

Structure-Property Evidence Challenge

g11_u07_w28

Purpose and boundary

Use original fictional structure/property cards only. No materials, testing, design, consumer choice, or safety determination is requested.

Targets: I can construct a bounded structure-property claim, compare competing explanations, and name a next measurement. **Vocabulary:** inference, correlation, mechanism, constraint, alternative explanation, evidence. **Prerequisites:** bonding, geometry, interactions, solids, uncertainty.

All cards in this packet are fictional. A listed property is evidence under stated conditions, not proof of a mechanism or a recommendation.

1. Distinguish a structure-property correlation from a mechanism claim.

2. Why can one property measurement support more than one structural explanation?

3. What makes a claim bounded rather than absolute?

4. Card A is labeled polar and has a listed transition 18°C; Card B is nonpolar with listed transition 12°C. State one cautious comparison.

5. Name one alternative explanation for item 4 besides polarity.

6. Card C is a fictional network-solid label with high listed stiffness. State one supported and one unsupported claim.

7. A table lists two samples with equal mass but different surface-area labels. Why might a rate-like property comparison need care?

8. A card has a higher model bond order and shorter listed bond length. Write a correlation claim.

9. Why does item 8 not prove that bond order is the only cause?

10. Identify one missing measurement that could test item 8's explanation.

11. A data table gives property P as 4.0 ± 0.3 for X and 4.8 ± 0.2 for Y. Write each interval.
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12. Do the simple intervals overlap? State a limited conclusion.
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13. Why is interval non-overlap not a universal proof of cause?
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14. A student says a structural diagram proves a material will perform well in a device. Identify two missing evidence categories.
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15. A fictional table lists a property trend opposite to a simple model prediction. Write a productive revision question.
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16. Explain why a model can remain useful after one prediction mismatch.
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17. Rank these claim strengths: observed table value; model-consistent explanation; universal causal law. Explain briefly.
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18. Write one evidence claim using an explicit condition, comparison, and limitation.
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19. Propose one next paper-data comparison that would reduce ambiguity.
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20. Write a two-sentence final structure-property argument using at least one alternative explanation.
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