

MCAS Questions: Earth History**Reporting Category: Earth and Space Science**

Standard: 2 - Describe the layers of the earth, including the lithosphere, the hot convecting mantle, and the dense metallic core.

Standard: 5 - Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes).

Reporting Category: Earth and Space Science

Standard: 6 - Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering.

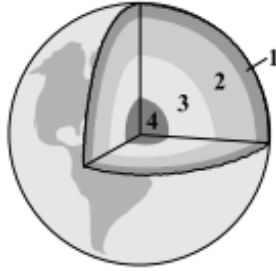
Standard: 7 - Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time.

1. (2013) Which of the following **most likely** causes Earth's inner core to be a solid?
 - A. The pressure at the core is very high.
 - B. The metals in the core are very heavy.
 - C. The temperature of the core is very low.
 - D. The chemicals in the core are very reactive.

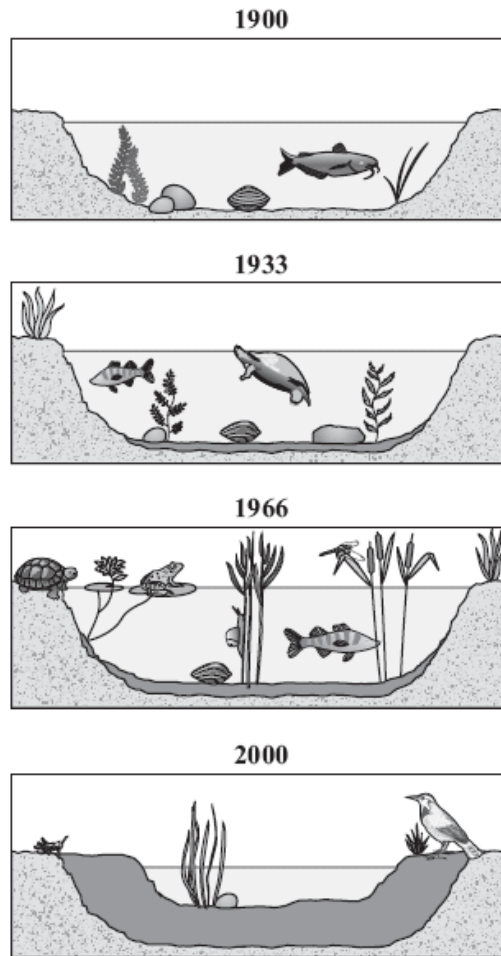
2. (2012) Which of the following processes usually takes the longest amount of time?
 - A. Hot lava cools and forms new rock.
 - B. Water vapor condenses to form a cloud.
 - C. A seismic wave travels through the mantle.
 - D. An ocean basin forms between two continents.

3. (2012) Scientists found evidence of past glacial activity in Massachusetts. Which of the following conclusions is best supported by this evidence?
 - A. Sea levels were much higher in the past.
 - B. The climate on Earth has changed over time.
 - C. Total numbers of organisms on Earth have changed over time.
 - D. The total amount of radiation from the Sun was much higher in the past.

4. (2012) Which of the following are formed when two crustal plates collide with one another?
- A. hot spots
 - B. rift valleys
 - C. mountain ranges
 - D. mid-ocean ridges
5. (2011) Which of the following provides the best evidence that Earth has evolved over geologic time?
- A. coral reefs that slowly changed size
 - B. desert sand dunes that were shaped by winds
 - C. deposits of sediment found at the mouth of a river
 - D. rock containing fossilized seashells found on a mountaintop
6. (2010) The Appalachian Mountains, which extend from Canada to Alabama, were much taller in the past than they are today. Which of the following two processes are most responsible for the decrease in the height of the Appalachian Mountains?
- A. weathering and erosion
 - B. sedimentation and flooding
 - C. volcanic eruptions and landslides
 - D. tectonic collisions and earthquakes
7. (2010) The diagram below shows four layers of Earth. Each layer is identified by a number.



