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Cell Respiration Virtual Activity

Directions: Click on the link below and answer the corresponding questions.
http://www.phschool.com/science/biology_place/labbench/lab5/intro.html

Introduction and Key Concepts

1. What will you observe in this investigation?

2. Write the equation for cellular respiration.

3. What are some processes in plants that require respiration?

Design of the Experiment

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

5. Which method will be used in this demonstration?

6. Sketch a respirometer and label its important features. What does it measure?

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

8. What happens to the CO_2 that the organism produces?

9. Experimental Setup: View the graphic and fill in the data table.

	Vial 1	Vial 2	Vial 3	Vial 4	Vial 5	Vial 6
Contents						
Temperature						

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10. How do you ensure that each vial has an equal volume?

11. What is the purpose of the vial with only glass beads?

Analyzing the Results

1. What is the equation to determine the rate of respiration?

2. What is x? What is y?

3. Read the respirometers and determine the rate of respiration. Show your calculations.

4. Answer the four self-quiz questions.
   a.

   b.

   c.

   d.

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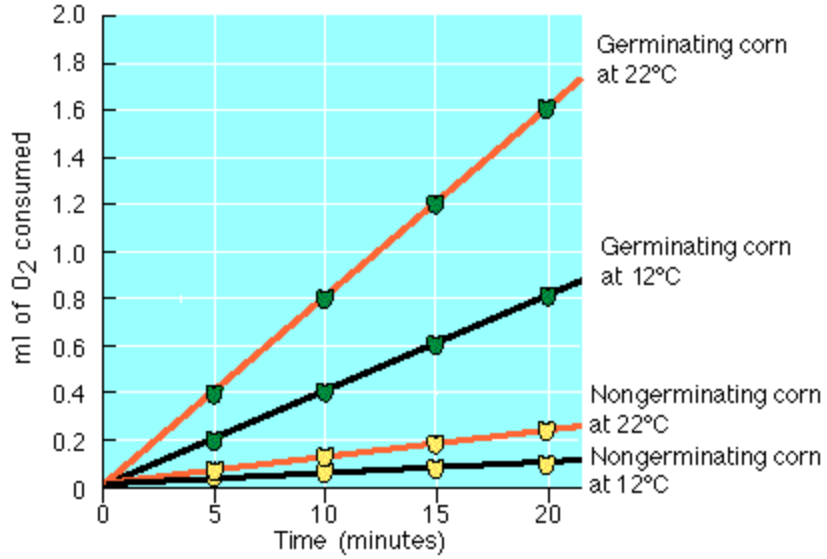
5. Answer the following questions based on the graph below.



a) Describe the relationship between temperature and consumption of oxygen.

b) Calculate the rate of oxygen consumption for germinating corn at 12 degrees. (Show calculations)

c) Based on the graph, would you conclude that non germinating seeds respire?

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Extension The following lab was conducted using respirometers to measure change in pressure inside a pipette for non-germinating seeds, germinating seeds, and mealworms. The following data was gathered:

Data Table 2: Calculation of Oxygen Consumption					
Respirometer 1a- Room Temperature, Non-Germinating Seeds					
Time Interval (min)	**0 min**	**5 min**	**10 min**	**15 min**	**20 min**
Reading (ml)	0.82	0.82	0.81	0.80	0.79
Δ volume (ml) (reading – time)	N/A	0	0.01	0.02	0.03
Respirometer 1b- Room Temperature, Germinating Seeds					
Reading (ml)	0.87	0.76	0.61	0.50	0.35
Δ volume (ml) (reading – time)	N/A	0.11	0.26	0.37	0.52
Respirometer 1c- Room Temperature, Mealworms					
Reading (ml)	0.79	0.63	0.52	0.38	0.15
Δ volume (ml) (reading – time)	N/A	0.16	0.27	0.41	0.64
Respirometer 2a- Ice Water, Non-Germinating Seeds					
Reading (ml)	0.9	0.9	0.9	0.89	0.89
Δ volume (ml) (reading – time)	N/A	0	0	0.01	0.01
Respirometer 2b- Ice Water, Germinating Seeds					
Reading (ml)	0.88	0.86	0.80	0.78	0.75
Δ volume (ml) (reading – time)	N/A	0.02	0.08	0.10	0.13
Respirometer 2c- Ice Water, Mealworms					
Reading (ml)	0.86	0.80	0.75	0.62	0.57
Δ volume (ml) (reading – time)	N/A	0.06	0.11	0.24	0.29

1. Determine the rate of respiration for each of the six respirometers between 0 and 20 minutes. (Show all work.)

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2. Make a **Claim** about how the temperature affected the respiration in ***<u>each</u>*** organism in this lab.

3. Using data collected from this experiment, provide **Evidence** that supports the claim.

4. Using background knowledge and data from this lab, provide **Reasoning** that uses the evidence to justify the claim (remember pV=nRT).