

Reading Guide Ch. 8: Metabolism Introduction

Cells get and use energy as well as materials needed to drive thousands of important cellular reactions on a daily basis.

☞ **Section 8.1** ☞

1. Define metabolism
2. What is a metabolic pathway?
3. Compare catabolic pathways to anabolic pathways. Give an example of both.
 - a.
 - b.
4. The study of energy flow through living organisms is called?
5. Energy is the capacity to cause change. Explain the difference between the following different energy types; kinetic, thermal, potential, and chemical energy.
 - a.
 - b.
 - c.
 - d.
6. How does heat and light fit into a discussion of energy?
- 7.
8. Discuss the different forms of energy found in an apple as it is being consumed by a human. Start with the plant and end in the digestive system of the human.

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9. Explain the 1st and 2nd Law of thermodynamics.

1st Law:

2nd Law:

10. Define entropy.

☞ Section 8.2 ☞

11. Energy conservation is not 100% effective, what is a good example of this idea?

12. Compare exergonic reactions to endergonic reactions in regards to free energy.

a.

b.

13. What does it mean if a system reaches equilibrium?

14. Why is equilibrium a hard goal to reach in living systems?

15. Organisms are considered open energy systems, describe what this means.

☞ Section 8.3 ☞

16. Cells can be involved in three kind of work; explain each of the three.

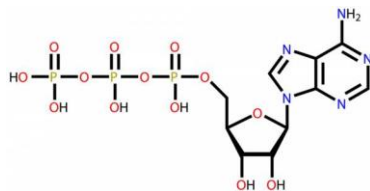
a.

b.

c.

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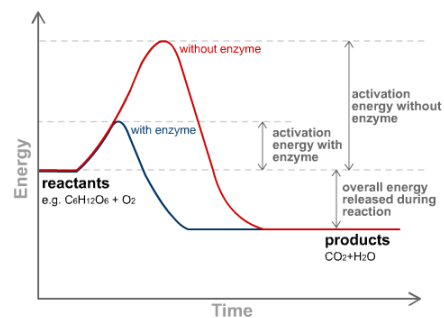
17. ATP is the molecule responsible for most of the energy transfer within living things. Label the three parts of the ATP molecule. (**Phosphate groups, Ribose group, Adenine group**)



18. Explain the importance of the phosphate groups of ATP.
19. Describe how ATP is a “renewable” molecule.
20. Cellular respiration uses glucose and oxygen to transfer the energy to ATP. Discuss if this is an exergonic or endergonic reaction.
21. If a molecule is phosphorylated, a phosphate group is added. (Example: $\text{ADP} + \text{P}_i \rightarrow \text{ATP}$) Discuss if this is an endergonic or exergonic reaction.

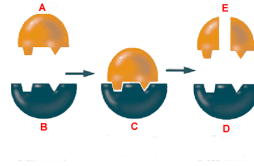
👉 Section 8.4 👈

22. What is an enzyme?
23. Explain activation energy.
24. How specific are enzymes?



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25. Label the enzyme model with the following: (**Substrate**, **Enzyme substrate complex**, **Active site**, **Product** and **Enzyme**.)



26. Do enzymes emerge after a reaction in their original form? How can this be helpful?
27. What are two conditions that can influence enzyme reactions?
- a. _____ b. _____
28. Describe cofactors and coenzymes.
- a. _____
- b. _____
29. Compare competitive inhibitors with non-competitive inhibitors.
- a. _____
- b. _____
30. Using a series of arrows draw the branched metabolic reaction pathways that result from the following statements:
- **L** can form either **M** or **N**
 - **M** can form **O**
 - **O** can form either **P** or **R**
 - **P** can form **Q**
 - **R** can form **S**
 - **O** inhibits the reaction of **L** to **M**
 - **Q** inhibits the reaction of **O** to **P**
 - **S** inhibits the reaction of **O** to **R**

Explain the reactions which would prevail if both **Q** and **S** were present in the cell at high concentrations.

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☞ Section 8.5 ☞

31. Explain allosteric regulation and the two ways that it can work.

32. Explain feedback inhibition and give an example.

Test Bank Questions: goo.gl/CUYGKD

Vocabulary Self Quiz: goo.gl/6u55ks

Take the Enzyme Quiz at: <http://www.sciencegeek.net/Biology/review/U2Enzymes.htm>