Engage

Gold or Not?

While shopping for a new ring, you see a sign that reads—

Your mother doesn't think the sign is correct and doesn't think the ring is pure gold. In science class, you have been studying density, and you remember density is a physical property that can help determine the identity of different substances. The person selling the ring lets you measure the mass and the volume of the ring. You find out the mass is 42 g and the volume is 3 mL. The Internet tells you the density of the element gold is 19.3 g/mL. What can you conclude about the ring on sale? Is the ring pure gold? Explain your answer.

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Explore

Example or Nonexample?

- Copy the T-chart into your science notebook.
- Study the example and nonexample shown in the T-chart.

Example	Nonexample
gold	T-shirt

- Classify the objects provided by your teacher as an example or a nonexample.
- Record your classifications on the T-chart you created in your science notebook.
- Discuss with your group an explanation for the classification of the object examples versus nonexamples.
- Record the group's classification on the chart paper provided by your teacher.
- Once your group agrees on the classification table and the explanation, follow your teacher's directions to view other groups' classifications.

Explain, Part 1

- Preview the questions in "Elements and Their Symbols," then read and discuss the passage.
- With a partner, discuss the main ideas of each paragraph and your answers to the questions.

Elements and Their Symbols

Everything in the universe is either matter or energy. If something has mass and takes up space, it is matter. If it is able to make changes happen, it is energy. Energy does not have mass or volume.

Chemistry is the study of matter, its properties, and how it changes. Every kind of matter has a set of properties that help identify the matter. For example, some properties are easily observable, such as color, shape, odor, and texture. Other properties, such as mass, volume, and temperature, can be measured using tools. Some properties cannot be observed or measured directly. Instead, they must be calculated. Density is one of those types of properties.

What are physical properties?

The building blocks of matter are known as elements. An element is the simplest pure substance made of only one kind of atom and has definite properties. Over the centuries, scientists have worked to organize all the known elements of the universe into a specialized chart called the Periodic Table of the Elements.

What is an element?

Chemical symbols are used to represent each element. The Periodic Table is used by scientists around the world. No matter what country you are in or what language is spoken, the language of chemistry is the same all over the world. The chemical symbol for each element is a shorthand method of writing the name.

Why do scientists use chemical symbols?

Writing Chemical Symbols

- The symbol always begins with a capital letter.
- If there is a second or third letter, it is written in lower case.
- Periods are not used at the end of the symbol.

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Elements and Their Symbols

Copy the tables into your science notebook. Use the Periodic Table to fill in the missing information.

Symbol	Element
O	
	nitrogen
Fe	
	cobalt
	gold
Li	

Symbol	Element
Ag	
	copper
Cl	
	neon
Si	
B	

Share your completed table with a partner. You may or may not need to make revisions based on your discussion.

Elements and Their Symbols Summary

Refer back to the reading passage. Write one sentence to summarize the main idea of each paragraph.

Review your classification of examples and nonexamples from the Explore activity. Does your explanation need to be revised to reflect new information? Rewrite your explanation to include the term *element*.

Explain, Part 2

Element or Not?

Using the cards your teacher provides, sort into two groups. The cards within each group should have something in common. Once you and your partners have agreed upon the two groups, write a short paragraph explaining how the cards are classified.

Elaborate

Interpreting Pie Charts

Have you ever wondered what your body is made of? Or what makes up the solid Earth? Or what is in the air we breathe? Like all living matter, our bodies are made up of parts called elements. Elements are the building blocks of the universe. The following pie charts represent the elements that make up most of the world in which we live, including the atmosphere, Earth's crust, sea water, and the human body.

Interpreting Pie Charts

In your science notebook, create a table for each pie chart that includes the title, both the element symbol and the element name, and the percentage. You may use the Periodic Table to identify the elements listed.

Figure 2.1. Composition of Earth's Atmosphere

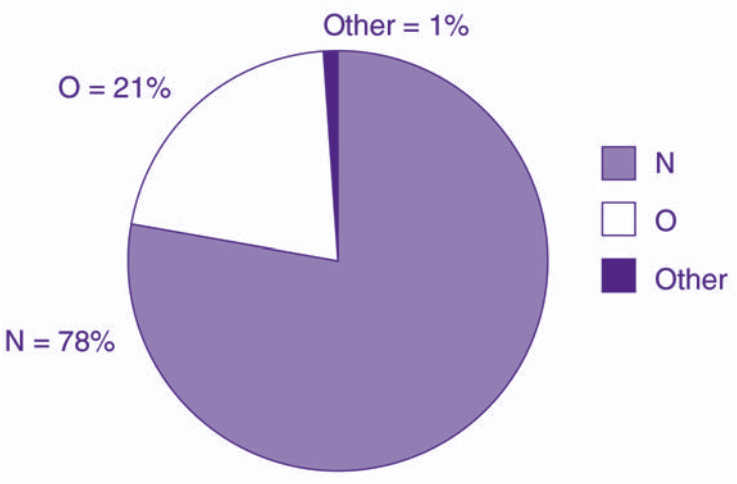

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Figure 2.2. Composition of Earth's Crust

