

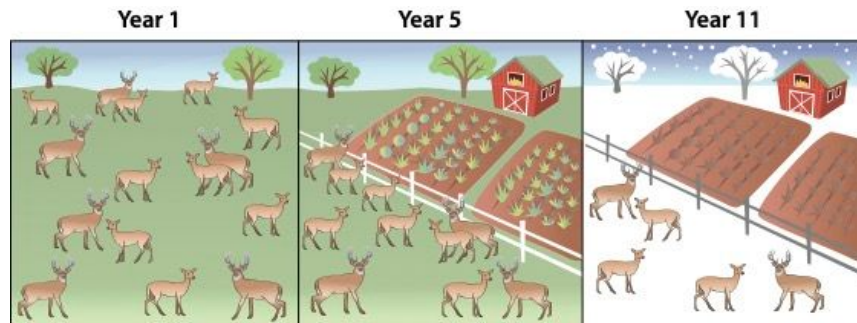
Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Assessment Items for Life Science 2-1

### Item 1

Scientists have been collecting data on a deer population in a grassland ecosystem for the past 15 years. People do not hunt this population of deer, but several events have happened during that time that may have affected the deer population. At the beginning of Year 5, 80% of the grassland is converted to farmland and fenced to keep out the deer. In Year 11, there is a very harsh winter, and the plants are not growing as much.



Year	Deer Population	Average Mass per Adult Deer (kg)	Number of Deer Births	% Malnourished (severely underweight) Deer
1	100	30	30	5
2	110	31	25	3
3	97	29	30	4
4	105	31	15	3
5	83	25	5	46
6	57	27	7	32
7	56	23	6	25
8	58	20	8	18
9	55	19	7	15
10	58	20	5	10
11	35	15	3	72
12	40	18	4	43
13	45	20	7	26
14	48	21	7	10
15	53	21	8	7

a. Use the data to describe the effect on the deer population of the grassland being converted to farmland in Year 5.

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b. Use the data to describe the effect on the deer population of the harsh winter in Year 11.

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c. Suppose that in Year 16, a nearby farm that had been fenced off is changed into a nature preserve with no fences. The deer can access the nature preserve for food and other resources. Predict if each of the following will increase, decrease, or stay the same and explain why you think those changes would occur:

- deer population numbers
- average mass of adult deer
- number of deer births
- % malnourished deer

