

Station A 2017

Answer all of the historical questions regarding the origins of Plate Tectonic Theory on your answer sheet A.

Station A 2017

1. (1pt) Who was the scientist that developed the preliminary theory which later became known as the Theory of Plate Tectonics?
 - a. Harry Hess
 - b. Rachel Carson
 - c. Emile Argand
 - d. Alfred Wegner
 - e. Alexander Du Toit
 - f. Charles Darwin
 - g. Arthur Holms
 - h. Kurt Wegener

2. (1 pt) What was the nationality of the scientist that developed the preliminary theory which later became known as the Theory of Plate Tectonics?
 - a. Dutch
 - b. Swiss
 - c. British
 - d. Russian
 - e. American
 - f. German
 - g. French
 - h. Spanish

3. (1 pt) What was the background of the scientist that developed the preliminary theory which later became known as the Theory of Plate Tectonics?
 - a. Geologist
 - b. Botanist
 - c. Climatologist
 - d. Cartographer
 - e. Meteorologist
 - f. Physicist
 - g. Astronomer
 - h. Zoologist

4. (1 pt) What was the original theory called?
 - a. Plate Tectonic
 - b. Continent Change
 - c. Sea Floor Spreading
 - d. Continental Drift
 - e. Pangaea
 - f. Plate Drift
 - g. Continent Fit
 - h. Land Bridge

5. (5 pts) What was the original evidence for the preliminary theory and where was it collected?

6. (1 pt) How was the original theory received by the scientific community?
 - a. With cautious optimism.
 - b. It allowed for the theory of Natural Selection to be developed.
 - c. It greatly expanded the field of Geology.
 - d. It was viewed as a hoax.
 - e. It sparked a great deal of discussion and new scientific inquiry into the scientific community.
 - f. It was viewed as nonsense by the academic community and made them angry.
 - g. It helped explain creationist theory.
 - h. It was highly respected.

7. (1pt) What happened to the original proposer of the theory?
 - a. He won a Nobel prize.
 - b. He continued to support his theory until he died.
 - c. He was ridiculed.
 - d. He looked for mechanisms to explain the movement of the continents.
 - e. He died within one year of its publication.
 - f. He became rich after his theory was published.

Go to back of answer sheet to complete this section.

