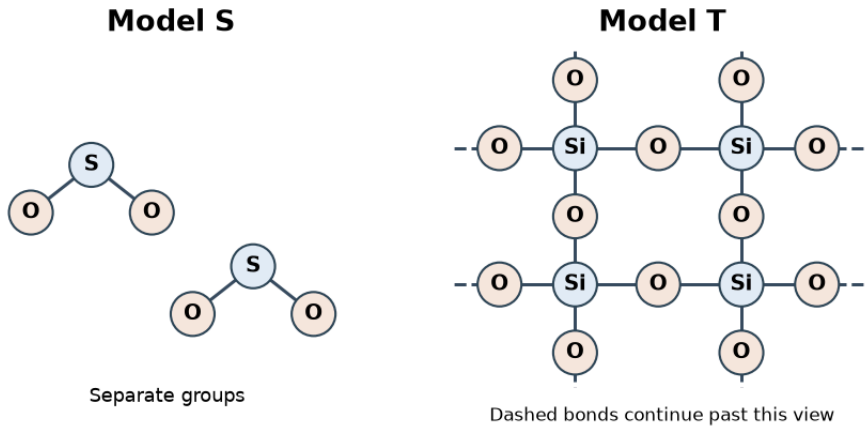
Reading Two Meanings of an Oxide Formula

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

A chemistry exhibit tests a tool that counts connected groups in drawings of sulfur dioxide and silicon dioxide. The sketches show which atoms are joined, without actual bond angles or orders. In the network each silicon is bonded to four oxygen atoms and each oxygen joins two silicon atoms.



Bond connections in two models. Dashed links show where the network continues.

1 Which observation identifies the drawing that contains separate molecules?

(1) Model S has groups that are not bonded to one another.

(2) Model T contains more oxygen symbols in the visible view.

(3) Model S has no bonds within its groups.

(4) Model T’s bonds stop permanently at the boundary of the drawing.

2 Explain why the full network has an oxygen-to-silicon ratio of 2:1 even though four oxygen atoms are attached to each silicon. [1]

Answer and work

The tool counts two connected groups in S and one connected region in the cropped view of T. It labels both outputs as molecule counts. A wider crop of T shows 12 silicon symbols and 30 oxygen symbols.

3 Which output can be read as a molecule count? Explain why the other connected region does not represent one molecule of the stated formula. [1]

Answer and work

4 The wider crop gives a visible oxygen-to-silicon ratio of 30:12. Explain why this reading can exceed the 2:1 ratio of the complete network. [1]

Answer and work