Tiny Tank Particles

Use evidence to compare atoms and molecules.

P.5.5A.1 "Obtain and evaluate scientific information to describe basic physical properties of atoms and molecules."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two facts about the mass or size of atoms. Circle the atom counts in each named molecule, then number two facts that could help you check a claim about water vapor.

What Is in a Fish Tank?

1. At a fish tank, tiny bubbles rise through water. You cannot see a single atom, even with a classroom microscope. Yet atoms have mass and take up space. Scientists compare their masses using tiny atomic mass units. A hydrogen atom has a mass of about 1 unit, a carbon atom about 12 units, and an oxygen atom about 16 units. These are approximate values.

2. Atoms can join by bonds to form molecules. A water molecule, H_2O, has two hydrogen atoms and one oxygen atom. Its atoms have a total mass of about 18 units. An oxygen gas molecule, O_2, has two oxygen atoms and a mass of about 32 units. Oxygen gas can be part of the bubbles in the tank. One molecule is far too small to see.

3. Warm water can turn into water vapor above the tank. Each water molecule in the vapor still has two hydrogen atoms and one oxygen atom. Its mass stays about 18 units. In the vapor, the molecules spread much farther apart than they are in liquid water. The vapor takes up more space, but the individual water molecules do not grow larger. Distance between molecules is not molecule size.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which has more mass, one carbon atom or one oxygen atom? Use the passage's numbers to support your answer.

2. How do the atoms in one water molecule differ from the atoms in one oxygen gas molecule?

3. A student says one water molecule and one oxygen gas molecule have the same mass. Does the passage support this claim? Explain.

4. A student says water molecules grow larger when liquid water becomes vapor. Which facts from the passage show whether this claim is correct?

3 YOUR TURN

Your own words

Write three sentences for a museum card about a carbon dioxide molecule, which has one carbon atom and two oxygen atoms. Use the passage's atom masses to find its approximate mass, compare it with an oxygen gas molecule, and explain why a museum would need to enlarge its model.

ANSWER KEY

Tiny Tank Particles

GRADE 5 · P.5.5A.1

PART 1 · READ AND MARK

Underline two facts about the mass or size of atoms. Circle the atom counts in each named molecule, then number two facts that could help you check a claim about water vapor. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which has more mass, one carbon atom or one oxygen atom? Use the passage's numbers to support your answer.	**One oxygen atom has more mass, about 16 units compared with about 12 units for one carbon atom.**
2	How do the atoms in one water molecule differ from the atoms in one oxygen gas molecule?	**A water molecule has two hydrogen atoms and one oxygen atom. An oxygen gas molecule has two oxygen atoms.**
3	A student says one water molecule and one oxygen gas molecule have the same mass. Does the passage support this claim? Explain.	**No. A water molecule has a mass of about 18 units, while an oxygen gas molecule has a mass of about 32 units.**
4	A student says water molecules grow larger when liquid water becomes vapor. Which facts from the passage show whether this claim is correct?	**The claim is incorrect. Each molecule keeps the same atoms and mass. In vapor, the molecules spread farther apart, but the individual molecules do not grow larger.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A carbon dioxide molecule has one carbon atom and two oxygen atoms, so its mass is about 44 units (12 + 16 + 16). That is about 12 units more than an oxygen gas molecule, which has a mass of about 32 units. A museum would need to enlarge its model because one molecule is far too small to see.

Accept approximate masses and comparisons based on the values in the passage. For the museum card, look for a total of about 44 units, a comparison with 32 units, and an explanation that a single molecule is too small to see.