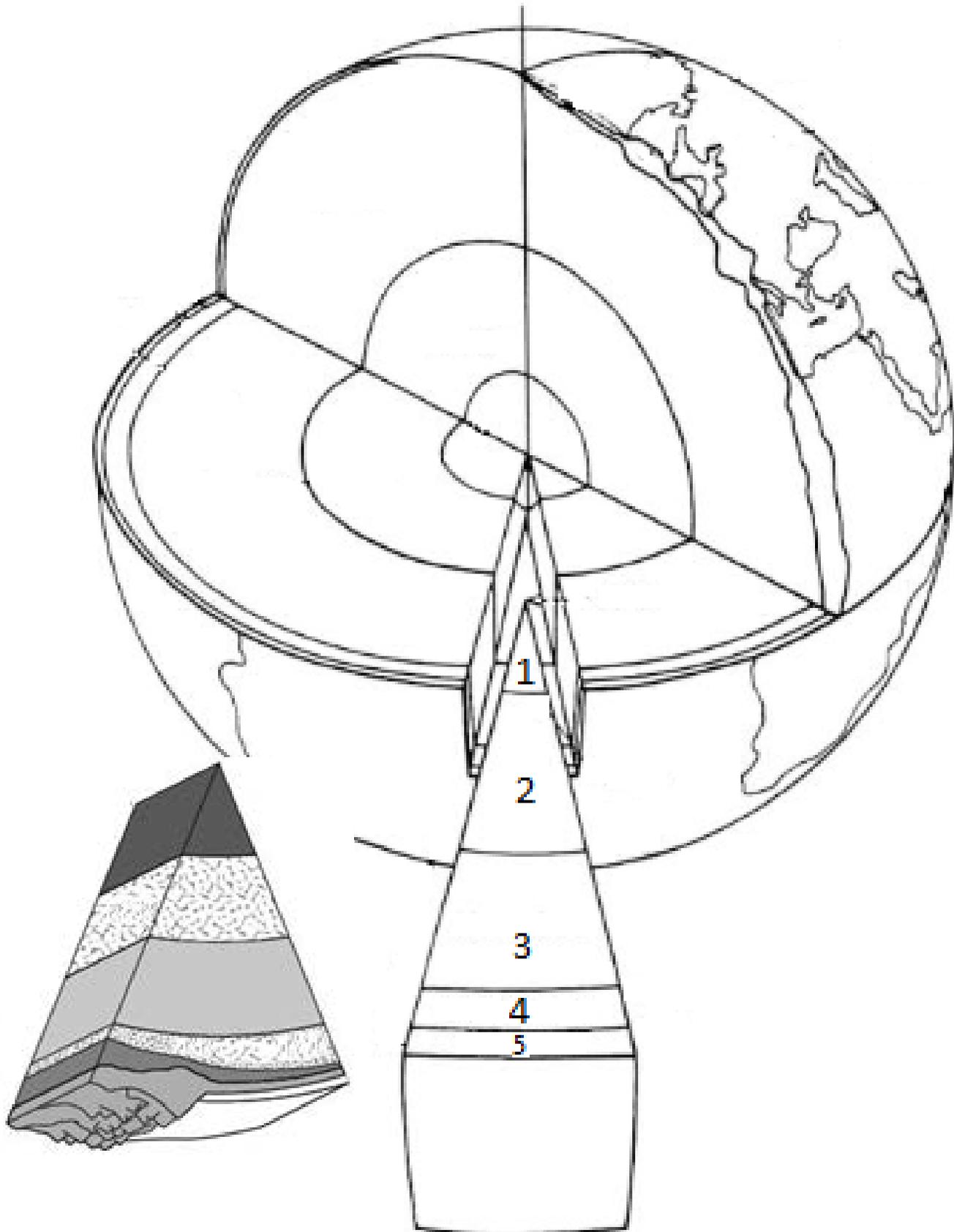
Station A 2017

8. (5 points) Give an in-depth explanation of the modern evidence for Plate Tectonic Theory.

9. *(TB 3 pts) How is the acceptance of the theory of Plate Tectonics similar to the currently debated scientific theory of Global Warming?

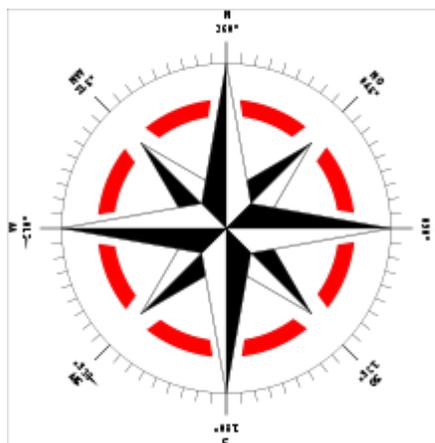
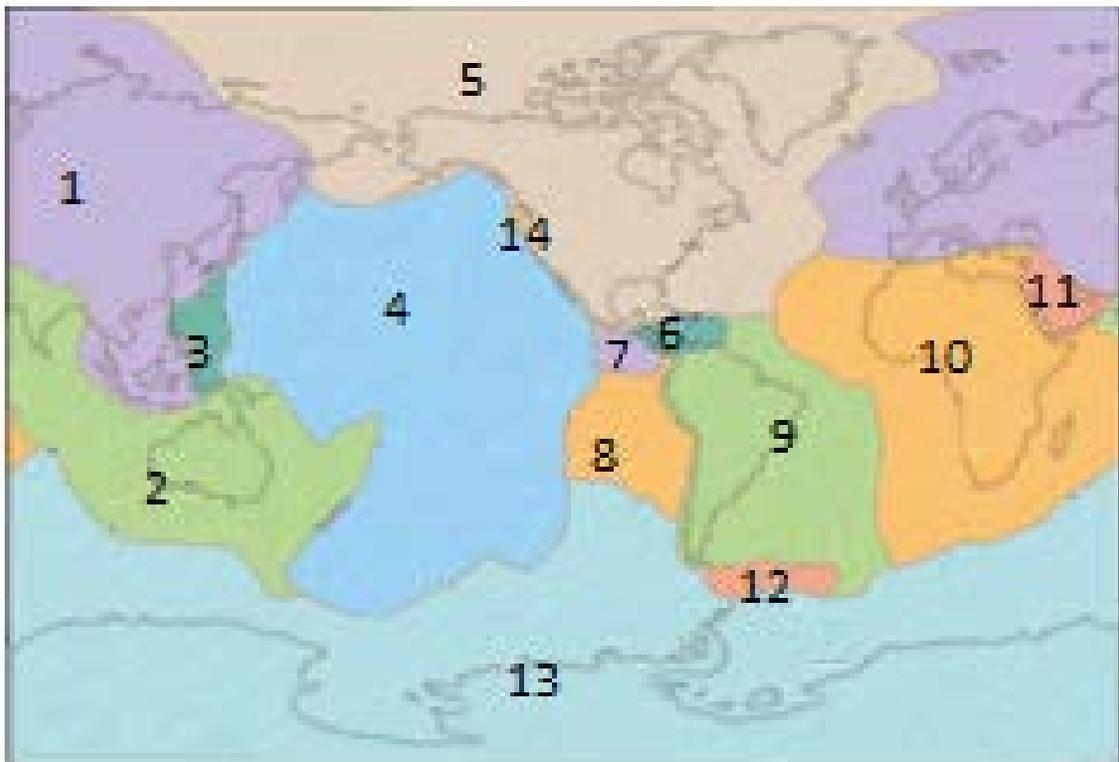
10. *(TB 3 pts) Explain the relationship between Pangaea, Panthalassa, Gondwana, Laurasia and the current known tectonic plate arrangements.

