Lily Pad Lab

Background

In Thailand, water plants such as lily pads are a daily problem citizens must cope with. Since cities are built around waterways, people often commute using boats and ferries instead of cars. The outboard motors are frequently getting clogged with lily pads, which grow quickly and are hard to eliminate.

Exercise 1: A Lily Pad Puzzle

Lily Pads can grow fast. Imagine that you discover a variety of lily pads that can double in number everyday. It takes 10 days for them to grow and halfway cover an entire pond!

Pre-Lab Questions: (Discuss these with your group and write the answers in the hypothesis section of your data sheet.)

1. **How many more days will it take for the lily pads to completely cover this pond?**
   a. About 10 more days.
   b. About 5 more days.
   c. Tomorrow.
   d. Never, because the lily pads couldn't ever fill the pond completely.

2. **Explain why you chose the answer you did for question 1** (Write your answer on the answer sheet)

Exercise 2: Growth of the Lily Pad Population

Procedure:

1. Your lab tables are the surface of the pond. **Using a ruler**, measure a square, **48" X 48"**, on your lab table. Use some masking tape to draw the edges of your "pond."

2. Use your stack of index cards to represent the lily pads. ***One index card = one lily pad***.

3. Be sure to **record all of your data in the data table as you carry out the lab**.

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

5. Now pretend that one day has passed. Double the number of lily pads in your pond ***(when you double 1, it means you put 1 card down, and your total population = 2)***.
   I have filled out that first generation for you (see your chart)

6. Pretend another day has passed (Generation #2) and double your lily pad population again (**Put down 2 cards).** Add the **TOTAL LILY** Pads in your population and fill in this information for generation #2).

7. Now, you can finish up your lab. Keep on doubling the population until **HALF** of the entire "pond" has been filled.

Post-Lab Questions: (Write your answers in the results section of your data sheet.)

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

4. How many days (generations) had passed when half of the pond was filled with lily pads?

5. **Taking it one step further**: If you were to continue the experiment, how many days would it take for the entire pond to be covered? ***(HINT**: You do not have to do this to get the correct answer, but if you need to…see me for more index cards)*

Exercise 3: Data Interpretation

Now use a piece of graph paper to make a graph of your results from the data table. The number of days (i.e. the generations) should be along the **x-axis** and population size of the lily pads (i.e. the total population) should be on the **y-axis**. LABEL BOTH AXES & Give your graph a TITLE!!!

Exercise 4: Follow-up Analysis Questions/Conclusion (Write your answers in the results section of your data sheet):

6. What is Exponential Population Growth?

7. What is Logistic Population Growth?

8. What type of "curve" is represented by Exponential Growth?

9. What type of "curve" is represented by Logistic Growth?

10. Does your graph display Logistic or Exponential population growth? **Explain** your answer.

11. What is a limiting factor?

12. What is the difference between Density-Dependent & Density-Independent limiting Factors?

13. Does your graph display any results of limiting factors?

14. Under realistic conditions, **Name 3 limiting factors** that would cause the lily pad population to change or stop its growth.

15. Define **biotic potential**. *(**HINT**: Look in your textbook and/or population notes for help.)*

DO NOT WRITE ON ME – Write on Student Data Sheet

Name:_____ Date:_____ Period:___

Lily Pad Lab - STUDENT DATA SHEET

Exercise 1: Pre-Lab Questions (Hypothesis):

1. _____
2. _____
   _____
   _____

Exercise 2: Results: Record the data from your lily pad growth experiment in the table below. **(YOU MAY NOT HAVE TO USE ALL GENERATIONS!)**

Generation (NUMBER OF DAYS)	Number of New Lily Pads (CARDS YOU PUT DOWN)	Number of Lily Pads in the Population (TOTAL POPULATION)
1 – Initial Day	1	1
2	1	2
3	2	4
4		
5		
6		
7		
8		
9		
10		
11		
12		

Post-Lab Questions:

