

Listen and Learn

Consider ►

What text structures are often used in scientific and technical texts?

How do graphics, symbols, and scientific terms clarify scientific and technical texts?

Journey to EARTH'S CENTER

1 Considering a journey to Earth's center brings to mind all sorts of wild, awe-inspiring feats. So it was with Jules Verne and his book *Journey to the Center of the Earth*. Today, though, we know that the story Verne wrote describes a journey into pure fantasy. The high pressure and temperature in Earth's core make it impossible for humans to survive there.

Now, you might ask yourself: *If humans couldn't survive deep in Earth's interior, how do we know so much about the interior layers?* Your question would certainly be valid. Geologists study rocks and other physical features of planet Earth as well as its history. Geophysicists study the relationship between Earth's features and the forces that change or produce them. These scientists have learned about the planet's interior from experiments with Earth's rocks and minerals and from the data gained through studies of earthquake waves. In laboratories, scientists apply extreme heat and pressure to rocks and minerals to learn more about the ways heat and pressure within Earth affect them. In the field, scientists study the vibrations produced by earthquakes. The speed at which these vibrations travel offers clues about the rocks through which they are traveling. Scientists' understanding of earthquake data grows deeper as time passes.

Scientists have learned that Earth is divided into layers called the crust, mantle, and core, based on composition. Each layer is significantly hotter and under greater pressure than the one above it.

ANALYZE SCIENTIFIC

TEXTS Scientific texts provide facts about living things, nonliving things, Earth and space, and physical properties. Why can this passage be accurately identified as scientific text?

The Crust

Earth's crust, being the outermost layer, is the easiest to study. The crust is a layer of light, solid rock. Most of the crust is made up of eight elements: oxygen (O), silicon (Si), aluminum (Al), iron (Fe), calcium (Ca), sodium (Na), potassium (K), and magnesium (Mg). It makes sense that scientists have gained the greatest knowledge about this layer. Ocean basins and the ground beneath your feet are part of Earth's crust. Think of Earth's crust the way you think about crust on a piece of bread. This will help you visualize that the crust is quite thin—at least in comparison to Earth's deeper layers. The oceanic crust, the crust beneath the oceans, is much thinner than the continental crust, which makes up the continents.

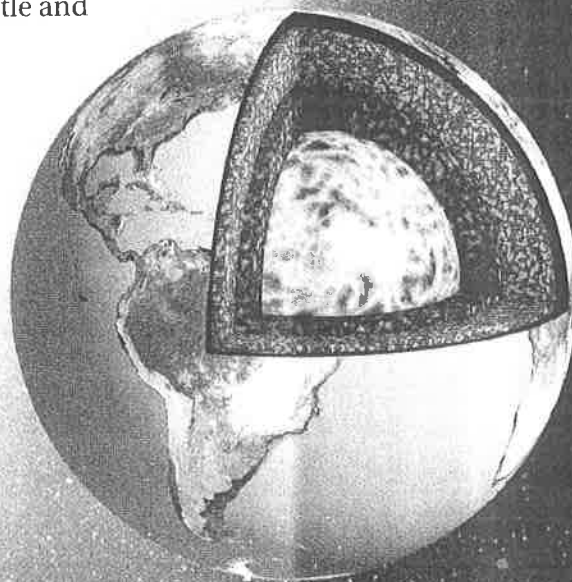
The Mantle

5 Below the crust is the mantle. The mantle is much hotter and softer than the crust, and it makes up most of Earth's volume. The part of the mantle closest to the crust, called the upper mantle, is solid and fractures easily. At greater depths, the temperature and pressure rise in a region called the lower mantle. This causes rock to flow like a slow-moving liquid. The rock is not actually melted, but it is hot enough to fold, stretch, compress, and slowly flow without fracturing. Because of heat and pressure, the rock within the inner mantle is less rigid than the rock above and below. It flows at a slow pace, the way in which gooey, sticky clay might move. This flexibility allows the upper mantle and crust above it to move.

SCIENCE SYMBOLS Scientists often use symbols for elements. Why do you think the author has included both the written names and symbols for the elements that make up Earth's crust?

SCIENCE TERMS A science term is a word or phrase found in a scientific text. What are the component parts of the mantle?

AUTHOR'S PURPOSE The author's purpose is the reason for writing: to entertain, to inform, to persuade, or to express. What is most likely the author's main purpose for writing this passage? Explain.