Station B 2017



Station C 2017

Types of plates, boundaries and margins - with specific examples. Identification of tectonic boundaries from paleogeographic reconstructions\



Station C 2017

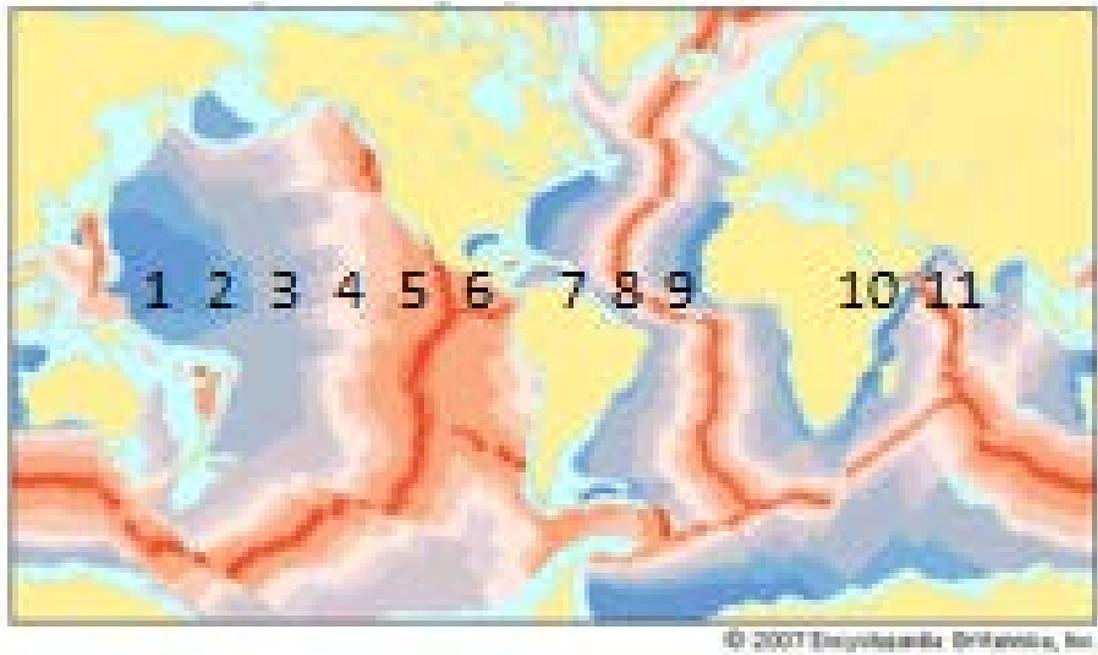


Figure 1. Map of Ocean Floor on Earth. Earth's Land mass are also shown.

