

Covalent Bonding Worksheet

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Part 1: Building a Foundation

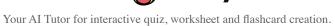
What is a covalent bond?
Hint: Think about how atoms interact with each other.
 A) A bond formed by the transfer of electrons B) A bond formed by the sharing of electron pairs between atoms C) A bond formed by the attraction between ions D) A bond formed by the sharing of protons
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Which of the following are types of covalent bonds? (Select all that apply)
Hint: Consider the different ways atoms can share electrons.
 □ A) Single covalent bond □ B) Double covalent bond □ C) Ionic bond □ D) Triple covalent bond
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Hint: Think about their physical and chemical characteristics.	
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List two characteristics of nonpolar covalent bonds.	
Hint: Consider the distribution of charge in the bond.	
1. Characteristic 1	_
O. Chavastovistia O	_
2. Characteristic 2	_
Which theory is used to predict the 3D shape of molecules?	
Hint: Think about the theories related to molecular geometry.	
○ A) Quantum Theory	



B) VSEPR TheoryC) Kinetic Molecular TheoryD) Atomic Theory
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A) Quantum TheoryB) VSEPR TheoryC) Kinetic Molecular Theory
O) Atomic Theory
Part 2: Comprehension and Application
What determines the polarity of a covalent bond?
Hint: Consider the factors that influence electron distribution.
 A) The number of protons in the nucleus B) The difference in electronegativity between the bonded atoms C) The size of the atoms D) The temperature of the environment
What determines the polarity of a covalent bond?
Hint: Consider the properties of the atoms involved.
 A) The number of protons in the nucleus B) The difference in electronegativity between the bonded atoms C) The size of the atoms D) The temperature of the environment
Which of the following statements about covalent compounds are true? (Select all that apply)
Hint: Think about the properties and behaviors of covalent compounds.
 A) They conduct electricity in solid state. B) They have low melting and boiling points. C) They are often soluble in organic solvents. D) They are formed by the sharing of electrons.





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C) They are often soluble in organic solvents.
D) They are formed by the sharing of electrons.
Explain why covalent compounds generally do not conduct electricity.
Hint: Consider the nature of covalent bonds and their structure.
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Which molecular shape is predicted by VSEPR theory for a molecule with two bonding pairs and two lone pairs?
Hint: Think about how lone pairs affect molecular geometry.
○ A) Linear
○ B) Bent
C) Trigonal planar
O D) Tetrahedral



lone pairs? Hint: Think about the arrangement of electron pairs around the central atom. A) Linear OB) Bent C) Trigonal planar O) Tetrahedral Identify the correct Lewis structure representations for water (H2O). (Select all that apply) Hint: Consider the arrangement of atoms and lone pairs in the molecule. A) H-O-H with two lone pairs on oxygen □ B) H=O=H C) H-O-H with no lone pairs D) H-O-H with one lone pair on oxygen Identify the correct Lewis structure representations for water (H2O). (Select all that apply) Hint: Consider the arrangement of atoms and lone pairs. A) H-O-H with two lone pairs on oxygen □ B) H=O=H C) H-O-H with no lone pairs D) H-O-H with one lone pair on oxygen Draw the Lewis structure for carbon dioxide (CO2) and describe its molecular geometry. Hint: Consider the arrangement of atoms and electron pairs.

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Draw the Lewis structure for carbon dioxide (CO2) and describe its molecular geometry.

Hint: Consider the arrangement of atoms and the types of bonds present.



Part 3: Analysis, Evaluation, and Creation
Which of the following molecules is likely to have a nonpolar covalent bond?
Hint: Consider the electronegativity of the atoms involved.
○ A) HCI
○ B) O2
○ C) NH3
○ D) H2O
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Hint: Think about the electronegativity of the atoms involved.
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○ C) NH3
○ D) H2O
Analyze the following molecules and determine which have polar covalent bonds. (Select all that apply)
Hint: Consider the electronegativity differences between atoms.
□ A) CH4
□ B) H2O
□ C) CO2
□ D) NH3

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Hint: Consider the electronegativity differences between the atoms.



☐ A) CH4	
□ B) H2O□ C) CO2	
□ D) NH3	
Compare and contrast the properties of ionic and covalent compounds.	
Hint: Think about their bonding characteristics and physical properties.	
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Design a molecule with a central atom that forms a tetrahedral shape. Which of the following could be the central atom? (Select all that apply)

Hint: Think about the elements that can form four bonds.



A) Carbon (C)
B) Nitrogen (N)
C) Oxygen (O) D) Silicon (Si)
(O)
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int: Think about fields such as medicine, materials science, or environmental science.
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