.

2. Specimen A has a dark, glassy surface and many small holes. The holes formed as gas escaped while molten material erupted and cooled quickly. Beside it, specimen B breaks along thin layers. Under a hand lens, its rounded sand grains are held together by natural mineral cement. Its grains were carried by a stream, deposited on a floodplain, and buried beneath later deposits. The two specimens can look equally dark from a distance, so color alone does not settle their identities. Inspecting texture and reconstructing each specimen's history provide stronger evidence than matching a rock to a color chart.

3. Specimen C contains alternating light and dark mineral bands. Its lab record says it began as a solid rock that was buried, heated, and compressed without melting. Specimen D has tightly interlocking calcite crystals and no visible sand grains. A drop of dilute acid makes D fizz, but the same test also makes its original limestone fizz. The lab record adds that D's limestone was heated and squeezed until its crystals grew together, without turning to liquid. For these two specimens, their histories matter as much as their textures: banding is not required, and fizzing does not reveal how a rock formed.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which rock category fits specimen A? Explain how its texture and formation history support your choice.

2. Which rock category fits specimen B? Use its grains and history to explain your choice.

3. Which rock category fits specimen C? Connect its bands to the process in its lab record.

4. Which rock category fits specimen D? Explain why the acid test alone cannot distinguish it from its original limestone.

3 YOUR TURN

Your own words

Invent a realistic two-stage history for a rock: describe how the first rock formed, then how it changed into a different rock category. Name the final category and describe two observations or tests that would help identify the final rock.

ANSWER KEY

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HIGH SCHOOL · ESS.2A.4

PART 1 · READ AND MARK

Underline how each rock category forms. Then circle two clues for each specimen, A through D, that help you identify it. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which rock category fits specimen A? Explain how its texture and formation history support your choice.	**Igneous. Its glassy texture and gas holes formed as erupted molten material cooled quickly.**
2	Which rock category fits specimen B? Use its grains and history to explain your choice.	**Sedimentary. Stream-carried sand grains were deposited, buried, and held together by mineral cement.**
3	Which rock category fits specimen C? Connect its bands to the process in its lab record.	**Metamorphic. Heat and pressure changed an existing solid rock without melting it, and its minerals formed bands.**
4	Which rock category fits specimen D? Explain why the acid test alone cannot distinguish it from its original limestone.	**Metamorphic. Heat and pressure changed the limestone and grew interlocking crystals. Both rocks contain calcite and fizz with acid, so the test alone does not show how D formed.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sand grains were deposited, buried, and cemented into sandstone. Later, heat and pressure recrystallized the sandstone into quartzite, a metamorphic rock. Its tightly interlocking quartz crystals and lack of distinct sand grains would help identify the changed rock.

Accept other scientifically plausible histories that change a rock from one category to another. The two observations or tests should be consistent with the proposed final rock, though neither must identify it on its own.