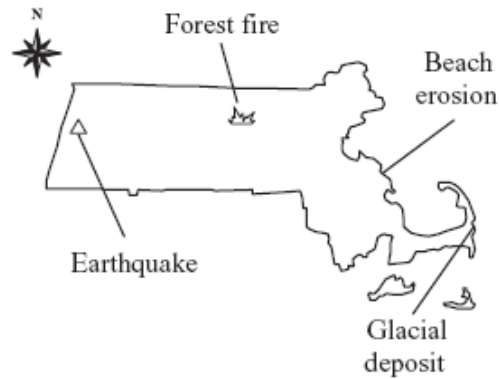
- Which layer of Earth is composed primarily of solid iron?
- A.** layer 1
 - B.** layer 2
 - C.** layer 3
 - D.** layer 4
8. (2009) Seafloor spreading provides evidence of which of the following Earth processes?
- A.** erosion of coastlines
 - B.** weathering of mountains
 - C.** movement of crustal plates
 - D.** formation of sedimentary rocks
9. (2008) The four pictures below show how a pond environment changed from 1900 to 2000.



Which of the following processes was most directly responsible for the changes that occurred in the pond environment?

- A. freezing
 - B. evaporation
 - C. sediment deposition
 - D. chemical weathering
10. (2008) When bedrock in Massachusetts is examined, it often appears scraped and polished. Which of the following most likely caused the bedrock to appear scraped and polished?
- A. crustal deformation
 - B. frequent earthquakes

- C.** glacial movement
 - D.** volcanic eruptions
- 11. (2008) The presence of which of the following geological features provides the best evidence that glaciers once covered an area?
 - A.** wide riverbeds
 - B.** U-shaped valleys
 - C.** underground caves
 - D.** groundwater springs
- 12. (2008) A layer of solid brittle rock comprises the outer 100 kilometers of Earth. This layer, which contains both the crust and the upper mantle, is called the
 - A.** core.
 - B.** sediment.
 - C.** lithosphere.
 - D.** hemisphere.
- 13. (2007) Heat from deep in Earth's interior is transferred to its crust by which of the following?
 - A.** conduction in the ocean
 - B.** convection in the mantle
 - C.** radiation from the solid core
 - D.** evaporation at mid-ocean ridges
- 14. (2007) The map of Massachusetts below shows where physical evidence of changes can be found.



Which of these is the best indication that Massachusetts' climate has changed over time?

- A. earthquake
- B. forest fire
- C. beach erosion
- D. glacial deposit

15. (2007) Which of the following Earth layers has the greatest density?

- A. crust
- B. mantle
- C. inner core
- D. outer core

16. (2007) Which of the following statements best explains why earthquakes occur more frequently in California than in Massachusetts?

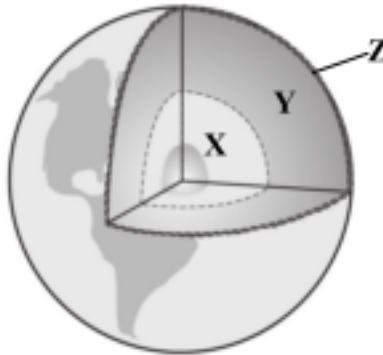
- A. The rock found in California is igneous, but the rock found in Massachusetts is sedimentary.
- B. California is located on the boundary of two crustal plates, but Massachusetts is not.
- C. The rock under California is soft, but the rock under Massachusetts is hard.
- D. California is located on a continental plate, but Massachusetts is not.

17. (2007) Which of the following areas is **most likely** to form metamorphic rocks such as gneiss and schist?

- A. a sea floor
- B. a windblown desert
- C. a site deep underground
- D. a site covered by a glacier

Open Response Questions

1. (2011) The diagram below shows three main layers that compose Earth. The layers are labeled X, Y, and Z.



- a. Identify **each** of the three layers of Earth (X, Y, and Z) labeled in the diagram.
 - b. Describe **one** characteristic of the layer labeled X.
 - c. Describe **one** characteristic of the layer labeled Y.
 - d. Describe **one** way that the layer labeled Y interacts with the layer labeled Z.
2. (2008) Some of the geologic features found on Earth's surface were caused by the movement of Earth's crustal plates.
- a. Name two geologic features found on Earth's surface that were caused by the movement of crustal plates.
 - b. For each of the features you named in part (a), describe how the movement of crustal plates caused the feature to form on Earth's surface.

**MCAS Questions: Water
Multiple Choice Answers**

1. D
2. D
3. A
4. A
5. B
6. B
7. D
8. A
9. C
- 10.D
- 11.B

Open Response Answers

1. Layers of the Earth

Score Point 4

A In the diagram shown, x can be identified as the outer core, y is the mantle, and the section labeled z is the crust.

