

## Unit 3: Energy Study Guide

### GPS Standards and Chapters:

- Energy Flow (*SB4b; Sec. 4-2*): Food Chains, Food Webs & Energy Pyramids
  - Enzymes (*SB1b; Sec. 3-1, 3-4*)
  - Photosynthesis & Cellular Respiration (*SB3a, Ch. 9*)

### Vocabulary:

Food web	Trophic level	Endosymbiotic theory
Food chain	ATP	Photosynthesis
Producers	Enzyme	Chlorophyll
Consumers	Substrate	Cellular respiration
Decomposers	Active site	Carbon cycle
Energy pyramid	Activation energy	

### Study Questions:

#### Energy Flow: Food Web

1. Define the parts of the food chain: producer, primary consumer, secondary consumer, tertiary consumer, decomposers and scavengers. (Be able to label these trophic levels on an example food web or chain) (6pts)
2. Using the terms producer, primary consumer, secondary consumer and tertiary consumer, draw a food chain with the correct orientation of the arrows. (2pts)
3. What is the difference between a food chain and food web? (2pts)
4. What happens to ALL the other trophic levels when the secondary consumers decrease in numbers? (3pts)
5. How much energy is transferred from one trophic level to the next? Why? (2pts)
6. If trophic level 3 has 650 J of energy, then how much energy is needed in trophic level 1 to support those organisms? (1pt)
7. What is an energy pyramid, numbers pyramid, and biomass pyramid? (3pts)

#### Enzymes

8. Define enzyme. What macromolecule is an enzyme? (2pts)
9. Define active site, activation energy, and substrate. (3pts)
10. How does an enzyme function? (1pt)
11. How does the activation energy change between when there is an enzyme present and without an enzyme? (2pts)
12. What are the main characteristics of enzymes? (4pts)
13. What is the difference between the induced fit model and the lock and key mechanism? (2pts)
14. How does each of the following affect the function of enzymes? (5pts)
  - a. Temperature – increase and decrease
  - b. pH
  - c. increase in enzyme concentration
  - d. Increase in substrate concentration
  - e. Addition of inhibitors – competitive and non-competitive

### Endosymbiotic Theory

15. What is the endosymbiotic theory? (1pt)
16. What organelles are involved in this theory? (1pt)

### Photosynthesis

17. Define photosynthesis – include the main goal (2pts)
18. Write out the equation for photosynthesis. (5pts)
19. What organelle and organism does photosynthesis? (2pts)
20. What are the 2 parts of photosynthesis and where does each occur in the organelle? (2pts)
21. What is the importance of the pigment found in chlorophyll? (1pt)
22. What is the purpose of the carrier molecules? (1pt)
23. What factors can impact the rate of photosynthesis? (1pt)

### Cellular Respiration

24. Define cellular respiration – include the main goal (2pts)
25. Write out the equation for cellular respiration. (5pts)
26. Write out the equation for how we use ATP for energy. (2pts)
27. What organelle and organisms do cellular respiration? (2pts)
28. How much ATP is made from one glucose molecule (total + how much in each step)? (2pts)
29. What are the 3 parts of cellular respiration and where does each occur in the organelle? (3pts)
30. Explain the 2 types of fermentation and how it affects the energy output for the organism. (2pts)

### Nutrient Cycles

31. Draw and label the parts of the carbon cycle. (2pts)