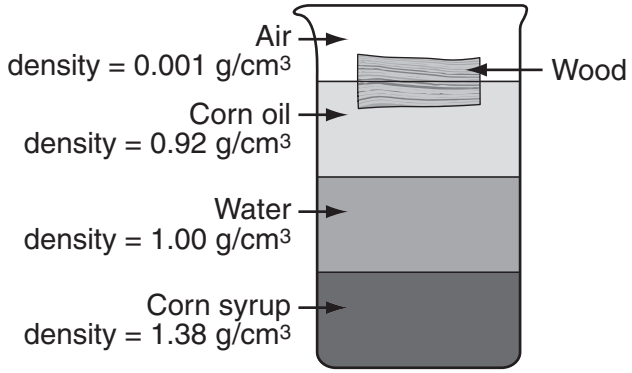
New England Common Assessment Program

Released Items
2016

Grade 8
Science

Science

❶ The air, wood, and liquids in the container below have different densities.



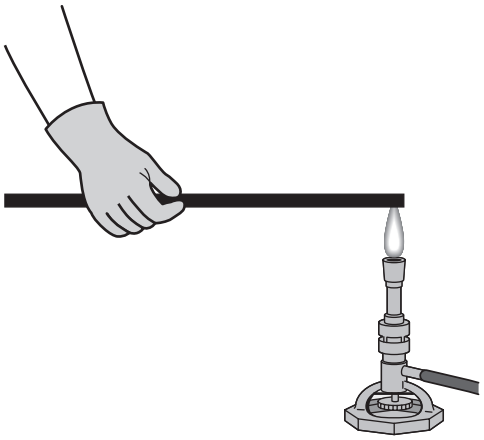
What is **most likely** the density of the wood?

A. 0.001 g/cm^3
B. 0.70 g/cm^3
C. 0.95 g/cm^3
D. 1.10 g/cm^3

❷ The point of a pencil contains graphite, which consists entirely of the element carbon. Which statement describes graphite?

A. Graphite is made of different kinds of compounds.
B. Graphite is made of one kind of compound.
C. Graphite is made of different kinds of atoms.
D. Graphite is made of one kind of atom.

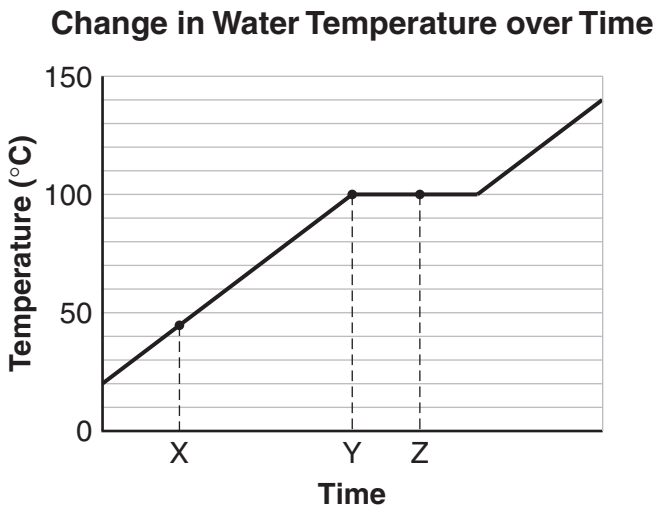
❸ In the figure below, a gloved hand holds a copper rod directly above a flame.



Which statement **best** describes what will happen after the rod is held above the flame for several minutes?

A. Both the glove and rod will be cool.
B. Both the glove and rod will be warm.
C. The glove will be warm and the rod will be cool.
D. The glove will be cool and the rod will be warm.

4 The graph below shows how the temperature of water changes over time as it is heated from 20°C to 140°C.

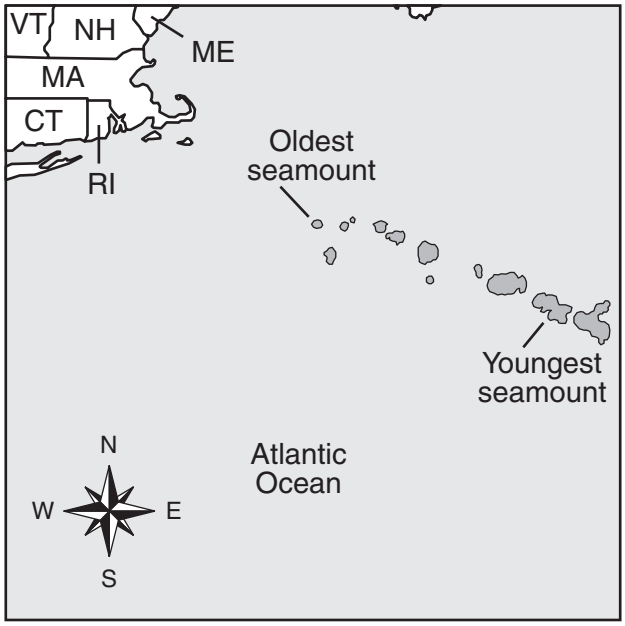


a. Explain what happens to the water in terms of energy, molecules, and state of matter from Time X to Time Y.

b. Explain what happens to the water in terms of energy, molecules, and state of matter from Time Y to Time Z.

Please use the Plate Movements diagram on the reference sheet to answer the question.

5 The map below shows the positions and relative ages of the seamounts in the New England seamount chain, which is located on the North American Plate.



Which conclusion about the movement of the North American Plate does the map **best** support?

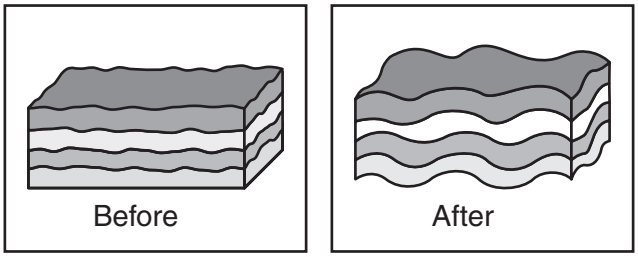
A. The plate moved in a southeast direction over a hot spot.

B. The plate moved in a northwest direction over a hot spot.

C. The plate subducted beneath the New England states.

D. The plate moved away from the New England states.

6 The diagram below shows rock layers that were changed.



Which type of event **most likely** caused the rock layers to change?

A. earthquakes cracking the rock layers

B. pressure pushing on opposite sides of the rock layers

C. heat from volcanic eruptions melting the rock layers

D. weight from sediments pushing on the rock layers

7 Which statement **best** explains why an object weighs less on Mercury than it does on Earth?

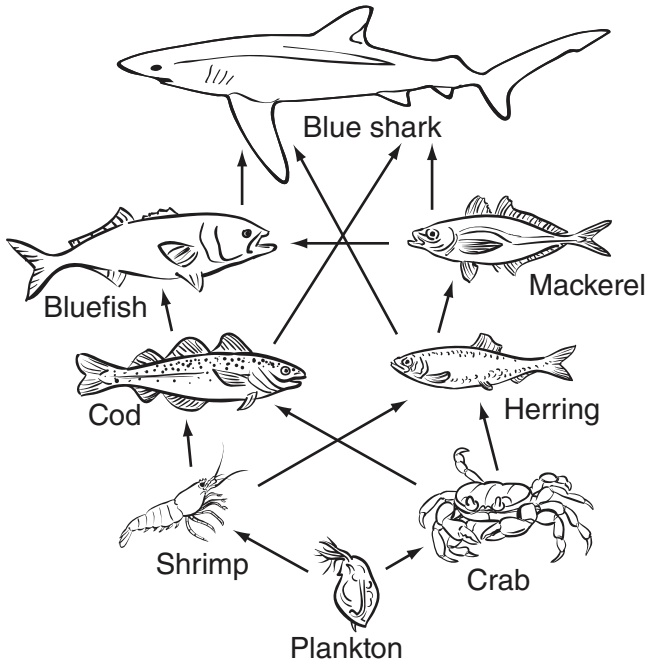
A. Mercury is less dense than Earth.

B. Mercury is more dense than Earth.

C. Mercury has a stronger gravitational pull than Earth does.

D. Mercury has a weaker gravitational pull than Earth does.

8 The diagram below shows a partial North Atlantic food web.



Overfishing and climate change threaten the cod population. Based on the diagram, how will bluefish change their feeding behavior if the cod population decreases?

A. Bluefish will eat more crabs.

B. Bluefish will eat more blue sharks.

C. Bluefish will eat more plankton.

D. Bluefish will eat more mackerel.

9 An ecosystem contains hawks, mice, grasses, and fungi. Removing which of these populations would **directly** result in fewer nutrients being returned to the ecosystem?

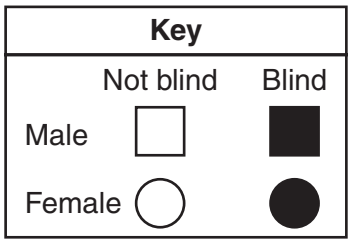
A. hawks, because the population of mice would become too large to find enough food

B. mice, because the population of grasses would become too large for the available space

C. grasses, because there would be no other organisms producing food

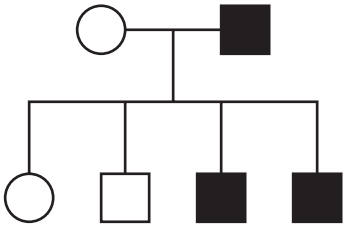
D. fungi, because there would be fewer organisms breaking down wastes

10 A researcher studies blindness in cats. The researcher breeds a cat that is blind with a cat that is not blind. Four kittens are produced. One male and one female kitten are blind. The other two male kittens are not blind. The researcher uses the key below to make the pedigree for the family of cats.

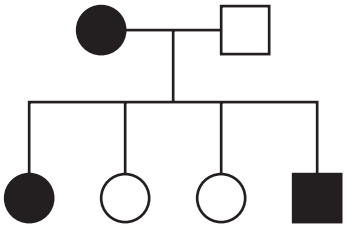


Which diagram shows the pedigree for this family of cats?

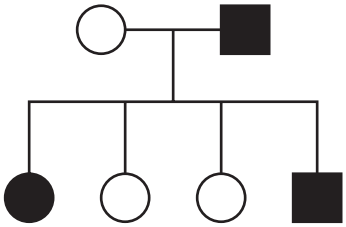
A.



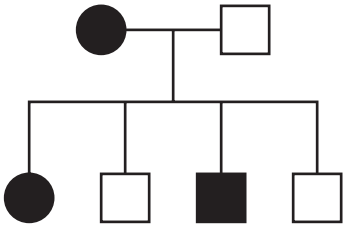
B.



C.



D.



Date: _____

Your Name: _____

New England Common Assessment Program

Released Science Inquiry Task

Plate Tectonics

2016

Grade 8

Student Test Booklet

Science

Directions:

In this task, you will read a story about four students who investigate the movement of tectonic plates. You will analyze the information and data provided by the students in the story as you answer a set of questions.

Plate Tectonics

The students in a science class are excited because their teacher, Ms. Johnson, shared an e-mail she received announcing the opportunity to compete in a technology competition. She read the description of the competition to the class.

"Plate Tectonics Competition: Participants work in teams to create an application (app) to answer the question ***'How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?'*** *The app must include information and models that demonstrate evidence of plate movement that can be viewed on a portable electronic device such as a smartphone or tablet."*

Jacob, Ali, Sarah, and Luke volunteer to participate in the competition. Ms. Johnson provides them with Map 1, the plate movements map shown on the Map Reference Sheet.

Please review Map 1 on the **Map Reference Sheet** before continuing.

