# D4. Metamorphic Rocks

## Metamorphic Rocks

Imagine a time long, long ago when the Earth's crust was not as it is today. Back then, there were rocks, but not the rocks you see now. Over millions of years, the Earth's forces worked their magic on these rocks, transforming them into what we now call metamorphic rocks. Let's journey into the world of metamorphic rocks and discover their incredible story.

**What Are Metamorphic Rocks?**
Metamorphic rocks are a type of rock that has undergone a change. The word "metamorphic" comes from the Greek word "metamorphoo," which means "to change form." And that's precisely what happens to these rocks. They are born from other rocks, known as parent rocks or protoliths, but then they go through a remarkable transformation under the Earth's surface.

**The Forces of Change**
To understand how metamorphic rocks form, we need to talk about heat and pressure. Deep beneath the Earth's surface, there are layers of rocks. When these rocks are subjected to high heat and pressure, they begin to change. The heat comes from the Earth's core and from nearby magma, while the pressure comes from the weight of the rocks above.

**A New Look**
The combination of heat and pressure causes the minerals within the rocks to rearrange themselves. They form new patterns and structures, giving the rock a whole new appearance. It's like the rocks are getting a makeover, but instead of makeup, they use minerals!

**Textures of Metamorphic Rocks**
Metamorphic rocks can have different textures, depending on how they were formed. Some have foliated textures, which means they have mineral layers. These layers can be so thin that you might not see them with your naked eye. Other metamorphic rocks have non-foliated textures, which means they don't have distinct layers.

**Famous Metamorphic Rocks**
One of the most famous types of metamorphic rocks is marble. Marble starts its life as limestone, a sedimentary rock, but with enough heat and pressure, it turns into the beautiful and smooth marble we use for statues and buildings.

Another well-known metamorphic rock is slate. Slate begins as shale, another type of sedimentary rock. With the right conditions, shale transforms into slate, which is often used for roofing and flooring due to its durability.

**Where Are They Found?**

Metamorphic rocks can be found all over the world. Some are hidden deep underground, while others have been pushed to the Earth's surface through the movement of tectonic plates. These exposed metamorphic rocks can form stunning mountain ranges and rocky outcrops.

1. What are metamorphic rocks?
    A) Rocks that are born from other rocks
    B) Rocks that are formed from sand and mud
    C) Rocks that come from outer space
    D) Rocks that are made of only one mineral

2. What does the word "metamorphic" mean?
    A) To change form
    B) To explode
    C) To disappear
    D) To float in water

3. What are the two main forces that cause metamorphic rocks to form?
    A) Wind and water
    B) Heat and pressure
    C) Fire and ice
    D) Lightning and thunder

4. What are the rocks called that metamorphic rocks are born from?
    A) Parent rocks or protoliths
    B) Baby rocks or siblings
    C) Grandparent rocks or ancestors
    D) Pet rocks or toys

5. How do minerals within rocks rearrange themselves during metamorphosis?
    A) They disappear completely
    B) They form new layers of rocks
    C) They change form and create new patterns and structures
    D) They become invisible to the naked eye

6. What is the term used for metamorphic rocks with mineral layers?
    A) Laminated rocks
    B) Stacked rocks
    C) Foliated rocks
    D) Layered rocks

7. What type of metamorphic rock starts its life as limestone?
    A) Slate
    B) Schist
    C) Marble
    D) Gneiss

8. What are metamorphic rocks often used for due to their durability?
    A) Decoration
    B) Roofing and flooring
    C) Sculptures and buildings
    D) Outdoor furniture

9. How can metamorphic rocks be found on the Earth's surface?
    A) They are always on the surface
    B) They are only found near volcanoes
    C) They can be exposed through the movement of tectonic plates
    D) They can be found in caves

10. What is one famous example of a non-foliated metamorphic rock?
    A) Marble
    B) Slate
    C) Schist
    D) Gneiss

## ANSWERS & EXPLANATIONS

1. A - Rocks that are born from other rocks.
    - Metamorphic rocks are formed from other rocks, known as parent rocks or protoliths.

2. A - To change form.
    - The word "metamorphic" comes from the Greek word "metamorphoo," which means "to change form."

3. B - Heat and pressure.
    - Metamorphic rocks form due to the combination of high heat and pressure beneath the Earth's surface.

4. A - Parent rocks or protoliths.
    - The rocks that metamorphic rocks are born from are called parent rocks or protoliths.

5. C - They change form and create new patterns and structures.
    - The minerals within rocks rearrange themselves during metamorphosis, forming new patterns and structures.

6. C - Foliated rocks.
    - Metamorphic rocks with mineral layers are called foliated rocks.

7. C - Marble.
    - Marble starts its life as limestone and transforms into the smooth and beautiful marble we use for statues and buildings.

8. B - Roofing and flooring.
    - Slate, a metamorphic rock, is often used for roofing and flooring due to its durability.

9. C - They can be exposed through the movement of tectonic plates.
    - Some metamorphic rocks can be pushed to the Earth's surface through the movement of tectonic plates.

10. A - Marble.
    - Marble is an example of a non-foliated metamorphic rock.