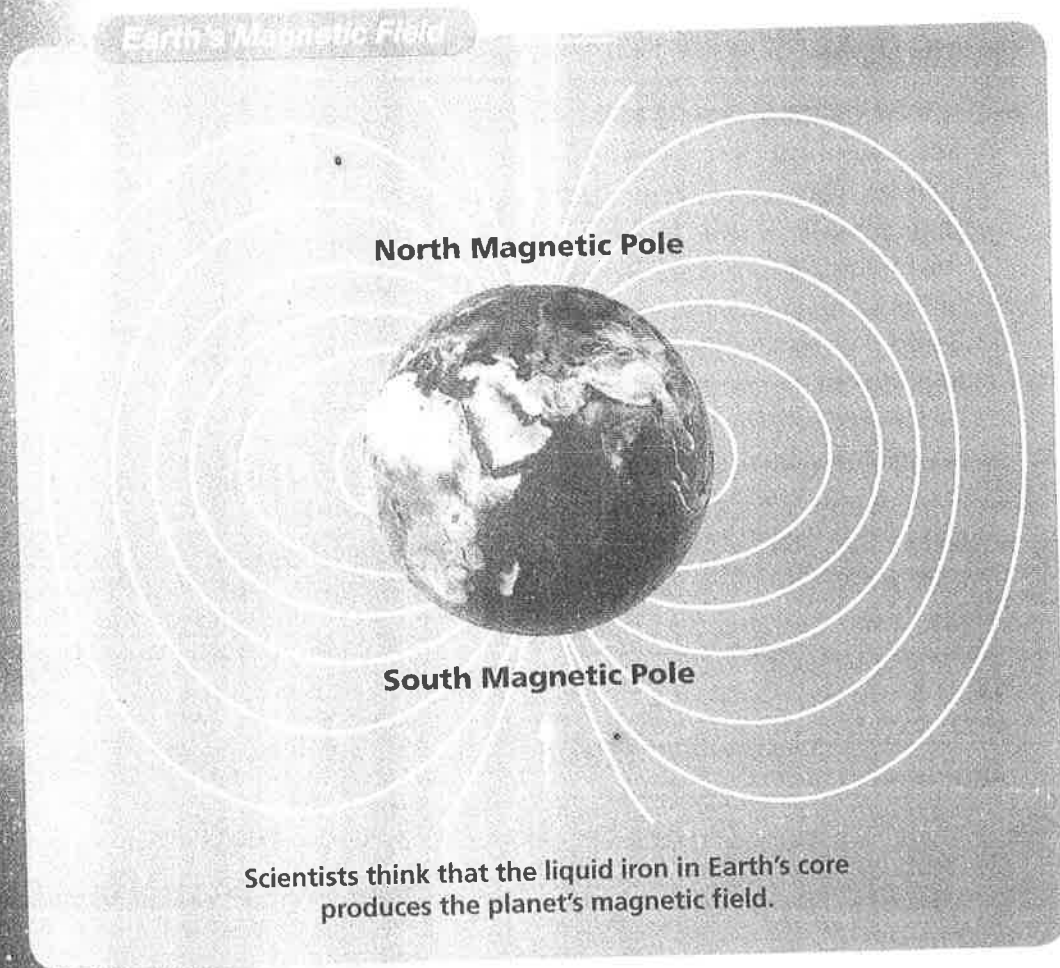


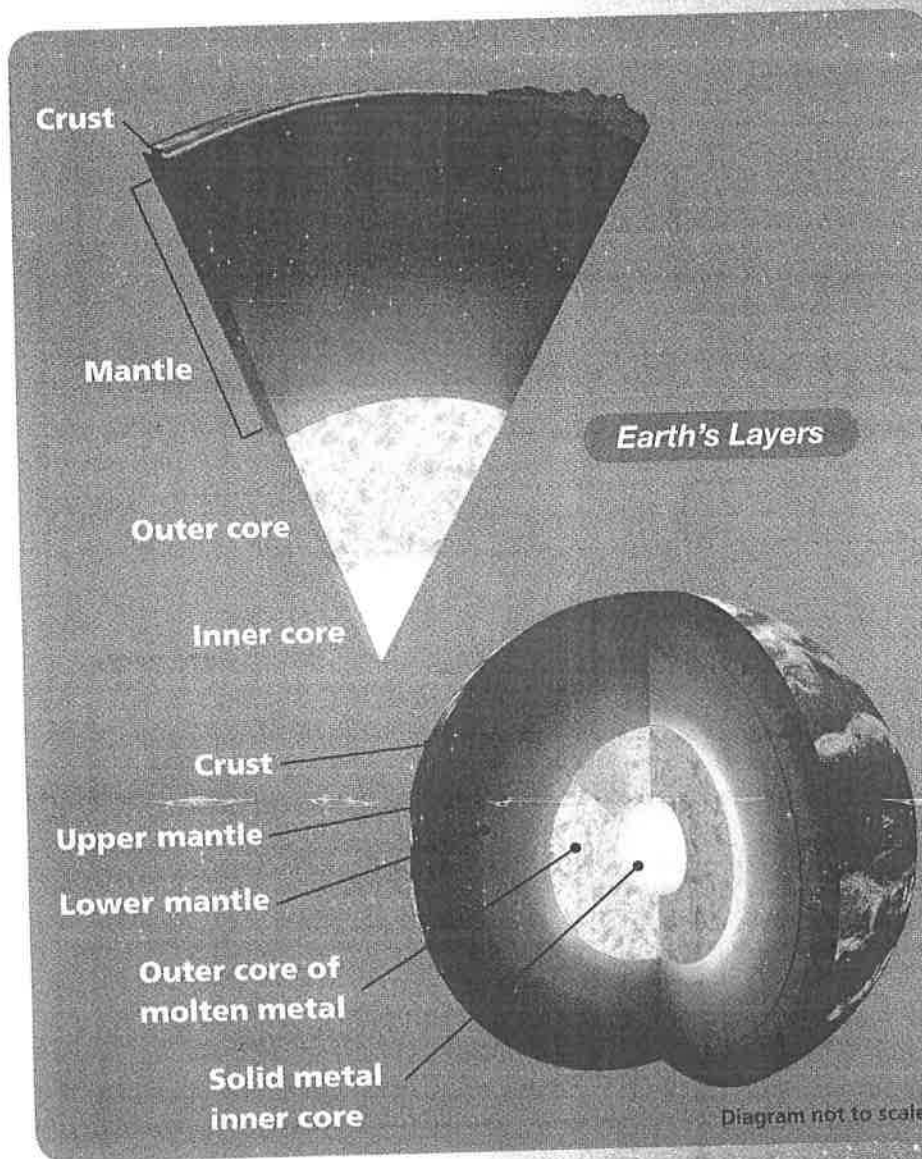
SCIENCE TERMS Some terms are specific to one area of study. Other words, such as *core*, are used in a variety of contexts. Which part of Earth's core is solid? Which part is liquid?

The Core

Earth's core is made up of the outer core and the inner core. The outer core is molten, which means that it has been turned to liquid by extreme heat. This core is made of hot liquid iron and nickel. Scientists think that the outer core is instrumental in the control of Earth's magnetic field, as this liquid metal portion of the core spins while Earth rotates.

The inner core is solid and is made almost completely of extremely hot iron. It is acted on by the extreme pressure of all the layers above it. To get a sense of the extraordinary heat at the center of Earth's core, think about this fact: it is hotter than the sun's surface!





ANALYZE SCIENTIFIC TEXTS You can use definitions, context, and graphics to help you understand scientific texts. Which of Earth's layers is directly beneath your feet? How can you tell?

GRAPHICS A diagram delivers information in a visual way. What is Earth's outermost layer? How does the diagram help you understand this?

LESSON

14

Main Idea

WORDS
TO KNOW

Main idea the most important idea of a passage. It is what the passage is mostly about.

Review It!

Read these sentences. Use the Hint to help you figure out the main idea.

Warm-blooded animals maintain a constant body temperature, no matter what the temperature of their environment is. They stay warm by burning food for energy. They cool off by sweating, panting, or moving to a cooler place.

Hint Look at the first sentence. How is the broad idea it expresses different from the information in the rest of the passage?

Try It!

Read this passage. As you read, underline phrases and sentences that express the most important idea in the passage.

