Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Lily Pad Population Activity**

Objectives:

2.6.1 - Explain the concepts of limiting factors and carrying capacity in the context of population growth.

2.6.2 - Describe and explain S and J population curves.

Opening Questions

Lily pads can grow fast. Imagine that you discover a variety of lily pads that can double in number every day. It takes 10 days for them grow to cover a pond halfway.

**Question 1**. How many more days will it take for the lily pads to completely cover this pond? (Circle one.)

a) About 10 more days

b) About 5 days

c) Tomorrow

d) Never, since the lily pads won't ever fill up the pond completely

**Question 2**. Explain why you think this?

**Activity 1: Growth of Lily Pad Population**

1. Work in groups of 2 students. Imagine that your lab table or desk is the surface of the pond (like a very small lake). Use a ruler to measure the surface area of your table.

2. Get small squares of paper from your teacher. Pretend that each piece is a lily pad. Approximately 5cm x 10 cm

3. Lay one card in the corner of the "pond" to represent the first lily pad.

4. Now pretend that a day has passed and double the number of lily pads in your pond.

5. Pretend another day has passed and double your lily pad population again.

6. Keep on doubling the population until half of the entire surface of the pond has been filled.

**Question 3.** How many lily pads does it take to fill half of your pond? \_\_\_\_\_\_\_\_\_\_\_

Question 4. How many days passed before half of the pond was filled with lily pads? \_\_\_\_\_\_\_\_\_

Question 5. How many more days will pass before the entire pond has been filled? \_\_\_\_\_\_\_\_\_\_\_

**Activity 2: Tracking Population Growth and Showing a J Curve Population**

**Now,** repeat the demonstration (steps 3-6), this time carefully counting up how many lily pads are present in each generation (day). **Create a data table and a graph** in your notebook to illustrate you observations.

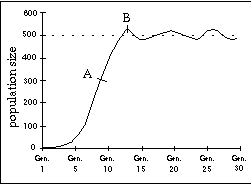
Activity 3: Carrying Capacity and S Curve Population Charts

**Background**

As you may have predicted, there is a maximum number of lily pads that can grow in your pond. This is called the carrying capacity. There are several factors which limit the carrying capacity of any environment. Some of them are:

* climate
* food and water availability
* physical space
* disease
* [**predators**](http://naturalsciences.sdsu.edu/classes/lab2.7/glossary.html#anchor11402277)

2. Figure 3 shows what happens to a population when it reaches the carrying capacity of the surrounding environment. This is called an "S curve" because it is roughly shaped like an "S".



**Figure 3. "S curve" for a hypothetical population**

**Question** 6. Examine the first half of the "S" curve shown in Figure 3 (up to point A). What is the shape of this graph?

Question 7. What happens at point B (after about 13 generations)?

Question 8. What is the carrying capacity of the population recorded in Figure 3 (about how many organisms of this species can be supported in this ecosystem)?

Question 9. How is the carrying capacity of the lily pads limited by biotic and abotic factors of its ecosystem?

Question 10. List and explain 3 different factors that could lead to a population crash in your lily pad population.

Activity adapted from:<http://naturalsciences.sdsu.edu/ta/classes/lab2.7/TG.html>