Station C 2017

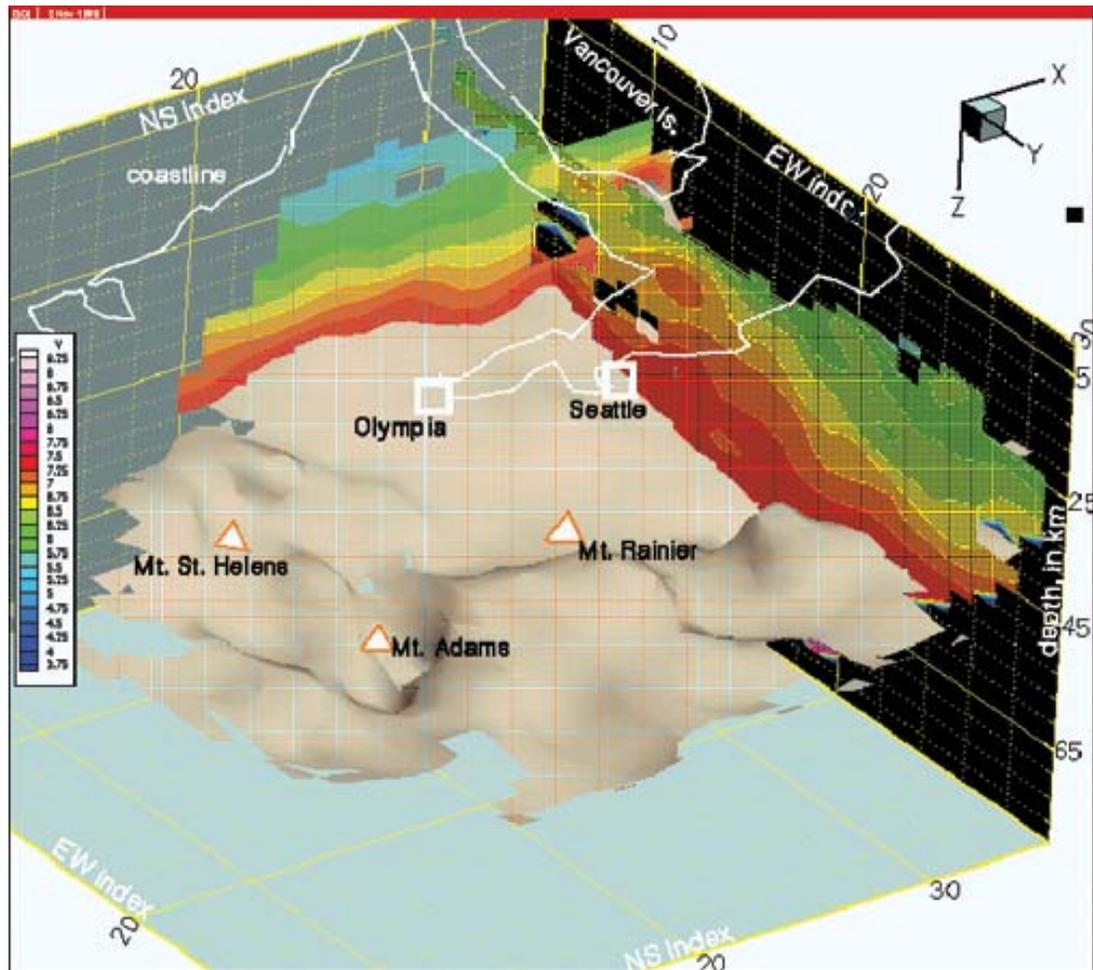
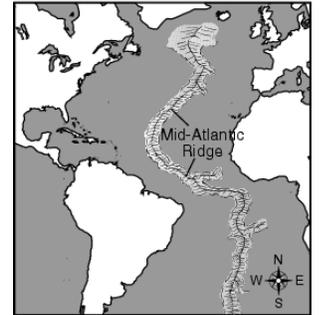


Figure 2. Topographic Image of Washington State, USA.

Station D 2017 (10 minutes)

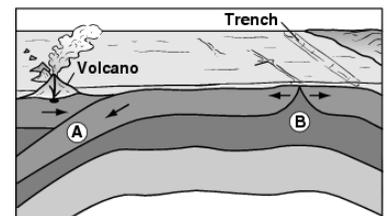
1. The map below shows the location of the Mid-Atlantic Ridge. Which statement *best* describes what is occurring at this location?

- Two oceanic plates are converging, forming a transform fault.
- Two oceanic plates are subducting, forming a deep ocean rift valley.
- New oceanic crust is being formed along the mid-ocean ridge as two oceanic plates diverge.
- New oceanic crust is being formed along the mid-ocean ridge as two oceanic plates converge.
- Two oceanic plates are sliding past each other, forming a transform boundary.



