Zombie Respiration Worksheet *by C. Kohn, Waterford WI*

Name: Hour Date:

Date Assignment is due: Why late? Score: + ✓ -  
 Day of Week Date If your project was late, describe why

## **Directions – read and follow carefully!**

Use the reading below to answer the accompanying questions. You can and should work in groups to complete this assignment but you are responsible for completing your own sheet. A “**+**” means that every answer is **clearly written** in **full sentences** and **takes up all the space given** or more. A “**✓**” means you met the expectations of the assignment.

**Reading**: In popular culture, zombies have become a popular subject for movies and television. These programs have created a couple of kinds of zombies:

1. In *The Walking Dead*, a virus or bacteria causes the deceased to become re-animated. The bite from a zombie (or “Walker”) will cause the affected person to also become a zombie when they die. These zombies can move quickly but usually move slowly; they can only be killed by a gunshot to the head. The ‘zombies’ are dead in this case and their body will decompose over time. Their ability to move and function seems to be because of the organism that infects them after being bit.
2. In *World War Z*, a virus causes dead bodies to become re-animated. Like the Walking Dead, the infected people are no longer alive. The pathogen takes over their cells and uses their own body to function. Unlike *The* *Walking Dead*, zombies in *World War Z* were fast and powerful and could quickly attack people. Their bodies’ cells were hijacked by a pathogen and did not decompose – while the person was technically dead, their cells were still functioning under the control of the infecting organism. In this example, victims were not attacked if the person was infected or unhealthy.
3. In *28 Days Later* and *I Am Legend*, the zombies were people who were still alive but who were infected by a rabies-like virus that caused them to become aggressive and cannibalistic. In these examples, the ‘zombies’ are actually still alive and can die like a normal person; it is an infection in their brain that causes them to behave the way they do. Like *World War Z*, these ‘zombies’ can move quickly like a normal person.
4. Frankenstein’s Monster is also kind of a zombie. In this classic horror story, parts of corpses were sewn together and electricity was used to re-animate the body. The ‘monster’ moves slowly but the body functions like a normal person. The re-animated person can die just like a normal person. The ‘monster’ is not necessarily aggressive – he only became violent when he was excluded and attacked by other people.

*Use this information to answer the questions below.*

1. Of the four kinds of zombies listed above, which one do you is the *least* scientifically accurate? (In other words, which of these is least possible from a scientific perspective? Multiple may be impossible, but choose just one)  
     
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2. Explain why you chose this answer:
3. We know that all living organisms have cells, and that all cells use ATP as their source of energy. In the space below, summarize how a cell produces ATP. Be sure to include the following: a) *glucose* b) *hydrogen* c) *mitochondria* d) *ATP* e) *ADP & Pi* f) *ATP* *Synthase* g) *Oxygen*
4. Using what you know about cellular respiration, explain why your answer for #1 could never actually happen. **Be sure to include what you know about ATP and cellular respiration in your answer** and use this as evidence to argue why this type of zombie is impossible. To receive full credit, be as specific and detailed as you can!
5. Of the four kinds of zombies listed on the previous page, which one do you is the *most* scientifically possible?   
     
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6. How would this type of zombie produce the ATP it needs?
7. How and where would this type of zombie acquire the glucose and/or hydrogen it needs to produce ATP?
8. How would it remove the waste products of ATP production?
9. Would this type of zombie rely mostly on substrate-level phosphorylation or oxidative phosphorylation? Explain: