Honors Biology

*Energy in a Cell Study Guide*

**Here are the objectives you need to know for the exam:**

Explain what ATP is used for.

Illustrate what molecules make ATP.

Write the chemical equation for ATP becoming ADP.

Explain how water hydrolizes ATP to release energy.

Write the balanced chemical equation for photosynthesis.

List the organisms that do photosynthesis.

Diagram the chloroplast and label where different parts of photosynthesis occur.

Compare a root, stem, and leaf cell for the number of chloroplasts you would expect to find.

Explain the point of each stage of photosynthesis.

Diagram a thylakoid membrane.

Illustrate the light dependent reaction of photosynthesis.

List the molecules made in the light dependent reaction that are required for the Calvin cycle.

Formulate a step by step explanation for the movement of a H+ through the thylakoid membrane. Explain how it moves across the membrane (active transport, diffusion), what proteins are involved (protein pump, ATP synthase), and the point of H+ moving back and forth.

Explain what would happen if a plant ran out of water (concerning photosynthesis)

Diagram the Calvin cycle.

Predict what would happen if a plant ran out of CO2 (concerning photosynthesis)

Write an explanation of how Carbon dioxide is used to add mass to an plant seedling.

Using evidence from our lab, discuss how factors such as light and temperature can affect the rate of photosynthesis

Discuss the point of cellular respiration.

Write the balanced chemical equation for cellular respiration.

Calculate how many ATP molecules are made in each step of cellular respiration.

Diagram a mitochondria and label where each step of cellular respiration occurs.

Explain what organisms do cellular respiration.

Discuss how glycolysis can have 3 separate results (Acetyl-CoA, Ethanol, and Lactic acid).

Explain the roles of NADH and FADH2 in cellular respiration, compare and contrast their roles with NADPH.

Write the chemical symbol for glucose.

Compare and contrast the investment stage and the payoff stage of glycolysis (concerning ATP production).

Discuss why cells might depend on glycolysis for survival (quick production of ATP) as compared to the normal production of ATP during cellular respiration.

Diagram glycolysis

Explain how energy and hydrogens are release by citric acid to make other molecules during the Krebs cycle (Bonds being broken, the new molecule changes shape, water being added).

Illustrate where molecules (NADH, FADH2, and ATP) are made during the Krebs Cycle.

Diagram the Krebs cycle

Draw and label the inner membrane of a mitochondria.

Explain how NADH is oxidized and what happens to the electron that is lost.

Compare and contrast the electron transport chain in the thylakoid to the one in the inner membrane of the mitochondria.

Diagram the electron transport chain in cellular respiration

**What you should do to prepare for this exam:**

Double check to make sure your note sheets are correct. You can use the Prezis for this.

Find a study partner.

With your study partner, you should quiz each other over the questions on your note sheets. (You can also do this with yourself on the way home from school or before you go to bed—just fold the notes in half lengthwise). You should be able to answer all of the questions correctly in under 5 seconds per question.

Get a white board (you can borrow one from me). Practice diagraming each step of photosynthesis and cellular respiration. Once you think you can do this quickly, you should race against your study partner at least 10 times per step (glycolysis, Calvin cycle, etc).

Look over your lab, make sure you understand the answers to the questions (there are three). Make sure you can interpret the graph and the data tables from the lab.

Once you can do the above steps without a problem, you should act like the above objectives are a test and write out the answers to each one. If you are not sure of the question, make one up that you think I might write for the test, then answer it. Have your partner check your answers—argue over the ones you disagree on until someone gives the evidence required to win the argument.

If you do this and you are still confused, watch the Khan videos again and/or the Crash Course videos (I will post them on the web site).

If you still have questions, come talk to me with specific questions.

Get a good night’s sleep and eat a healthy breakfast.

Don’t put off studying until Thursday night.