Jacob says that before they learn about the process of designing an app, they need to learn more about plate tectonics. Ali suggests they use their textbooks and the Internet to conduct research. Jacob and Ali create the following Word Bank for the four students to refer to while they do their research for the app.

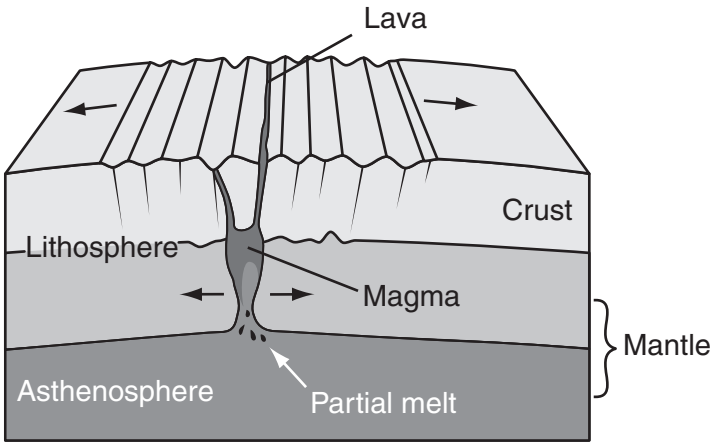
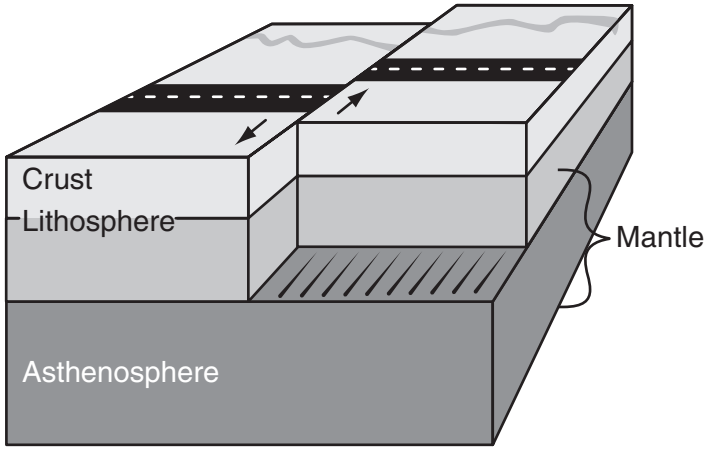
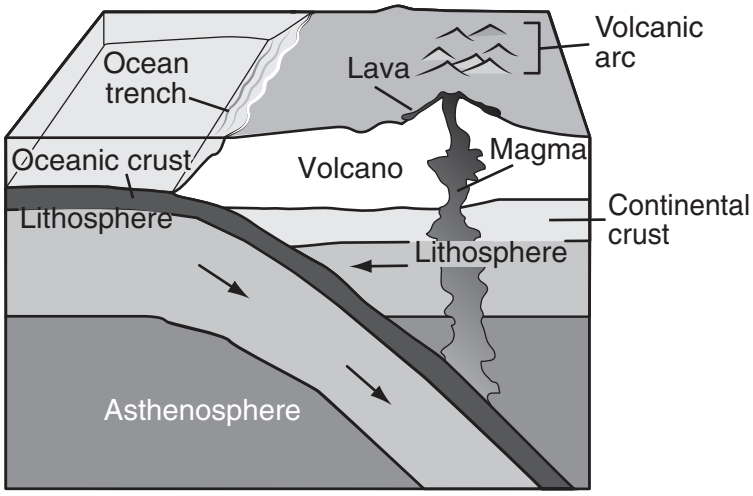
The following Word Bank defines the terms that you will need to understand throughout this investigation. You may refer back to this page throughout the session.

Word Bank

Asthenosphere	a slowly flowing layer of solid and melted rock formed by heat and pressure; the lithosphere floats on the asthenosphere
Crust	the outermost layer of Earth
Hot spot	is formed when very hot rock rises from the mantle and erupts through Earth's crust
Lava	melted rock on Earth's surface
Lithosphere	the solid outer part of Earth that includes the crust and upper mantle
Magma	melted rock beneath Earth's surface
Mantle	the layer of Earth between the core and the crust; the mantle contains the lower part of the lithosphere and all of the asthenosphere
Ocean trench	a long, narrow, deep area on the ocean floor that is formed at a convergent plate boundary
Plate boundary	an area where two or more tectonic plates meet
Tectonic plate	a large piece of the lithosphere that floats and moves on the asthenosphere
Transect	a straight line of travel where data is being collected

Sarah and Luke research plate tectonics and then make the table shown below to highlight the differences between the three types of plate boundaries.

Types of Plate Boundaries

Type of Boundary	When It Is Formed	Diagram
Divergent	It is formed when plates move apart. Hot mantle rock melts as it rises and becomes magma. When magma reaches Earth's surface, it becomes lava, which cools and creates a new crust that pushes the old crust to the side.	
Transform	It is formed when two plates slide past each other.	
Convergent	It is formed when two plates move toward each other, and the denser plate sinks below the less dense plate.	

GO ON

Jacob says, “The movement of tectonic plates at these boundaries causes changes to Earth’s surface, such as volcanoes and earthquakes.” Jacob’s statement causes Ali to suggest that their app should focus on volcanoes and earthquakes. Ms. Johnson asks the students to divide into two groups to research them. Jacob and Sarah choose to investigate earthquakes, and Ali and Luke choose to investigate volcanoes.

Jacob learns that the movement of tectonic plates at the different types of plate boundaries creates earthquakes with different depths that range from shallower than 50 km to deeper than 250 km. He shares this information with Sarah, who then finds more data to make a map that identifies the locations and depths of earthquakes of the world (Map 2), as shown on the Map Reference Sheet.

Please review Map 2 on the **Map Reference Sheet** before continuing.

Jacob says, “The locations of the plate boundaries on Map 1 and the earthquakes on Map 2 are very similar. We should show this relationship in our app.”

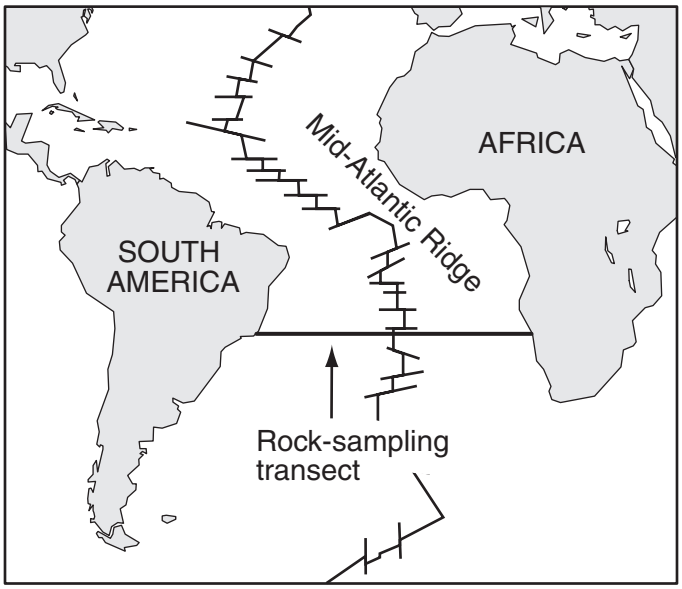
Sarah replies, “I agree. I also noticed that my map supports your data that showed the earthquakes have different depths. I wonder if there is a relationship between the depth of an earthquake and the type of plate boundary nearby.”

Answer question 1 on page 1 of your Student Answer Booklet.

1. Describe **two** observations Sarah could use from Maps 1 and 2 to show the relationship between the depth of an earthquake and the type of plate boundary nearby. Use evidence from Maps 1 and 2 on the **Map Reference Sheet** to support your answer.

As Sarah continues to compare Maps 1 and 2, she observes that the Mid-Atlantic Ridge is a large feature on Map 1 and that there have been many earthquakes along this ridge. She reads about a scientific investigation in which scientists sampled rocks along a transect, or a straight line of travel, across the Mid-Atlantic Ridge from South America to Africa to determine the age of the seafloor rocks. Sarah creates the diagram of the transect (Diagram 1) shown below to help explain the investigation to Jacob.

Diagram 1:
Transect from South America to Africa



GO ON

Sarah shows Jacob Diagram 1 and the data from the investigation (Data Table 1) shown below.

Data Table 1:
Age of Seafloor Rocks from South America to Africa

Distance from South America (km)	Age of Seafloor Rocks (millions of years)
0	120
500	108
1000	70
1500	42
2000	25
2500	8
2600	2
3000	20
3500	42
4000	70
4500	88
5000	105
5400	114

Jacob suggests they see if there is any pattern in the data the scientists collected about the age of the seafloor rocks along the transect from South America to Africa. He says, "I think a graph would be the best way to share these data in our app so they are easy to see on a smartphone or tablet."

Sarah creates a line graph that shows the age of the seafloor rocks along the transect between South America and Africa. She suggests that students could use the app to describe the trends shown in her graph.

Answer question 2 on page 2 of your Student Answer Booklet.

2. Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.

Sarah concludes that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

Answer question 3 on page 3 of your Student Answer Booklet.

3. Explain how the evidence from either your graph or Data Table 1 supports Sarah's conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

While Jacob and Sarah investigate earthquakes, Ali and Luke investigate volcanoes. Ali shares her research notes with Luke, as shown below:

- Explosive volcanoes occur on the seafloor at convergent boundaries.
- Volcanic eruptions have less explosive forces at divergent boundaries.
- Volcanoes occur at divergent boundaries on the ocean floor, but some of these areas are so deep that the volcanoes cannot be seen from the ocean's surface and are not easily recorded.
- Some volcanoes form over hot spots in the mantle. These volcanoes form when very hot rock rises and erupts through Earth's crust.

Luke reads Ali's notes and says, "Since explosive volcanoes form at convergent boundaries, I wonder if most of the volcanoes are located on convergent boundaries."

Ali finds some data and generates the map of locations of volcanoes of the world (Map 3) shown on the Map Reference Sheet to investigate Luke's idea. Ali and Luke study Map 3 and compare it to Map 1. They decide to include Map 3 in their app.

Please review Map 3 and Map 1 on the **Map Reference Sheet** before continuing.

Answer question 4 on page 3 of your Student Answer Booklet.

4. Describe **two** pieces of evidence from Maps 1 and 3 on the **Map Reference Sheet** that support Luke's idea that most of the volcanoes are located on convergent boundaries.

Ms. Johnson reviews the three maps and says, "The ocean ridges are located at plate boundaries and have many earthquakes, but I do not see volcanoes on them. Map 3 might be missing information."

Answer question 5 on page 4 of your Student Answer Booklet.

5. Use information from the story on page 7 and the **Map Reference Sheet** to explain why Map 3 is missing information. Describe **two** factors that could explain the lack of evidence of volcanic activity on the ocean ridges.

Ali and Luke join Jacob and Sarah to compare data. Ali notices that the continent of Africa has had many earthquakes and volcanoes. However, when she compares Maps 1, 2, and 3, she observes that many of these earthquakes and volcanoes are not located on a plate boundary. Ali wonders if the earthquakes and volcanoes in Africa occurred recently or a long time ago. She asks, "Where are the most recent earthquakes and volcanic eruptions in eastern Africa located?" Luke helps her investigate this research question. Some of the data they collected are shown in Data Tables 2 and 3 below.

