Glycolysis is always the first process that starts when an animal cell goes under physical activity. This is because aerobic cellular respiration requires a small amount of time to utilize the oxygen in the blood stream and in the cell. However the energy produced from glycolysis is not enough to sustain activities if there is a large amount of energy required.

When an animal cell is stressed it can go under a different type of cellular respiration. When an animal cell has oxygen, it can go under aerobic cellular respiration. This is a process where oxygen is used to create a large amount of ATP. This set of reactions has a set chemical reaction. The reaction looks like this…

Today we will be testing to see what type of cellular respiration our bodies go under with different types of activities. We will figure out how our activities dictate what type of cellular respiration we undergo.

**Materials:**

Stopwatch

Book

Energy

**Procedure:**

Today we will start by figuring out our resting heart rate. In order to figure this out we need to have a moment of rest. During this moment of rest, there should be no moving, talking or releasing of energy.

1. Our resting heart rate will be a 20 second sample of our heartbeat. Find your resting heart rate and write it below.

Resting heart rate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Our resting breathing rate will be a 20 second sample of breaths. Find your resting breathing rate and write it below

Resting breathing rate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Intensity of breaths (scale 1-10) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Get in a group of 2 and we will perform the experiments that are listed below as a class. Before and after each experiment, be sure to take a 20 second heart rate and a 20 second breathing rate. This should relate the amount of oxygen that is being used by our body.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Activity | Beginning HR | Beginning BR | Ending HR | Ending BR | Beginning BR Intensity | Ending BR Intensity |
| 90 Second Jumping Jack |  |  |  |  |  |  |
| 5 Second Clap |  |  |  |  |  |  |
| 60 Seconds Of Running In Place |  |  |  |  |  |  |
| Jump As High as You Can |  |  |  |  |  |  |
| Lift a Book From the Floor To Over Your Head |  |  |  |  |  |  |
| Climb Then Descend The Stairs Twice |  |  |  |  |  |  |

1. Take the data that you have collected and determine if the activities listed above use oxygen. If the activities have used oxygen, label what pathway your cells have used to get energy. If your activities did not use oxygen, label what pathway your cells used to get energy.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Increase or Decrease in HR | Increase or Decrease in BR | Increase or Decrease in Intensity | Pathway used |
| 90 Second Jumping Jack |  |  |  |  |
| 5 Second Clap |  |  |  |  |
| 60 Seconds Of Running In Place |  |  |  |  |
| Jump As High as You Can |  |  |  |  |
| Lift a Book From the Floor To Over Your Head |  |  |  |  |
| Climb Then Descend The Stairs |  |  |  |  |

Analysis:

1. Which activities raised your heart rate?
2. Which activities raised your breathing rate?
3. Which activities do you think caused a higher need for oxygen?
4. What activities made your body undergo glycolysis?
5. What activities made your body undergo anaerobic cellular respiration?
6. What was the difference in time between the activities for anaerobic cellular respiration and the activities for aerobic cellular respiration?
7. What was the difference in time between the activities for anaerobic cellular respiration and the activities for aerobic cellular respiration?