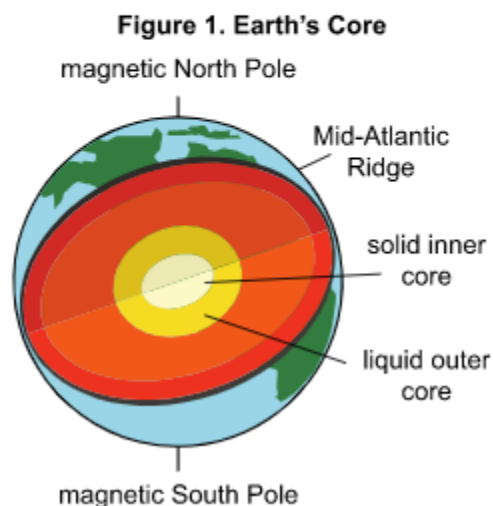
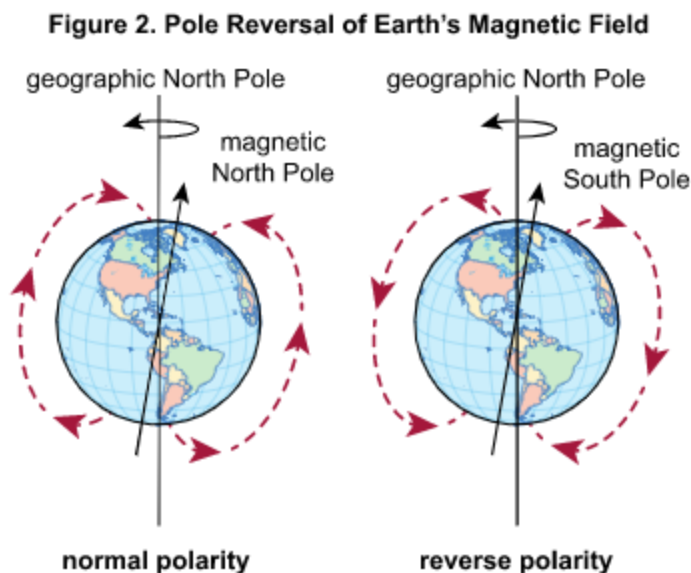


Changes in Earth's Magnetic Field

Earth has a magnetic field that extends from the North and South Poles of the planet and out into space. Many scientists suggest that Earth's magnetic field size, strength, and direction are related to the liquid iron outer core. Figure 1 shows a model of Earth's core.



Scientists discovered that the locations of Earth's North and South Poles can switch every so often. About every few hundred thousand years, Earth's magnetic poles reverse. This is a result of Earth's magnetic field changing direction, as shown by the dotted magnetic field lines in Figure 2.



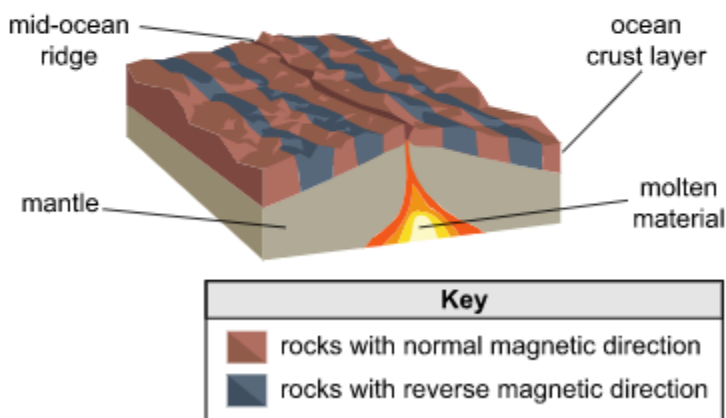
Source: Houghton Mifflin Company.

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Changes in Earth's Magnetic Field

Evidence of the reversal of Earth's magnetic field is found in the rocks along the ocean floor. The ocean floor moves away slowly from the ridge on either side. As lava from the ridge erupts, tiny fragments in the lava align with the direction of Earth's magnetic field before the lava cools to become solid rock. Some of these fragments have a normal magnetic direction, while other fragments have a reverse magnetic direction. Figure 3 shows the location of rocks with a normal magnetic direction or a reverse magnetic direction.

Figure 3. Magnetic Direction of Ocean Floor Rocks



Source: United States Geological Survey.

24.

Use Figure 1 and Figure 2 to answer the question.

Scientists suggest that the movement of Earth's liquid iron core results in electrical currents. These currents would then result in Earth's magnetic field.

Recent satellite data suggest that the strength of Earth's magnetic field has weakened by about 3.5 percent in some areas. In other areas, Earth's magnetic field strength has increased by about 2 percent.

Which statement **best** explains the differences in Earth's magnetic field strength based on the movement of Earth's liquid iron core?

- ☐ (a) The movement of Earth's liquid iron core stopped in both locations.
- ☐ (b) The movement of Earth's liquid iron core changes direction in some locations.
- ☐ (c) The movement of Earth's liquid iron core is the same in all locations.
- ☐ (d) The movement of Earth's liquid iron core increased in speed in both locations.

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Changes in Earth's Magnetic Field

25.

Based on Figure 2 and Figure 3, select the correct answer from **each** drop-down menu to complete the paragraph.

A magnetic compass needle is able to detect the direction of Earth's magnetic North Pole. Over hundreds of thousands of years, the direction in which a compass needle points would . During a normal polarity period, a compass needle points mostly in the direction of the . After a magnetic pole reversal, a compass needle points mostly in the direction of the .


<input type="text"/>	<input type="text"/>	<input type="text"/>
stay the same	geographic North Pole	geographic North Pole
change	Equator	Equator
	geographic South Pole	geographic South Pole

26.

Scientists will study how Earth's magnetic field changes as distance from Earth changes. Satellites will be placed at different distances from Earth and will be used to measure the strength of Earth's magnetic field.

Drag the correct label into **each** box in the table to identify the dependent and independent variables in the investigation.

Not all labels will be used.

		?
Variable	Property	
dependent variable		magnetic field strength
independent variable		distance from Earth
		size of satellite
		mass of satellite
		gravitational force of Earth

27.

Scientists are planning an investigation to collect evidence to help predict future magnetic pole reversals of Earth's magnetic field. Using the information in Figure 3, describe how scientists can collect data on changes in Earth's magnetic poles and explain how this data can be used to predict future magnetic pole reversals.