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## Battle Creek Area Mathematics and Science Center Summative Assessment - End of Unit Exam

Attached is the Summative Assessment for the Battle Creek Area Mathematics and Science Center Science Unit, *Earth: Yesterday, Today, and Tomorrow*. This assessment includes a number of multiple-choice questions, one constructed response question, and several items from the unit's Student Journal. Summative assessment of targeted concepts and skills provides feedback to the individual student and the teacher on conceptual understanding, demonstration of achievement of selected content, and determination of readiness for refinement and application of new knowledge and skills. The inclusion of the Student Journal items provides the opportunity to determine the level of understanding and ability of key knowledge and skills targeted in this unit. The Student Journal items evaluate individual student learning and the effectiveness of instruction. Rubrics are included in the Summative Assessment to ensure consistent scoring of the items. All components of this assessment provide multiple opportunities to assess student understanding of each science content expectation addressed in the unit.

The BCAMSC Summative Assessments are in draft form and may change based on student performance and teacher feedback. The BCAMSC Outreach Staff will use data collected from participating districts to make adjustments for the following school year.

If you have any questions or suggestions regarding the Summative Assessment, please direct your calls to Nancy Karre at (269) 965-9584 or email: [nancy@bcamsc.org](mailto:nancy@bcamsc.org).

Updated November, 2010



A S S E S S M E N T



Name: \_\_\_\_\_



Date: \_\_\_\_\_

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1. While digging in the side of a mountain, a scientist found a fossil that resembled a sea shell. Choose the BEST explanation for the fossil discovery.
  - a. Someone lost the fossil and dropped it while hiking up the mountain.
  - b. Millions of years ago some sea animals lived on land.
  - c. Millions of years ago there was an ocean where the mountains exist today.
  - d. The scientist was mistaken about the fossil resembling a sea shell.
  
2. Which of the following would prove MOST useful in the relative dating of a fossil?
  - a. salt deposits
  - b. humidity
  - c. rock layers
  - d. calendars
  
3. The surface of the Earth is made up of about a dozen huge slabs of rock or crust called the tectonic plates. The plates move very slowly, one to ten centimeters per year. What causes the motion of the tectonic plates?
  - a. ocean waves and currents
  - b. heat from inside the Earth
  - c. the rotation of the Earth on its axis
  - d. the vibrations from earthquakes
  
4. Scientist Alfred Wegener revealed the idea that the continents were moving or drifted. What evidence did Alfred Wegener use as evidence for drifting continents?
  - a. pictures of the Earth from space over the past 50 years
  - b. the distance between the continents over 100 years
  - c. fossils of reptiles and seed fern found on different continents
  - d. the location of the edges of the tectonic plates