Data Table 2: Seven Recent Earthquakes in Eastern Africa

Magnitude	Depth (km)	Day	Location
5.1	14.2	12/31/2014	Malawi
4.6	12.6	12/13/2014	Ethiopia
4.3	10	11/20/2014	Lake Tanganyika (Tanzania & Democratic Republic of Congo)
4.8	15.1	11/11/2014	Lake Tanganyika (Tanzania & Democratic Republic of Congo)
5.3	10	11/02/2014	Zambia
5.1	10	10/31/2014	Tanzania
4.5	10	10/31/2014	Democratic Republic of Congo

Data Table 3: Five Recent Volcanic Eruptions in Eastern Africa

Volcano Number	Volcano Name	Year Eruption Started	Month Eruption Started	Country
223020	Nyamuragira	2014	6	Democratic Republic of Congo
223020	Nyamuragira	2011	11	Democratic Republic of Congo
222120	Lengai, Ol Doinyo	2011	6	Tanzania
221101	Nabro	2011	6	Eritrea
221041	Dallol	2011	1	Ethiopia

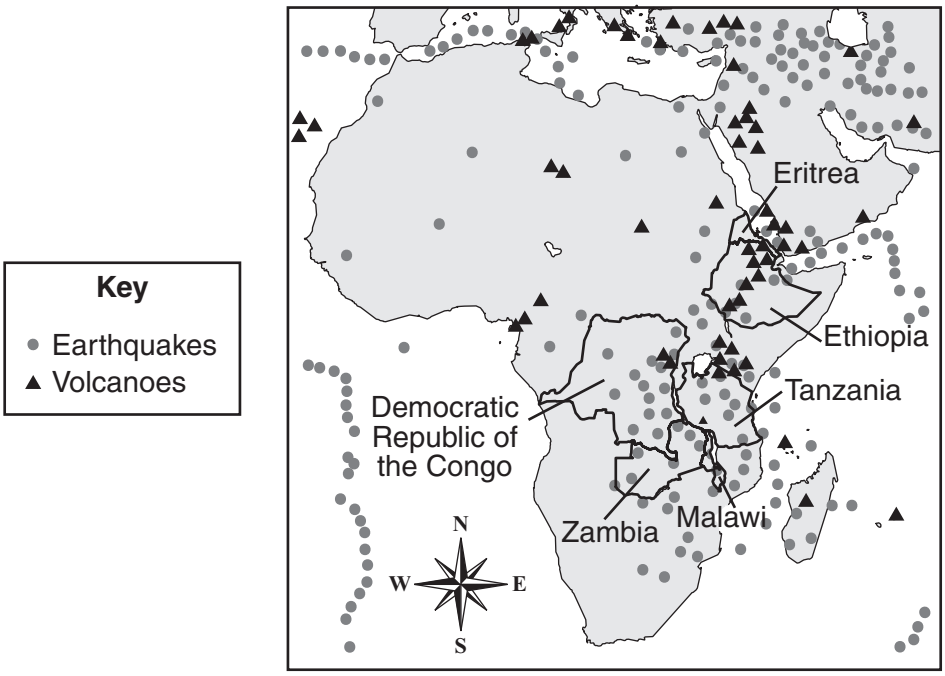
Sarah reviews the data tables and says, "These two data tables contain some helpful information, but some parts of the tables are unnecessary for the app. We cannot use these tables in our app without editing them. We should summarize the data." The students work together to edit the data tables to only include the information that is important to Ali's research question, **"Where are the most recent earthquakes and volcanic eruptions in eastern Africa located?"**

Answer question 6 on page 4 of your Student Answer Booklet.

6. Identify which information in Data Tables 2 and 3 is the most important to answer Ali's research question. Explain why the information you chose is important to include in the app.

Luke uses Data Tables 2 and 3 and additional data to create the diagram (Diagram 2) shown below.

Diagram 2:
Earthquakes and Volcanoes in Africa



Jacob says, "Diagram 2 reminds me of a research study I just read about." Jacob finds the article on the Internet and explains, "Scientists collected rock samples from volcanoes in Tanzania and Ethiopia. These rocks were created during volcanic eruptions and still have volcanic gases trapped inside them. The scientists discovered that the gases are all made of the same material and are the same age. I wonder if a new plate boundary is forming in Africa." The students decide to use their app to explain why there are many recent earthquakes and volcanoes in eastern Africa.

Answer question 7 on page 5 of your Student Answer Booklet.

7. Use the **Map Reference Sheet** and the information from the story to support Jacob's idea that a new plate boundary is forming in Africa. Use evidence from Data Tables 2 and 3 and Diagram 2 to support your answer.

Jacob, Sarah, Ali, and Luke decide they have gathered enough information to create their app. Ms. Johnson tells them the next step is to learn the process of coding, which involves using a computer to create step-by-step commands to build the app. The students must also complete an entry form for the competition. The final question on the entry form says, "Describe how the app answers the question **How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?**"

Answer question 8 on page 6 of your Student Answer Booklet.

8. Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

STOP

Grade 8 Map Reference Sheet

Map 1: Plate Movements

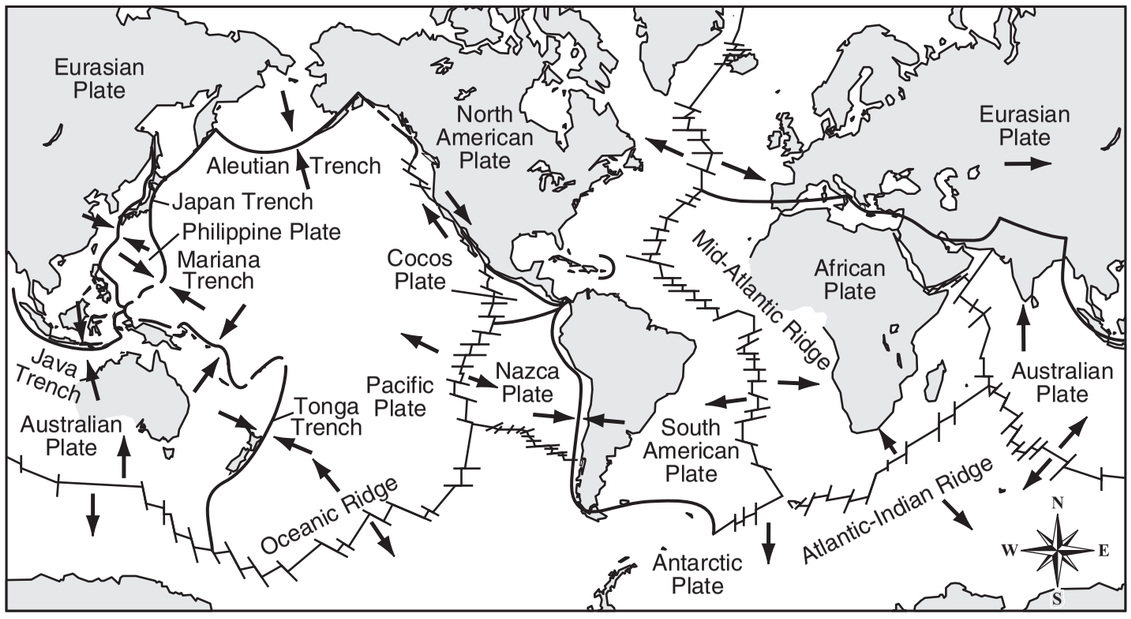
Key

Arrows show the direction of plate movement

divergent plate boundary

transform plate boundary

convergent plate boundary



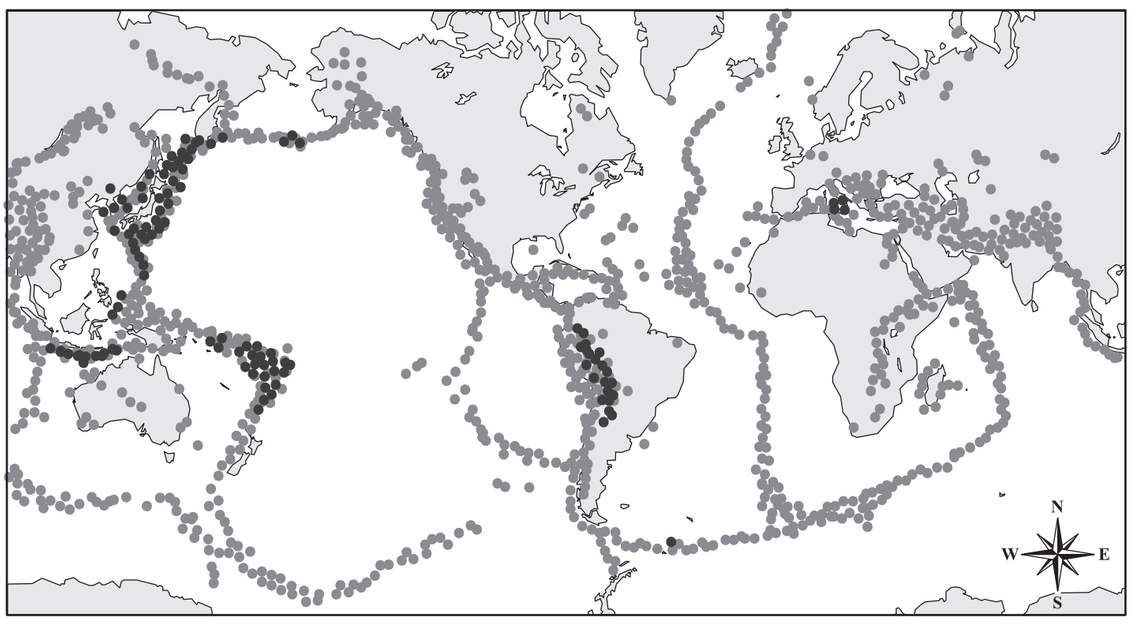
Map 2: Locations and Depths of Earthquakes of the World

Key

Earthquake Depth

Shallower than 50 km

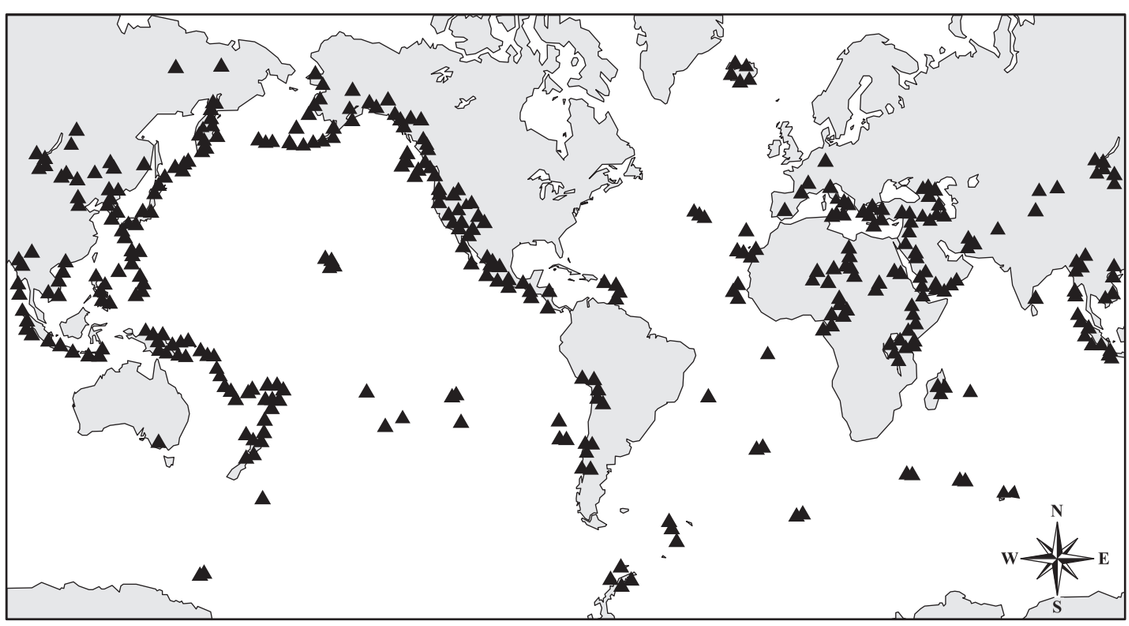
Deeper than 250 km



Map 3: Locations of Volcanoes of the World

Key

▲ Volcanoes



New England Common Assessment Program

Released Items Support Materials 2016

Grade 8 Science

Grade 8 Science Released Item Information

Item Number	Big Idea[1]	Assessment Target	Depth of Knowledge Code	Item Type[2]	Answer Key	Total Possible Points
1	INQ	PS 1-1	2	MC	B	1
2	MAS	PS 1-5	1	MC	D	1
3	POC	PS 2-7	2	MC	B	1
4	SAE	PS 1-4	2	CR4		4
5	POC	ESS 1-1	2	MC	B	1
6	POC	ESS 1-3	2	MC	B	1
7	POC	ESS 2-8	2	MC	D	1
8	SAE	LS 2-6	2	MC	D	1
9	SAE	LS 2-7	2	MC	D	1
10	POC	LS 4-11	2	MC	D	1

