

THE ROCK CYCLE - IGNEOUS, SEDIMENTARY, METAMORPHIC ROCKS GRADE 8 AND UP READING

Improve students'
literacy skills

Sub Plan

Science Applicability



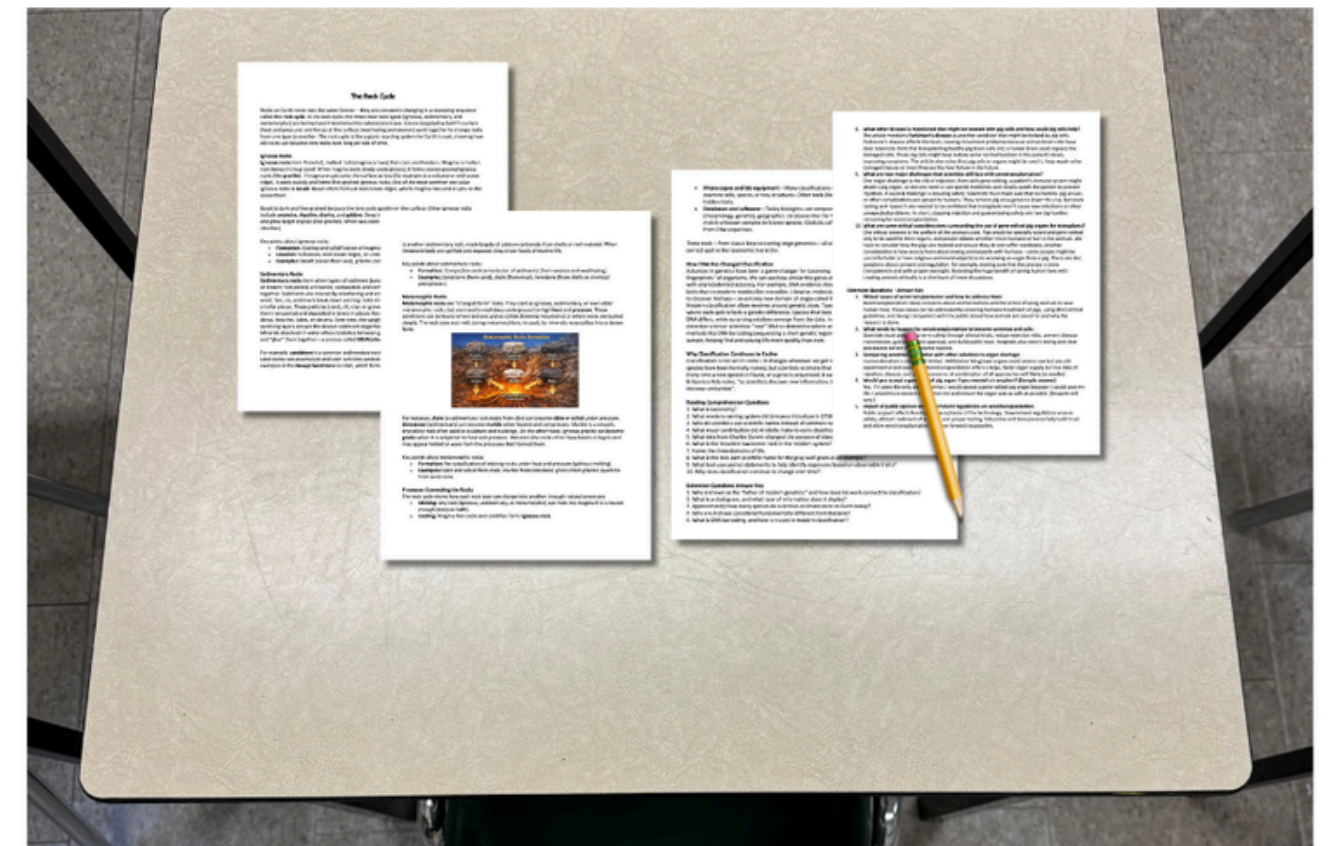
SCROLL
to take a look inside!

THE PROBLEMS YOU FACE

- Limited time to teach scientific literacy and strengthen students' reading and analysis skills.
- Need meaningful extension activities to engage fast-moving learners.
- Difficulty creating effective last-minute sub plans that still support student learning.

