

Name: _____

Date: _____

Per: _____

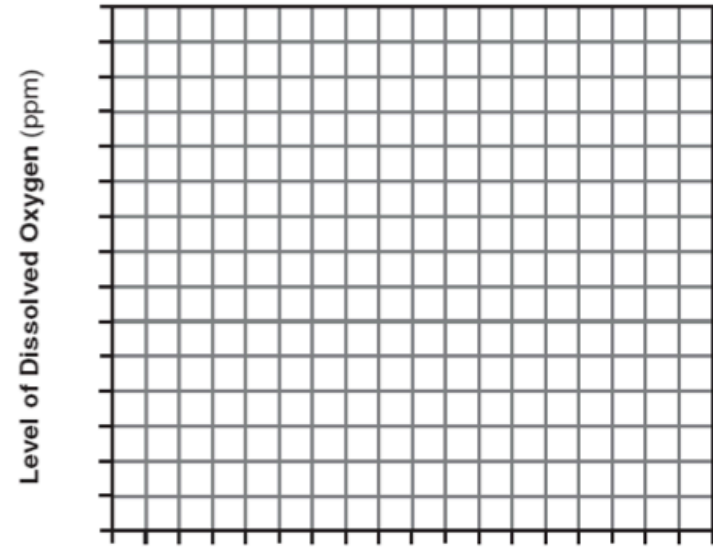
Living Environment: Graphing Practice

1. The amount of oxygen gas dissolved in water is important to the organisms that live in a river. The amount of dissolved oxygen varies with changes in both physical factors and biological processes. The temperature of the water is one physical factor affecting dissolved oxygen levels as shown in the data table below. The amount of dissolved oxygen is expressed in parts per million (ppm).

Dissolved Oxygen Levels at Various Temperatures

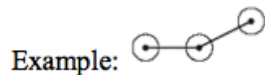
Water Temperature (°C)	Level of Dissolved Oxygen (ppm)
1	14
10	11
15	10
20	9
25	8
30	7

Dissolved Oxygen Levels at Various Temperatures



Using the information in the data table, construct a line graph on the grid, following the directions below.

- Mark an appropriate scale on each labeled axis.
- Plot the data for dissolved oxygen on the grid. Surround each point with a small circle and connect the points.



Water Temperature (°C)

- If the trend continues as shown in the data, what would the dissolved oxygen level most likely be if the temperature of the water was 35°C?

_____ ppm

- State the relationship between the level of dissolved oxygen and water temperature.

2. A number of bean seeds planted at the same time produced plants that were later divided into two groups, A and B. Each plant in group A was treated with the same concentration of gibberellic acid (a plant hormone). The plants in group B were not treated with gibberellic acid. All other growth conditions were kept constant. The height of each plant was measured on 5 consecutive days, and the average height of each group was recorded in the data table below.

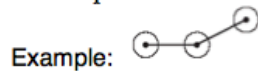
Data Table

	Average Plant Height (cm)				
	Day 1	Day 2	Day 3	Day 4	Day 5
Group A	5	7	10	13	15
Group B	5	6	6.5	7	7.5

