

## Lewis Structures Quiz Answer Key PDF

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**Which molecules follow the octet rule?**

- A. H<sub>2</sub>O ✓
- B. CO<sub>2</sub> ✓
- C. BF<sub>3</sub>
- D. NH<sub>3</sub> ✓

**What are common mistakes when drawing Lewis structures?**

- A. Incorrect electron counting ✓
- B. Misplacement of electrons ✓
- C. Ignoring the octet rule ✓
- D. Using too many resonance structures

**How many valence electrons does nitrogen have?**

- A. 3
- B. 5 ✓
- C. 7
- D. 8

**Which element is most likely to be the central atom in a Lewis structure?**

- A. Hydrogen
- B. Fluorine
- C. Carbon ✓
- D. Oxygen

**Which of the following is NOT a valid resonance structure for the nitrate ion (NO<sub>3</sub>-)?**

- A. One with a double bond between nitrogen and one oxygen
- B. One with a single bond between nitrogen and all oxygens
- C. One with two double bonds between nitrogen and two oxygens ✓**
- D. One with a double bond between nitrogen and a different oxygen

**What is the primary purpose of a Lewis structure?**

- A. To predict the molecular weight
- B. To represent the bonds and lone pairs in a molecule ✓**
- C. To determine the color of a compound
- D. To calculate the boiling point

**Which of the following are steps in drawing a Lewis structure?**

- A. Count total valence electrons ✓**
- B. Determine the molecular weight
- C. Draw single bonds between atoms ✓**
- D. Distribute remaining electrons to satisfy the octet rule ✓**

**Which molecule does not follow the octet rule?**

- A. CH<sub>4</sub>
- B. BF<sub>3</sub> ✓**
- C. H<sub>2</sub>O
- D. NH<sub>3</sub>

**Explain how expanded octets are possible and give an example of a molecule that exhibits this.**

**Expanded octets occur in elements in period 3 or higher due to available d orbitals, such as in SF<sub>6</sub>.**

**Explain why hydrogen is an exception to the octet rule.**

**Hydrogen only requires 2 electrons to fill its valence shell, as it only has one electron shell.**

**Describe the process of determining the central atom in a Lewis structure.**

The central atom is usually the least electronegative element, except for hydrogen, which is never central.

How does the concept of resonance contribute to the stability of a molecule?

Resonance allows for the distribution of electrons across multiple structures, lowering energy and increasing stability.

Provide a step-by-step method for calculating the formal charge of an atom in a molecule.

Formal charge = (Valence electrons in free atom) - (Non-bond electrons + 0.5 \* Bond electrons).

Discuss the significance of valence electrons in the formation of chemical bonds.

Valence electrons are involved in bond formation, determining how atoms interact and bond with each other.

In which of the following molecules can resonance structures be drawn?

- A. O<sub>3</sub> ✓
- B. CO<sub>2</sub>
- C. NO<sub>3</sub><sup>-</sup> ✓
- D. CH<sub>4</sub>

Which of the following statements about formal charge are true?

- A. It helps determine the most stable Lewis structure ✓
- B. It is calculated by subtracting the number of valence electrons in the free atom from the number of valence electrons in the molecule
- C. A structure with formal charges closest to zero is generally more stable ✓
- D. Formal charge is irrelevant in determining resonance structures

Which of the following elements can have an expanded octet?

- A. Sulfur ✓
- B. Phosphorus ✓
- C. Chlorine ✓

D. Neon

**What is the typical number of electrons needed to satisfy the octet rule?**

- A. 2
- B. 4
- C. 6
- D. 8 ✓**

**Which of the following molecules is an example of an expanded octet?**

- A. H<sub>2</sub>O
- B. CO<sub>2</sub>
- C. SF<sub>6</sub> ✓**
- D. NH<sub>3</sub>

**What is the formal charge on the oxygen atom in a water molecule (H<sub>2</sub>O)?**

- A. -1
- B. 0 ✓**
- C. +1
- D. +2