

# ZOO-585 Ecophysiology

## Worksheet no:3

**Name:**

**Date:**

### LAB ACTIVITY -3 (RESPIROMETER)

#### **Q.I. Answer the following questions:**

1. Write the equation for cellular respiration:

2. What are the three ways in which you can measure the rate of cellular respiration?

3. As the organism inside the respirometer consumes oxygen, what happens to the water?

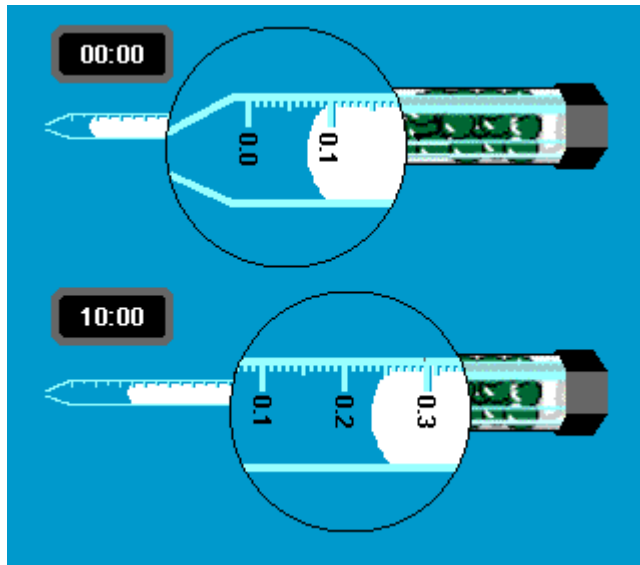
4. What happens to the CO<sub>2</sub> that the organism produces?

**Q.II.** After you have collected data for the amount of oxygen consumed over time by germinating and nongerminating peas at two different temperatures, you can compare the rates of respiration. Let's review how to calculate rate.

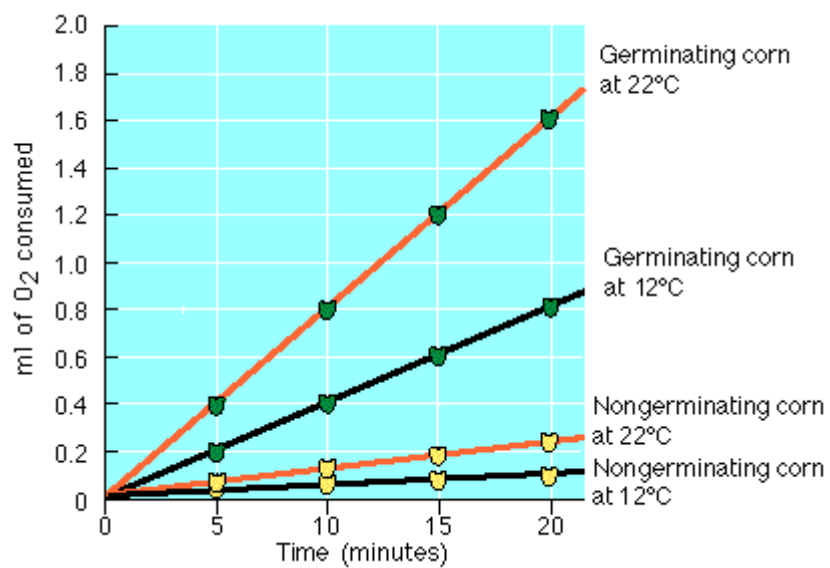
Rate = slope of the line, or  $\Delta y / \Delta x$

In this case,  $\Delta y$  is the change in volume, and  $\Delta x$  is the change in time (10 min).

What would be the rate of oxygen consumption if the respirometer readings were as shown here?



Q.III. Use the following figure to answer questions 1–3.



1. Which of the following is a true statement based on the data?

- a. The amount of oxygen consumed by germinating corn at 22°C is approximately twice the amount of oxygen consumed by germinating corn at 12°C.
- b. The rate of oxygen consumption is the same in both germinating and nongerminating corn during the initial time period from 0 to 5 minutes.
- c. The rate of oxygen consumption in the germinating corn at 12°C at 10 minutes is 0.4 ml O<sub>2</sub>/minute.
- d. The rate of oxygen consumption is higher for nongerminating corn at 12°C than at 22°C.
- e. If the experiment were run for 30 minutes, the rate of oxygen consumption would decrease.

2. What is the rate of oxygen consumption in germinating corn at 12°C?

- a. 0.08 ml/min
- b. 0.04 ml/min
- c. 0.8 ml/min
- d. 0.8 ml/min
- e. 1.00 ml/min

3. Which of the following conclusions is supported by the data?

- a. The rate of respiration is higher in nongerminating seeds than in germinating seeds.
- b. Nongerminating peas are not alive, and show no difference in rate of respiration at different temperatures.
- c. The rate of respiration in the germinating seeds would have been higher if the experiment were conducted in sunlight.
- d. The rate of respiration increases as the temperature increases in both germinating and nongerminating seeds.
- e. The amount of oxygen consumed could be increased if pea seeds were substituted for corn seeds.

4. What is the role of KOH in this experiment?

- a. It serves as an electron donor to promote cellular respiration.

- b.As KOH breaks down, the oxygen needed for cellular respiration is released.
- c.It serves as a temporary energy source for the respiring organism.
- d.It binds with carbon dioxide to form a solid, preventing CO<sub>2</sub> production from affecting gas volume.
- e.Its attraction for water will cause water to enter the respirometer.