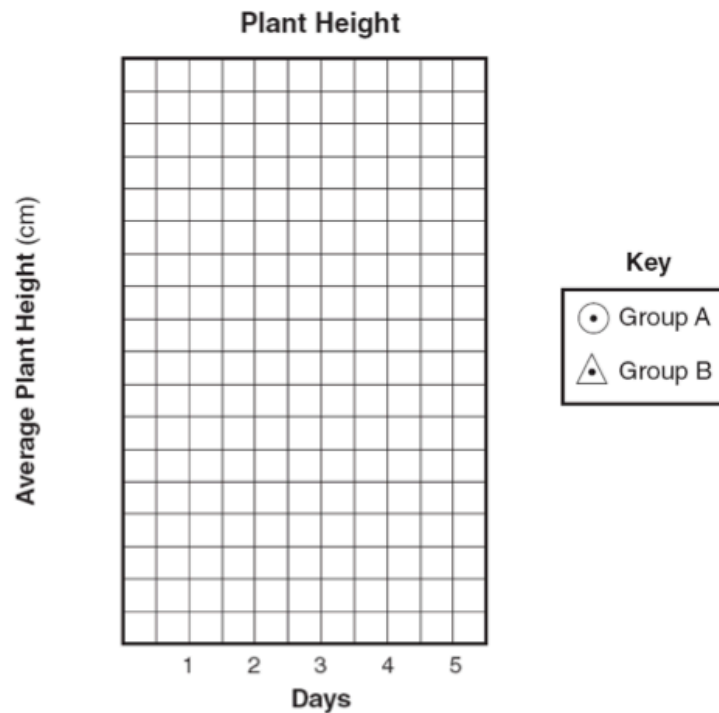
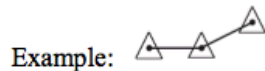
Using the information in the data table, construct a line graph on the grid, following the directions below.

a. Mark an appropriate scale on the axis labeled “Average Plant Height (cm).”

b. Plot the data for the average height of the plants in group A. Surround each point with a small circle and connect the points.



c. Plot the data for the average height of the plants in group B. Surround each point with a small triangle and connect the points.



d. The dependent variable in this investigation is the:

- (1) days
- (2) average plant height
- (3) gibberellic acid
- (4) group B

e. State a valid conclusion that can be drawn concerning the effect of gibberellic acid on bean plant growth.


3. Biologists investigated the effect of the presence of aluminum ions on root tips of a variety of wheat. They removed 2-mm sections of the tips of roots. Half of the root tips were placed in a nutrient solution with aluminum ions, while the other half were placed in an identical nutrient solution without aluminum ions. The length of the root tips, in millimeters, was measured every hour for seven hours. The results are shown in the data table below.

Data Table

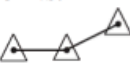
Time (hr)	Length of Root Tips in Solution With Aluminum Ions (mm)	Length of Root Tips in Solution Without Aluminum Ions (mm)
0	2.0	2.0
1	2.1	2.2
2	2.2	2.4
3	2.4	2.8
4	2.6	2.9
5	2.7	3.2
6	2.8	3.7
7	2.8	3.9

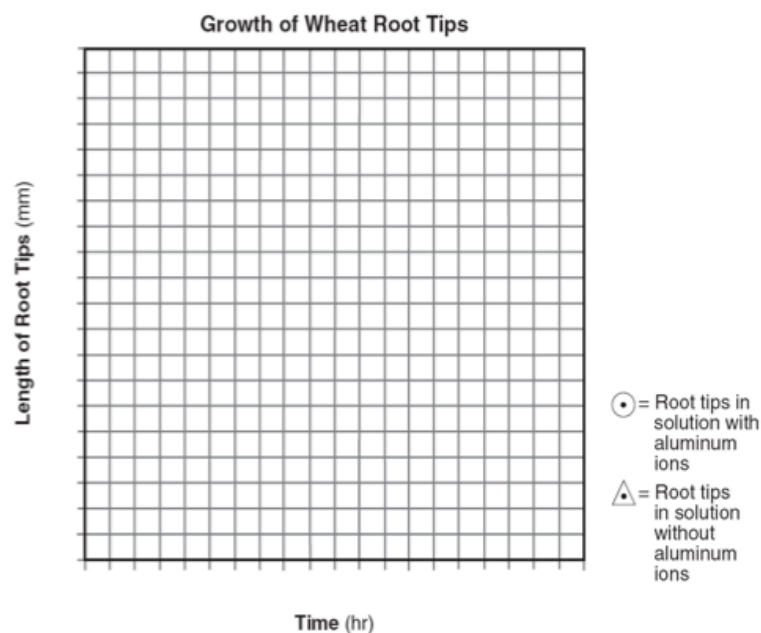
Using the information in the data table, construct a line graph on the grid, following the directions below.

