

Earth's Main Ingredients

Trace the small sets of elements that make up Earth's major systems.

6.5.g "a few elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the names of elements and circle the Earth system each paragraph describes. Write a 1 beside each sentence that tells which elements make up the largest portion of that system.

A Few Elements, Many Earth Systems

- ① Earth's solid outer part includes rocks, soil, and the deep mantle. It may look like it is made of many different materials, yet a few elements make up most of its mass. Oxygen is the most common element in the solid Earth. Silicon is next, followed by aluminum, iron, calcium, sodium, potassium, and magnesium. These elements usually occur joined in minerals, not as separate pieces of pure element. For example, oxygen and silicon are common parts of minerals in many rocks.
- ② The ocean is mostly water, H₂O. In water, oxygen and hydrogen are the two elements, and oxygen supplies most of water's mass because each oxygen atom is much heavier than either hydrogen atom. Seawater also contains dissolved salts. Chlorine and sodium are the most abundant elements in those salts. Even so, oxygen and hydrogen make up the largest portion of the ocean because water makes up far more of the ocean than dissolved salt does.
- ③ The atmosphere is mostly nitrogen and oxygen. Nitrogen makes up about 78 percent of dry air, and oxygen makes up about 21 percent. Argon is present in a much smaller amount, while carbon dioxide is only a tiny fraction. Living things also contain a small set of main elements. Oxygen, carbon, hydrogen, and nitrogen make up most living matter. The leading elements differ among Earth systems, but each system shows the same pattern: a few elements form its largest portion.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Which two elements are named as the most common and second most common in the solid Earth?

2 Why does oxygen make up most of the mass of ocean water?

3 Name the two largest parts of dry air and give the approximate percent for each.

4 What four elements make up most living matter?

3 YOUR TURN _____ Your own words

Write exactly five sentences. In the first four sentences, name the elements that make up the largest portion of the solid Earth, ocean, atmosphere, and living matter, one system per sentence. In the fifth sentence, explain one pattern you notice across the four systems.

PART 1 • READ AND MARK

Underline the names of elements and circle the Earth system each paragraph describes. Write a 1 beside each sentence that tells which elements make up the largest portion of that system. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Which two elements are named as the most common and second most common in the solid Earth?	Oxygen is the most common, and silicon is second.
2	Why does oxygen make up most of the mass of ocean water?	An oxygen atom is much heavier than either hydrogen atom in a water molecule.
3	Name the two largest parts of dry air and give the approximate percent for each.	Nitrogen is about 78 percent, and oxygen is about 21 percent.
4	What four elements make up most living matter?	Oxygen, carbon, hydrogen, and nitrogen.

PART 3 • YOUR TURN (SAMPLE ANSWER)

The solid Earth is mostly oxygen and silicon, followed by elements such as aluminum and iron. The ocean is mostly oxygen and hydrogen because it is mostly water. The atmosphere is mostly nitrogen and oxygen. Living matter is mostly oxygen, carbon, hydrogen, and nitrogen. Each Earth system has a few elements that make up most of it.

Accept scientifically accurate wording that identifies the major elements named in the passage. For the open response, accept a valid comparison pattern, such as oxygen appearing in several systems or each system having only a few leading elements.