CLASSROOM READY

- Questions and Answer Key
- **No Prep, Ready-to-Use:** Print or assign digitally with Google Docs, Microsoft Word, and PDF formats for flexible classroom use
- **Includes Varied Question Types:** Knowledge, thinking, connecting, application, and open-ended questions.



What Will Your Students Learn?

READING COMPREHENSION ARTICLE & QUESTION BUNDLE

Article with
Comprehension
Questions

Grade 8 and Up

Print & Digital

- The Rock Cycle
- Igneous Rocks
- Sedimentary Rocks
- Metamorphic Rocks
- Weathering & Erosion
- Heat & Pressure
- Real-World Examples
- Earth's Dynamic Crust

Comprehension Questions

1. What are the three main types of rocks?
2. How does igneous rock form? (Name the process and what material it cools from.)
3. Give an example of an igneous rock and where it can form.
4. What processes turn sediments into a sedimentary rock?
5. Name one sedimentary rock and describe its origin (what it is made of).
6. How is a metamorphic rock formed, and what is an example?
7. Explain how limestone can become marble.
8. What does erosion do to the Earth's surface?
9. Describe how weathering and erosion work together to change rocks.
10. Why is the rock cycle important?

Extension Questions

1. Why are igneous rocks called the "primary" rocks?
2. How does the rock cycle change over time?
3. Why are sedimentary rocks called the "secondary" rocks?
4. How does the rock cycle change over time?
5. Explain how the rock cycle is a giant recycling system for Earth's crust, showing how old rocks can become new rocks over long periods of time.

The Rock Cycle

Rocks on Earth never stay the same forever – they are constantly changing in a repeating sequence called the **rock cycle**. In the rock cycle, the three main rock types (igneous, sedimentary, and metamorphic) are formed and transformed by natural processes. Forces deep below Earth's surface (heat and pressure) and forces at the surface (weathering and erosion) work together to change rocks from one type to another. The rock cycle is like a giant recycling system for Earth's crust, showing how old rocks can become new rocks over long periods of time.

Igneous Rocks
Igneous rocks form from hot, melted rock (magma or lava) that cools and hardens. Magma is molten rock beneath the ground. When magma cools slowly underground, it forms coarse-grained igneous rocks (like granite). If magma erupts onto the surface as lava (for example at a volcano or mid-ocean ridge), it cools quickly and forms fine-grained igneous rocks. One of the most common extrusive igneous rocks is **basalt**. Basalt often forms at mid-ocean ridges, where magma rises and erupts on the ocean floor.

Basalt is dark and fine-grained because the lava cools quickly on the surface. Other igneous rocks include **andesite**, **rhyolite**, **diorite**, and **gabbro**. Deep inside the Earth, igneous rocks cool very slowly and grow larger crystals (like granite). When lava cools very rapidly, it can even form volcanic glass (like obsidian).

Key points about igneous rocks:

- **Formation:** Cooling and solidification of magma or lava.
- **Location:** Volcanoes, mid-ocean ridges, or underground magma chambers.
- **Examples:** Basalt (ocean floor lava), granite (continental crust), obsidian (volcanic glass).

Sedimentary Rocks

Sedimentary rocks form when layers of sediment (sand, mud, or broken rock pieces) are buried, compacted, and cemented together. Sediments are created by weathering and erosion: wind, rain, ice, and rivers break down existing rocks into smaller pieces. These particles (sand, silt, clay, or gravel) are then transported and deposited in layers in places like river deltas, beaches, lakes, or deserts. Over time, the layers are buried deeper and deeper.

Over millions of years, the layers are buried so deep that the pressure and heat turn them into sedimentary rocks. One of the most common sedimentary rocks is sandstone. In Utah, where the desert sand dunes are, sandstone is a common rock.

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Your Reading

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For example, **sandstone** is a common sedimentary rock made mostly of sand grains. In desert regions, sand dunes can accumulate and later turn into sandstone under pressure. One of the best-known examples is the **Navajo Sandstone** in Utah, which formed from ancient desert sand dunes. **Limestone**

is another sedimentary rock, made largely of calcium carbonate from shells or reef material. When limestone beds are uplifted and exposed, they show fossils of marine life.