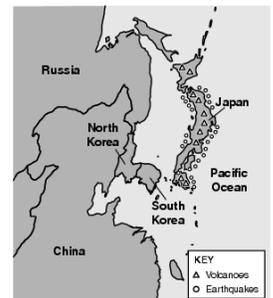
2. The diagram below shows the geologic activity in areas A and B. Which statement *best* describes how the source of energy for these processes affects the areas in the diagram?

- The Sun's continuous supply of unlimited energy produces the spreading center above point B.
- Gravitational energy from the attraction between the Sun and Earth drives the plates apart at point B.
- Heat from friction caused by the plates colliding provides the energy for continued plate movement at point A.
- Heat from within the mantle creates convection currents and causes one plate to move below another at point A.
- Pressure from the volcano is pushing plate A down into the mantle as an equal and opposite force.



3. *The map below shows a group of islands in the Pacific Ocean. The islands have many volcanoes, both active and dormant, and there are deep ocean trenches near the islands. Which of these processes is responsible for the formation of this group of islands?

- two oceanic plates pulling apart
- pressure from within the mantle as two plates slide passed each other.
- the erosion of a continental plate
- the subduction of ocean crust
- parallel movement of two ocean plates



4. One piece of evidence in support of plate tectonic theory is that the east coast of South America -

- fits like a puzzle piece with the west coast of Africa
- has the same type of beach sand as the east coast of North America
- is lined by a chain of volcanic mountains
- is very close to the Mid-Atlantic Ridge
- has the same rock type as Europe

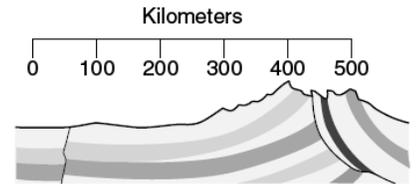
5. The youngest rocks on the ocean floor are typically located near what feature?

- A mid-ocean ridge
- A continental shelf
- A black smoker
- An abyssal plain
- A subduction trench

Station D 2017 (10 minutes)

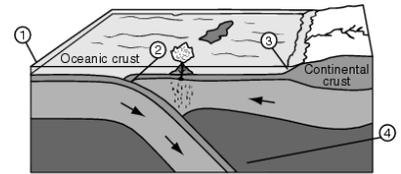
6. The mountain shown is composed of deformed sedimentary layers. They are located near a tectonic plate boundary and are still increasing in elevation due to -

- A. colliding tectonic plates
- B. seafloor spreading of tectonic plates
- C. subduction of a tectonic plate
- D. transform faulting of a tectonic plate
- E. both C and D



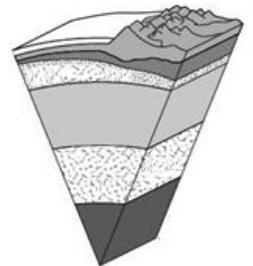
7. **Converging tectonic plates, as shown in the figure below, can produce deep ocean trenches. At which location would a deep ocean trench be located?**

- A. point 1, because the oceans are deepest far from land
- B. point 2, because this is where the two crustal plates first meet
- C. point 3, where the continental crust meets the ocean
- D. point 4, where the subducted oceanic plate is at its deepest point
- E. both A and C



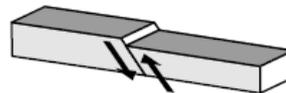
8. *A model of Earth's internal structure is shown at right. Analysis of which type of data led to the development of this model?

- A. Seismic waves
- B. Depth of Earth's oceans
- C. Magnetic field mapping
- D. Electromagnetic radiation
- E. Isobar gradients



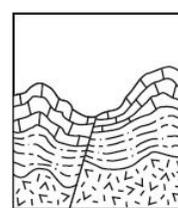
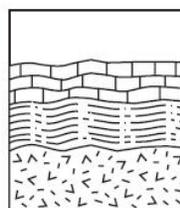
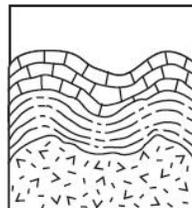
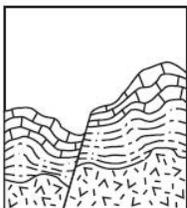
9. The diagram shown illustrates which geological process?

