

Chemistry

Atoms and Molecules

What is the difference between atoms and molecules? It is actually pretty simple. **Molecules**¹ are made up of atoms. Each element on the periodic table of elements is made up of one single type of atom. Molecules are formed when atoms **bond**.² Different types of atoms can form together to make a molecule. Two or more of the same type of atom can also be bonded to make a molecule.

For example, H is the **symbol**³ for hydrogen and O is the symbol for oxygen. Water is made up of both hydrogen and oxygen. H₂O is the symbol for water. Two hydrogen atoms and one oxygen atom are bonded together to create a water molecule. Oxygen gas is made up of two oxygen atoms bonded together. O₂ is the symbol for an oxygen molecule.

With so many elements, imagine all the **combinations**⁴ of atoms that have been researched and have yet to be researched. Chemistry is very complicated because there are so many different combinations.

¹ **molecules** – the smallest units of a substance that can exist by themselves; are made of one or more atoms

² **bond** – to fasten together

³ **symbol** – a written sign used instead of a word to represent something

⁴ **combinations** – something that results when two or more substances are brought together

Name: _____ Date: _____

1. Water molecules are made up of
 - a. any two atoms bonded together.
 - b. two hydrogen atoms and one oxygen atom.
 - c. atoms of only one type of element bonded together.
 - d. two oxygen atoms.

2. Why does the author describe the atoms that make up water?
 - a. to give an example of a specific molecule
 - b. to show how liquids are different from solids
 - c. to explain why water is so abundant
 - d. to illustrate how simple chemistry is

3. Can a single atom be considered a molecule?
 - a. only if the atom is found in water
 - b. no, it takes two or more atoms bonded to create a molecule
 - c. only if it is an oxygen atom floating in the air
 - d. yes, all atoms are made up of many different molecules

4. Read the following sentence: "Chemistry is very complicated because there are so many different combinations."

The word **complicated** means

 - a. simple and basic
 - b. difficult to understand
 - c. fun and exciting
 - d. able to be learned easily

5. What is the main idea of this passage?
 - a. Bonded atoms make up molecules.
 - b. Atoms and molecules are unrelated to each other.
 - c. Water is the most common type of molecule.
 - d. Oxygen and hydrogen are necessary for molecules.

6. What makes up a molecule of oxygen gas?

7. Explain why understanding bonding is important for understanding molecules.

8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Molecules can be made up of two atoms of the same element; _____ , oxygen gas is made up only of oxygen atoms.

- a. for example
- b. most importantly
- c. on the other hand
- d. therefore

9. Read the following sentence.

Two hydrogen atoms and one oxygen atom create a water molecule by bonding together.

Answer the questions below based on the information provided in the sentence you just read. One of the questions has already been answered for you.

1. What? Two hydrogen atoms and one oxygen atom
2. What do hydrogen and oxygen atoms do? _____
3. How? _____

10. **Vocabulary Word:** symbol: a written sign used instead of a word to represent something.

Use the vocabulary word in a sentence: _____

Teacher Guide and Answer

Passage Reading Level: Lexile 780

Featured Text Structure: Compare/Contrast – the writer presents similarities and differences between two or more objects, places, events or ideas

Passage Summary: The passage describes the difference between atoms and molecules.

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5. What is the main idea of this passage?

- a. **Bonded atoms make up molecules.**
- b. Atoms and molecules are unrelated to each other.
- c. Water is the most common type of molecule.
- d. Oxygen and hydrogen are necessary for molecules.

6. What makes up a molecule of oxygen gas?

Suggested answer: A molecule of oxygen gas is made up of two atoms of oxygen bonded together.

7. Explain why understanding bonding is important for understanding molecules.

Suggested answer: Understanding bonding is important for understanding molecules because a molecule cannot exist without the bond between atoms.

8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Molecules can be made up of two atoms of the same element; _____ , oxygen gas is made up only of oxygen atoms.

- a. **for example**
- b. most importantly
- c. on the other hand
- d. therefore

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Answer the questions below based on the information provided in the sentence you just read. One of the questions has already been answered for you.

- 1. What? Two hydrogen atoms and one oxygen atom
- 2. What do hydrogen and oxygen atoms do? **create a water molecule**
- 3. How? **by bonding together**

10. **Vocabulary Word:** symbol: a written sign used instead of a word to represent something.

Use the vocabulary word in a sentence: answers may vary.