Rock Cycle and Plate Tectonics

Use this key to check answers and read the explanations.

1. Molten rock at the surface cools until it becomes solid. What kind of rock forms?
   - A. Igneous rock
   - B. Metamorphic rock
   - C. Sedimentary rock
   - D. A fossil of the magma

   Correct answer: A. Igneous rock
   Igneous rock forms when molten rock solidifies. Molten rock at Earth’s surface is called lava.

2. Sand grains accumulate, then become pressed together and cemented into sandstone. Which major rock group does sandstone belong to?
   - A. Metamorphic
   - B. Igneous
   - C. Sedimentary
   - D. Molten

   Correct answer: C. Sedimentary
   Sandstone forms from deposited sediment that becomes rock through processes such as compaction and cementation.

3. A buried rock changes minerals in response to heat and pressure while remaining solid. What kind of rock results?
   - A. Fresh lava
   - B. Metamorphic rock
   - C. A sediment deposit
   - D. An unaltered igneous rock

   Correct answer: B. Metamorphic rock
   Metamorphism changes a rock while it remains solid. Complete melting would lead to a different path in the rock cycle.

4. Water freezes in a crack and helps break a stone into two pieces at the same site. Which process does this show?
   - A. Subduction
   - B. Sediment deposition
   - C. Cementation
   - D. Physical weathering

   Correct answer: D. Physical weathering
   Physical weathering breaks solid material down in place. Erosion can move the pieces later.

5. What do we call a boundary where two tectonic plates move away from each other?

A. A convergent boundary
B. A divergent boundary
C. A transform boundary
D. A plate’s interior

Correct answer: B. A divergent boundary
Divergent boundaries are places where plates move apart, such as many mid-ocean ridges.

6. After grit breaks off a cliff, a stream carries it into a valley. Which word describes the stream carrying the grit?

A. Erosion
B. Weathering
C. Metamorphism
D. Crystallization

Correct answer: A. Erosion
Erosion is the movement of weathered material. The earlier breakdown is weathering.

7. Magma cools slowly deep underground and produces crystals large enough to see. Which description fits the resulting rock?

A. Unconsolidated sediment
B. Extrusive igneous
C. Clastic sedimentary
D. Intrusive igneous

Correct answer: D. Intrusive igneous
An intrusive igneous rock forms below the surface. Slow cooling often allows sizable crystals to grow.

8. At an ocean trench, one plate bends and descends beneath another. What is this process called?

A. Surface erosion
B. Deposition
C. Subduction
D. Seafloor spreading

Correct answer: C. Subduction
Subduction occurs at some convergent boundaries when one plate descends beneath another.

9. Two plates move horizontally past each other along a fault. What kind of boundary is described?

A. Transform
B. Convergent with subduction
C. Divergent
D. A mid-ocean spreading center

Correct answer: A. Transform
At a transform boundary, the two plates move sideways relative to one another.

10. Limestone heated and compressed underground recrystallizes into marble. Which change is represented?

A. Sediment stays loose on the surface
B. Igneous rock becomes sediment
C. Metamorphic rock melts into magma
D. Sedimentary rock becomes metamorphic rock

Correct answer: D. Sedimentary rock becomes metamorphic rock
Limestone is sedimentary. Recrystallization by heat and pressure can change it into marble, which is metamorphic.

11. Which process at a mid-ocean ridge adds new solid oceanic crust as plates separate?

A. Wind deposits sand until it becomes oceanic crust
B. Older crust from both sides sinks at the ridge
C. Molten material rises and cools
D. The plates stop moving when magma reaches them

Correct answer: C. Molten material rises and cools
At a spreading ridge, rising melt cools into new crust as the plates move away from the ridge.

12. Granite exposed on a hillside eventually contributes grains to a new sandstone bed. Which sequence could produce that result?

A. Melting, cooling, then freezing of water around the granite
B. Weathering, transport, deposition, then compaction and cementation
C. Burial, recrystallization, then formation of magma
D. Compaction, melting, then transport as liquid lava

Correct answer: B. Weathering, transport, deposition, then compaction and cementation
The granite first breaks down. Its grains are moved, deposited, and consolidated into sandstone.

13. Samples of ocean crust on both sides of a ridge are youngest at the ridge. They get older with distance from it. Which model explains this pattern?

A. The same crust stays at the ridge and is never replaced
B. The oldest crust is made at the ridge and migrates inward
C. All ocean crust forms only at beaches
D. New crust forms at the ridge and moves away on both sides

Correct answer: D. New crust forms at the ridge and moves away on both sides
Spreading makes fresh crust at the ridge. That crust gets older as it travels farther from where it formed.

14. Two continents converge and their rocks fold and thicken. Which long-term result can that produce?

A. An uplifted mountain belt
B. An open ocean basin between the continents at the collision
C. A line where both plates simply slide past without shortening
D. A surface layer made entirely of recent lava

Correct answer: A. An uplifted mountain belt
Continental collision can crumple and thicken crust. Uplift forms mountain belts such as the Himalayas.

15. A metamorphic rock formed far below the surface is exposed in a mountain outcrop. Which combination can explain its exposure?

A. The rock remains buried as magma forever
B. Deposition adds sediment above the rock until the rock is visible
C. Uplift raises the rocks and erosion removes material above them
D. Rain causes the deep rock to appear without moving or removing material

Correct answer: C. Uplift raises the rocks and erosion removes material above them
Uplift can bring rocks closer to the surface. Erosion removes overlying material and can reveal rocks formed at depth.