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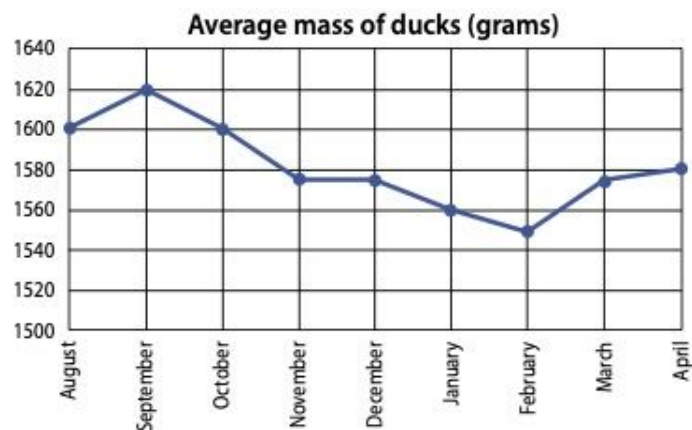
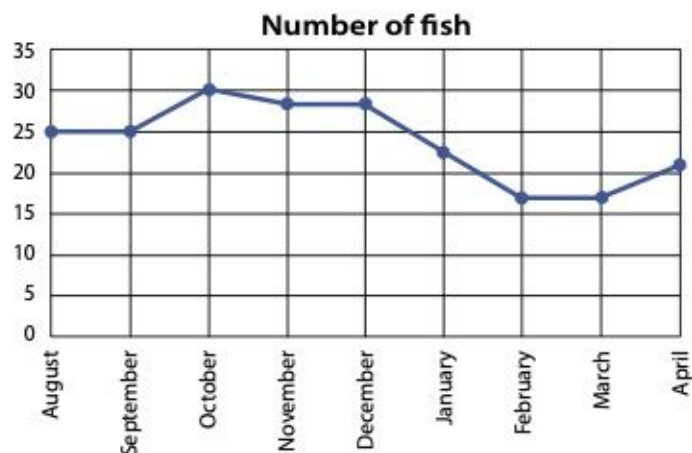
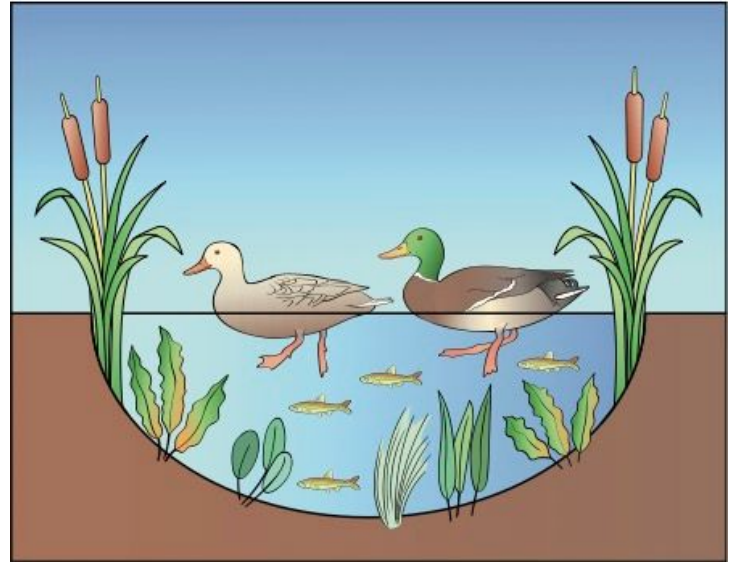
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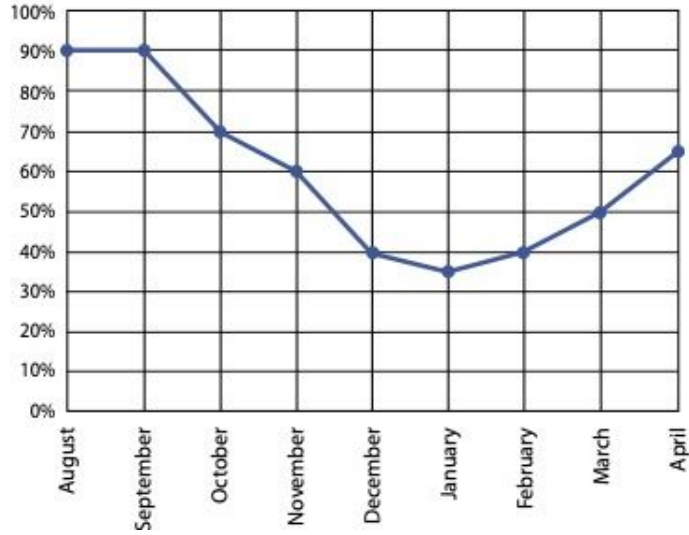
## Item 2

In Lucy's backyard there is a pond with small fish, a pair of pet ducks, and plants growing on the bottom of the pond. Lucy knows that the ducks and fish eat the plants, and the ducks do not eat fish. Where Lucy lives, summer is warm and sunny, while in winter it gets cold but the pond does not freeze. Spring and fall are rainy and sometimes cold. Lucy has noticed that the number of fish and the amount of plants seem to change throughout the year.

Knowing that she has to do a science fair project this year, Lucy decides to start collecting data on the organisms in the pond and see if she notices any patterns in the data over the seasons. Lucy collected data on the number of fish, the mass of the ducks, and the amount (percentage) of the pond bottom covered by plants. Using the graphs of Lucy's data below, answer the questions that follow.



**Amount of pond bottom covered with plants (%)**



a. Give an example of competition between organisms in the pond, based on Lucy's observations. In your answer, include which organisms are competing and what resource they are competing for.

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b. Based on the data Lucy collected, do you think competition is affecting the organisms in the pond? Why or why not?

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c. Suppose Lucy was worried about the organisms in the pond in the winter, and she decided to give them extra food from December through February. Predict what would happen to the ducks and the fish population if Lucy did this.

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