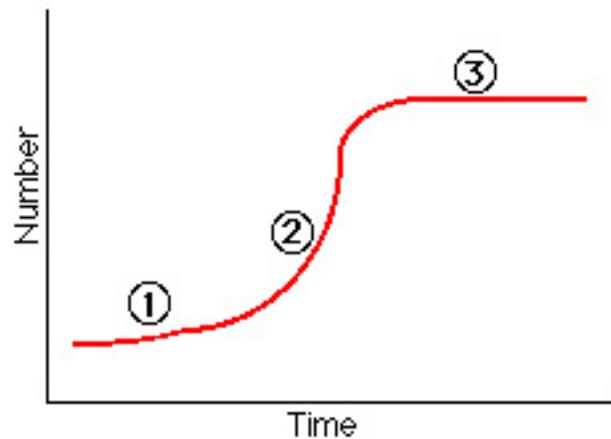


Duckweed Growth



Introduction:

By definition, Duckweed is a small aquatic floating plant with leaf like fronds and roots extending down into the water. Each of the fronds is considered to be a different plant. In Biology, you have learned that a population of plants will exhibit the **S-Shaped Curve**.



This S-Shaped Curve consists of three different phases:

1. **Lag phase**- A period of slow growth.
2. **Growth phase**- A period of rapid growth.
3. **Equilibrium phase**- The population maintains itself at a fixed level.

In this activity, we are interested in the growth phase.

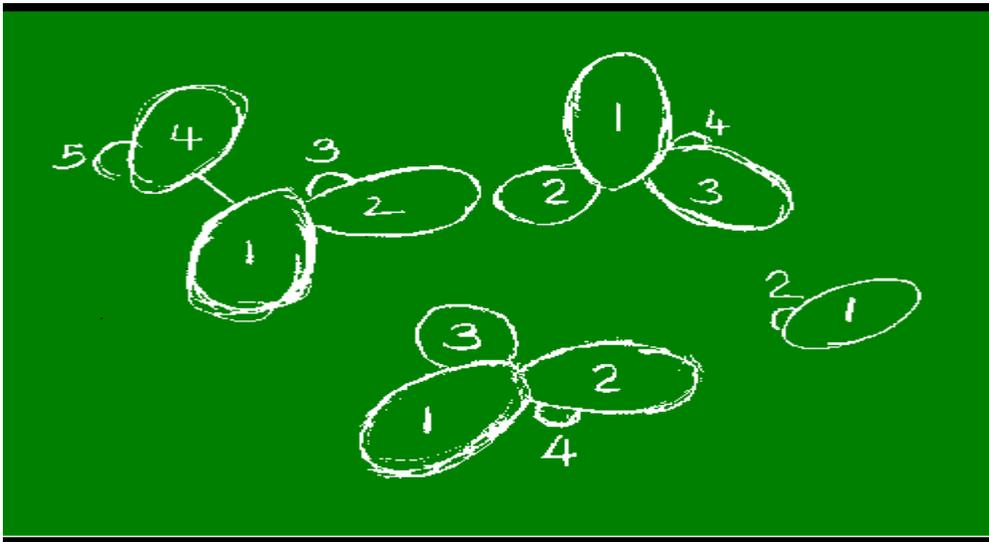
Materials:

- Containers
- Duckweed
- Marking Pens
- Gloves
- 50 mL graduated cylinder
- Magnifying glass

Procedure:

This activity will take place over a two week period.

1. Each group of students will take a container and label the outside of the dish with their initials.
2. Each group will add 25 mL of the water to the container. Once this has been done, rinse the graduated cylinder with distilled water.
3. Transfer the duckweed to the container.
4. Place your container under the window where it will remain undisturbed for the duration of the experiment.
5. Create your data table. Determine the independent and dependent variables in the problem. Make sure that you start the data table with Day 0. Why?
6. Observe the plants for eight days and record the number of fronds in your data table. Remember, use the magnifying glass so that none of the smaller fronds are missed. Refer to the diagram below.



7. On the ninth day, make your last observation. Then complete the information on the student information worksheet.

Student Worksheet: Create the following in your TI-Nspire.

Remember: **All tables and graphs should be properly labeled.**

Page 1: Notes: Create a title page including the scientific name for Duckweed.

Page 2: Notes Page: Explain where you believe the beginning of the growth phase and the end of the growth phase is located in respect to your data. Only use the data that is within the growth phase. List the data that was eliminated.

Page 3: Lists: Create a list including only the growth phase data.

Page 4: Data & Statistics: Create a scatter plot.

Page 5: Data & Statistics: Use the scatter plot to plot the linear regression.

Page 6: Data & Statistics: Use the scatter plot to plot the quadratic regression.

Page 7: Data & Statistics: Use the scatter plot to plot the cubic regression.

Page 8: Data & Statistics: Use the scatter plot to plot the exponential regression.

Page 9: Notes Page: Which model appears to be the best fit to the growth phase? Why? Give the regression equation. (Remember: the model that you have chosen is not an exact model for the growth of the Duckweed, but a very close model. Why is this true?)

Save results as “duckweed(last name)(period)” No spaces.