Grade 8 Science Released Inquiry Task Information

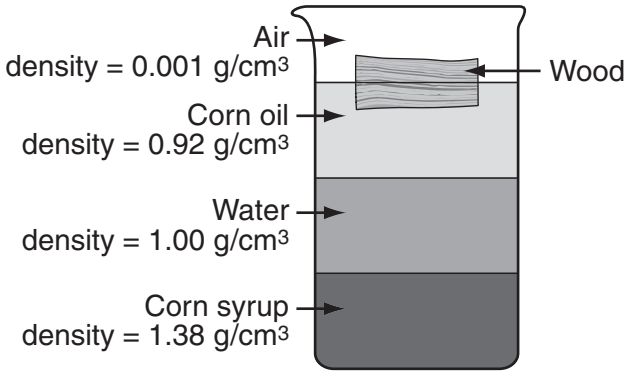
Item Number	Big Idea[1]	Inquiry Construct	Depth of Knowledge Code	Item Type[2]	Total Possible Points
1	INQ	1-3	2	SA	2
2	INQ	3-8	2	CR3	3
3	INQ	3-10	2	SA	2
4	INQ	1-2	2	SA	2
5	INQ	4-11	2	SA	2
6	INQ	2-4	2	SA	2
7	INQ	4-13	3	SA	2
8	INQ	4-12	3	CR3	3

[1]Big Idea: NOS = Nature of Science, SAE = Systems and Energy, MAS = Models and Scale, POC = Patterns of Change, FAF = Form and Function, INQ = Scientific Inquiry

[2]Item Type: MC = Multiple Choice, CR = Constructed Response, SA = Short Answer

PS1 (5-8) INQ-1 Investigate the relationships among mass, volume, and density.

1. The air, wood, and liquids in the container below have different densities.



What is **most likely** the density of the wood?

A. 0.001 g/cm^3
B. 0.70 g/cm^3
C. 0.95 g/cm^3
D. 1.10 g/cm^3

PS1 (5-8) MAS-5	Given graphic or written information, classify matter as atom/molecule or element/compound (not the structure of an atom).

2 The point of a pencil contains graphite, which consists entirely of the element carbon. Which statement describes graphite?

A. Graphite is made of different kinds of compounds.

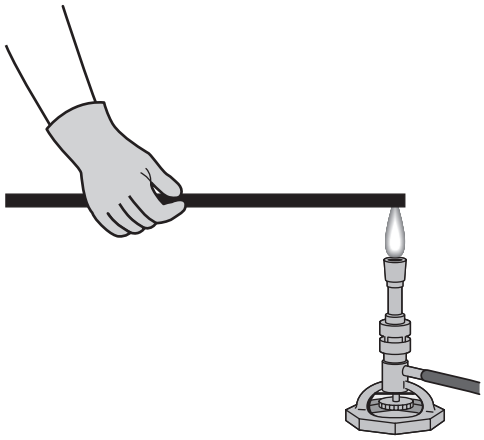
B. Graphite is made of one kind of compound.

C. Graphite is made of different kinds of atoms.

D. Graphite is made of one kind of atom.

PS2 (5-8) POC-7	Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation).

3 In the figure below, a gloved hand holds a copper rod directly above a flame.



Which statement **best** describes what will happen after the rod is held above the flame for several minutes?

A. Both the glove and rod will be cool.

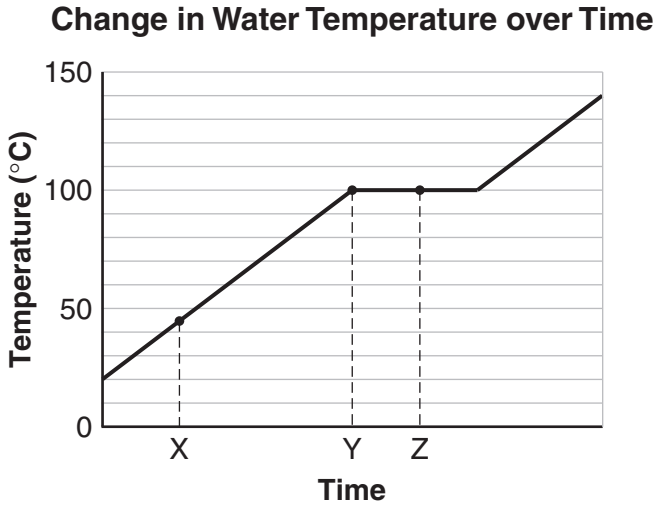
B. Both the glove and rod will be warm.

C. The glove will be warm and the rod will be cool.

D. The glove will be cool and the rod will be warm.

PS1 (5-8) SAE-4	Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.

4 The graph below shows how the temperature of water changes over time as it is heated from 20°C to 140°C.



a. Explain what happens to the water in terms of energy, molecules, and state of matter from Time X to Time Y.

b. Explain what happens to the water in terms of energy, molecules, and state of matter from Time Y to Time Z.

Scoring Guide

Score	Description
4	The response demonstrates a thorough understanding of the relationship between energy, molecular motion, and states of matter. The student explains what happens to the water in terms of energy, molecules, and state of matter from Time X to Time Y and from Time Y to Time Z.
3	The response demonstrates a general understanding of the relationship between energy, molecular motion, and states of matter. The overall response is general.
2	The response demonstrates a limited understanding of the relationship between energy and states of matter. The overall response is limited.
1	The response demonstrates a minimal understanding of the relationship between energy and states of matter. The overall response is minimal.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

a. A thorough understanding can be exemplified by the following sample responses:

- Energy is increasing (energy is constantly added over time) or the water absorbs energy.
- The molecules move more quickly or the molecular motion is increasing.
- The state of matter stays the same.
- Liquid water is heated to its boiling point.

Note: Students only receive credit for referring to increasing temperature if they explain why the temperature is increasing.

b. A thorough understanding can be exemplified by the following sample responses:
Energy is increasing [h]. The molecular motion is constant. The phase of matter is changing from a liquid to a gas.

Score Point 4

4

(A) From time X to time Y, the energy of the water is increasing, the molecules are moving faster and the state of matter is a liquid.

(B) From time Y to time Z, the energy of the water is being used to change states of matter, the molecules aren't moving as faster, and the state of matter is between a liquid and gas.

The response demonstrates a thorough understanding of the relationship between energy, molecular motion, and states of matter. The student correctly explains the energy, molecular motion, and states of matter for both time frames with no errors or omissions.

Score Point 3

4

a. Between time X and time Y, the water is getting hotter The molecules are moving faster, and energy is increasing. The water heats about 50°c from time X to time Y. By time Y, the water should be boiling.

b. Between time Y and time Z, the water has reached a constant boiling point. The molecules are moving very quickly. Bubbles should be forming in the water, as well as the water starting to evaporate. The water stays at a constant temperature between time Y and time Z.

The response demonstrates a general understanding of the relationship between energy, molecular motion, and states of matter. The response gives the correct energy and molecular motion in part (a) but doesn't clearly address the state of matter. In part (b), the energy and molecular motion discussion is mostly accurate, although evaporation is not the correct process. Overall, the main points are generally discussed with a few minor omissions and inaccuracies.

SCORE POINT 2

4 a.) From time X to time Y the water heats up, the molecules get moving Faster and Faster, and the water is geting ready to turn into a gas.

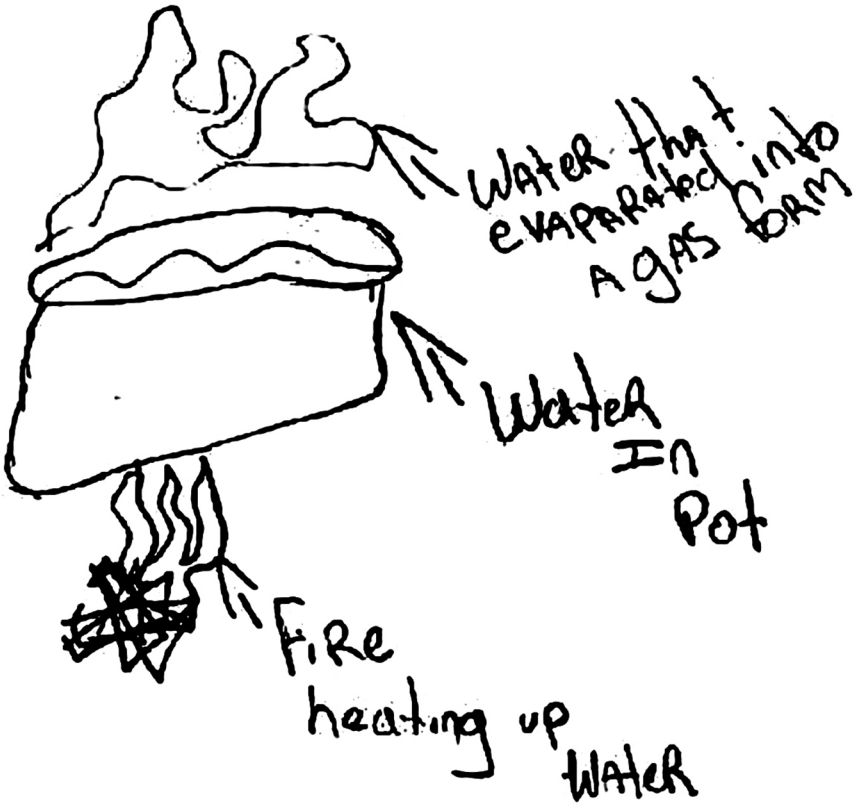
b.) The tempature is at 100 which its boiling point and the water is turing into a gas. The molecules are racing and the water has alot of energy

The response demonstrates a limited understanding of the relationship between energy and states of matter. The response to part (a) addresses molecular motion and vaguely energy (heats up) but doesn't state that the water is in liquid form. In part (b), the states of matter are correctly addressed, but the molecules "racing" and the water having "a lot of energy" are unclear. While some of the concepts are correct, the response has imprecise and limited explanations in both parts.

SCORE POINT 1

4

What that does its (changing Pyisical propites) to a liquid to A gas



The response demonstrates a minimal understanding of the relationship between energy and states of matter. The statement about liquid changing into a gas is sufficient to demonstrate minimal understanding.

SCORE POINT 0

4

a. the time x is going to 49 of the temperature.