- Mark an appropriate scale on each axis.
- Plot the data for root tips in the solution with aluminum ions on the grid. Surround each point with a small circle and connect the points.

Example: 

- Plot the data for root tips in the solution without aluminum ions on the grid. Surround each point with a small triangle and connect the points.

Example: 

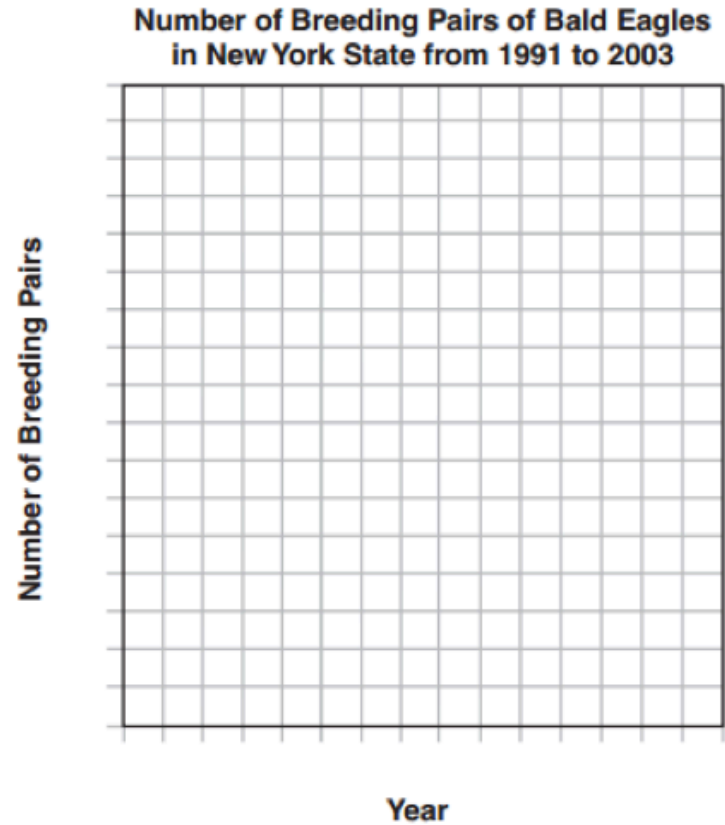


- Describe the effect of aluminum ions on the growth of the root tips of wheat.

4. Base your answers to questions 44 through 47 on the data table below and on your knowledge of biology. The data table shows the number of breeding pairs of bald eagles in New York State from 1991 to 2003.

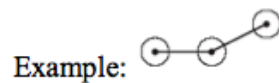
Number of Breeding Pairs of Bald Eagles in New York State from 1991 to 2003

Year	Number of Breeding Pairs
1991	15
1993	20
1995	25
1997	35
1999	45
2001	65
2003	75



Using the information in the data table, construct a line graph on the grid, following the directions below.

- Mark an appropriate scale, without any breaks, on each labeled axis.
- Plot the data on the grid. Surround each point with a small circle and connect the points.



c. In which time period did New York State see the largest increase in breeding pairs of bald eagles?

