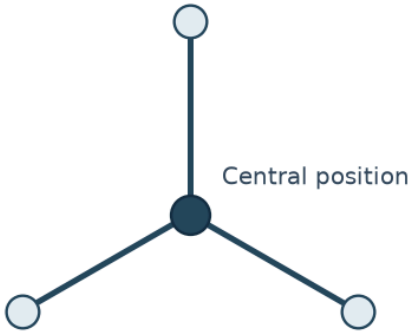
Reading a Molecule From Two Views

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A molecular display shows one unknown model from above. The image hides element labels. The unknown is either BF_3, with three B–F bonds lying in a plane, or CH_4, with four C–H bonds pointing in different directions in three dimensions. A bond pointing directly toward the viewer can project onto the central position.



Top view of the unknown model, with element labels hidden.

1 What can the top view establish by itself?

(1) Exactly three bonds exist.

(2) Four bonds are all visible.

(3) Three bonds are visible, and a bond along the viewing direction could be hidden.

(4) All bonds must lie in the same plane.

2 Explain how either candidate could produce three visible spokes in this view. [1]

Answer and work

The class tilts the same model without changing any bonds. The new view shows four separate lines connecting the center to four outer atoms.

3 Identify the unknown and explain why tilting the model changed the visible count. [1]

Answer and work

4 Draw the center atom and all its bonded atoms. Label one bond that could point toward the viewer in the original view. [1]

Draw your molecular model