From the time y is going to the 100 of the temperature.

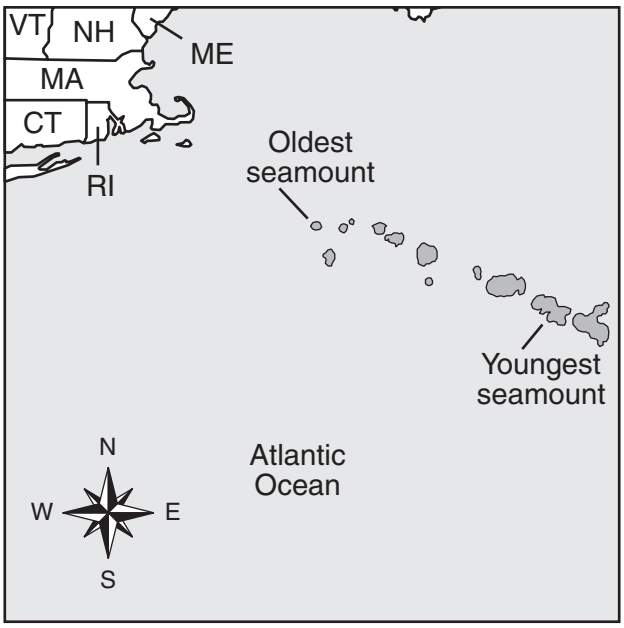
b. From the time y to time z the water is going to increase and then stay in one place.

The response is incorrect or irrelevant to the skill or concept being measured. No understanding of the relationship between energy and states of matter is demonstrated.

ESS1 (5-8) POC-1 Use geological evidence provided to support the idea that the Earth's crust/lithosphere is composed of plates that move.

Please use the Plate Movements diagram on the reference sheet to answer the question.

5 The map below shows the positions and relative ages of the seamounts in the New England seamount chain, which is located on the North American Plate.



Which conclusion about the movement of the North American Plate does the map **best** support?

A. The plate moved in a southeast direction over a hot spot.

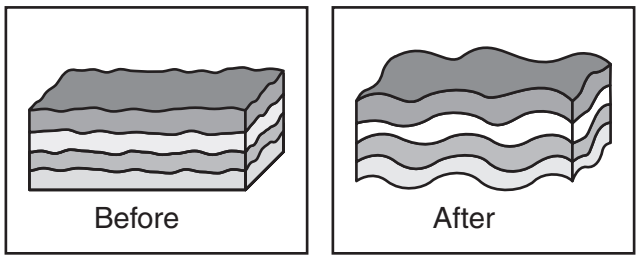
B. The plate moved in a northwest direction over a hot spot.

C. The plate subducted beneath the New England states.

D. The plate moved away from the New England states.

ESS1 (5-8) POC-3 Explain how Earth events (abruptly and over time) can bring about changes in Earth's surface: landforms, ocean floor, rock features, or climate.

6 The diagram below shows rock layers that were changed.



Which type of event **most likely** caused the rock layers to change?

A. earthquakes cracking the rock layers
B. pressure pushing on opposite sides of the rock layers
C. heat from volcanic eruptions melting the rock layers
D. weight from sediments pushing on the rock layers

ESS2 (5-8) POC-8	Explain temporal or positional relationships between or among the Earth, Sun, and Moon (e.g., night/day, seasons, year, tides) OR how gravitational force affects objects in the solar system (e.g., moons, tides, orbits, satellites).

7 Which statement **best** explains why an object weighs less on Mercury than it does on Earth?

A. Mercury is less dense than Earth.

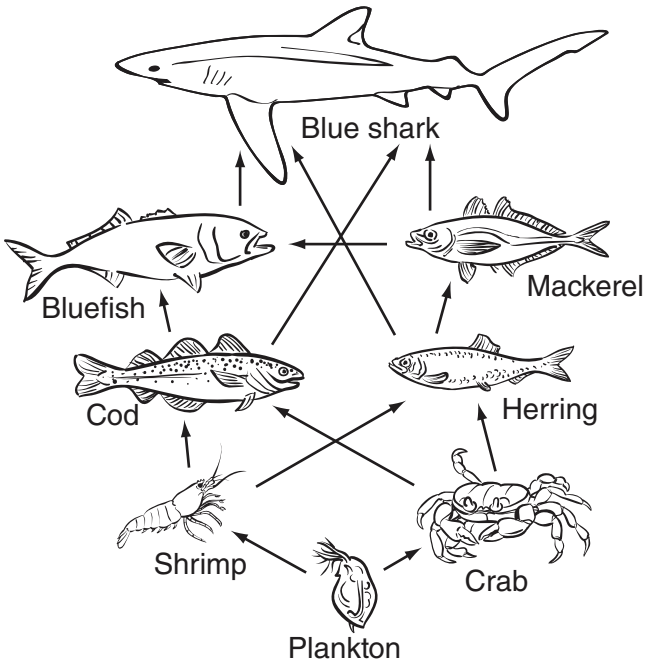
B. Mercury is more dense than Earth.

C. Mercury has a stronger gravitational pull than Earth does.

D. Mercury has a weaker gravitational pull than Earth does.

LS2 (5-8) SAE-6	Given a scenario, trace the flow of energy through an ecosystem, beginning with the sun, through organisms in the food web, and into the environment (includes photosynthesis and respiration).

8 The diagram below shows a partial North Atlantic food web.



Overfishing and climate change threaten the cod population. Based on the diagram, how will bluefish change their feeding behavior if the cod population decreases?

A. Bluefish will eat more crabs.

B. Bluefish will eat more blue sharks.

C. Bluefish will eat more plankton.

D. Bluefish will eat more mackerel.

LS2 (5-8) SAE-7	Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).

9 An ecosystem contains hawks, mice, grasses, and fungi. Removing which of these populations would **directly** result in fewer nutrients being returned to the ecosystem?

A. hawks, because the population of mice would become too large to find enough food

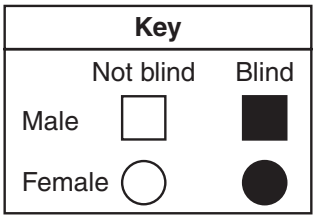
B. mice, because the population of grasses would become too large for the available space

C. grasses, because there would be no other organisms producing food

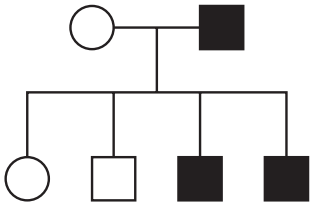
D. fungi, because there would be fewer organisms breaking down wastes

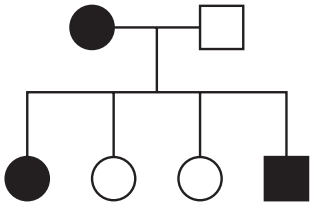
LS4 (5-8) POC-11 Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.

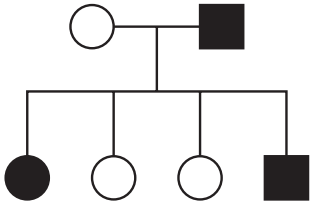
10 A researcher studies blindness in cats. The researcher breeds a cat that is blind with a cat that is not blind. Four kittens are produced. One male and one female kitten are blind. The other two male kittens are not blind. The researcher uses the key below to make the pedigree for the family of cats.

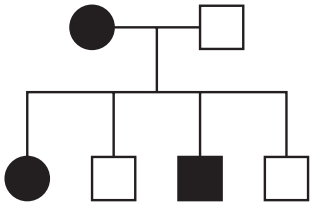


Which diagram shows the pedigree for this family of cats?

A.


B.


C.


D.


Broad Area of Inquiry:	**Formulating Questions & Hypothesizing**
Inquiry Construct 3:	Make and describe observations in order to ask questions, hypothesize, make predictions related to topic.

1. Describe **two** observations Sarah could use from Maps 1 and 2 to show the relationship between the depth of an earthquake and the type of plate boundary nearby. Use evidence from Maps 1 and 2 on the **Map Reference Sheet** to support your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to make and describe observations in order to make predictions. The response uses evidence to describe two observations that could be used from the maps to show the relationship between the depth of an earthquake and the type of plate boundary nearby.
1	The response demonstrates a limited understanding of how to make and describe observations in order to make predictions. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by any two of the following sample responses:

- There are shallow earthquakes on the divergent boundaries such as the Mid-Atlantic Ridge.
- There are shallow earthquakes on the transform plate boundaries between the North American and Pacific Plates.
- There are deep earthquakes on the convergent boundaries between the South American and Nazca Plates.

Score Point 2

1. Describe **two** observations Sarah could use from Maps 1 and 2 to show the relationship between the depth of an earthquake and the type of plate boundary nearby. Use evidence from Maps 1 and 2 on the **Map Reference Sheet** to support your answer.

One observation that Sarah could use from Maps 1 and 2 is that most earthquakes deeper than 250 km occur on or very close to Convergent plate boundaries. Another observation she could make is that most earthquakes shallower than 50 km occur on or very close to divergent plate boundaries.

The response demonstrates a general understanding of how to make and describe observations in order to make predictions. The response describes that Maps 1 and 2 show that deeper earthquakes occur on convergent plate boundaries, and shallower earthquakes tend to occur on divergent boundaries.

Score Point 1

1. Describe **two** observations Sarah could use from Maps 1 and 2 to show the relationship between the depth of an earthquake and the type of plate boundary nearby. Use evidence from Maps 1 and 2 on the **Map Reference Sheet** to support your answer.

All the earthquakes happen on different types of plate boundaries.

Most earthquakes that are deeper than 250km. happen on convergent boundaries.

The response demonstrates a limited understanding of how to make and describe observations in order to make predictions. The response describes that Maps 1 and 2 show that deeper earthquakes occur on convergent plate boundaries, but the first observation is insufficient for credit.

Score Point 0

1 Describe **two** observations Sarah could use from Maps 1 and 2 to show the relationship between the depth of an earthquake and the type of plate boundary nearby. Use evidence from Maps 1 and 2 on the **Map Reference Sheet** to support your answer.

- the edges of the continents are usually deeper and they are where the plates were seperated

- Convergent plate boundaries cause more earthquakes than the other two.

The response is incorrect or irrelevant to the skill or concept being measured. Neither observation is supported by the evidence provided in Maps 1 and 2. There does not appear to be a pattern connecting earthquake depth and continental boundaries. The second observation is not clearly supported by the maps and does not relate the plate boundary type to depth.

Broad Area of Inquiry:	**Conducting Investigations**
Inquiry Construct 8:	Use accepted methods for organizing, representing, and manipulating data.

