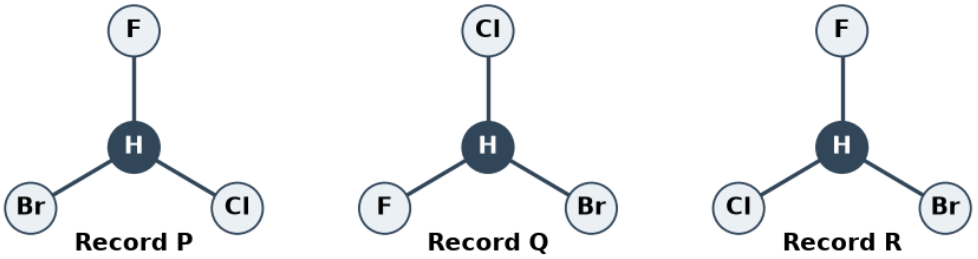
Reading a Carbon Model in a Mirror

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

A display builds a model with a central carbon atom bonded once to H, F, Cl, and Br. The four bonds point toward the corners of a tetrahedron. Each record keeps H pointing toward the viewer, directly in front of C. A rotation of the model may change which of the other atoms appears at the top, while preserving their clockwise order.



Projected views with H directly toward the viewer.

1 Use P and Q to explain how two views can have different atoms at the top but show the same circular order. [1]

Answer and work

2 Which observation rules out getting R by rotating P while keeping H pointed toward the viewer?

(1) H still points toward the viewer.

(2) P and R each have F at the top.

(3) Br follows F in R, while Cl follows F in P.

(4) The same four elements occur in all models.

A mirror view of P reverses the circular order. A separate student model swaps the positions of Cl and Br on P while keeping H and F in place.

3 Draw the swapped model as seen with H toward the viewer and F at the top. Label where Cl and Br appear. [1]

Draw and label the projected view

4 A student says the atom count and bond types alone can distinguish P and R. Evaluate the claim using the two records. [1]

Answer and work