*Fold along the line and glue this side down in your Biology Interactive Learning Log (BILL)*

**Unit 4: Cellular Energy**

**Objectives:** Energy comes in several forms – heat, light, electricity, and chemical. Plants have the amazing ability to convert light energy into chemical energy. Heterotrophs use the energy captured by plants to also produce the chemical storage molecule called ATP. Specialized organelles within cells are structured specifically to produce the maximum amount of ATP that is used to fuel all of life’s processes. Knowledge of these chemical processes can be used to study sports performance and our own existence.

**Key concepts:**

Photosynthesis Cellular Respiration Chemosynthesis

 Endosymbiotic theory

Can you show what you know?

**Essential Questions:**

1. How are cell structures adapted to their functions?
2. How do microscopes work?
3. What is the role of ATP in cellular processes?
4. How are the reactions of photosynthesis and cellular respiration used in cells?
5. How is the structure of chloroplasts and mitochondria important to producing the maximum amount of products?
6. How do the structures and functions of chloroplasts and mitochondria provide evidence for evolution of eukaryotic cells?

Vocabulary**:** (**+**) = Can explain it; (**-**) = Only heard it; **0** = No idea

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| **Term** | **Pre** | **Post** | **Memory Clue** |
| 1. autotroph |  |  |  |
| 2.heterotroph |  |  |  |
| 3. producers |  |  |  |
| 4. consumers |  |  |  |

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| --- | --- | --- | --- |
| **Term** | **Pre** | **Post** | **Memory Clue** |
| 5. cell wall |  |  |  |
| 6. central vacuole |  |  |  |
| 7. chlorophyll |  |  |  |
| 8. chloroplast |  |  |  |
| 9. thylakoid |  |  |  |
| 10. granum |  |  |  |
| 11. stroma |  |  |  |
| 12. guard cells |  |  |  |
| 13. stomata |  |  |  |
| 14. cuticle of leaf |  |  |  |
| 15. turgor pressure |  |  |  |
| 16. palisade layer |  |  |  |
| 17. mesophyll |  |  |  |
| 18. vascular bundle |  |  |  |
| 19. transpiration |  |  |  |
| 20. aquifer |  |  |  |
| 21. sublimation |  |  |  |
| 22. cellular respiration |  |  |  |
| 23. cristae |  |  |  |
| 24. matrix |  |  |  |
| 25. aerobic respiration |  |  |  |
| 26. anaerobic respiration |  |  |  |
| 27. glycolysis |  |  |  |
| 28. Krebs Cycle |  |  |  |
| 29. Electron Transport Chain |  |  |  |
| 30. lactic acid fermentation |  |  |  |
| 31. alcoholic fermentation |  |  |  |
| 32. ATP synthase |  |  |  |
| 33. chemosynthesis |  |  |  |
| 34. endosymbiotic theory |  |  |  |
| 35. sedimentation |  |  |  |
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**Study Guide:**

1. **Describe** the role of ATP in cellular activities.
2. **Sketch** and **label** the general structure of an ATP molecule, and identify the high-energy bond that is broken.
3. **Describe** the function of the chloroplasts and mitochondria in the cell.
4. **Label** and **describe** the functions of the parts of a leaf.
5. **State** the overall equations for photosynthesis and cellular respiration.
6. **Describe** how a water molecule cycles through the water cycle. Be able to label a diagram. \*do the same with Carbon cycle.
7. **Demonstrate** the ability to prepare a temporary wet mount.
8. **Identify** the parts of a microscope and their functions.
9. **Compare and contrast** photosynthesis with chemosynthesis.
10. **Label** and **describe** the functions of the parts of a mitochondrion.
11. **Explain** the advantages of highly folded membranes in cells.
12. **Compare** the reactants and products of glycolysis, Krebs Cycle and ETC.
13. **Compare** how autotrophs and heterotrophs obtain energy.
14. **Differentiate** betweenaerobic and anaerobic respiration and the 2 types of fermentation.
15. **Explain** how organisms produce energy in the absence of oxygen.
16. **Identify** the pathways the body uses to release energy during exercise.
17. **Explain** the evidence for the Endosymbiotic Theory and the role of chloroplasts and mitochondria in this theory.
18. **Sketch** how endosymbiosis occurs.