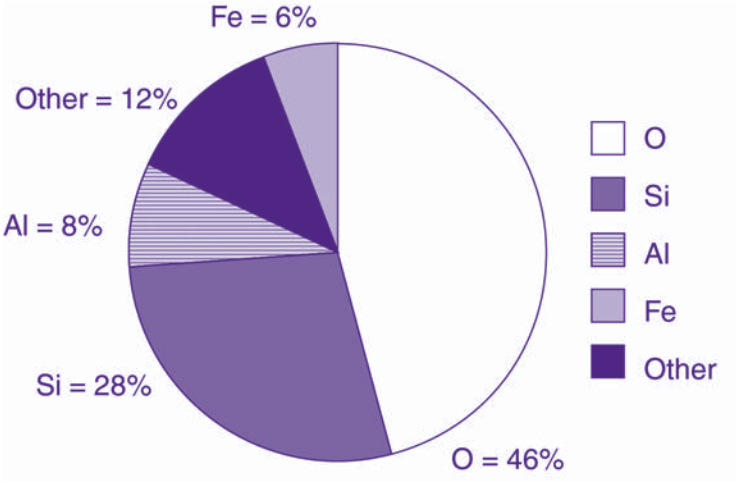


Figure 2.3. Composition of Sea Water

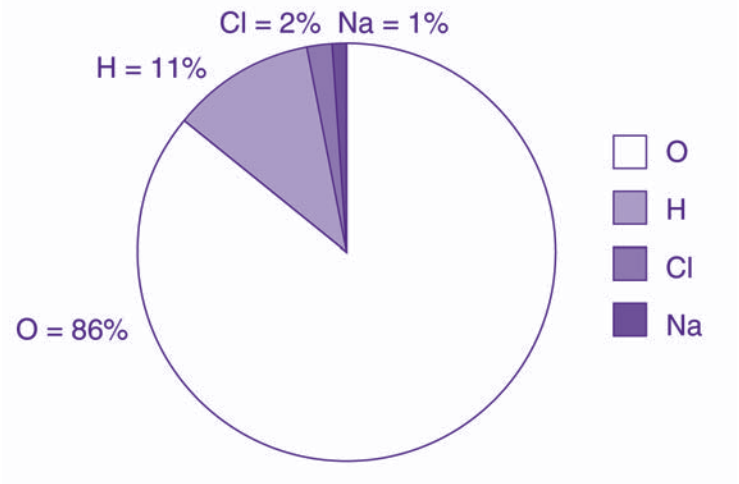
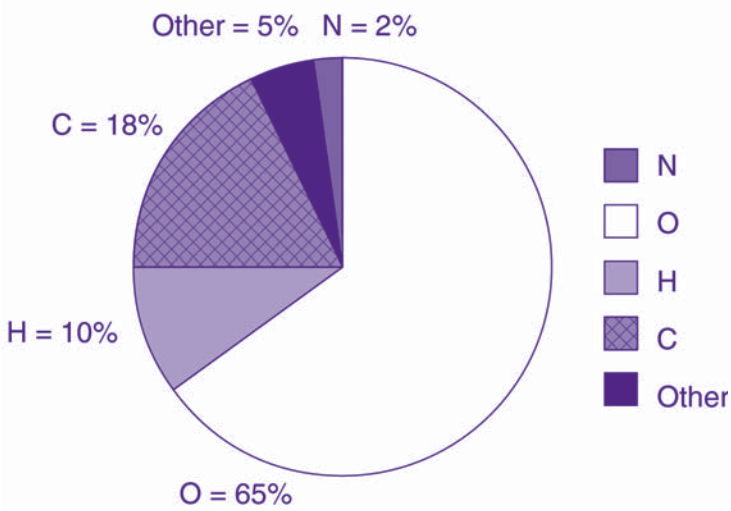


Figure 2.4. Composition of the Human Body



Conclusion

In your science notebook, respond to the questions using complete sentences.

1. Which element or elements are found in all four locations?
2. Which element or elements are found in the human body that are not listed in any of the other locations?
3. Which element or elements are found in Earth's crust that are not listed in any of the other locations?
4. How many elements are identified on the Periodic Table?
5. Based on all four pie charts, how many different elements make up humans and a majority of the world in which we live?
6. What conclusion can be drawn about the number of elements that make up the majority of the world in which we live and the total number of elements identified on the Periodic Table?

Evaluate

Use your knowledge of elements and their symbols to complete the assessment.

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