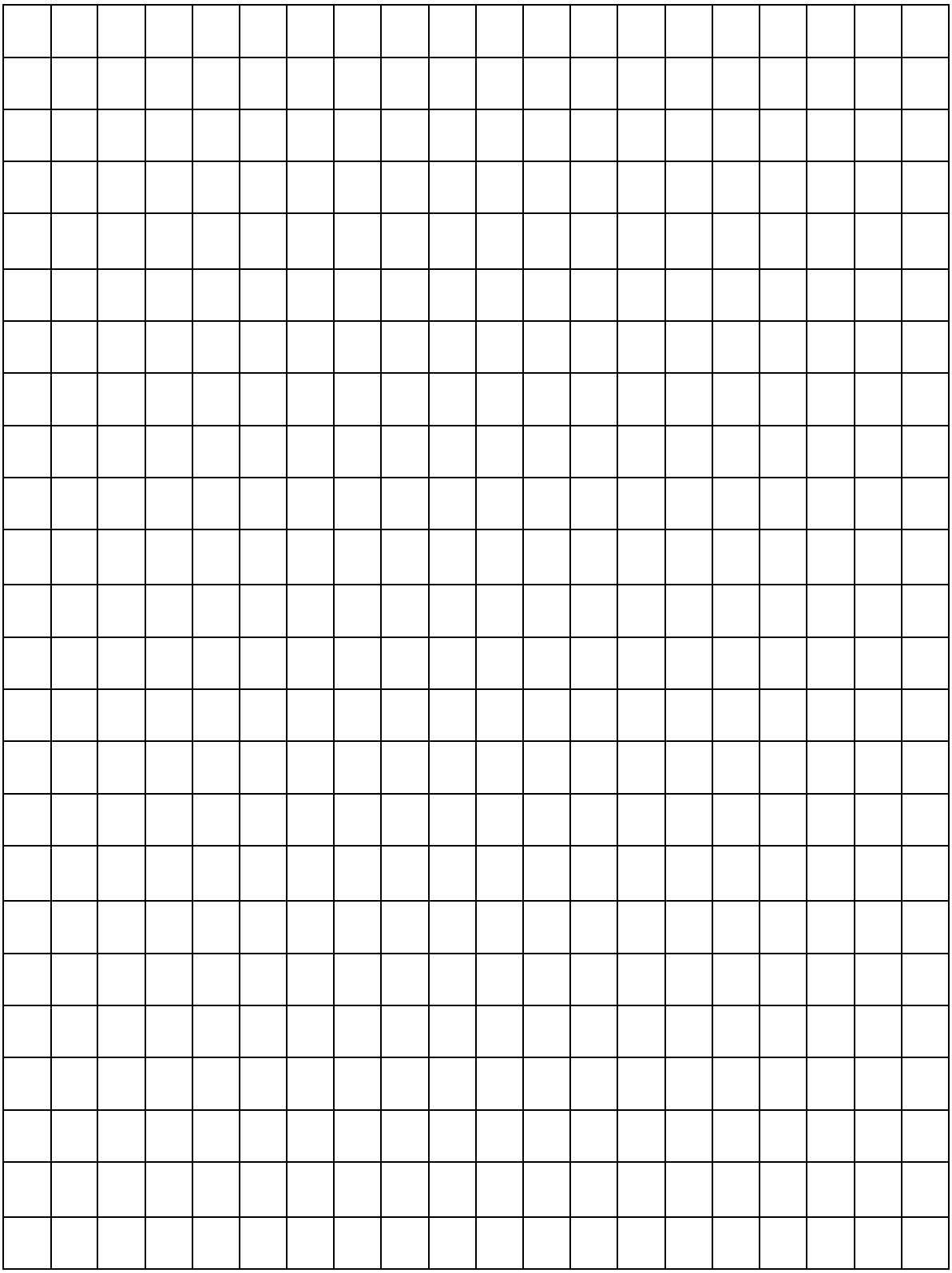
3. _____
4. _____
5. _____

Exercise 3: Data Interpretation

Now use a piece of graph paper to make a graph of your results from the data table. The number of days (generations) should be along the **x-axis** and population size of the lily pads (total population) should be on the **y-axis**. LABEL BOTH AXES & Give your graph a TITLE!!!

Graph Paper on next page →

TITLE: _____



Follow-Up Questions On Back →

Exercise 4: Follow-up Questions/Conclusion

6. What is Exponential Population Growth?

_____

_____

_____

7. What is Logistic Population Growth?

_____

_____

_____

8. What type of "curve" is represented by Exponential Growth?

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9. What type of "curve" is represented by Logistic Growth?

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10. Does your graph display Logistic or Exponential population growth? **Explain** your answer.

_____

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11. What is a limiting factor?

_____

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12. What is the difference between **<u>Density-Dependent</u>** & **<u>Density-Independent</u>** limiting Factors?

_____

_____

_____

_____

13. Does your graph display any results of limiting factors?

_____

14. Under realistic conditions, **<u>Name 3 limiting factors</u>** that would cause the lily pad population to change or stop its growth.

_____

_____

_____

_____

15. Define **biotic potential**:

_____

_____

_____

_____

(**<u>HINT</u>**: Look in your textbook and/or population notes for help.)