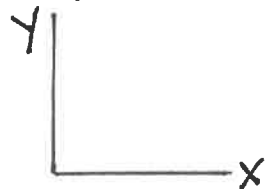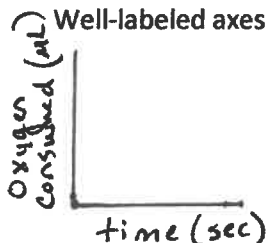REMINDERS: All graphs should have all axes labeled with the units. Every graph should have a descriptive title.

Poorly labeled axes   Well-labeled axes   Poorly titled graph   Well-titled graph

Y   Oxygen Consumed (mL)   "Part One Graph"   "Oxygen produced by
                           time (sec)   algae in different
X   temperatures."

1. Using the following data, answer the questions below and then construct a line graph with all required
    components.

DEPTH IN METERS	PLANT A BUBBLES/MIN	PLANT B BUBBLES/MIN
2	45	21
5	36	27
10	36	40
16	32	40
25	20	34
30	10	20

a. What is the independent variable? _____

b. What is the dependent variable? _____

c. Calculate the mean, median, and mode for all three columns.

Variable	Mean	Median	Mode
Depth			
Plant A Bubbles/min			
Plant B Bubbles/min			
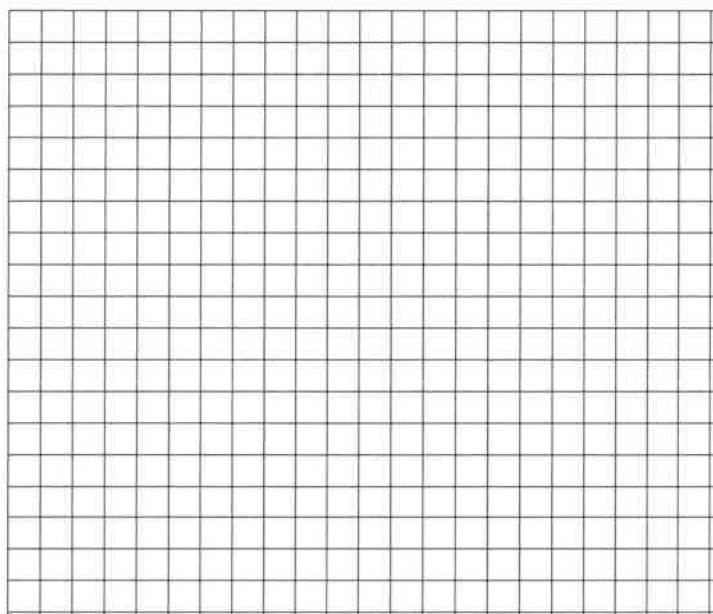
2. Diabetes is a disease affecting the insulin producing cells of the pancreas. If there is inadequate insulin being produced, the amount of glucose in the blood will remain high. A high blood glucose level above 140 for an extended period of time is not considered normal. The disease, if not properly managed, can lead to severe complications, blindness, and even death. Answer the following questions about the data then graph it, including all of the required components.

Time after eating (hours)	Glucose (mL/L of blood) Person A	Glucose (ml/L of blood) Person B
0.5	170	180
1.0	155	195
1.5	148	230
2.0	140	245
2.5	132	235
3.0	135	220
4.0	130	218

a. Which is the dependent variable? _____

b. Which is the independent variable? _____

c. Which individual (if any) has diabetes? _____

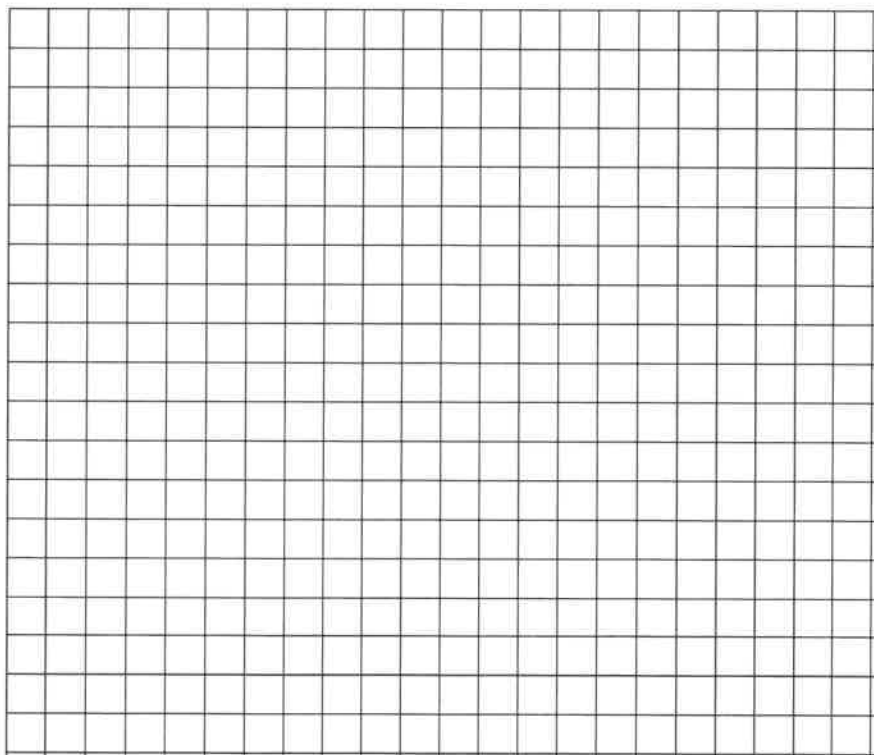d. If the time were extended to 6 hours, what would the expected blood glucose level be for Person B?

