Name _____

LAB: THE LESSON OF THE KAIBAB

INTRODUCTION:
The environment may be changed by the things within the biotic community, as well as relationship between organisms and the nonliving environment. The carrying capacity of an ecosystem is the maximum number of organisms that an area can support over time. The density of a population may cause huge changes in the environment so that the environment becomes unstable for the survival of that species. Humans can mess up natural selection and have either a positive or negative effect.

OBJECTIVES

- Graph data on the Kaibab deer population of Arizona from 1905-1939.
- Analyze the factors that caused the changes in the deer population.

PROCEDURE:
Before 1905, there was an estimated 4000 deer on almost 30,000 hectacres of land on the Kaibab Plateau in Arizona. The average carrying capacity of the land at that time was estimated to be about 30,000 deer. Being concerned about the low number of deer, President Theodore Roosevelt created the Grand Canyon National Game Preserve to protect what he called the "finest deer herd in America." He did this on November 28, 1906.

Unfortunately, by this time, the Kaibab forest area had already been overgrazed by sheep, cattle and horses. Most of the grasses – the main source of food for the Kaibab deer – were gone. The first step to protect the deer was to ban all hunting. In addition, in 1907, the Forest Service tried to kill all predators of the deer. Between 1907-1939, 816 mountain lions, 20 wolves, 7388 coyotes, and more than 500 bobcats were killed. All of these animals had been predators of the deer.

1. Label the X and Y axis of the graph. You will be plotting the Deer Population between the years of 1900 and 1940.
2. Using your first colored pencil, draw in the carrying capacity of the deer. Label this line "Average Carrying Capacity."
3. Using your second colored pencil, graph the data from Table 1.
4. Answer the analysis questions 1-4.

Signs that the deer population was out of control began to show up as early as 1920 – the area was beginning to worsen quickly. The Forest Service reduced the number of permits it issued for livestock grazing. By 1923, the deer were close to starvation and the area conditions were horrible.

A Kaibab Deer Investigating Committee suggested that all livestock not owned by local people be removed from the area right away and that the number of deer be cut in half as quickly as possible. Hunting was reopened, and during the fall of 1924, 675 deer were killed by hunters. However, the 675 deer represented only 1/10 the number of deer that were born that spring.

5. Using a third colored pencil, plot the data from Table 2 on your graph.
6. Create a title for the completed graph.
7. Answer the analysis questions 5-6.

Today the Arizona Game Commission carefully manages the Kaibab area with rules that have local needs in mind. Hunting permits are issued to keep the deer in balance with the area. Predators are protected to help keep herds in balance with food supplies. Tragic winter losses can be kept under control only by keeping the number of deer near or below the carrying capacity of the range.