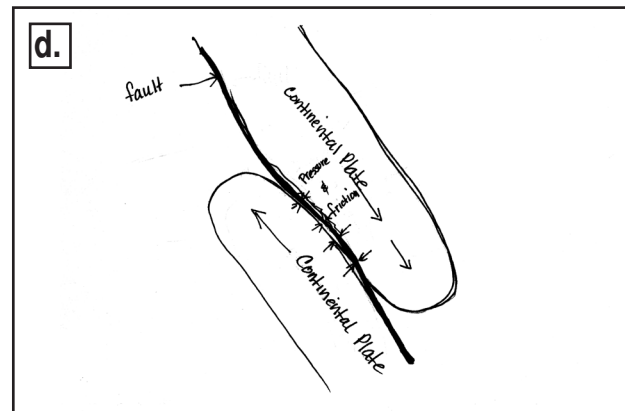
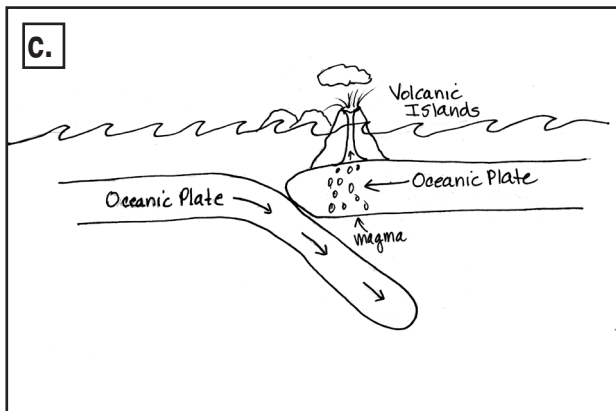
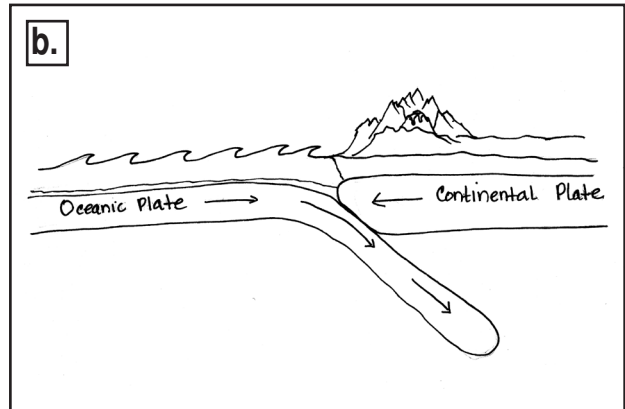
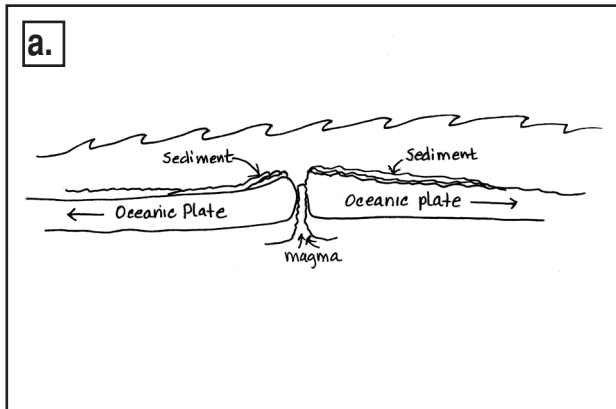
**Earth: Yesterday, Today, and Tomorrow (cont.)**

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5. The Earth is made up of three basic layers. Choose the answer that describes the layers of the Earth.
  - a. core, mantle, and crust
  - b. magma, rock, and soil
  - c. igneous, metamorphic, and sedimentary
  - d. iron, magma, and tectonic plates
  
6. The center of the Earth is:
  - a. molten lava
  - b. magma
  - c. solid
  - d. gaseous
  
7. Chris and Angela were surprised to learn that there are approximately 20 earthquakes each day. They decided to plot the earthquakes recorded by the National Earthquake Information Center on a world map for 8 weeks. By collecting and plotting earthquake data, Chris and Angela should be able to learn:
  - a. the amount of damage caused by earthquakes in 8 weeks.
  - b. what caused the earthquakes in each area over 8 weeks.
  - c. the number of people affected by the earthquakes over 8 weeks.
  - d. where earthquakes occurred most frequently over 8 weeks.
  
8. After completing their data collection, Chris and Angela wondered why some areas on Earth were more prone to earthquakes than other areas. What is the best explanation for the earthquakes in some areas on Earth and not in other areas? The earthquakes occur:
  - a. along the borders of the tectonic plates as they move into one another.
  - b. where there are deposits of molten magma below the surface.
  - c. where the ocean and the continents come together and collide.
  - d. when they are located in the same area as volcanoes and mountains.

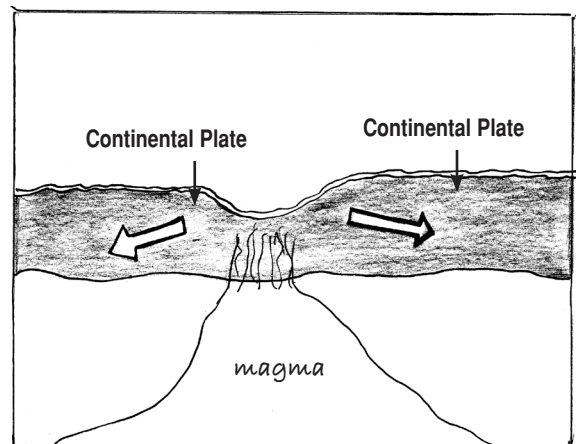


9. Choose the diagram that BEST illustrates converging plates that form mountains.



10. Which of the following BEST describes the process in the diagram below?

- a. converging plates form a transform boundary
- b. converging plates form volcanoes
- c. diverging plates form a mid-ocean ridge
- d. diverging plates form a rift valley





