

Name: _____ Date: _____

Answer Key: Level Up: The Carbon Crafting Quest for 7th Grade

Students build and break down complex organic molecules through model-based analysis to reinforce their understanding of atomic bonding and isomerism.

1. In the game of molecular construction, carbon is known as the 'building block of life' because it can form how many covalent bonds with other atoms?

Answer: B) Four bonds

Carbon has four valence electrons, allowing it to form four stable covalent bonds, which enables the creation of complex, diverse structures.

2. True or False: Isomers are molecules that have the same chemical formula but different physical arrangements of atoms.

Answer: A) True

Isomers have the same number and types of atoms, but their different spatial arrangements give them unique physical and chemical properties.

3. When modeling a molecule of _____ (C₈H₁₈), a component of gasoline, you would draw a long chain of eight carbon atoms saturated with hydrogen.

Answer: A) Octane

The prefix 'oct-' indicates eight carbon atoms in a hydrocarbon chain, following the standard IUPAC nomenclature.

4. If a scientist adds a functional group containing oxygen and hydrogen (-OH) to a hydrocarbon chain, what category of organic compound is created?

Answer: C) Alcohol

The hydroxyl group (-OH) is the defining functional group for alcohols, such as isopropanol or methanol.

5. Organic molecules that consist of very long, repeating chains of smaller units (monomers) are called _____.

Answer: B) Polymers

Polymers, like DNA or synthetic plastics, are large molecules made of many repeating structural units linked together.

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6. True or False: All organic compounds must contain at least one metallic element like Iron (Fe) or Copper (Cu).

Answer: B) False

Organic chemistry focuses primarily on carbon and hydrogen, often including non-metals like oxygen and nitrogen, but metallic elements are not a requirement.

7. In the process of fractional distillation, how are different hydrocarbons separated from crude oil?

Answer: C) By their different boiling points

Hydrocarbons of different lengths have different boiling points; distillation uses heat to vaporize and collect them separately.

8. The simplest organic molecules, containing only carbon and hydrogen, are collectively known as _____.

Answer: B) Hydrocarbons

Hydrocarbons are the foundational compounds of organic chemistry, ranging from simple gases to complex waxes.

9. Which of these is a real-world application of synthetic organic chemistry that helps protect people from infections?

Answer: B) Developing antibiotics and medicines

Most modern pharmaceuticals are complex organic molecules designed in labs to interact with biological systems.

10. True or False: Carbon atoms can bond to each other to form closed geometric rings.

Answer: A) True

Carbon is versatile and can form not only straight and branched chains but also stable ring structures like cyclohexane.