

Metabolism and Energy-Coupling System Models

g12_u03_w11

Purpose and boundary

Trace matter and energy in original fictional pathway diagrams. No biological procedure, health advice, dietary claim, or real-system prediction is requested.

Targets: I can identify a system boundary, trace stated matter/energy labels, and name limits of a pathway model. **Vocabulary:** system boundary, input, output, coupling, transfer, conservation, pathway model.

Prerequisites: conservation, energy transfer, reaction models, evidence boundaries.

Fictional Pathway P uses only labels X, Y, Z, and energy tokens. It is not a real biological pathway.

1. What is a system boundary in a pathway model?

2. Why must inputs and outputs be named before a conservation check?

3. What does an arrow in a pathway model usually represent?

4. Why is an arrow not a video or proof of a real step?

5. What does energy coupling mean in a stated model?

6. Why does energy transfer not mean energy is created?

7. Card P labels X entering and Y leaving. What matter-accounting question should be asked?

8. Card P labels an energy token transferred. What claim does this cautiously support?

9. What missing label would make a conservation check incomplete?

10. Why might several routes fit the same simplified output card?

11. How can a feedback arrow be useful in a system model?

12. Why does a feedback arrow not prove a measured regulatory mechanism?

13. Name one condition a pathway card may omit.

14. What is the difference between a transfer label and a measured amount?

15. Write one bounded claim about matter conservation in Card P.

16. Write one bounded claim about energy transfer in Card P.

17. Name one claim Card P cannot support about an organism or person.

18. Give one non-color-only accessibility feature for a pathway diagram.

19. Compare a pathway model with a complete explanation.

20. Write a two-sentence systems interpretation for Fictional Pathway P.