**Earth: Yesterday, Today, and Tomorrow (cont.)**

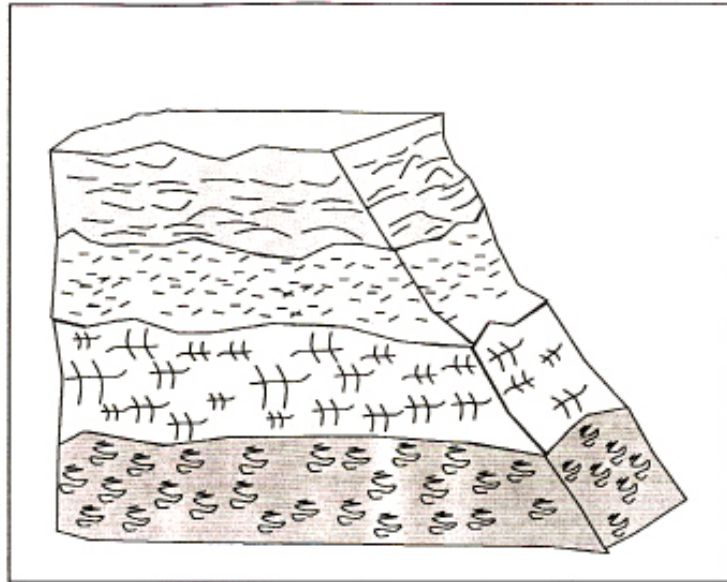
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11. Earth's crust has many cracks called faults. Major cracks or faults are found near where the tectonic plates touch. What geological event occurs when two plates rub against one another, causing great pressure to build?
- a. mountain building
  - b. volcanic eruptions
  - c. earthquakes
  - d. tsunamis
12. Choose the answer that BEST describes conditions at the plate edges that result in a volcanic eruption.
- a. Plates collide causing cracks or holes where magma and gases push up from deep inside the Earth.
  - b. Plates remain stationary while gas and magma build up pressure.
  - c. Plates rub back and forth against one another, building pressure and magma, and gases push through the cracks, spewing lava and gases.
  - d. Plates vibrate from earthquakes causing cracks or holes where magma and ash erupt.
13. Choose the BEST answer that explains why the Earth behaves like a magnet.
- a. Large deposits of iron ore at the Earth's poles create a magnetic field.
  - b. The Earth has a hard metallic core, convecting mantle, and outer crust.
  - c. The convection currents or Earth's convecting mantle create a magnetic field.
  - d. The compass needle aligns with the lines of force in Earth's magnetic field.
14. The Earth is like a large bar magnet extended from North to South. The Earth's magnetic field makes it possible to find direction. Choose the BEST explanation that describes how a compass helps travelers find direction.
- a. The magnetic field affects radio and television communication.
  - b. The magnetized needle in the compass always points to the north.
  - c. The compass is a magnet.
  - d. The compass needle points in the direction the traveler wants to go.



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This diagram shows a side view of rock layers from a surface mine.



15. How might the rock layers in the above diagram be useful in studying the measurement of the geologic time of Earth?
- a. They may contain fossils which can be compared to the age of the rock.
  - b. There may be bones of modern-day animals mixed in with the rock piles.
  - c. The rock layers may have been created by the mining equipment.
  - d. The rock layers contain different types of sediments and rocks.

16. A glacier is a large body of ice that slowly moves over land. Explain how glaciers help to provide evidence of the history of the Earth.

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**Earth: Yesterday, Today and  
Tomorrow  
Answer Key**



17. Draw and label a picture of the layers of the Earth.

18. Describe how the layers of the Earth are related to the movement of the Earth's tectonic plates.

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19. Explain the statement: The Earth is a giant magnet. Include what evidence scientists have that supports the statement.

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20. Explain why a magnetized object has one end that points north.

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21. Explain how the compass works using the magnetic field of the Earth.

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**Earth: Yesterday, Today, and Tomorrow  
Answer Key (cont.)**



Rubric for Earth: Yesterday, Today, and Tomorrow Summative Assessment

(Total Possible Points - 33)

Question #1: Choose the BEST explanation for the fossil discovery. (E.ST.06.31)

Answer: c (1 point)

Question #2: Which of the following would prove MOST useful in the relative dating of a fossil? (E.ST.06.31)

Answer: c (1 point)

Question #3: What causes the motion of the tectonic plates? (E.SE.06.51)

Answer: b (1 point)

Question #4: What evidence did Alfred Wegener use as evidence for drifting continents? (E.ST.06.31, E.ST.06.42)

Answer: c (1 point)