- A. Faulting
- B. Folding
- C. Weathering
- D. Metamorphism
- E. D and B



10. **Which of these pictures shows the last in the sequence of events?**

- A. B. C. D.



Station D 2017 (10 minutes)

11. **Fossil evidence supports the idea of plate tectonics. The fossil remains of a small reptile only in South America and Africa, indicating that -**
- A. the reptile migrated across the Atlantic on rafts of weeds
 - B. the reptile was a powerful swimmer
 - C. South America and Africa were formed at the same time
 - D. the two continents were once joined together
 - E. Both A and C
12. Scientists know what the condition of Earth's Interior is through
- A. analysis of earthquake waves speed through different parts of the planet.
 - B. by comparing minerals from outer space with those found on the Earth.
 - C. By examining the difference between the density of the entire Earth compared to the density of the lithosphere.
 - D. through the study of the volcano location.
 - E. A, B and C.
13. The density of the continental crust is closest to
- A. 2.0 g/cm^3
 - B. 2.3 g/cm^3
 - C. 2.7 g/cm^3
 - D. 3.0 g/cm^3
 - E. 3.3 g/cm^3
14. The density of oceanic crust is closest to
- A. 2.0 g/cm^3
 - B. 2.3 g/cm^3
 - C. 2.7 g/cm^3
 - D. 3.0 g/cm^3
 - E. 3.3 g/cm^3
15. Fossils of *Lystrosaurus*, an early land-dwelling reptile, have been found in Antarctica, India, and South Africa. The distribution of these fossils suggests that these areas were once
- A. made of the same chemical elements
 - B. covered by oceanic crust.
 - C. home to a wide variety of organisms.
 - D. connected to one another.
 - E. located closely so that the animals trapped on floating debris could travel safely to another land mass.
16. The original theory prior to the modern day Plate Tectonic theory suggests that at 245 million years a single landmass was surrounded by a sea called
- A. Pangaea.
 - B. Laurasia.
 - C. Pangesea.
 - D. Gondwana.
 - E. Panthalassa.
 - F. Oceanea.

Station D 2017 (10 minutes)

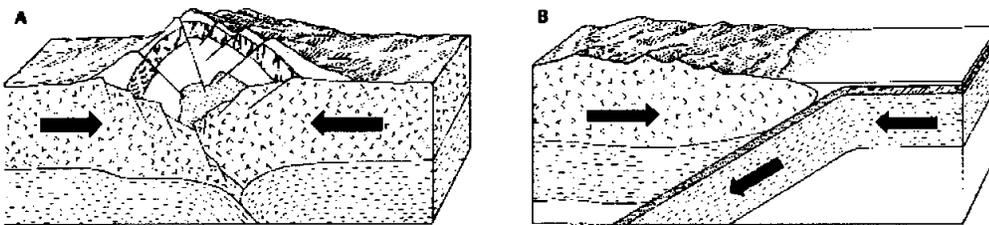
17. Which of the following statements concerning magnetic reversal is NOT true?
- A. Magnetic reversals are recorded in rocks on the ocean floor.
 - B. The north and south magnetic poles have changed many times throughout Earth's history.
 - C. Magnetic mineral grains in rocks on the ocean floor all point in the same direction.
 - D. All igneous rocks are magnetic.
 - E. none of the above
18. Which of the following makes up most of the Earth's mass?
- A. Crust
 - B. Outer Core
 - C. Mantle
 - D. Inner Core
 - E. Asthenosphere

Station E 2017

Short Answer: Answer using complete sentences.

1. How do the three types of convergent boundaries differ from one another?
2. Explain the process of subduction.

Examine the diagrams of boundaries and answer the questions that follow.



3. Which type of tectonic plates are colliding in A, what geologic feature do they form and what is the mechanism for that formation? Explain your reasoning.
4. Which type of tectonic plates are colliding in B, what geologic feature do they form and what is the mechanism for that formation? Explain your reasoning.

Imagine that you could travel to the center of an *Earth-like planet* (each layer has the same properties as that on Earth). Use the table below to answer the questions that follow.