TABLE 1. EFFECT OF 0.1 mM CAFFEINE ON MEMORY IN BEES

3.

Treatment	Memory (average probability of revisiting a nectar source $\pm 2SE_{\bar{x}}$)	
	10 Minutes	24 Hours
Control	0.72 ± 0.09	0.41 ± 0.07
Caffeine	0.83 ± 0.07	0.78 ± 0.08

In flowering plants, pollination is a process that leads to the fertilization of an egg and the production of seeds. Some flowers attract pollinators, such as bees, using visual and chemical cues. When a bee visits a flower, in addition to transferring pollen, the bee can take nectar from the flower and use it to make honey for the colony.
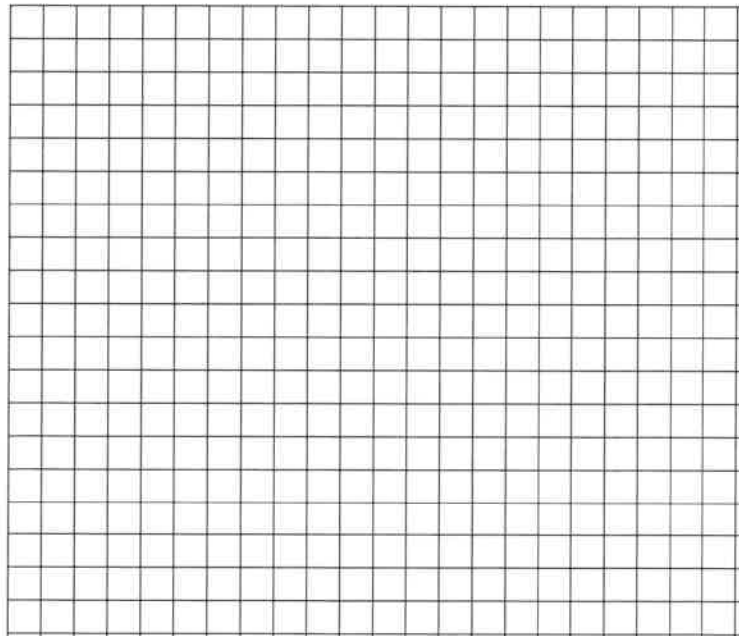
Nectar contains sugar, but certain plants also produce caffeine in the nectar. Caffeine is a bitter-tasting compound that can be toxic to insects at high concentrations. To investigate the role of caffeine in nectar, a group of researchers studied the effect of 0.1 mM caffeine on bee behavior. The results of an experiment to test the effect of caffeine on bees' memory of a nectar source are shown in Table 1.

Use the graph below to plot a bar graph with standard error (SE) bars. (The data in the table has already been calculated for means and standard errors.
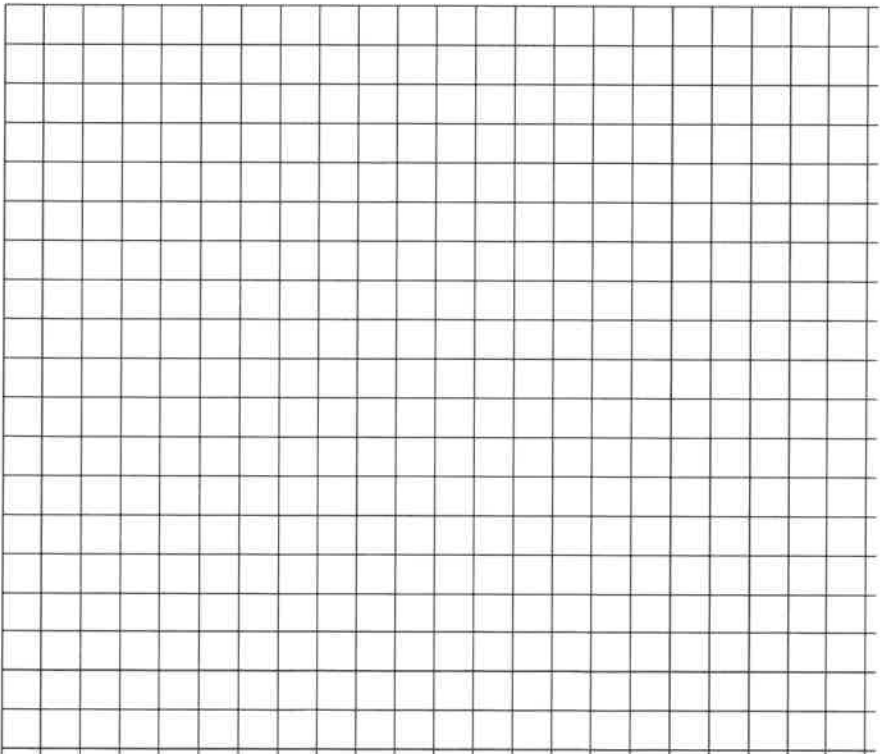
4. Temperatures were measured in November in a fairly arid area of Nevada. At two different sites, temperature readings were taken at a number of heights above and below the soil surface. One site was shaded by a juniper plant and the other was not. Plot the data and construct a line graph, including ALL of the required components.