Question #5: Choose the answer that describes the layers of the Earth. (E.SE.06.53)

Answer: a (1 point)

Question #6: The center of the Earth is: (E.SE.06.53)

Answer: c (1 point)

Question #7: By collecting and plotting earthquake data, Chris and Angela should be able to learn: (E.SE.06.52, S.IA.06.11)

Answer: d (1 point)

Question #8: The earthquakes occur: (E.SE.06.52)

Answer: a (1 point)

Question #9: Choose the diagram that BEST illustrates converging plates that form mountains. (E.SE.06.52)

Answer: b (1 point)



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Question #10: Which of the following BEST describes the process in the diagram below? (E.SE.06.52)

Answer: d (1 point)

Question #11: What geological event occurs when the two plates press against each other, causing great pressure to build? (E.SE.06.52)

Answer: c (1 point)

Question #12: Choose the answer that BEST describes conditions at the plate edges that result in a volcanic eruption. (E.SE.06.52)

Answer: a (1 point)

Question #13: Choose the BEST answer that explains how the Earth behaves like a magnet. (E.SE.06.16)

Answer: c (1 point)

Question #14: Choose the BEST explanation that describes how a compass helps travelers find direction. (E.SE.06.61, E.SE.06.62)

Answer: b (1 point)

Question #15: How might the rock layers in the above diagram be useful in studying the measurement of the geologic time of Earth? (E.ST.06.41)

Answer: a (1 point)

Question #16. How do glaciers provide evidence of the history of the Earth? (E.ST.06.41)

Elements

- a. Glaciers slowly travel over rock and soil.
- b. As glaciers move, melt, and freeze they pick up or pluck rocks and stones that move along with the glacier.
- c. The rocks and stones scratch and polish the sides of valleys and canyons.
- d. The grooves, scratches, and polished surfaces of stones provide evidence of glacier movement and the history of the Earth.



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Scoring (4 points)

- 4 - Response includes all four elements
- 3 - Response includes three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Summative Assessment: Student Journal

Question #17 - Activity #2, Journal Entry Question #1: Draw and label a picture of the layers of the Earth. (E.SE.06.53)

Elements

- a. Illustration includes the core of the Earth with label (core or metallic core).
- b. Illustration includes the mantle with label.
- c. Illustration includes crust with label.

Scoring (3 points)

- 3 - Response includes all three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #18 - Activity #2, Journal Entry Question #2: Describe how the layers of the Earth are related to the movement of the Earth's tectonic plates. (E.SE.06.51, S.RS.06.53)

Elements

- a. The outer layer, crust, is made up of huge plates of solid rock called tectonic plates.
- b. The plates move a few centimeters each year due to the convection currents or motion of the hot molten rock of the mantle.

Scoring (2 points)

- 2 - Response includes both elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer



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Question #19 - Activity #6, Journal Entry Question #1: Explain the statement: The Earth is a giant magnet. Include what evidence scientists have that supports the statement. (E.SE.06.61)

Elements

- a. The Earth and the bar magnet have poles with opposite charges.
- b. The poles of the Earth and bar magnet are the strongest parts of the magnetic fields.
- c. Magnetized material is attracted or repelled by the poles of the Earth's magnet and bar magnet.
- d. A magnetic field of flowing electrons surrounds the Earth and the bar magnet.
- e. The shape of the Earth and the shape of the bar magnet differ.
- f. The magnetic pull of Earth's magnetism is greater than that of the bar magnet.

Scoring (3 points)

- 3 - Response includes at least three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #20 - Activity #7, Journal Entry Question #1: Explain why a magnetized object has one end that points north. (E.SE.06.62)

Elements

- a. The magnetized object has two poles of different charges.
- b. The pole of the magnetized object that has the opposite charge of Earth's north pole is attracted to the north and will point to the north.

Scoring (2 points)

- 2 - Response includes both elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer

Question #21 - Activity #7, Journal Entry Question #2: Explain how the compass works using the magnetic field of the Earth. (E.SE.06.62)

Elements

- a. The compass needle is magnetized with charged poles.
- b. One pole of the compass needle has the opposite charge as the north pole.
- c. The compass needle is north seeking and is attracted to the north pole.
- d. The compass needle points toward the north, allowing travelers to always know what direction is north.



Scoring (4 points)

- 4 - Response includes all four elements
- 3 - Response includes three elements
- 2 - Response includes two elements
- 1 - Response includes one element
- 0 - No response, no elements, can't read the answer