

Lewis structure: A chemical formula (diagram) which shows the arrangement of the atoms and valence electrons in the species.

Water, H_2O . The oxygen nucleus has two H nuclei attached. Again there are 8 valence electrons, $6(\text{O}) + 2 \times 1 (\text{H})$. Lewis structure:



The two pairs of dots represent the two **non-bonding electron pairs** in the valence shell of the O atom. However, these are not always shown as their existence can be inferred. The inner shell electrons which we can consider belonging exclusively to the one nucleus are never shown in Lewis structures.

Dinitrogen, N_2 . 10 valence electron, $2 \times 5 (\text{N})$. The Lewis structure: $:\text{N} \equiv \text{N}:$ Each N nucleus is surrounded by 8 valence electrons, 3 pairs of electrons being attracted simultaneously to two N nuclei. Dinitrogen contains a triple bond .

Calcium phosphate, $\text{Ca}_3(\text{PO}_4)_2$ consists of Ca^{2+} cations surrounded by PO_4^{3-} anions and vice-

EXERCISES

Show the polarity of the following bonds:

1. *Example:* C-Cl

Answer: (+)C-Cl(-) Chlorine more electronegative than carbon

2. C-O 3. Si-F 4. Cl-P 5. H-C 6. H-N

State whether the following molecules are polar and if so show the polarity:

7. Hydrogen fluoride, HF 8. Boron trifluoride, BF₃, a planar triangular molecule

9. Carbon dioxide, CO₂, a linear molecule 10. Sulfur dioxide, SO₂, a bent molecule

11. Ammonia, NH₃, a pyramidal molecule

12. Methane, CH₄, the carbon atom is tetrahedrally surrounded by the 4 hydrogens