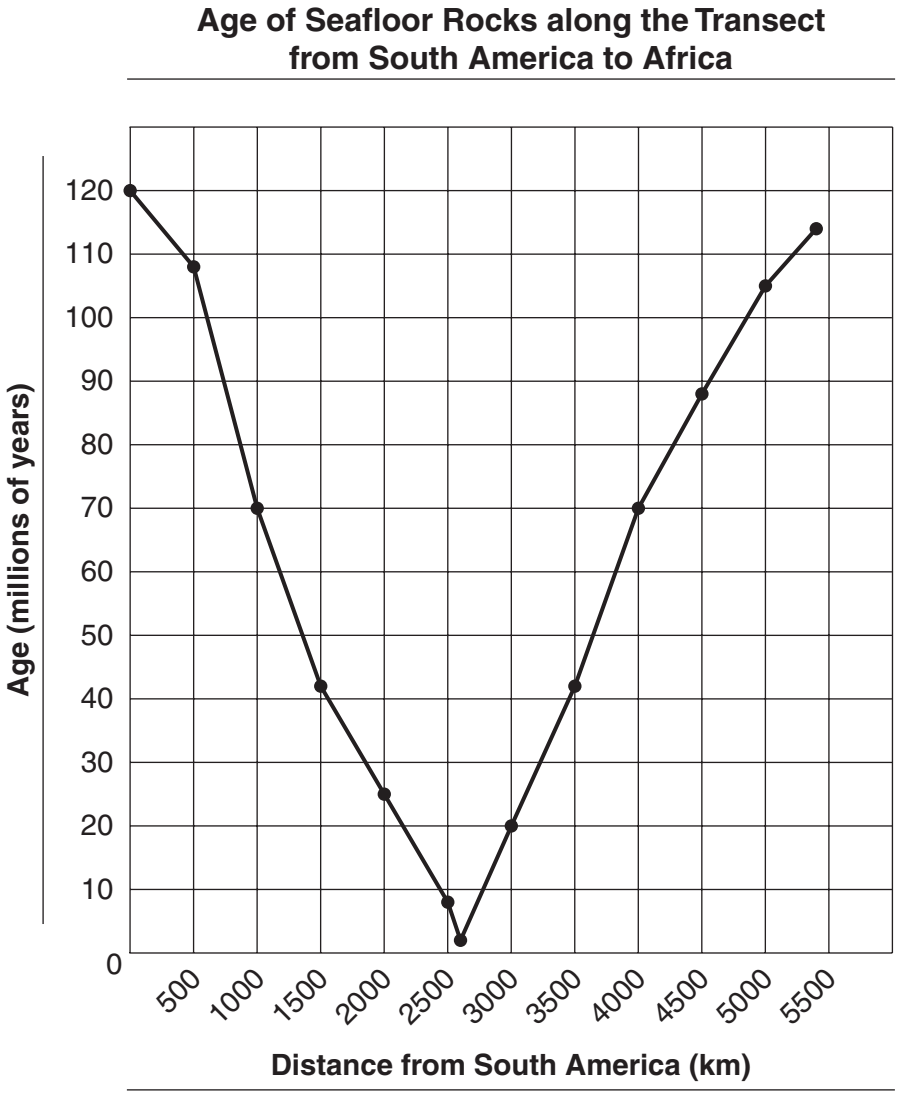
❷ Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.

Scoring Guide

Score	Description
3	The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response uses the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.
2	The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is general.
1	The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

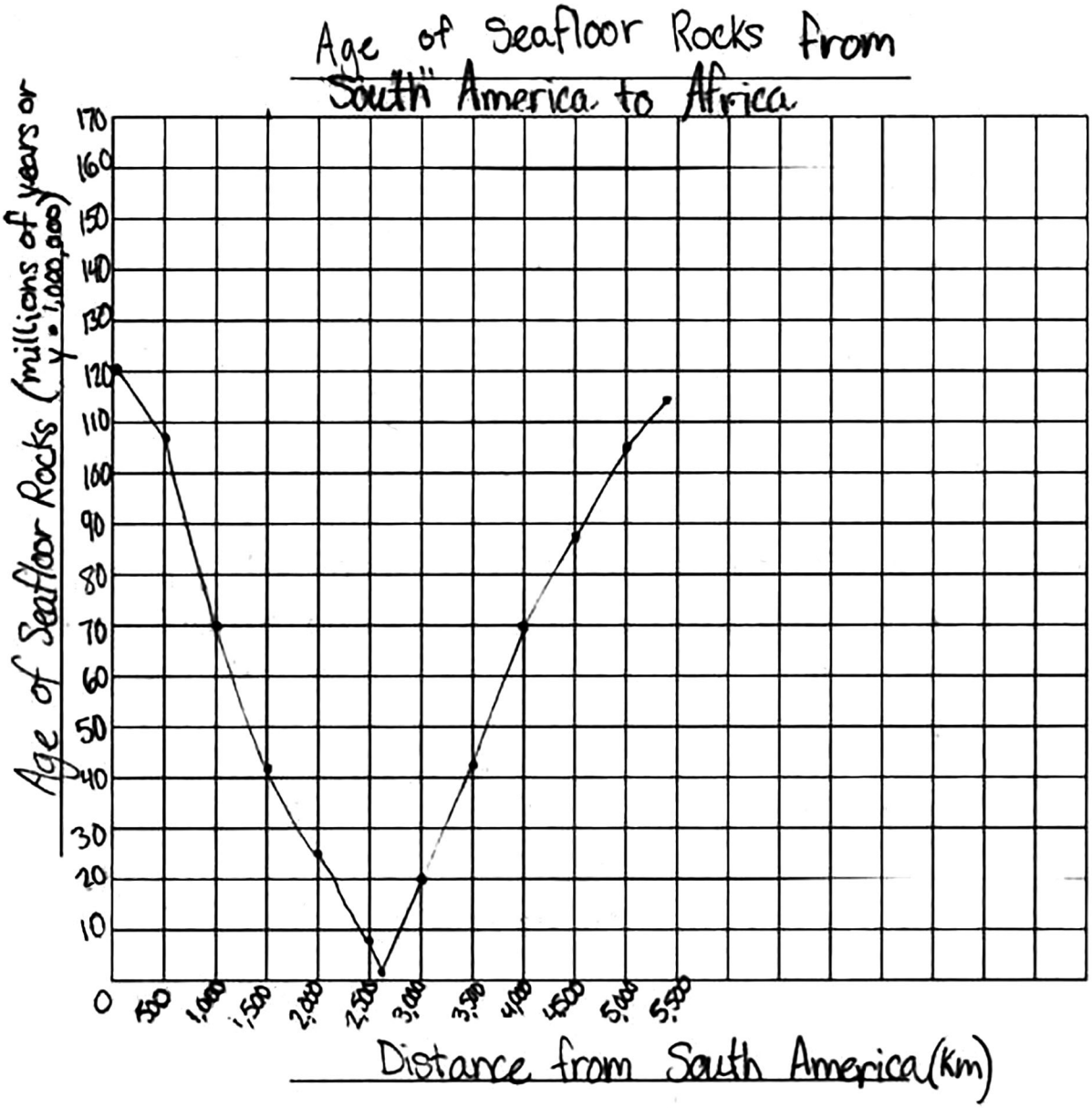
A thorough understanding can be exemplified by the following sample response:

- includes titles, labels, keys, or symbols as needed
- includes a scale appropriate for the range of data to be plotted



Score Point 3

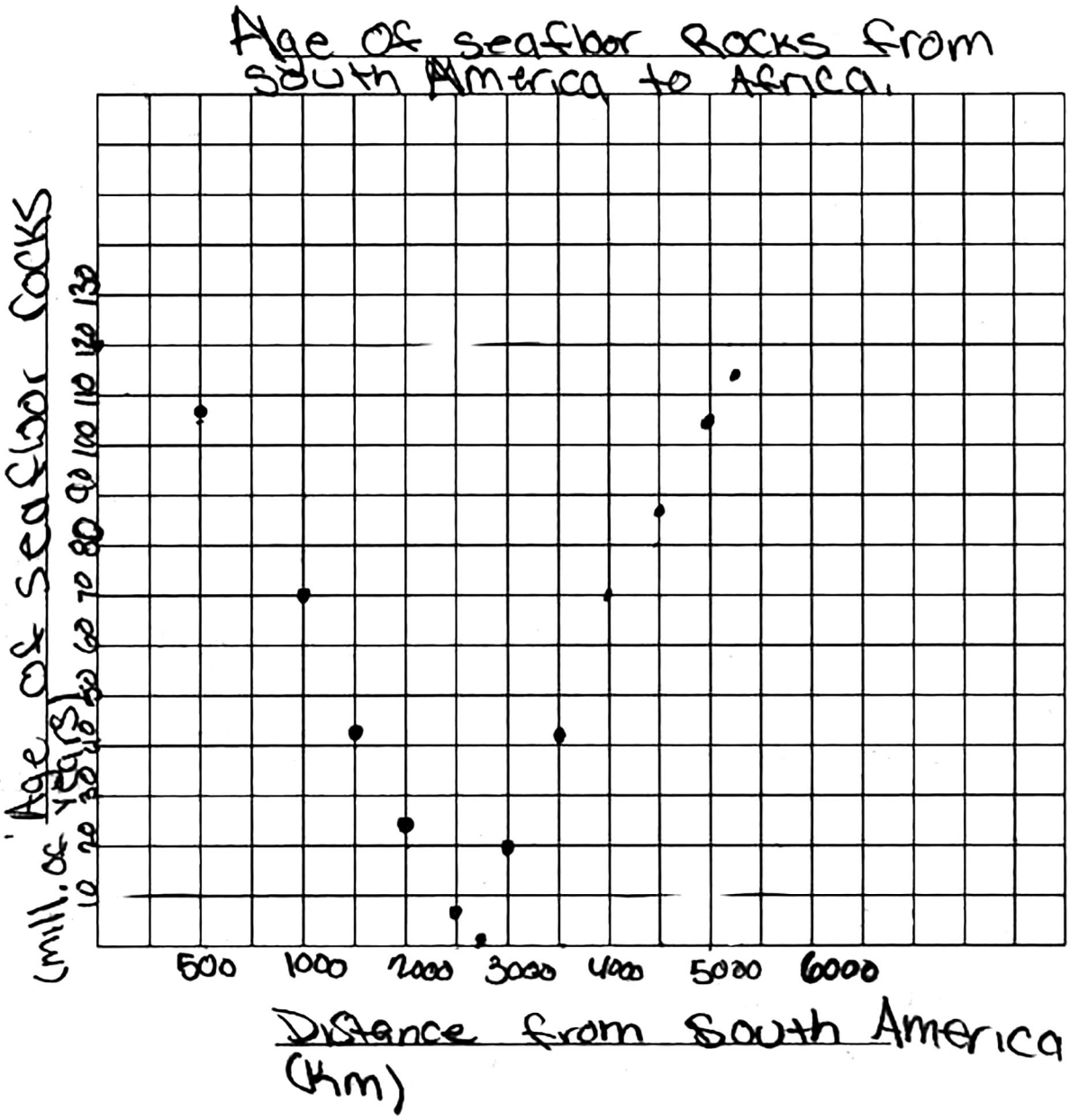
❷ Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.



The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response uses the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa. The graph contains a title, axes labels with units, appropriate scales, and correctly plotted data points.