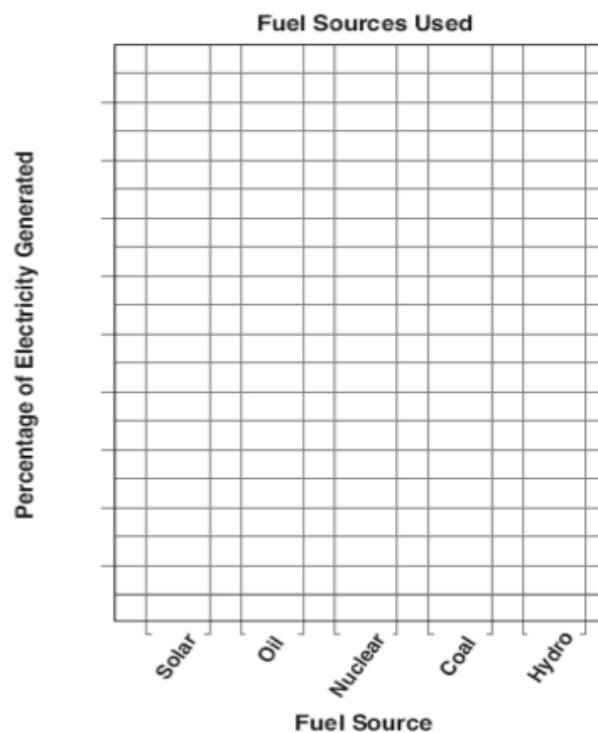
- | | |
|---------------|---------------|
| (1) 1991–1993 | (3) 1995–1997 |
| (2) 1993–1995 | (4) 1999–2001 |

5. Each year, a New York State power agency provides its customers with information about some of the fuel sources used in generating electricity. The table below applies to the period of 2002–2003.

Fuel Source	Percentage of Electricity Generated
hydro (water)	86
coal	5
nuclear	4
oil	1
solar	0

Using the information in the data table, construct a bar graph on the grid, following the directions below.

- Mark an appropriate scale on the axis labeled “Percentage of Electricity Generated.”
- Construct vertical bars to represent the data. Shade in *each* bar.



- Identify *one* fuel source in the table that is considered a fossil fuel.

- Identify *one* fuel source in the table that is classified as a renewable resource.

6. Tooth decay occurs when bacteria living in the mouth produce an acid that dissolves tooth enamel (the outer, protective covering of a tooth).

The Effect of Sugar Intake on Tooth Decay

World Regions	Average Sugar Intake per Person (kg/year)	Average Number of Teeth with Decay per Person
Americas	40	3.0
Africa	18	1.7
Southeast Asia	14	1.6
Europe	36	2.6

Using the information in the data table, construct a bar graph on the grid, following the directions below.

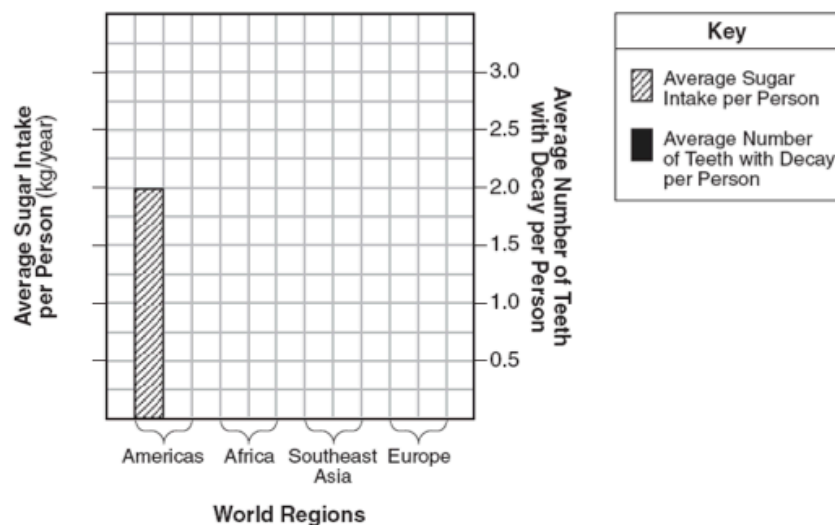
- Mark an appropriate scale on the axis labeled "Average Sugar Intake per Person."
- Construct vertical bars in the bracketed area for each world region to represent the "Average Sugar Intake per Person." Place the bars on the left side of each bracketed region and shade the bars as shown below. (The bar for Americas has been done for you.)



