1. Lyle filled a glass bottle completely with water. He put the lid on tightly, then he put the water in the freezer to cool it down quickly. Lyle forgot about his water until the next day.

When Lyle took his bottle out of the freezer, all the water was frozen solid. The bottle had cracked in several places and was broken.

If water in the ground acts like water in the bottle when it freezes, how does water in the ground affect layers of rock and soil?

- A. It rearranges them.
- B. It breaks them up.
- C. It makes them larger.
- D. all of these

2. Jordan notices that the bottom part of a cliff is worn away.

Why is the cliff worn away the most near or under the level where the water is?
A. because changes in temperature are greater in the water
B. because the cliff is softer beneath the water line
C. because the moving water is what wears away the cliff
D. because fish and animals who live in the water tear up the cliff

3. What natural force is most likely responsible for the formation of the narrow passage through the cliffs in the picture?
   A. Blowing wind eroded the soil.
   B. Gravity moved and deposited soil.
   C. Flowing water eroded the soil.
   D. Ocean waves deposited soil.

4. Juanita wants to learn about the way clay swells when it is wet and shrinks when it dries. She gets a sturdy wooden box and fills it most of the way with clay. She buries a few hard-boiled eggs in the clay.
Juanita pours water into the box and lets it soak into the clay. She lets the clay dry out, then she carefully removes it from the box one layer at a time. She finds that the egg shells have all been crushed.

If the eggs in Juanita's experiment represent rocks in the real world, her experiment shows how swelling clay can cause

- A. frost heaves.
- B. weathering.
- C. deposition.
- D. erosion.

5. New landforms are often created or destroyed by geologic processes, such as erosion and volcanoes. However, humans and animals can change landforms as well.

A beaver dam can change a landform by

- A. causing flooding which may result in the formation of new ponds.
- B. causing deposition which eventually results in very tall mountains.
- C. creating strong winds which form arches by weathering and eroding rock.
- D. causing river water to move more swiftly, resulting in deepening of the riverbed.

6. The picture below shows a river that meanders, or flows in a pattern shaped like an "s."

![River Meandering](image)

What causes a river to meander?

- A. Flowing water erodes soil from one river bank and deposits soil onto the other.
- B. Fish carry soil and rock from one side of the river to the other.
- C. One side of the river receives more sunshine than the other.
- D. When water evaporates from the river, it takes soil from one river bank with it.

7. When mountains are young, like the Rocky Mountains, they are very tall, with sharp jagged shapes. When mountains are old, they are lower and very round. The pictures below show young mountains on the left and old mountains on the right.
Which of the following processes makes mountains become rounder as they age?

- A. mountain building
- B. weathering
- C. volcanic eruptions
- D. deposition

8. Many materials, such as rocks, expand (get larger) when they are heated and contract (shrink) when they are cooled. This change in size can cause cracks to form and break large rocks into smaller pieces.

In this example, what is caused by heating and cooling?

- A. erosion
- B. weathering
- C. earthquakes
- D. decay

9. The picture below shows a town that is near a steep hill.
Which natural event probably caused the hill to flow into the town?

○ A. a sandstorm
○ B. a landslide
○ C. a snowstorm
○ D. an ocean wave

10. The image below shows two river deltas along the shore of a lake in China.
Which statement best describes how these deltas were formed?

- A. The deltas were built up by the constructive force of lava hardening.
- B. The deltas were carved out of the shoreline by the destructive force of weathering.
- C. The deltas were carved out of the shoreline by the destructive force of erosion.
- D. The deltas were built up by the constructive force of sediment deposition.

**Answers**

1. B
2. C
3. C
4. B
5. A
6. A
7. B
8. B
9. B
10. D
**Explanations**

1. As the water changed to ice, it expanded. This force of expanding water broke the glass bottle in the same way that freezing water **breaks up rocks and soil** in the ground.

   When a lot of ice gathers under the ground in the winter and swells, it pushes up rocks and soil. This makes a circular area of broken up rocks and soil called a **frost heave**.

2. **Water is what wears away the cliff** in this example of erosion.

3. **Flowing water** is a powerful force that can shape the land by eroding soil and depositing it in new locations. Steep cliffs like the ones in the picture form because water erodes, or carries away, large amounts of soil over time.

   Rain that falls on land moves downhill and collects into streams and rivers. The erosion and deposition caused by moving water can change the course of the streams and rivers over time.

4. **Weathering** breaks up rocks into smaller pieces. As clay swells and shrinks over and over, it can end up breaking things that are much harder than eggs. It can even break rocks after a while.

5. A **beaver dam can cause flooding which may result in the formation of new ponds**. Depending on the size of river or stream, this process may take less than a day.
Beavers use branches, twigs, mud, and weeds to build dams across rivers and create safe places to build their lodges. The dams can reduce the flow of water in rivers or streams and cause water to build up in the area behind the dams. Ponds or wetlands may form as a result. Man-made dams can have similar effects.

6. As water flows through a slight curve in a river, the water flows faster on the outside edges causing sediment to be eroded. The water flows slower on the inside edges causing sediment to be deposited. Over time, this process will cause the river to meander, or become "s" shaped. As a result, **flowing water erodes soil from one river bank and deposits soil onto the other.**

7. **Weathering** breaks down the large, sharp rocks in mountains. Combined with erosion, it gradually wears away even great mountain peaks into lower, rounded shapes.

8. Weathering describes all of the processes that break up larger rocks into smaller pieces. Erosion describes the processes that move rocks and other materials from one place to another.

Since heating and cooling causes the rocks to break apart, they are causing **weathering.**

9. **A landslide** happens when soil, mud, rocks, or clay move rapidly down a hill, cliff, or mountain.

There can be many causes of a landslide, such as heavy rain or wind. A landslide can even happen just because a hill cannot hold itself together. People and property are at risk when a landslide happens.

10. Deltas are formed when sediment is carried by water in a river and deposited at the mouth of the river. Since sediment deposition adds material to the surface of the Earth, delta formation is caused by a constructive force. So, in this image, **the deltas were built up by the constructive force of sediment deposition.**