

## GRAPHING EXERCISES CHEMISTRY

Oxygen can be generated by the reaction of Hydrogen Peroxide with Manganese Dioxide.



A Chemistry class sets up nine test tubes and placed different masses of  $\text{MnO}_2$  in each test tube. An equal amount of  $\text{H}_2\text{O}_2$  is added to each test tube and the volume of gas produced is measured each minute for five minutes. The data from the experiment is as follows:

Tube #	$\text{MnO}_2$ (g)	1 min (ml $\text{O}_2$ )	1 min (ml $\text{O}_2$ )	2 min (ml $\text{O}_2$ )	3 min (ml $\text{O}_2$ )	4 min (ml $\text{O}_2$ )	5 min (ml $\text{O}_2$ )
1	0.1	1.4	2.6	3.5	4.2	4.2	5.1
2	0.2	2.8	4.6	5.8	7.1	7.1	7.6
3	0.3	4.9	7.2	8.8	10.2	10.2	11.3
4	0.4	5.9	8.5	10.4	11.8	11.8	13.3
5	0.5	8.5	12.4	14.4	16.1	16.1	17.1
6	0.6	11.0	14.8	17.5	19.8	19.8	21.8
7	0.7	12.0	17.0	20.2	22.7	22.7	24.8
8	0.8	13.6	19.0	22.1	24.7	24.7	27.3
9	0.9	16.2	21.8	25.1	28.2	28.2	30.4

1. What volume of  $\text{O}_2$  did tube #3 produce between the second and fourth minutes?
2. How much  $\text{O}_2$  is produced in tube #5 during the first two minutes?
3. How much oxygen did tube #7 and #8 produce together during the third minute?
4. What volume of oxygen gas, in litres, was produced during this procedure?
5. Graph the amount of oxygen produced each minute in tubes #2,4,6.
6. By comparing the slope of the graph curves, which tube was producing oxygen at the fastest rate between minutes four and five?
7. Make a graph using the mass of manganese dioxide and the volume of oxygen for all tubes at five minutes.

## GRAPHING EXERCISES BIOLOGY

Using the following table complete the questions.

pH of water	Number of tadpoles
8.0	45
7.5	69
7.0	78
6.5	88
6.0	43
5.5	23

1. Make a line graph
2. What is the dependent variable?
  
3. What is the independent variable?
  
4. What is the average pH in this experiment?
  
5. What is the average number of tadpoles per sample?
  
6. What is the optimum water pH for tadpole development?
  
7. Between what two pH readings is there the greatest change in tadpole number?
  
8. How many tadpoles would we expect to find in water with a pH reading of 5.0?

Ethylene is a plant hormone that causes fruit to mature. The data concerns the amount of time it takes for fruit to mature from the time of the first application of ethylene by spraying a field of trees.

Using the following data, complete the questions.

<b>Amount of ethylene in ml/m<sup>2</sup></b>	<b>Wine Sap Apples: Day to Maturity</b>	<b>Golden Apples: Days to Maturity</b>	<b>Gala Apples: Days to Maturity</b>
10	14	14	15
15	12	12	13
20	11	9	10
25	10	7	9
30	8	7	8
35	8	7	7

1. Make a line graph of the data
2. What is the dependent variable?
  
3. What is the independent variable?
  
4. From the data what conclusions can you make?
  
5. Farmers constantly need to consider the cost of the products they use. What amount of ethylene would you recommend to the farmer to use? Explain your answer.

The thickness of the annual tree rings indicate what type of environmental situation was occurring at the time of the tree's development. A thin ring, usually indicates a rough period of development. Lack of water, forest fires, or a major insect infestation. On the other hand, a thick ring indicates just the opposite.

<b>Age of the tree in years</b>	<b>Average thickness of the annual rings in cm. Forest A</b>	<b>Average thickness of the annual rings in cm. Forest B</b>
10	2.0	2.2
20	2.2	2.5
30	3.5	3.6
40	3.0	3.8
50	4.5	4.0
60	4.3	4.5

1. Make a line graph of the data
2. What is the dependent variable?
3. What is the independent variable?
4. What was the average thickness of the annual rings of 40 year old trees in Forest A?
5. Based on this data, what can you conclude about Forest A and Forest B?