Cellular Respiration Worksheet

Name____________________

Section A: Intro to Cellular Respiration
Cellular respiration breaks down glucose (C₆H₁₂O₆) and transfers the energy to make ATP which provides energy for cellular processes. Cellular Respiration can be divided into three metabolic processes: glycolysis, the Krebs cycle and electron transport chain. Glycolysis reaction occurs in the cytosol and begins the process of breaking down glucose without the use of O₂. Products from the first reaction enter the mitochondria where O₂ is needed for the Krebs cycle and the ETC to occur. A net of 36 ATPs are formed from the enzymatic breakdown of one glucose molecule.

1. What is cellular respiration? ___________________________________________________________
2. Which process of cell respiration is anaerobic? __________________________________
3. Which processes of cell respiration are aerobic? __________________________________________
4. When one glucose molecule enters cellular respiration, how many ATPs are formed? __________

Mitochondria are the powerhouse of the cell. Mitochondria have a double-membrane: the outer membrane is smooth; the inner membrane is convoluted into folds called cristae. The electron transport chain takes place across the membranes of the cristae. Inside the cristae (folds) is a space called the matrix that contains enzymes needed for the Krebs cycle.

5. Color the cristae orange and the matrix blue.
6. What are the inner folds called? _______________________
7. What is the fluid called? ______________________

Section B: Reactions

**Glycolysis**
Location: _______________ Anaerobic or aerobic? _______________________
What happens? _____________________________________________________________
NET YIELD: _______________________________________________________________

**Krebs Cycle**
Location: _______________ Anaerobic or aerobic? _______________________
What happens? _______________________________________________________________
NET YIELD: _______________________________________________________________

**Electron Transport Chain**
Location: _______________ Anaerobic or aerobic? _______________________
What happens? _______________________________________________________________
NET YIELD: _______________________________________________________________
Section C: Cellular Respiration

1. The class set up an experiment using Bromthymol Blue as an indicator that changes color from blue to yellow in the presence of CO$_2$. What color would the solutions be and what processes have occurred?
   Flask 1 – H$_2$O, bromthymol blue, plant
   Flask 2 – H$_2$O, bromthymol blue, 2 small fish
   Flask 3 – H$_2$O, bromthymol blue, plant, 2 small fish

   | Flask 1: Color – ________________ | Process – ____________
   | Flask 2: Color – ________________ | Process – ____________
   | Flask 3: Color – ________________ | Process – ____________

2. Cellular respiration is the process by which cells convert the energy available in food to which energy-rich compound? ______________

3. What molecule is the final electron acceptor in the ETC? ______________

4. What is the function of the NADH/FADH? ______________

5. What is the equation for cell respiration? ________________________________________________

6. Use the graph to describe the relationship between temperature and consumption of oxygen. ______________

7. Based on the graph, would you conclude that non-germinating seeds respire? ______________

8. After glycolysis, if no O$_2$ is available, what happens next? ______________

9. Some bacteria are facultative anaerobes, which usually produce ATP by aerobic respiration but are capable of switching to fermentation when there is a lack of ______________ in their environment.

10. Ms. Green’s students were studying respiration with yeast. Each group mixed 2 grams of yeast with warm water in a test tube. The groups used the height of bubbles produced to determine the rate of fermentation. What must be added to the yeast to facilitate fermentation? ______________ What gas is released? ______________

11. Muscle soreness associated with strenuous exercise is at least partly due to
   a. the presence of lactic acid produced during fermentation in muscle cells.
   b. the large amount of carbon dioxide that builds up in the muscle.
   c. the accumulation of alcohol from anaerobic respiration.
   d. an excess of ATP that builds up during vigorous exercise.

Section D: Photosynthesis vs. Cellular Respiration

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Quizzes:
http://www.sciencegeek.net/Biology/review/U2Respiration.htm
http://edhsgreensea.net/Biology/taters/respiration_mc.htm