Key points about sedimentary rocks:

- **Formation:** Compaction and cementation of sediments (from erosion and weathering).
- **Examples:** Sandstone (from sand), shale (from mud), limestone (from shells or chemical precipitates).

Metamorphic Rocks

Metamorphic rocks are "changed form" rocks. They start as igneous, sedimentary, or even older metamorphic rocks, but are transformed deep underground by high **heat** and **pressure**. These conditions can be found where tectonic plates collide (forming mountains) or where rocks are buried deeply. The rock does not melt during metamorphism; instead, its minerals recrystallize into a denser form.



For instance, **shale** (a sedimentary rock made from clay) can become **slate** or **schist** under pressure. **Limestone** (sedimentary) can become **marble** when heated and compressed. Marble is a smooth, crystalline rock often used in sculpture and buildings. On the other hand, igneous granite can become **gneiss** when it is subjected to heat and pressure. Metamorphic rocks often have bands or layers and may appear folded or wavy from the pressures that formed them.

Key points about metamorphic rocks:

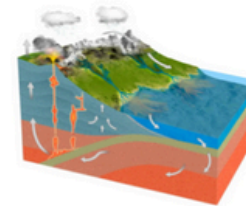
- **Formation:** Recrystallization of existing rocks under heat and pressure (without melting).
- **Examples:** Slate and schist from shale; marble from limestone; gneiss from granite; quartzite from sandstone.

Processes Connecting the Rocks

The rock cycle shows how each rock type can change into another through natural processes:

- **Melting:** Any rock (igneous, sedimentary, or metamorphic) can melt into magma if it is heated enough (deep in Earth).
- **Cooling:** Magma that cools and solidifies forms **igneous rock**.

- **Weathering & Erosion:** Rocks exposed at the surface are broken down into sediments by wind, rain, ice, and chemical action.
- **Deposition:** Those sediments are transported and deposited in layers by water, wind, or ice.
- **Compaction & Cementation (Lithification):** Over time, buried sediments are squeezed and glued to become **sedimentary rock**.
- **Heat and Pressure:** Any rock type can be deeply buried or tectonically squeezed into a **metamorphic rock**.
- **Uplift and Exposure:** Mountain building or erosion can push rocks back to the surface, restarting the cycle.



These steps often occur in cycles. For example, metamorphic rock might be uplifted, eroded into sediments, then buried and turn into sedimentary rock, which might later melt to become magma again.

Examples of pathways: A sedimentary rock like limestone can be pushed deep under a mountain range (heat/pressure) to form marble (metamorphic). If that marble is later thrust upward, weathered into pebbles, and those pebbles get buried, they could lithify into a new sandstone (sedimentary). If sandstone or any rock melts, it forms magma which can cool to igneous rock.

How the Rock Cycle Shapes Earth

The rock cycle constantly **recycles Earth's materials** and reshapes landscapes over geologic time. For example:

- **Volcanoes** bring new igneous rock (like basalt) onto Earth's surface, building islands and mountains.
- **Erosion** from rain, rivers, and glaciers wears down mountains and forms valleys and canyons, depositing sediments that become new rocks (like sandstone layers in the Grand Canyon).
- **Mountain building** (plate collisions) creates metamorphic rocks deep below and then uplifts them.
- As new rocks form, old rocks are torn down. No material is "lost" or created; the same minerals cycle through forms again and again.

In this way, the rock cycle is like a recycling machine for the planet's crust. It explains why Earth's surface is dynamic: landforms change, new rocks form, and minerals are constantly transformed. By understanding the rock cycle, we see that rocks on Earth — from granite countertops to sandstone cliffs and marble statues — all originated from the same Earth materials and processes.