| Condition	Height in cm from Soil Surface	Temp. in °C – Beneath the Juniper Tree	Temp. in °C- Unshaded field
Air	150	18	20
Air	90	18	21
Air	60	18	20
Air	30	18	21
Soil Surface	0	16	33
Humus	-6	12	19
Mineral	-15	9	15
Mineral	-30	7	12

State at least three conclusions you can make from analyzing this data about the relationship between soil depth and temperature and the relationship between tree cover and temperature.

5. An experiment was conducted to measure the reaction rate of the human salivary enzyme α-amylase. Ten mL of a concentrated starch solution and 1.0 mL of α-amylase solution were placed in a test tube. The test tube was inverted several times to mix the solution and then incubated at 25° C. The amount of product (maltose) present was measured every 10 minutes for an hour. The results are given in the table below.

Time (minutes)	Maltose Concentration (μM)
0	0
10	5.1
20	8.6
30	10.4
40	11.1
50	11.2
60	11.5

Graph the data below, following all required components of the graph.
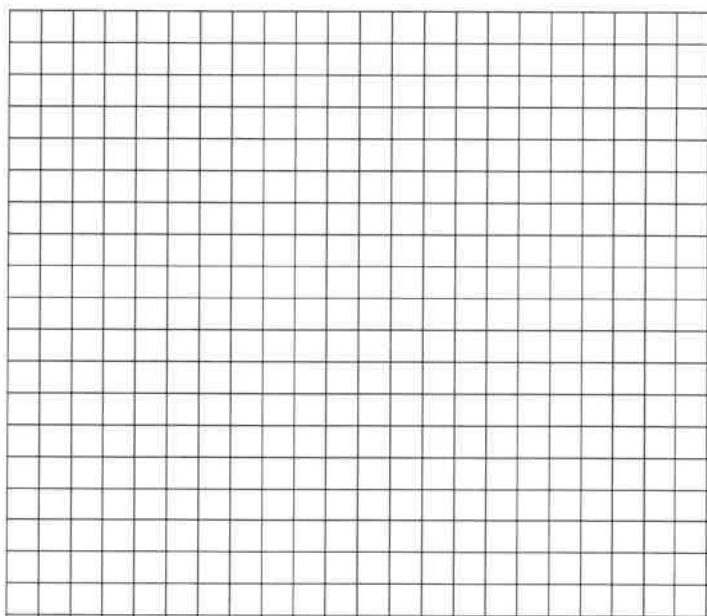
a. Which is the independent variable?
b. Calculate the rate of the reaction for the time period 0 to 30 minutes.

6. The following questions and practice are specific to box and whisker plots. Look at the Information packet for guidelines.

   a. Construct a box and whisker plot for the following data:

Data Group	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
A	82	94	95	102	110
B	55	60	67	70	74
C	80	81	82	83	84
D	49	60	72	80	95
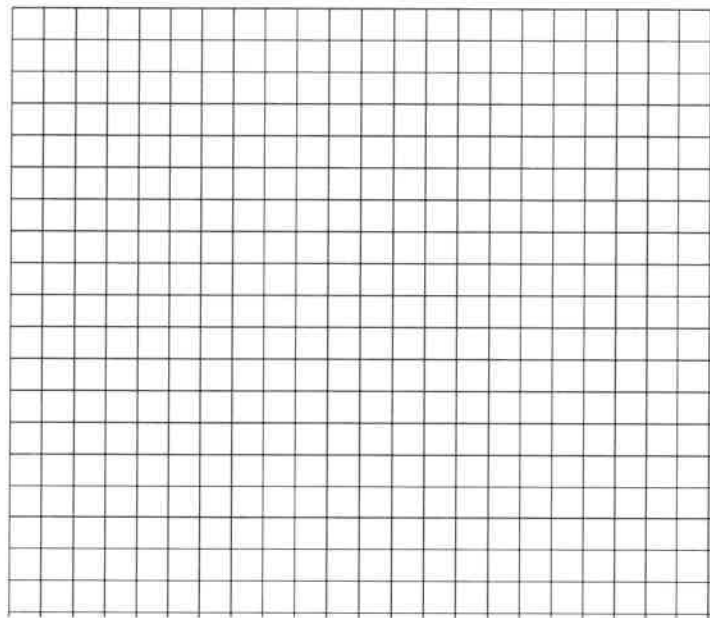
   b. Given the following data set, fill in the blanks below: 5, 7, 1, 8, 9, 11, 22, 11, 15

Minimum _____   maximum _____

Lower quartile _____   Upper quartile _____

Median _____