- Construct vertical bars in the bracketed area for each world region to represent the "Average Number of Teeth with Decay per Person." Place the bars on the right side of each bracketed region and shade in each bar as shown below.



Effect of Sugar Intake on Tooth Decay



- Which statement is a valid conclusion regarding tooth decay?
 - As sugar intake increases, the acidity in the mouth decreases, reducing tooth decay.
 - As sugar intake increases, tooth decay increases in Europe and the Americas, but not in Africa and Southeast Asia.
 - The greater the sugar intake, the greater the average number of decayed teeth.
 - The greater the sugar intake, the faster a tooth decays.

7.

Yellowstone Park Wolf Update

For the first time in nearly 70 years, the howl of the wolf is being echoed throughout Yellowstone National Park. *Canis lupus*, the gray wolf, one of the largest and most complex of the canine species, has been successfully reintroduced into the Yellowstone ecosystem. In mid-January 1995, 14 wolves from many separate packs were captured in Canada and then transported into Yellowstone Park and placed into three one acre pens....

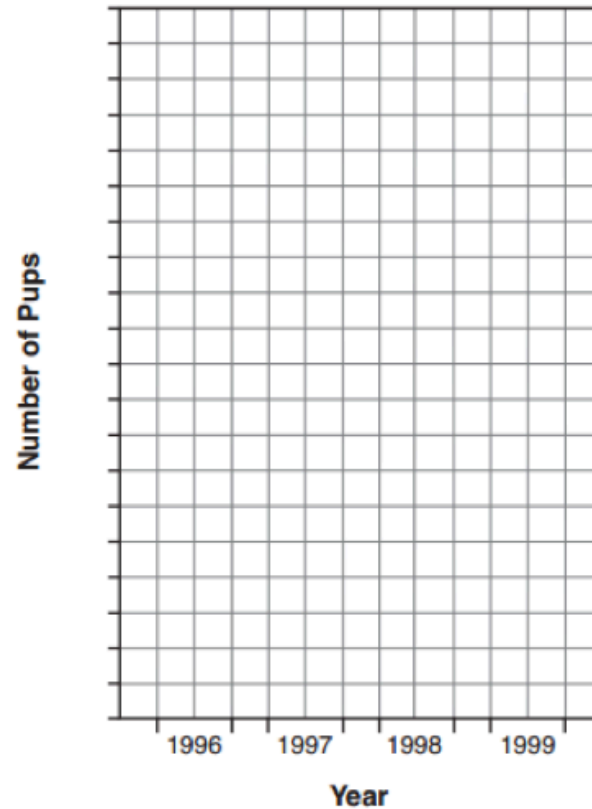
(Source: <http://www.yellowstone-bearman.com/w-update.html>)

After the wolves were given time to establish a new pack structure, the packs were released into the wild. The number of wolf pups was counted each year for four years. The data are shown in the table below.

Number of Wolf Pups Observed

Year	Number of Pups
1996	11
1997	64
1998	42
1999	61

Number of Wolf Pups Observed



Using the information in the data table, construct a bar graph on the grid, following the directions below.

a. Mark an appropriate scale, without any breaks, on the axis labeled "Number of Pups."

b. Construct vertical bars to represent the data. Shade in *each* bar.

c. State one possible reason why the wolf population showed a decline from 1997 to 1998.

8. Insecticides are used by farmers to destroy crop-eating insects. Recently, scientists tested several insecticides to see if they caused damage to chromosomes. Six groups of about 200 cells each were examined to determine the extent of chromosome damage after each group was exposed to a different concentration of one of two insecticides. The results are shown in the data table below.

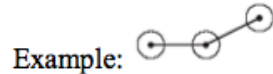
Cell Damage After Exposure to Insecticide

Insecticide	Insecticide Concentration (ppm)	Number of Cells with Damaged Chromosomes
Methyl parathion	0.01	7
	0.10	15
	0.20	30
Malathion	0.01	3
	0.10	4
	0.20	11

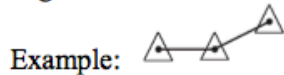
Using the information in the data table, construct a line graph on the grid, following the directions below.

