

Name: _____

Date: _____

Period: _____

Cellular Respiration Intro

Week # _____

Directions: Read p. 250 - 252. Then answer the questions below.

Question	Description
What do food molecules contain? (p.250)	
Where do organisms get energy? (p.250)	
What does a calorie refer to? (not the definition) (p.250)	
What do cells use the energy stored in food for? (p.250)	
What is cellular respiration? (p.251)	
What is the formula for cellular respiration? (p.251)	In symbols: In words:
What does the double meaning of respiration refer to? (p.252)	
What organelle does cellular respiration occur in? What does this organelle do? (p.252)	

Check for Understanding

- In your own words, what is the goal of cellular respiration? _____
- What types of organisms do cellular respiration?
 - Circle one: Autotrophs Heterotrophs All organisms
 - Explain your choice: _____
- What does the cell produce from cellular respiration? _____, which is _____ the cell can use.

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The Mystery of the Seven Deaths: A Case Study in Cellular Respiration

Directions: Read and annotate each section. Then answer the questions.

On September 29, 1982, 12-year-old Mary Kellerman of Elk Grove woke up feeling ill. Her parents gave her one Extra-Strength Tylenol capsule. The next morning, they found Mary dead. On the same day, paramedics were called to the Arlington Heights home of 27-year-old Adam Janus. When they arrived, his breathing was strained and his blood pressure was very low. The paramedics rushed Adam to the hospital but it was too late. The next day, as Adam's family gathered at his house, his brother Stanley and his wife, Theresa, both had a headache from the stress. Stanley found Adam's bottle of Extra Strength Tylenol. He took a capsule and then gave one to his wife. Soon after, both Stanley and his wife collapsed onto the floor. Once again paramedics rushed to the home and attempted to revive the young couple, however, they both died hours later.

1. What is the connection among each of these suspicious deaths? _____

Autopsies revealed that each of the Januses died of suffocation, or lack of oxygen. Tissue from the heart, lungs, kidneys, and liver all showed massive cell death. Analysis of cells showed major mitochondria damage and very low levels of ATP. Interestingly, oxygen levels in the blood were normal.

2. Recall from earlier in this unit, what is the function of mitochondria? _____

3. Given the data in the autopsy, what finding seems inconsistent with the cause of death? _____

It was determined that cyanide poison was to blame. The Cook County toxicologist then examined the Tylenol bottles and discovered that they were filled with deadly amounts of cyanide. The maker of Tylenol, Johnson & Johnson, was alerted to the deaths and began a massive recall. However, three more deaths occurred before all of the contaminated Tylenol could be recalled. Chicago police discovered that someone had bought the Tylenol, filled the capsules with cyanide, and returned them.

So, why is cyanide lethal? Cyanide interferes with cellular respiration. In order to survive, cells need energy, and they get this energy from the sugars in food. In cellular respiration, cells use oxygen molecules from the air we breathe to obtain the energy from sugar. Cyanide molecules disrupt cellular respiration because cyanide looks like oxygen. If oxygen and cyanide molecules are both present in the bloodstream, cells grab onto cyanide molecules first, instead of oxygen. Since cyanide is not the same as oxygen, it clogs the cellular respiration process. With its respiration mechanism clogged, the cell dies and if enough cells die, then the person dies as well.

4. Given what you now know about the action of cyanide on cellular respiration, explain why the patients died of suffocation, while their blood oxygen levels were normal.

5. Explain why the autopsy results indicate very low levels of ATP in the mitochondria.