Rock Cycle Processes (Summary)

- **Melting** → magma (leads to igneous rock when it cools)
- **Cooling of magma/lava** → igneous rock (e.g., basalt, granite)
- **Weathering/Erosion** → sediments (sand, silt, pebbles)
- **Compaction & Cementation** → sedimentary rock (e.g., sandstone, limestone)
- **Heat & Pressure (Metamorphism)** → metamorphic rock (e.g., marble, slate)

Comprehension Questions

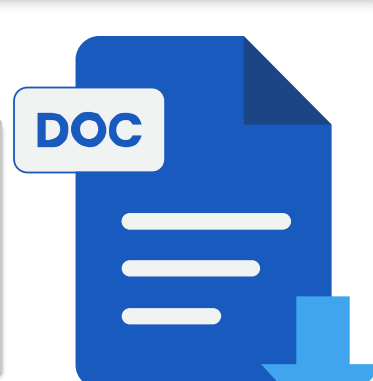
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6. How is a metamorphic rock formed, and what is an example?
7. Explain how limestone can become marble.
8. What role do erosion and weathering play in the rock cycle?
9. Describe how the rock cycle "recycles" Earth's materials.
10. Why are fossils usually found in sedimentary rocks rather than igneous or metamorphic rocks?

Extension Questions

1. What would happen to the rock cycle if Earth had no plate tectonics?
2. How might a mountain range change over millions of years due to the rock cycle?
3. Why is marble often used for sculpture and buildings, considering how it forms?
4. Predict how shale could be transformed by the rock cycle into three different rock types, naming each.
5. Explain why chemical rocks like limestone indicate that an area was once underwater.

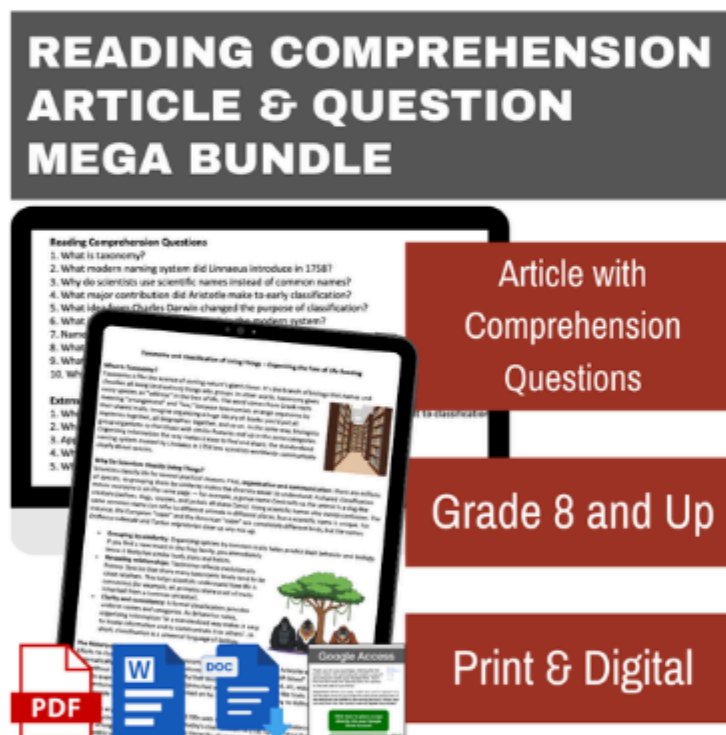
Answer Key
Included

Comprehension and Extension
Questions



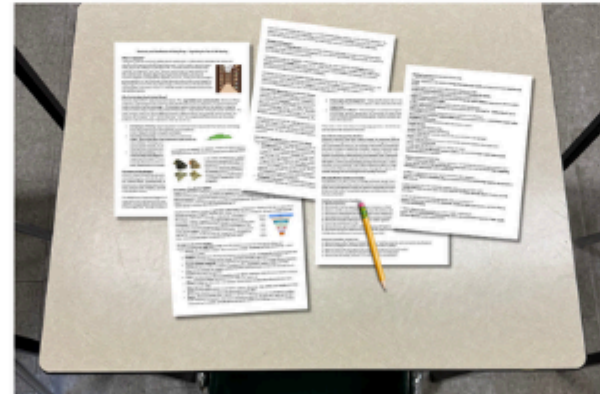
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★★★★★ Extremely satisfied - It is a good supplemental activity either for review and at the same time introducing some concept. I also use this for sub plan. It is well presented, organized and interesting.

★★★★★ Extremely satisfied - This a great resource. I used this for a sub plan. It was fun and engaging for my students.

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