- a. Mark an appropriate scale on the axis labeled, "Number of Cells with Damaged Chromosomes." [1]

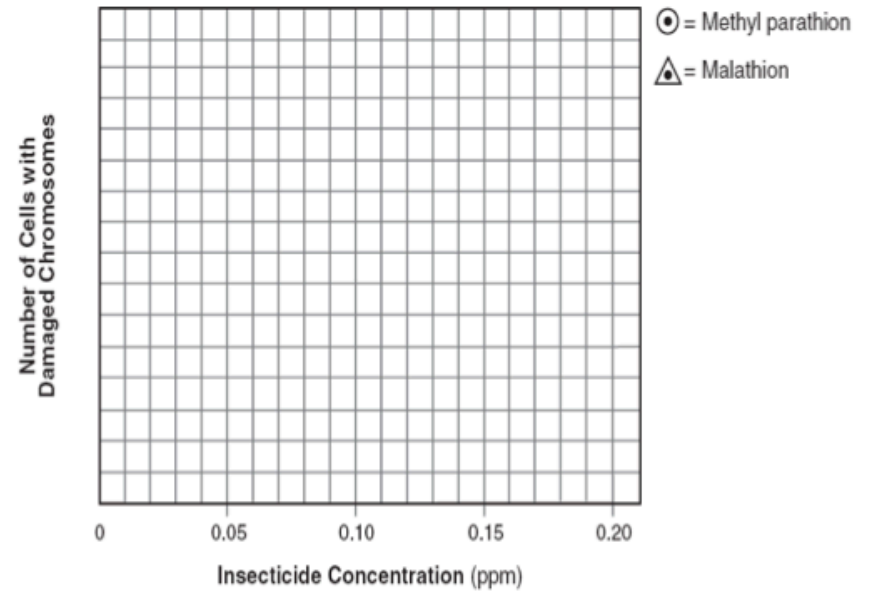
- b. Plot the data for methyl parathion on the grid. Surround each point with a small circle and connect the points. [1]



- c. Plot the data for malathion on the grid. Surround each point with a small triangle and connect the points. [1]



Cell Damage After Exposure to Insecticide



- d. Which insecticide has a more damaging effect on chromosomes? Support your answer. [2]

9. The effect of temperature on the action of pepsin, a protein-digesting enzyme present in stomach fluid, was tested. In this investigation, 20 milliliters of stomach fluid and 10 grams of protein were placed in each of five test tubes. The tubes were then kept at different temperatures. After 24 hours, the contents of each tube were tested to determine the amount of protein that had been digested. The results are shown in the table below.

Protein Digestion at Different Temperatures


Tube #	Temperature (°C)	Amount of Protein Digested (grams)
1	5	0.5
2	10	1.0
3	20	4.0
4	37	9.5
5	85	0.0

- a. The dependent variable in this investigation is the: (circle the correct answer) [1]

