

Mechanism Arrows as Electron-Accounting Models

g12_u01_w03

Purpose and boundary

Use original fictional electron-accounting diagrams only. No reaction, synthesis, chemical handling, procedure, or real-world prediction is requested.

Targets: I can read a curved arrow as an electron-accounting convention, check charge and atoms, and state what an arrow diagram cannot prove. **Vocabulary:** electron pair, nucleophile, electrophile, leaving group, formal charge, mechanism model. **Prerequisites:** Lewis structures, formal charge, bonding, oxidation/reduction.

All arrow cards are fictional bookkeeping models. They are not instructions for carrying out a reaction.

1. What does a full curved arrow conventionally track in an electron-accounting model?

2. Distinguish an arrow tail from an arrow head in a stated diagram convention.

3. Why is an arrow diagram not a video of atoms moving?

4. A card arrow begins at a lone pair and ends at an electron-poor atom. What model relation is represented?

5. A card arrow begins at a bond and ends at one atom. What bookkeeping change may be represented?

6. Why must atoms and total charge be checked before accepting a diagram?

7. A fictional reactant card has charge 0 and product cards total charge 0. What conservation check passes?

8. A card has one carbon on reactant side and two carbons on product side. What diagram issue is present?

9. Define nucleophile and electrophile as model roles, not permanent identities.

10. Why can conditions change a model role or pathway plausibility?

11. A student draws an arrow from a positive atom to a lone pair. What convention question should be checked?
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12. Explain why arrow direction alone does not prove a real mechanism occurred.
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13. A card has balanced atoms but changes total charge from -1 to 0 without another charged species. What check fails?
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14. Identify one missing feature that could make a multi-step arrow model incomplete.
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15. Why is a plausible arrow model different from a measured intermediate?
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16. A fictional diagram has two possible arrows. Name one evidence question that could compare models without proposing an experiment.
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17. State one supported and one unsupported claim from a balanced arrow card.
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18. Explain why a mechanism diagram is not a synthesis plan.
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19. Propose one annotation that improves accessibility of an arrow model.
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20. Write a two-sentence bounded critique of a fictional electron-accounting diagram.
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