Score Point 2

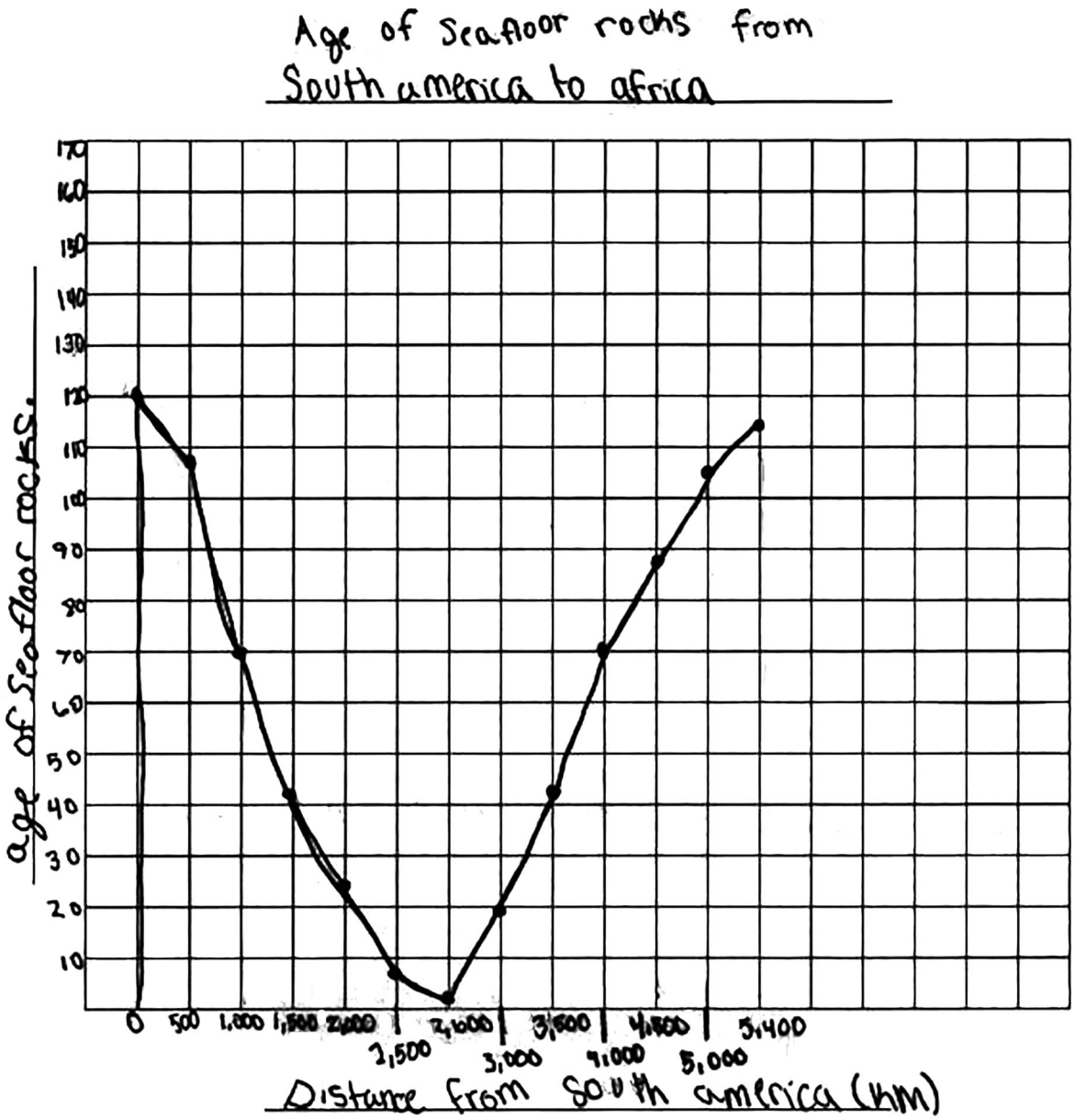
❷ Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.



The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The graph contains a title, axes labels with units, mostly appropriate scales, and correctly plotted data points. However, there is no origin, the *x*-axis scale is inconsistent (switching from 500 km to 1000 km every two grid lines), and there is no line drawn to connect the data points.

Score Point 1

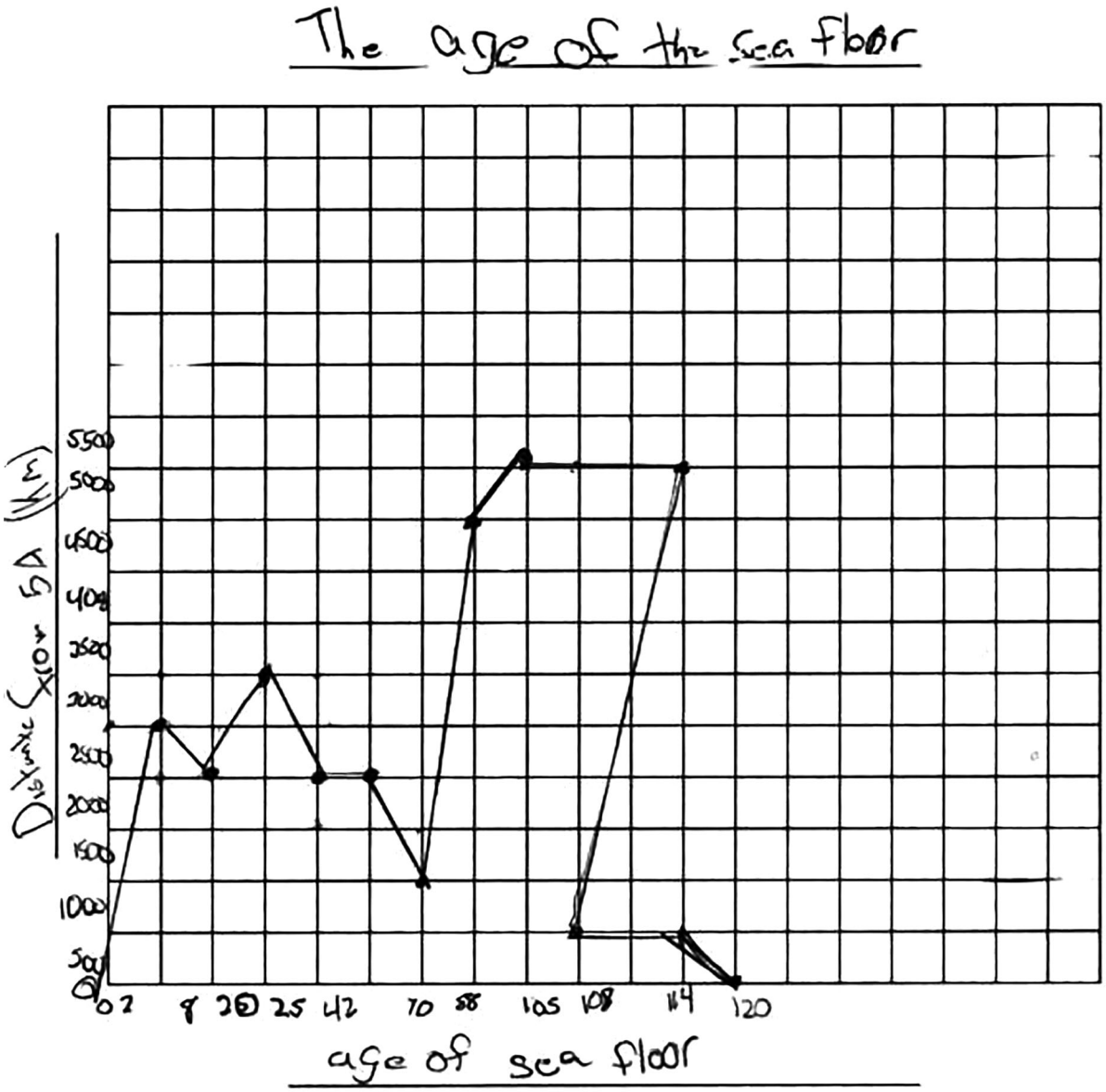
❷ Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.



The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The graph contains a title, axes labels, and correctly plotted data points. However, the *x*-axis does not start at zero and uses the data points to label the grid instead of creating a scale, the *y*-axis is missing units, and there is an extraneous line at the zero *x*-axis point.

Score Point 0

❷ Use the data from Data Table 1 to create a line graph that shows the age of the seafloor rocks along the transect from South America to Africa.



The response is incorrect or irrelevant to the skill or concept being measured. The axes are reversed, the scaling is off on both axes, there are data points missing, there are no units for age of seafloor, and the title is incomplete. The line and overall shape of the graph do not represent the data set and signify a lack of understanding.

Broad Area of Inquiry:	**Conducting Investigations**
Inquiry Construct 10:	Summarize results based on data.

❸ Explain how the evidence from either your graph or Data Table 1 supports Sarah's conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to summarize results based on data. The response explains how the evidence from either the graph or Data Table 1 supports the conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.
1	The response demonstrates a limited understanding of how to summarize results based on data. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

The evidence supports Sarah's conclusion. As the African Plate and the North American and South American Plates move apart, new seafloor is formed, so the areas closest to the Mid-Atlantic Ridge have the youngest rocks. For example, around 2600 kilometers from South America, the rocks are two million years old. The areas farther away from the ridge have older rocks. For example, at 5400 kilometers from South America the rocks are 114 million years old.

Score Point 2

3 Explain how the evidence from either your graph or Data Table 1 supports Sarah's conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

The data lable helps support Saras conclusion that the Plate boundary at Mid-Atlantic Ridge is a divergent Plate boundary because the plates have moved apart and caused new crust to push out the old crust. From the data table it showed that every 500 km the age of the seafloor rocks had consistanly gone down until 3000 km when it went from 2 million years to 20 million years and continued to increase. This is because the new crust was pushing out the old crust which pushed out some of the seafloor rocks.

The response demonstrates a general understanding of how to summarize results based on data. The response explains how the evidence from the graph and Data Table 1 support the conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary. Although stating that new crust is "pushing out" the old crust is not the most precise terminology, it is acceptable at the general understanding level.

Score Point 1

❸ Explain how the evidence from either your graph or Data Table 1 supports Sarah's conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

Evidence from the graph and data table 1 supports Sarah conclusion because the graph and table are showing the new rock that is being created and the old rock that the new rock is just pushing aside.

The response demonstrates a limited understanding of how to summarize results based on data. While the conclusion is correct and summarizes the data appropriately, the statement is not supported with evidence from the graph or data table.

Score Point 0

❸ Explain how the evidence from either your graph or Data Table 1 supports Sarah's conclusion that the plate boundary at the Mid-Atlantic Ridge is a divergent plate boundary.

The graph demonstrates Sarah's conclusion of the Mid-Atlantic Ridge being divergent because as the distance increases in the graph it shows it getting narrow showing that the old rock is getting covered by new rock.

The response is incorrect or irrelevant to the skill or concept being measured. The interpretation of the evidence is incorrect which, as a result, does not support Sarah's conclusion.

Broad Area of Inquiry:	**Formulating Questions & Hypothesizing**
Inquiry Construct 2:	Construct coherent arguments in support of a question, hypothesis, prediction.

❹ Describe **two** pieces of evidence from Maps 1 and 3 on the **Map Reference Sheet** that support Luke's idea that most of the volcanoes are located on convergent boundaries.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of constructing a coherent argument in support of a question, hypothesis, or prediction. The response describes two pieces of evidence from Maps 1 and 3 that support Luke's idea that most of the volcanoes are located on convergent boundaries.
1	The response demonstrates a limited understanding of constructing a coherent argument in support of a question, hypothesis, or prediction. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by one of the following sample responses (or other plausible responses):

- There are many volcanoes located along trenches such as the Aleutian and Mariana Trenches.
- There are many volcanoes on the convergent boundary between the South American and Nazca Plates.

Score Point 2

❹ Describe **two** pieces of evidence from Maps 1 and 3 on the **Map Reference Sheet** that support Luke's idea that most of the volcanoes are located on convergent boundaries.

The two pieces of evidence include:

- The Aleutian Trench were many volcanos occur.
- The Tonga Trench were also many volcanos occur.

Trenchs occur on convergent boundaries, and these were the two trenchs with the most volcanic activity

The response demonstrates a general understanding of constructing a coherent argument in support of a question, hypothesis, or prediction. The response describes two pieces of evidence from Maps 1 and 3, many volcanoes on the Tonga Trench and on the Aleutian Trench, that support Luke's idea that most of the volcanoes are located on convergent boundaries.

Score Point 1

4 Describe **two** pieces of evidence from Maps 1 and 3 on the **Map Reference Sheet** that support Luke's idea that most of the volcanoes are located on convergent boundaries.

