Name Period Date

CHAPTER 3 | ADDITIONAL INVESTIGATION A

Introduced Species and Population Dynamics

MATERIALS

(per group of four students)

- 8 rectangles of green construction paper (Plants)
- 8 rectangles of yellow construction paper (Native Plant Eaters)
- 2 rectangles of orange construction paper (Native Predators)
- 8 rectangles of red construction paper (Introduced Plant Eaters)

TIME

45 minutes

OVERVIEW AND PURPOSE

In this lab you will

- make a model of an ecosystem
- model the effect of an introduced species on an ecosystem

Problem

How can an introduced species affect an ecosystem's native plants and animals?

Hypothesize

Circle a word or phrase to complete the sentence below:

If I add introduced plant eaters to my model ecosystem, then the number of native species will (increase, decrease, stay the same.)

Procedure

Check off each step as you do it.

❑ ❶ Choose community members.

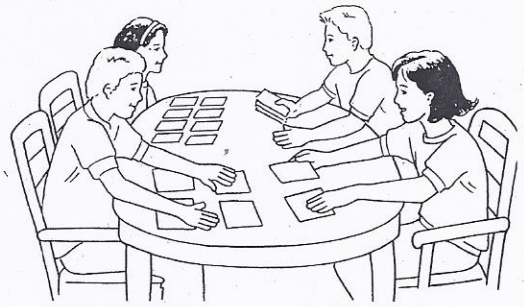
- Decide which person in your group will be in charge of which model species.
- Each person should have a pile of green, yellow, orange, or red rectangles.

❑ ❷ Read the following rules.

- **Plants:** Every generation, the number of plants that have not been eaten doubles.
- **Native Plant Eaters:** Every generation, each native plant eater has to eat one plant or it will die. Each native plant eater that eats one plant will produce one baby.
- **Native Predators:** Every generation, each predator must eat one native plant eater or it will die. It does *not* eat the introduced plant eaters. The predators live a long time and reproduce only every 10 generations.
- **Introduced Plant Eater:** When the introduced plant eaters start living in the ecosystem, each needs to eat one plant or it will die. The introduced plant eaters eat *before* the native plant eaters. Each introduced plant eater that eats one plant will produce one baby. The introduced plant eaters have no predators.

❸ Model one generation.

- The person in charge of plants should lay out 8 green rectangles.
- The person in charge of native plant eaters should put down 4 yellow pieces.
- The person in charge of predators should lay down the 2 orange pieces.



❹ In the "Beginning of Generation 1" column of Table 1, write down how many members of each species there are.

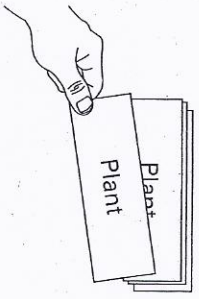
TABLE 1. MODEL ECOSYSTEM—GENERATIONS 1–3

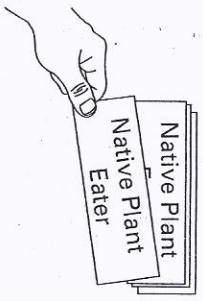
	Beginning of Generation 1	Beginning of Generation 2	Beginning of Generation 3
Plant			
Native Plant Eater			
Predator			

NOTE: There are no introduced plant eaters in these generations.

❺ Let the community members eat.

- First have the plant eaters eat.
- Next have the predators eat.
- Put the "eaten" pieces back in their piles.





❻ Let the community members reproduce.

- Reread the rules.
- Have the members that have not been eaten reproduce.
- Place the new generation members out with the previous generation members.
- In the "Beginning of Generation 2" column, write down how many members of each species there are.

❑ ❼ Model one more generation. Do this by repeating steps 5 and 6. Write your results in Table 1.

❑ ❽ The introduced plant eater arrives.

- Add two introduced plant eaters (red rectangles) to your Generation 3 community.
- Look at the rules again. Remember that the introduced species gets to eat before the native plant eaters do.
- Model two more generations.
- Write the results in Table 2.

TABLE 2. MODEL ECOSYSTEM—GENERATIONS 3–5

	Beginning of Generation 3	Beginning of Generation 4	Beginning of Generation 5
Plant			
Native Plant Eater			
Predator			
Introduced Plant Eater			

Observe and Analyze

1. **Communicate** What happened to the populations during Generations 1, 2, and 3?

2. **Interpret** During Generations 1, 2, and 3, were the populations of plants, plant eaters, and predators in a period of growth, decline, or stability? Explain.

3. **Communicate** What effect did the introduced species have on the other populations?

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Conclude

1. **Interpret** Explain whether the results support your hypothesis.

2. **Analyze** Explain how the native members of the ecosystem depend on each other. How did the introduced plant eater affect the balance?

3. **Predict** What do you think would happen to the population of predators, if there was a Generation 6?

4. **Limitations** How is your model different from what happens in a real ecosystem?

5. **Apply** Poison is sometimes used to rid an ecosystem of an introduced species. What do you think the advantages and disadvantages of using poison are?