

Name: _____ Date: _____

Answer Key: Secrets of the Carbon Kingdom: A 7th Grade Quest

Learners build a solid foundation in molecular basics by identifying carbon's unique bonding patterns and recognizing organic substances in everyday life.

1. Carbon is known as the 'building block of life.' How many chemical bonds can a single carbon atom form with other atoms?

Answer: B) Four

Carbon has four valence electrons, allowing it to form four covalent bonds, which makes it incredibly versatile for building complex molecules.

2. Organic chemistry is the study of all compounds that do NOT contain the element carbon.

Answer: B) False

Organic chemistry is specifically defined as the study of carbon-containing compounds.

3. A molecule that is made up of ONLY carbon and hydrogen atoms is classified as a _____.

Answer: B) Hydrocarbon

The term 'hydrocarbon' literally combines 'hydro' (hydrogen) and 'carbon,' representing molecules like wax or gasoline.

4. Which of these everyday items is primarily made of organic carbon chains called polymers?

Answer: A) A plastic water bottle

Plastics are synthetic organic polymers made of long chains of carbon atoms.

5. In organic chemistry, when carbon atoms link together in a straight line, what is this structure called?

Answer: C) A chain

Carbon atoms often bond sequentially to form long, stable strings known as carbon chains.

6. Isopentane and Pentane have the same number of atoms but different shapes; these are called isomers.

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Answer: A) True

Isomers are molecules with the same chemical formula but different structural arrangements.

7. The aroma of a fresh orange or a rose comes from organic compounds known as _____.

Answer: B) Esters

Esters are a group of organic compounds often responsible for the pleasant smells of fruits and flowers.

8. Which gas is produced when an organic hydrocarbon (like candle wax) burns in the presence of oxygen?

Answer: C) Carbon Dioxide

Combustion of organic materials releases the carbon stored in the molecule as carbon dioxide (CO₂).

9. Diamonds and Graphite are both made of pure carbon, even though they look different.

Answer: A) True

Both are 'allotropes' of carbon, meaning they are the same element arranged in different crystal structures.

10. The simplest organic molecule, which is often released by cows and found in landfills, is _____.

Answer: B) Methane

Methane (CH₄) is the most basic hydrocarbon and a common byproduct of organic decomposition.