One piece of evidence showing that most volcanoes are located on convergent boundaries can be that map 1 shows where the convergent boundaries are and map 3 shows more volcanoes on those areas. Another piece of evidence could be that on the west side of both maps (on map 1 where the convergent boundaries are) that is where most of the volcanoes are.

The response demonstrates a limited understanding of constructing a coherent argument in support of a question, hypothesis, or prediction. The response provides one piece of evidence in support of Luke's idea, that the west side of the maps is where the convergent boundaries are and most of the volcanoes. The first statement is a description of what the maps are showing, which is not evidence supporting Luke's idea.

Score Point 0

❹ Describe **two** pieces of evidence from Maps 1 and 3 on the **Map Reference Sheet** that support Luke's idea that most of the volcanoes are located on convergent boundaries.

Two pieces of evidence from Maps 4 and 3 that supports Luke's idea that most of the volcanoes are located on convergent areas is that the volcanoes are next to eachother and explosive voluanoes occur on the sea floor at convergent boundaries.

The response is incorrect or irrelevant to the skill or concept being measured. The response repeats information from the bullet points in the passage, which is not evidence from the maps.

Broad Area of Inquiry:	**Developing and Evaluating Explanations**
Inquiry Construct 11:	Analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous.

❺ Use information from the story on page 7 and the **Map Reference Sheet** to explain why Map 3 is missing information. Describe **two** factors that could explain the lack of evidence of volcanic activity on the ocean ridges.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous. The response uses information from the story and the Map Reference Sheet to explain why Map 3 is missing information. The response describes two factors that could explain the lack of evidence of volcanic activity on the ocean ridges.
1	The response demonstrates a limited understanding of how to analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by any two of the following sample responses:

- Volcanoes are not always very explosive.
- Volcanoes may occur in very deep water.
- Volcanoes are located in very inaccessible areas.

Score Point 2

5 Use information from the story on page 7 and the **Map Reference Sheet** to explain why Map 3 is missing information. Describe **two** factors that could explain the lack of evidence of volcanic activity on the ocean ridges.

Volcanoes occur under water at divergent boundaries, but the water is so deep in some places that we can not detect the volcanoes. Also, they have less explosive force than volcanoes at convergent boundaries, so it is difficult to detect them.

The response demonstrates a general understanding of how to analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous. The response uses information from the story and the Map Reference Sheet to explain that the depth and explosiveness of some volcanoes could explain why Map 3 is missing information.

Score Point 1

5 Use information from the story on page 7 and the **Map Reference Sheet** to explain why Map 3 is missing information. Describe **two** factors that could explain the lack of evidence of volcanic activity on the ocean ridges.

1. Sometimes volcanoes cannot be seen from the ocean's surface because of how deep the area is.

2. Its difficult to record the data when the volcanoe can't be seen.

The response demonstrates a limited understanding of how to analyze data, including determining if data are relevant, artifact, irrelevant, or anomalous. The response explains that deep volcanoes could be difficult to detect, but the second statement only serves to clarify the first piece of evidence.

Score Point 0

❺ Use information from the story on page 7 and the **Map Reference Sheet** to explain why Map 3 is missing information. Describe **two** factors that could explain the lack of evidence of volcanic activity on the ocean ridges.

Map 3 could be missing information because theres a lot of plate boundaries where the volcanoes are not shown on the map.

1) theres alot of divergent plates in the ocean where volcanoes are located.

2) theres a lot of transform plates in the ocean where volcanoes are located.

The response is totally incorrect or irrelevant to the skill or concept being measured. The statements do not adequately explain why there is missing information.

Broad Area of Inquiry:	**Planning and Critiquing of Investigations**
Inquiry Construct 4:	Identify information/evidence that needs to be collected in order to answer the question, hypothesis, prediction.

❻ Identify which information in Data Tables 2 and 3 is the most important to answer Ali's research question. Explain why the information you chose is important to include in the app.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction. The response identifies which information is the most important to answer the research question, "Where are the most recent earthquakes and volcanic eruptions in eastern Africa located?" and explains why the information chosen is important to include in the app.
1	The response demonstrates a limited understanding of how to identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following or another reasonable sample response:

The data that are the most important include the year and location of earthquakes and volcanoes in eastern Africa. This information shows where and when the eruptions occurred, which is what is asked by Ali's research question (the other information, such as volcano name, is not necessary). The app should show that volcanoes and earthquakes have occurred recently in eastern Africa.

Score Point 2

6 Identify which information in Data Tables 2 and 3 is the most important to answer Ali's research question. Explain why the information you chose is important to include in the app.

I think that the information Ali needs to include is the location/country and the day/month/year. This information is important to include in the app because Ali is asking "where" and "most recent". That information will answer her question perfectly.

The response demonstrates a general understanding of how to identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction. The response identifies that the location and date of the volcanic eruptions are the most important pieces of information to answer the research question and explains why the information chosen is important to include in the app.

Score Point 1

6 Identify which information in Data Tables 2 and 3 is the most important to answer Ali's research question. Explain why the information you chose is important to include in the app.

The most important information on data tables 2 and 3 are the earthquake magnitude the earth quak depth and date the volcano number and the year in which the eruption started.

The response demonstrates a limited understanding of how to identify information/evidence that needs to be collected in order to answer the question. The response identifies the date, or year, as important but also includes other extraneous pieces of information.

Score Point 0

6 Identify which information in Data Tables 2 and 3 is the most important to answer Ali's research question. Explain why the information you chose is important to include in the app.

The information in Data tables 2 and 3 are helpful but Ali needs to observe which Earthquake was nearest to a plate boundry. Then to use that info in the App.

Another Piece of information that she Could loom at in table 2 is what was the magnitude and Depth.

The response is incorrect or irrelevant to the skill or concept being measured. The pieces of evidence named would not be the most important to help answer Ali's research question.

Broad Area of Inquiry:	**Developing and Evaluating Explanations**
Inquiry Construct 13:	Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.

❼ Use the **Map Reference Sheet** and the information from the story to support Jacob's idea that a new plate boundary is forming in Africa. Use evidence from Data Tables 2 and 3 and Diagram 2 to support your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The response uses evidence to support the idea that a new plate boundary is forming in Africa.
1	The response demonstrates a limited understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

A new plate boundary may be forming in eastern Africa. This is supported by the data that show there are many recent volcanoes and earthquakes in Africa not on plate boundaries. This supports Jacob's idea because Maps 1, 2, and 3 show that there are volcanoes and earthquakes on plate boundaries. (Rocks and gases in this area are also the same age.)

Score Point 2

❼ Use the **Map Reference Sheet** and the information from the story to support Jacob's idea that a new plate boundary is forming in Africa. Use evidence from Data Tables 2 and 3 and Diagram 2 to support your answer.

A new plate boundry is forming because all the recent Volcanoes and earthquakes which happened in 2011 and 2014 all happened a long one curve where there is no plate boundry. For a Volcanse or earthquake most likely to happen is to be a long a plate boundry. In map 1 it shows no plate boundry, so maybe there is a new one being formed.

The response demonstrates a general understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The response uses evidence from the data tables and Diagram 2 to support the idea that a new plate boundary is forming in Africa.

Score Point 1

❼ Use the **Map Reference Sheet** and the information from the story to support Jacob's idea that a new plate boundary is forming in Africa. Use evidence from Data Tables 2 and 3 and Diagram 2 to support your answer.

Theres been a lot more earth-
quakes and over the years
the volcanoes are starting to
erupt more and more.
Theres also more earth-
quakes happening in one area.

The response demonstrates a limited understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The response provides a broad statement that seems to be centered on the passage under Diagram 2. The response does not mention that they are not on a plate boundary on Map 1 or explain how this information supports Jacob's idea.

Score Point 0

❼ Use the **Map Reference Sheet** and the information from the story to support Jacob's idea that a new plate boundary is forming in Africa. Use evidence from Data Tables 2 and 3 and Diagram 2 to support your answer.

A new plate boundry is coming
because the gas and earthquaks
and volcanic eruptions all
point to yes

The response is incorrect or irrelevant to the skill or concept being measured. The response does not explain how the cited pieces of evidence support Jacob's idea.

Broad Area of Inquiry:	**Developing and Evaluating Explanations**
Inquiry Construct 12:	Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis.

❽ Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

Scoring Guide

Score	Description
3	The response demonstrates a thorough understanding of using evidence to support and justify interpretations and conclusions. The response identifies three important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" The response describes how each piece of information will help support the goal of the app.
2	The response demonstrates a general understanding of using evidence to support and justify interpretations and conclusions. The overall response is general.
1	The response demonstrates a limited understanding of using evidence to support and justify interpretations and conclusions. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A thorough understanding may be exemplified by any three of the following sample responses or other reasonable responses.

- Earthquakes are located at plate boundaries. For example, the deepest earthquakes are located between the Nazca and South American Plates, which shows that plates are moving toward each other.
- The youngest rocks (2 million years old) were found along divergent plate boundaries at the Mid-Atlantic Ridge (2600 kilometers from South America), which provides evidence that tectonic plates are moving away from each other.
- Volcanoes are located at plate boundaries and are caused by moving plates; for example, there are many volcanoes at the boundary between the Eurasian and African Plates.
- A new tectonic plate may be forming in eastern Africa. Volcanoes and earthquakes in eastern Africa provide evidence that this new plate is moving.

Score Point 3

8 Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

Three important pieces of information that would best help Someone use the app to answer the question are data table 1, diagram 1, and data table 2 (41). Each piece of information will help the goal for the app because they all provide very different information and data that can be used to show evidence that Earth's tectonic plates are moving. Diagram 1 (38) will help because it shows where the new crust pushed the old crust (divergent). Data table 1 (39) shows the different ages of the rock because of how the divergent boundary moves the old crust. data table 2 (41) shows the most recent earthquakes that happened in easter Africa to answer more about the reaserch question.

The response demonstrates a thorough understanding of using evidence to support and justify interpretations and conclusions. The response identifies three important pieces of information, using Diagram 1, Data Table 1, and Data Table 2, that would best help someone use the app to answer the research question. The response describes how each piece of information will help support the goal of the app.

Score Point 2

8 Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

☆~ Research of the Mid-atlantic ridge shows new Rocks forming from the boundaries, and old ones Moving away from the ridge from the divergent Boundaries.

☆~ The 3 types of Map 1 Shows Plate Movement in divergent, transform, and convergent Boundaries

☆~ Diagram 2/Map 2/Map 3 Shows a new plate forming on africa. Plate movement makes this possible

The response demonstrates a general understanding of using evidence to support and justify interpretations and conclusions. The response identifies three important pieces of information, using Data Table 1, Map 1, and Diagram 2, but does not clearly make a connection between the evidence and the research question.

Score Point 1

8 Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

The formations, the activity
of volcanos and earthquakes
and natural disasters. This
information helps because it
shows that somehow the
earth is moving and causing
these specific things.

The response demonstrates a limited understanding of using evidence to support and justify interpretations and conclusions. The response identifies vague pieces of information without a clear explanation of how the evidence would support the goal of the app.

Score Point 0

❽ Identify **three** important pieces of information that would best help someone use the app to answer the research question "How do data from scientific investigations provide evidence that Earth's tectonic plates are moving?" Describe how each piece of information will help support the goal of the app.

what would best help a students is explain more map reference.

The response is incorrect or irrelevant to the skill or concept being measured. The response does not provide information that would support the goal of the app.

Date: _____

Your Name: _____

New England Common Assessment Program

Released Science Inquiry Task

Plate Tectonics

2016

Grade 8

Student Answer Booklet

SCIENCE

1.

2.

3.

4.

5.

6.

7.

8.

STOP