

Name: _____

How to Write Lewis Dot Structures for Atoms & Molecules

You may work with others on this worksheet, but **DO NOT USE YOUR BOOK!** I want you to construct your own rules. Only after completing this worksheet may you look in the text and make additions and/or changes if needed.

Atom	Structure	Atom	Structure
K potassium	$K\cdot$	Ca calcium	$\overset{\cdot}{\underset{\cdot}{Ca}}$
Ga gallium	$\cdot\overset{\cdot}{Ga}\cdot$	Ge germanium	$\cdot\overset{\cdot}{\underset{\cdot}{\underset{\cdot}{Ge}}}\cdot$
As arsenic	$\cdot\overset{\cdot}{\underset{\cdot}{\underset{\cdot}{As}}}\cdot$	Se selenium	$\cdot\overset{\cdot}{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{Se}}}}\cdot$
Br bromine	$\cdot\overset{\cdot}{\underset{\cdot}{\underset{\cdot}{Br}}}\cdot$	Kr Krypton	$\cdot\overset{\cdot}{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{Kr}}}}}\cdot$

Can you determine the rules for drawing Lewis dot structures for the atoms above? Please write down any rules you can determine on the next page.

Formula & Name	Structure	Formula & Name	Structure
H ₂ hydrogen	$H\cdot H$ or $H-H$	HF hydrogen fluoride	$H\cdot\overset{\cdot}{\underset{\cdot}{F}}\cdot$ or $H-\overset{\cdot}{\underset{\cdot}{F}}\cdot$
CH ₄ methane	$\begin{array}{c} H \\ \vdots \\ H:C:H \\ \vdots \\ H \end{array}$ or $\begin{array}{c} H \\ \\ H-C-H \\ \\ H \end{array}$	C ₃ H ₈ propane	$\begin{array}{c} H & H & H \\ \vdots & \vdots & \vdots \\ H:C & :C & :C:H \\ \vdots & \vdots & \vdots \\ H & H & H \end{array}$ or $\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C-H \\ & & \\ H & H & H \end{array}$
NH ₃ ammonia	$\begin{array}{c} \cdot\cdot \\ \vdots \\ H:N:H \\ \vdots \\ H \end{array}$ or $\begin{array}{c} \cdot\cdot \\ \\ H-N-H \\ \\ H \end{array}$	H ₂ O water	$H\cdot\overset{\cdot}{\underset{\cdot}{O}}\cdot H$ or $H-\overset{\cdot}{\underset{\cdot}{O}}-H$
Cl ₂ chlorine	$\cdot\overset{\cdot}{\underset{\cdot}{Cl}}\cdot\overset{\cdot}{\underset{\cdot}{Cl}}\cdot$ or $\cdot\overset{\cdot}{Cl}-\overset{\cdot}{Cl}\cdot$	OCl ₂ oxygen dichloride	$\cdot\overset{\cdot}{Cl}\cdot\overset{\cdot}{\underset{\cdot}{O}}\cdot\overset{\cdot}{\underset{\cdot}{Cl}}\cdot$ or $\cdot\overset{\cdot}{Cl}-\overset{\cdot}{\underset{\cdot}{O}}-\overset{\cdot}{Cl}\cdot$
O ₂ oxygen	$\overset{\cdot}{\underset{\cdot}{O}}\cdot\overset{\cdot}{\underset{\cdot}{O}}\cdot$ or $\overset{\cdot}{\underset{\cdot}{O}}=\overset{\cdot}{\underset{\cdot}{O}}\cdot$	C ₂ H ₂ acetylene	$H:C\cdot\cdot\cdot C:H$ or $H-C\equiv C-H$
CH ₂ O acetone	$\begin{array}{c} \cdot O \cdot \\ \vdots \\ H:C:H \\ \vdots \\ H \end{array}$ or $\begin{array}{c} \cdot O \cdot \\ \\ H-C-H \end{array}$	SiO ₃ H ₂ silicic acid	$\begin{array}{c} \cdot O \cdot \\ \vdots \\ H:\overset{\cdot}{\underset{\cdot}{O}}:Si:\overset{\cdot}{\underset{\cdot}{O}}:H \\ \vdots \\ H \end{array}$ or $\begin{array}{c} \cdot O \cdot \\ \\ H-O-Si-O-H \\ \vdots \\ H \end{array}$
CO ₂ carbon dioxide	$\overset{\cdot}{\underset{\cdot}{O}}\cdot\cdot\cdot C\cdot\cdot\cdot\overset{\cdot}{\underset{\cdot}{O}}\cdot$ or $\overset{\cdot}{\underset{\cdot}{O}}=C=\overset{\cdot}{\underset{\cdot}{O}}\cdot$	N ₂ nitrogen	$\cdot N\cdot\cdot\cdot N\cdot$ or $\cdot N\equiv N\cdot$

Can you determine the rules for drawing Lewis dot structures for the molecules above? Please write down any rules you can determine on the next page.

Rules for drawing Lewis Dot Structures for atoms:

Rules for drawing Lewis Dot Structures for Molecules:

CHE 140/170 Handout – How to Write Lewis Dot Structures

Now, using the rules you developed, draw the Lewis Dot Structures for the following molecules. Feel free to refine your rules as needed. In fact, it would be quite surprising if you didn't have to go back and add to your rules!

After attempting to draw a structure for each one, you *may* then look in your book and make any needed changes to your rules or structures.

CH ₃ CH ₃		HNO HSiO_2	
CCl ₄		N ₂ H ₂	
CO		SO SO	
CH ₂ F ₂		PF ₃	

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**Chapter 7 Practice Worksheet:
Covalent Bonds and Molecular Structure**

- 1) How are ionic bonds and covalent bonds different?
- 2) Describe the relationship between the length of a bond and the strength of that bond.
- 3) Identify the type(s) of bond(s) found in the following molecules:

- a. CCl_4 _____
- b. Li_2O _____
- c. NF_3 _____
- d. CaS _____
- e. SO_2 _____
- f. MgO _____
- g. CH_4 _____
- h. SCl_2 _____
- i. Ba Br_2 _____
- j. Mg_3P_2 _____
- k. AsBr_3 _____

4. Write the names of the following covalent compounds

- a. CO_2 _____
- b. S_2Cl_4 _____
- c. N_5O_3 _____
- d. SeBr_2 _____
- e. FBr _____