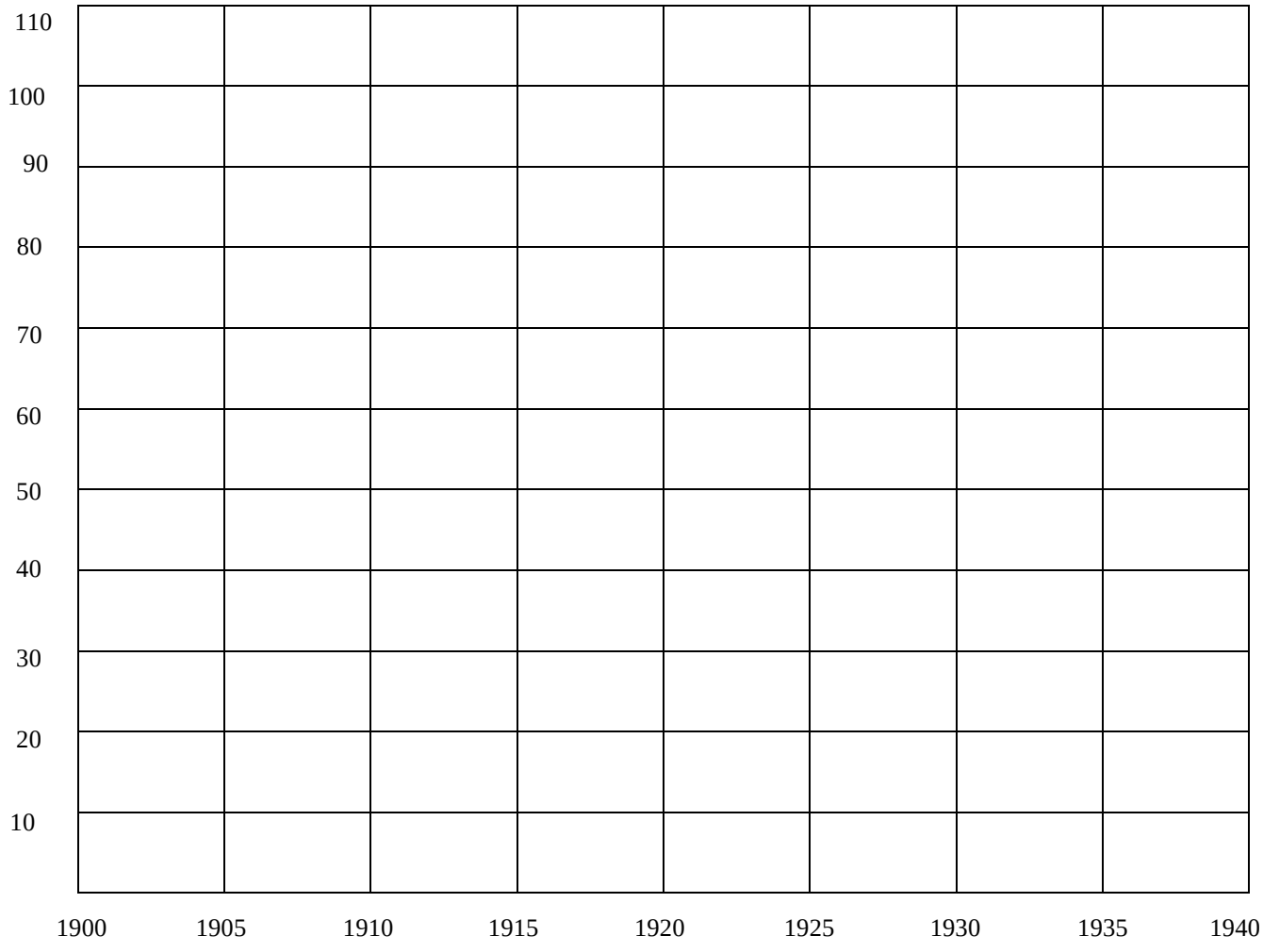
8. Answer the rest of the analysis questions.

DATA:

Deer Population from 1905-1924	
Year	Number of Deer
1905	4,000
1910	9,000
1915	25,000
1920	65,000
1924	100,000

Deer Population from 1925-1939	
Year	Number of Deer
1925	60,000
1926	40,000
1927	37,000
1928	35,000
1929	30,000
1930	25,000
1931	20,000
1935	18,000
1939	10,000

GRAPH:



ANALYSIS

1. In 1906 and 1907, what two methods did the Forest Service use to protect the Kaibab deer?

2. How many total predators were removed from the preserve between 1907 and 1939? _____

3. Compare the deer herd to the carrying capacity of the area:
   a. In 1915 _____
   b. In 1920 _____
   c. In 1924 _____

4. Did the Forest Service program ***seem to be*** a success between 1905 and 1924? Explain your answer.
   _____
   _____
   _____

5. Why do you think the population of deer decreased in 1925, even though the predators were being removed?
   _____
   _____
   _____

6. Do you think anything happened to the carrying capacity of the area from 1900 to 1940? Explain your answer.
   _____
   _____
   _____

7. Why do you think the population of deer in 1900 was only 4,000 when the range was thought to have a carrying capacity of 30,000 deer?
   _____
   _____
   _____

8. If humans had not interfered with the deer population, what do you think would have happened to the deer after 1900?
   _____
   _____
   _____

9. What major lessons were learned from the Kaibab deer experience?
   _____
   _____
   _____