Example: duckweedwebb1st



Sample student information:

1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Growth of Duckweed
scientific name: LEMNA MINOR

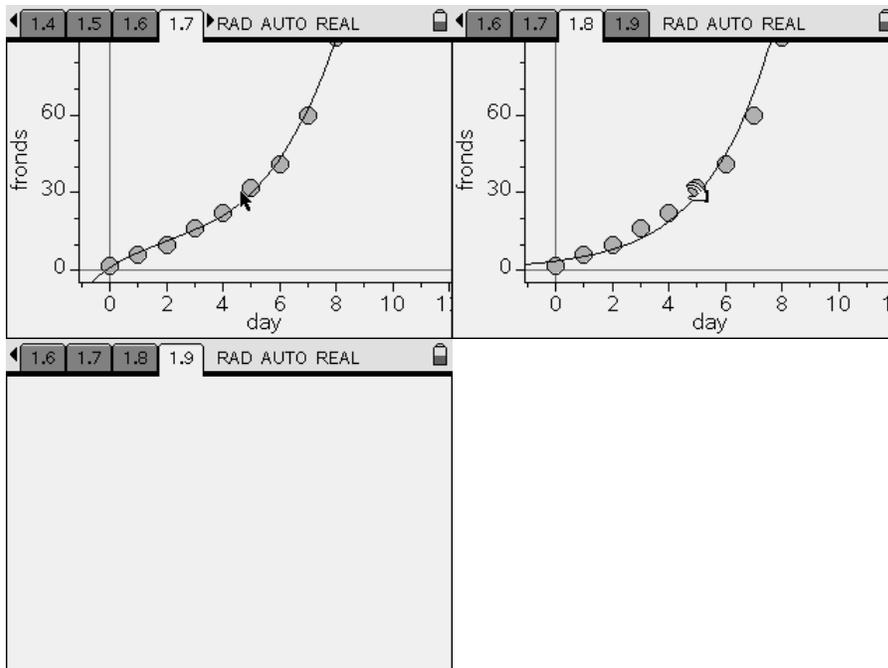
1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

A	day	B	fronds	C	D	E	F	G
1	0	2						
2	1	6						
3	2	10						
4	3	16						
5	4	22						

A7 0

1.2 1.3 1.4 1.5 ▸ RAD AUTO REAL

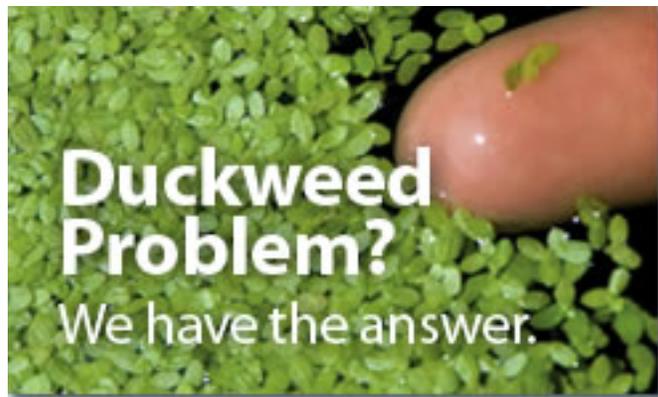
1.3 1.4 1.5 1.6 ▸ RAD AUTO REAL



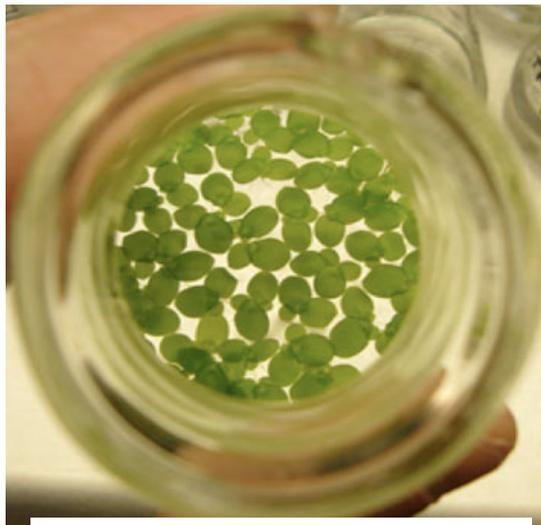
EXTENSION:

Research Duckweed: Answer the following questions with a minimum of a ½ a page for each question. (minimum of two sources per question)

1. Why would Duckweed be a problem? Be specific. Cite your sources.



2. Why are scientists researching Duckweed? Be specific. Cite your sources.



Sequencing of Duckweed

References:

Cross, John W. Measuring Duckweed Growth. 8 July 2008

<<http://www.mobot.org/jwcross/duckweed/duckweed-measuring-growth.htm>>.

. 2007. 8 July 2008 <<https://www.lakelawnandpond.com/customerDefault.aspx>>.

"Why Sequence the Greater Duckweed." DOE Joint Genome Institute: Enabling Bioenergy Advances. 1 July 2008. The Regents of The University of California. 8 July 2008 <<http://www.jgi.doe.gov/sequencing/why/duckweed.html>>.

"OBSERVING GROWTH RATE." Lab Dad's Laboratory. 8 July 2008

<<http://www.geocities.com/CapeCanaveral/Hall/1410/index.html>>.