B The layer labeled x is the outer core. The outer core is very hot, contains nickel, and is liquid, whereas the inner core at the center of the earth (not labeled in the diagram) is solid and even hotter.

C The layer labeled y is the mantle which contains magma and is the thickest layer of the Earth.

D The layer y, the mantle, interacts with layer z, the crust. The crust is a very thin layer (5 to 25 miles thick) that covers the Earth. Volcanos, which are on Earth's crust, shoot magma from the mantle and magma is brought to Earth's surface (the crust) as lava.

Score Point 4

- a. X is the core.
Y is the mantle.
Z is the crust.
- b. The core, which is the layer labeled x, is extremely hot. The temperature inside is well over 1000°F.
- c. The mantle, which is the layer labeled Y, is also amazingly hot with magma flowing through it.
- d. When a volcano erupts on the outside of layer Z, it is because it became filled with the magma that came from within the mantle (Y).

Score Point 3

A. Layer 2 is the crust, layer Y is the mantle, and layer X is the outer core.

B. Layer X is extremely hot and it moves like a liquid.

C. Layer Y is mostly made up of iron.

D. Layer Y and layer 2 will interact through earthquakes. When layer Y shifts it cause Layer 2 to move also.

Score Point 2

A. Z is the crust Y is the mantle and X is the outer core

B. The crust is the top of the earth AKA the ground.

C. The mantle is where it is hot and is next to the core.

D. The crust and mantle interacts because if you dig in the earth you go through the crust then the mantle but the mantle can go through crust that is called volcanoes.

Score Point 1

A. Layer Z is the crust. Layer Y is the mantle and Layer X is the core.

B. Layer X is where most of the heat and oxygen comes from. It is located in the center of the earth.

C. Layer Y is where the heat and oxygen travel through to go to the crust or the outside layer of the earth.

D. Layer Z gets all of its heat, oxygen and carbon dioxide from layer Y.

Score Point 0

a. The three layers of Earth labeled in the diagram are Z: Crust, Y: Outer Core, X: Inner Core.

b. One characteristic of the layer labeled X, Inner Core is that it is at the center of the universe.

c. One characteristic of the layer labeled Y, Outer Core is that it is right after layer Z.

d. One way that the Outer core and Crust interact with each other is that the Crust protects the Outer core because it's hard.

2. Geological Features of the Earth's Surface

Score Point 4

A: Mountains
Trenches

B. Mountains form when two continental plates collide, head on. Forces each plate to bend upward, creating a mountain.



Trenches form when the more dense oceanic plate collides head on with a less dense continental plate. Because the oceanic plate is more dense it sinks beneath the lighter continental plate.



Score Point 4

a) One feature on the Earth's surface that is the result of tectonic movement is the Hawaiian islands (I'm sure that's not spelt right...). The second is the face of the Earth itself, I.e., the continents.

b) The islands are a product of the Earth's crustal movement because as the Earth's crust moved, it moved over a hot spot (a stationary spot beneath the Earth's surface constantly spitting out magma). As the plate moved across the hot spot, the magma, now lava, would surface, then harden and dry, forming land. The Earth's surface is a result of tectonic movement because, roughly 3 billion years ago, the Earth's contents were all one big landmass. But, due to tectonic movement, the plate broke apart and the pieces drifted off, forming the continents we know today.

Score Point 3

A two features are mountains and ocean rifts.

B. Mountains are formed when two plates hit and push up the ground. Rifts are formed when the land sides away from each other.

Score Point 2

a. One geologic feature caused by the Earth's crustal movement is mountains. Another feature is plateaus.

b. Mountains are caused by the two pieces of crust pushing together and pushing crust up to form a mountain. Plateaus are formed also by crust pushing together. Only partial crust gets pushed up.

Score Point 1

a) Earthquakes, and volcanoes are both features on the Earth's surface because of the crustal plates.

b) Earthquakes and volcanoes are both caused by the Earth's crustal plates to form the Earth's surface.

Score Point 0

A) Two geologic features found on Planet Earth's surface that were caused by the movement of crustal plates would probably be tree's and roads.

B) Movement of crustal plates caused the feature to form Earth's surface because without tree's you couldn't breathe and animals and us humans would die without air to breathe with. Roads because we could walk on them and their not always flat but their can be hills and slopes and all kinds of directions roads can go and take us.