- 1 Desert plants have adapted to deal with the lack of water in the southwestern desert. Some plants store water. Some have a waxy covering on their leaves and stems. This prevents stored water from evaporating. Small leaves, spines, and camouflage are also ways plants deal with the water issue.
- 2 Desert animals, too, have adapted to the lack of water. Some recycle water from within their bodies. Some tap plants for water. Others get water from dry seeds they eat.
- 3 Desert plants have also adapted to deal with the high heat in their habitat. Many live for only one season. They release their seeds and die. The seeds remain dormant until cooler weather comes. Then they sprout and new plants appear.
- 4 Animals deal with desert heat in different ways. Some leave the desert during the hottest times. Others burrow beneath the ground. Some only move around at night, when temperatures are cooler.

Now, use the passage to answer the questions on the following page.

1. What is the main idea of paragraph 1?
 - A. There isn't enough water in the desert.
 - B. Desert plants have adapted to survive with little water.
 - C. Many different kinds of plants grow in the desert.
 - D. Some desert plants die because of lack of water.

2. The main idea of paragraph 2 is that desert animals
 - A. have adapted to the lack of water
 - B. adapt in the same ways as plants
 - C. cannot live without water
 - D. can live without water

3. Which sentence **best** states the main idea of paragraph 4?
 - A. Most desert animals can't tolerate the heat.
 - B. The best way animals escape the heat is by burrowing.
 - C. Different animals deal with desert heat in different ways.
 - D. Animals are better able to survive in the desert than plants are.

4. Which sentence **best** states the main idea of paragraph 3?
 - A. Most desert plants die when it gets very hot.
 - B. Plants are scarce in the southwestern desert.
 - C. Desert plants have developed ways to survive the desert heat.
 - D. Plants sometimes release their seeds when the desert gets hot.



2.

Which answer choice restates the most important idea from the paragraph?

3.

The main idea makes a general statement about the topic. Decide which answer choices are the most general. Then ask yourself: Which choice best matches the information in the paragraph?

In Your Own Words

5. Write the main idea of the passage in your own words.

5.

Don't get bogged down in details. Ask yourself, What was the passage mostly about?

LESSON

15

Supporting Details

WORDS
TO KNOW

Supporting details information that backs up the main idea

Review It!

Read these sentences. Use the Hint to help you locate supporting details.

People are interested in the benefits of electric cars. One reason is that they do not cause as much air pollution as other cars do. Another reason is that they are very quiet.

Hint First, look for the sentence that states the main idea. Then see how the other sentences back it up, or support it, with facts and information.

Try It!

Read this passage. As you read, underline the main idea in each paragraph and circle details that back it up.

- 1 West Indian manatees live along the coast of Florida and in the Caribbean. Today, these gentle animals face the risk of becoming extinct. Fewer and fewer of them are surviving.
- 2 The waters in which they live hold several dangers. The water can become too cold for them to stay alive. Boats that speed by pose another danger. They can hurt and even kill these large, gray creatures. Trash thrown into the water also harms the manatees. If swallowed, it can choke them or block their intestines.
- 3 But the greatest danger to the manatees' survival is the loss of habitat. The number of people moving to places where manatees live has grown a great deal over the past several years.
- 4 Efforts are being made to improve the manatees' chances for survival. Warm-water refuges have been created where manatees can live safely. Also, boaters are being made more aware of the need to protect these animals.

Now, use the passage to answer the questions on the following page.



1. Which detail from paragraph 1 supports the idea that West Indian manatees face possible extinction?
 - A. West Indian manatees are gentle.
 - B. Speeding boats are a problem.
 - C. West Indian manatees live in Florida.
 - D. Fewer of them are surviving.

2. Which detail from paragraph 2 does **not** support the idea that the water manatees live in holds danger for them?
 - A. Manatees are large and gray in color.
 - B. Trash thrown into the water harms the manatees.
 - C. Speeding boats can hurt or kill the manatees.
 - D. The water sometimes gets too cold for the manatees.

3. According to paragraph 4, what efforts are being made to stop boaters from harming manatees?
 - A. They are being fined for hitting manatees.
 - B. They are forced to study manatee behavior.
 - C. They are not allowed to boat in manatee areas.
 - D. They are being made aware of the need to protect manatees

4. What is the main idea of paragraph 3?
 - A. the manatees' enemies
 - B. the water in which manatees live
 - C. the manatees' loss of habitat
 - D. the need to help manatees survive

In Your Own Words

5. Rewrite two important details from paragraph 2 in your own words.

2.

Which detail doesn't show how the water is dangerous for the manatees?

3.

Are there key words that appear both in the answer choices and in the passage?

5.

Often, the main idea comes at the beginning of a paragraph. Which facts in paragraph 2 back up that main idea?