

Stereochemistry and Conformational Models

g12_u01_w02

Purpose and boundary

Use original fictional drawings and representation cards only. No substances, synthesis, handling, biological/medical claim, or real-world use is requested.

Targets: I can identify a stereocenter in a stated drawing, compare enantiomer/model relationships, and name what a conformation card omits. **Vocabulary:** stereocenter, enantiomer, diastereomer, conformation, wedge-dash, Newman projection. **Prerequisites:** connectivity, bonding, structural representation.

All drawings are simplified fictional models. They do not determine biological, medical, safety, or product effects.

1. Distinguish constitutional isomers from stereoisomers.

2. What does a wedge-dash drawing conventionally represent?

3. What is a stereocenter in a simple tetrahedral model?

4. A fictional carbon is bonded to H, F, Cl, and Br. Is it a stereocenter under the stated model?

5. A carbon is bonded to H, H, Cl, and Br. Is it a stereocenter? Explain.

6. Define enantiomers as a relationship between representations.

7. Why can a 2-D drawing be insufficient to decide a 3-D relationship?

8. What does a Newman projection represent?

9. Compare eclipsed and staggered conformational models in terms of torsional interaction.

10. Why is a conformation not necessarily a different constitutional compound?

11. A card shows two mirror-image tetrahedral drawings with one stereocenter. What relationship is supported?
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12. A card has two stereocenters and differs at one. What relationship might require further comparison?
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13. Explain why a stereochemical label does not predict a biological or safety effect.
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14. A student rotates a drawing on paper and calls it a different molecule. Correct the reasoning.
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15. State one feature a wedge-dash drawing omits about motion or environment.
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16. A fictional conformer table lists relative model energies 0.0 and 3.0 units. Which is lower in the stated table? What limitation remains?
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17. Why does a lower model energy not establish a real population without conditions?
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18. State one supported and one unsupported claim from a fictional stereochemical card.
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19. Propose one additional representation that could resolve a 3-D ambiguity.
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20. Write a two-sentence bounded comparison of two fictional conformer or stereochemical cards.
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