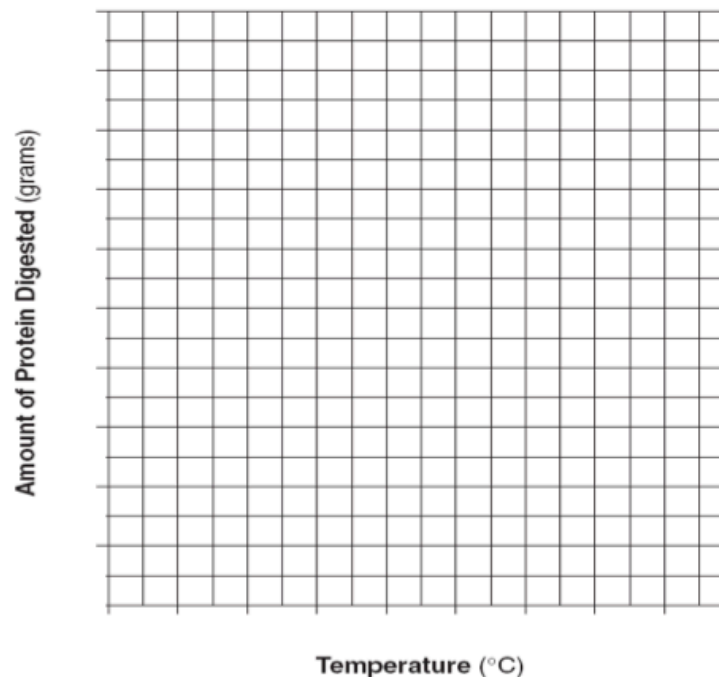
- (1) size of the test tube
- (2) time of digestion
- (3) amount of stomach fluid
- (4) amount of protein digested

Using the information in the data table, construct a line graph on the grid, following the directions below.

- b. Mark an appropriate scale on each axis. [1]
- c. Plot the data on the grid. Surround each point with a small circle and connect the points. [1]

Example: 

Protein Digestion at Different Temperatures



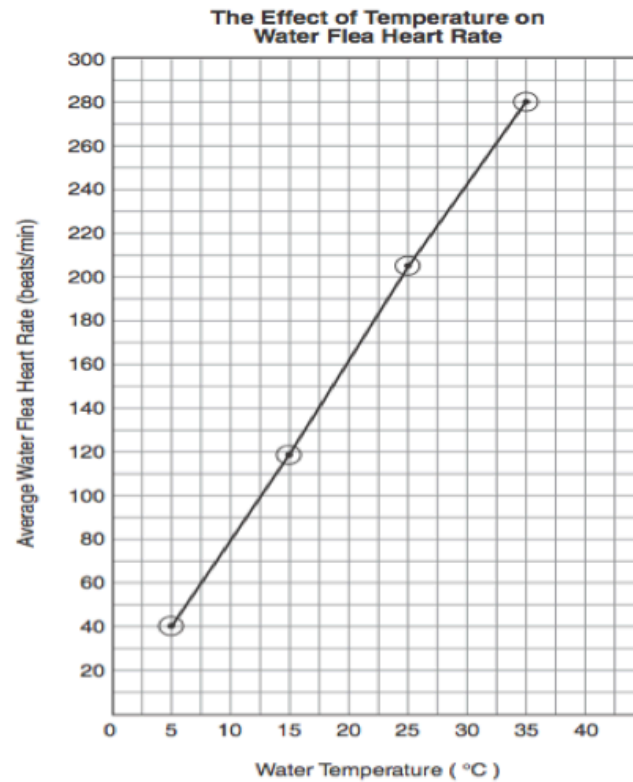
- d. If a sixth test tube identical to the other tubes was kept at a temperature of 30°C for 24 hours, the amount of protein digested would most likely be: (circle the correct answer) [1]

- (1) less than 1.0 gram
- (2) between 1.0 and 4.0 grams
- (3) between 4.0 and 9.0 grams
- (4) more than 9.0 grams

10. Three students each added equal volumes of pond water to four beakers and placed each beaker in a different water bath. Each student maintained the water baths at temperatures shown in the data table. The students then added an equal number of water fleas to each of their four beakers. After one hour, the students used microscopes to determine the average heart rate of the water fleas. The procedure was repeated for a total of three trials at each temperature. The results of the investigation are summarized in the data table.

In the space above, create a data table by using the information in the graph to the right. Be sure to include:

- a. A title [1]
- b. Labels [1]
- c. Appropriate data [2]



- d. The independent variable in this investigation is the: (circle the correct answer) [1]
 - (1) number of trials
 - (2) number of water fleas
 - (3) temperature of the waer
 - (4) average heart rate

e. State the relationship between temperature and heart rate in water fleas. [2]