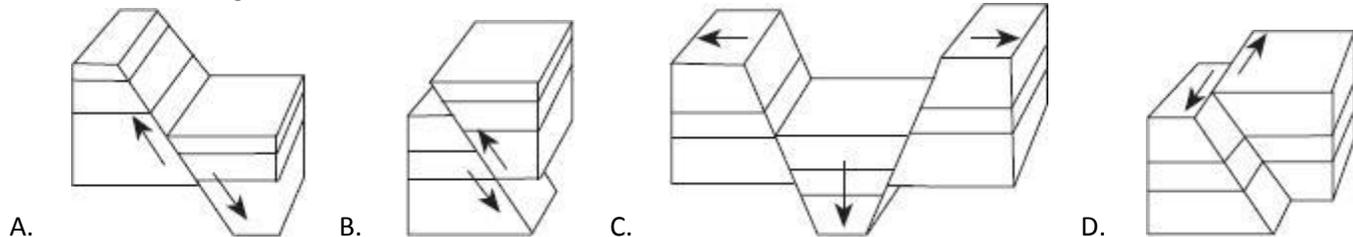
Composition	Structure
Crust (35 km)	Lithosphere (250 km)
Mantle (1,500 km)	
Core (2,548 km)	Outer core (1,500 km)
	Inner core (1,048 km)

5. How far beneath Planet's surface would you have to go to find the liquid material in the core?
6. At what range of depth would you find mantle material but still be within the lithosphere?
7. Describe the role of the asthenosphere in the movement of tectonic plates.

Station E 2017

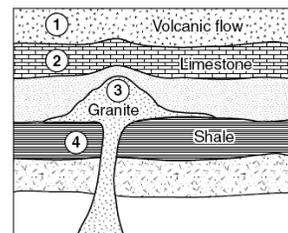
8. Which of the following is *not* considered a result of the movement of tectonic plates?
- Earthquakes
 - Mountain ranges
 - Rift valley
 - Increased volcanic activity
 - Karst topography

9. Which block diagram *best* shows a transform fault?

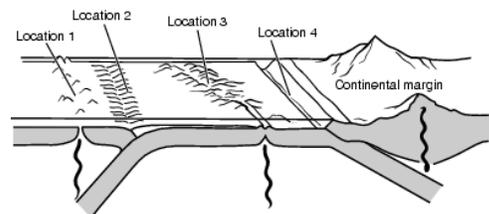


10. **A volcano erupts in the Andes Mountains. The eruptions are sometimes explosive and sometimes quiet. The formation of the volcano is due to**
- A hot spot
 - a subduction zone between a continental plate and an oceanic plate
 - a divergent plate boundary between two continental plates
 - a convergent plate boundary between two continental plates
 - both A and B

11. In the illustration shown, which layer is an example of an intrusion?
- 1
 - 2
 - 3
 - 4
 - Both 3 and 1



12. The diagram below shows different features of an ocean basin. Where is new ocean floor being created?
- Location 1
 - Location 2
 - Location 3
 - Location 4
 - Location 2 and 3



13. What type of plate boundary creates a strike-slip fault?
- Convergent between two continental plates
 - Divergent between two continental plates
 - Transform between two continental plates
 - Convergent between one oceanic plate and one continental plate
 - Divergent between one oceanic plate and one continental plate.

Station E 2017

14. What type of plate boundary interactions produce strong deep earthquakes?
- A. Convergent between two continental plates
 - B. Divergent between two continental plates
 - C. Transform between two continental plates
 - D. Convergent between one oceanic plate and one continental plate
 - E. Divergent between two oceanic plates
15. What type of plate boundary interactions produce moderate and shallow earthquakes?
- A. Convergent between two continental plates
 - B. Divergent between two continental plates
 - C. Transform between two continental plates
 - D. Convergent between one oceanic plate and one continental plate
 - E. Divergent between two oceanic plates
16. What type of plate boundary interactions produce weak and shallow earthquakes?
- A. Convergent between two continental plates
 - B. Divergent between two continental plates
 - C. Transform between two continental plates
 - D. Convergent between one oceanic plate and one continental plate
 - E. Divergent between two oceanic plates
17. The type of tectonic plate boundary involving a collision between two tectonic plates is
- A. divergent.
 - B. strike-slip.
 - C. convergent.
 - D. transform.
 - E. normal.
 - F. reverse.
18. The San Andreas fault is an example of a
- A. divergent boundary.
 - B. strike-slip boundary.
 - C. convergent boundary.
 - D. transform boundary.
 - E. normal boundary.
 - F. reverse boundary

Station E 2017