Worksheet information for *Ponds in Peril* Classroom Experiment

Note: For overall background information, refer to the Science Scope article

Worksheet 1: Aquatic Nutrient Pollution

- When to use: Beginning of the experiment, before or after jar set-up.
- Relevant background for students:
    - Eutrophication Video on YouTube (https://www.youtube.com/watch?v=6LAT1gLMPu4)
    - Nutrients and Invaders PowerPoint

Worksheet 2: Invasive Species

- When to use: Beginning of the experiment, before or after jar set-up.
- Relevant background for students:
    - Invasive Species Video on YouTube (https://www.youtube.com/watch?v=eY7nuxE8-jM)
    - Nutrients and Invaders PowerPoint

Worksheet 3: Experimental Design

- When to use: Shortly after experiment set-up.
- Relevant background for students:
    - Scientific Process PowerPoint

Worksheet 4: Microscope Field-of-View Drawing

- When to use: 1 to 2 weeks after experiment set-up
- Relevant background for students:
    - Aquatic Macroinvertebrates PowerPoint

Worksheet 5: Organism Investigation

- When to use: 1 to 2 weeks after experiment set-up
- Relevant background for students:
    - Food Webs Video on YouTube (https://www.youtube.com/watch?v=Vtb3I8VzIfg)
    - Aquatic Macroinvertebrates PowerPoint

Worksheet 6: Invertebrate Data Collection

- When to use: 3 to 4 weeks after experiment set-up
- Relevant background for students:
    - Aquatic Macroinvertebrates PowerPoint

Worksheet 7: Periphyton Data Collection

- When to use: 5 to 6 weeks after experiment set-up
- Relevant background for students:
    - Discuss difference between periphyton and phytoplankton

Worksheet 8: Phytoplankton Data Collection

- When to use: 5 to 6 weeks after experiment set-up
- Relevant background for students:
    - Discuss difference between periphyton and phytoplankton

Worksheet 9: Snail Data Collection

- When to use: 5 to 6 weeks after experiment set-up
- Relevant background for students:
    - Aquatic Macroinvertebrates PowerPoint

Worksheet 10: Graphing Results

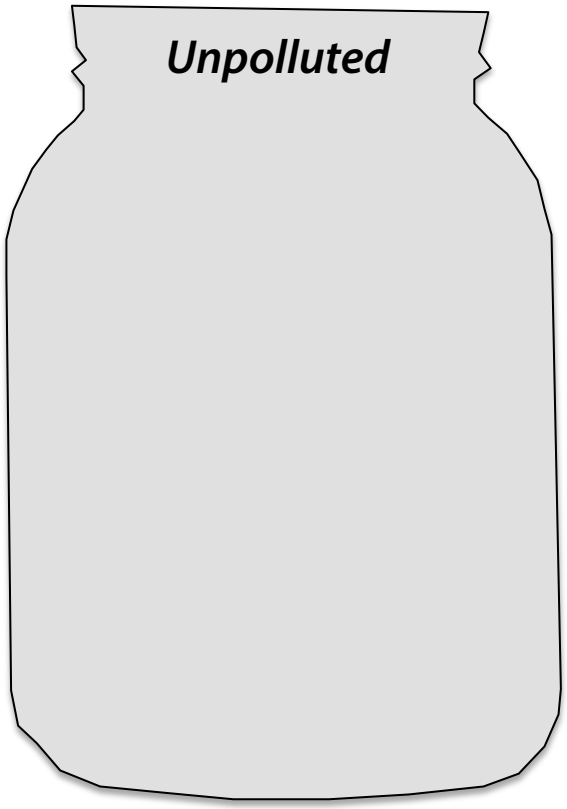
- When to use: At the conclusion of the experiment
- Relevant background for students:
    - Discuss calculating averages and making a bar graph

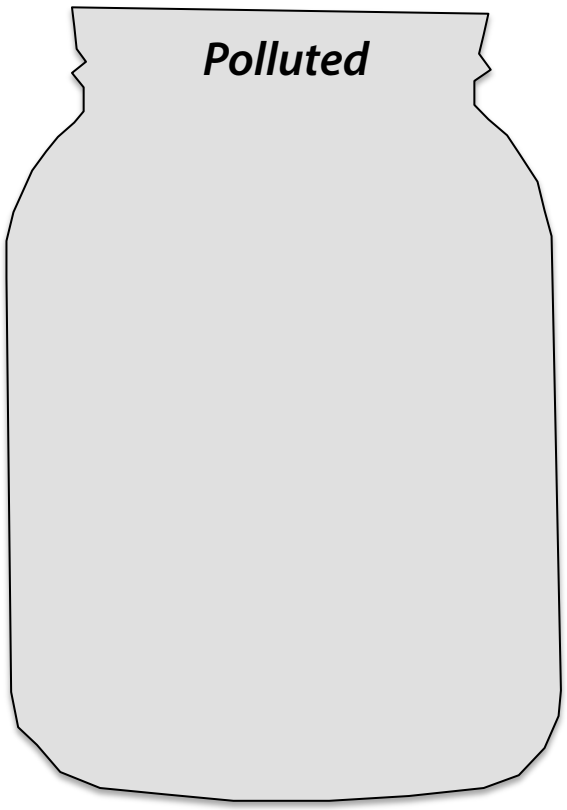
Name _____ Date _____ ***Worksheet 1***

Aquatic Nutrient Pollution

1) Describe how it occurs. Where does it come from?

2) Make a hypothesis about how eutrophication will affect your pond ecosystems and draw 2 predictions below.





3) How can you measure the effects of fertilizer? _____

Name _____ Date _____

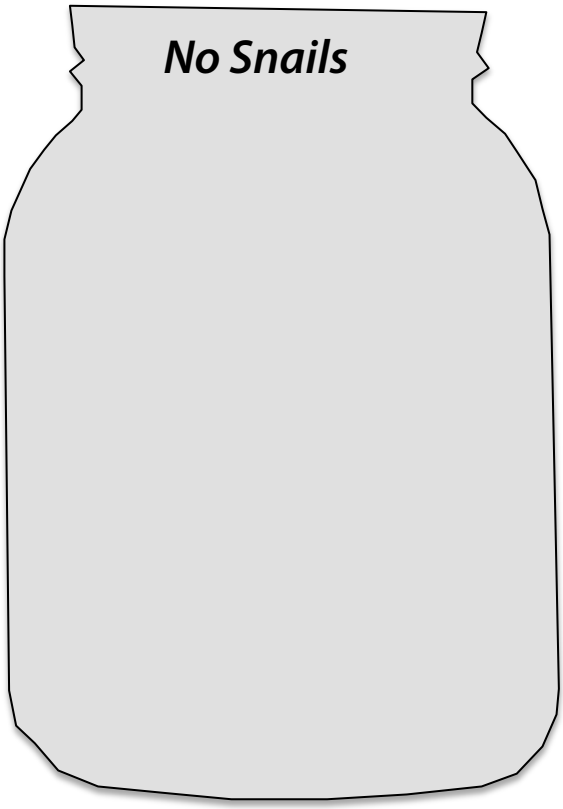
Worksheet 2

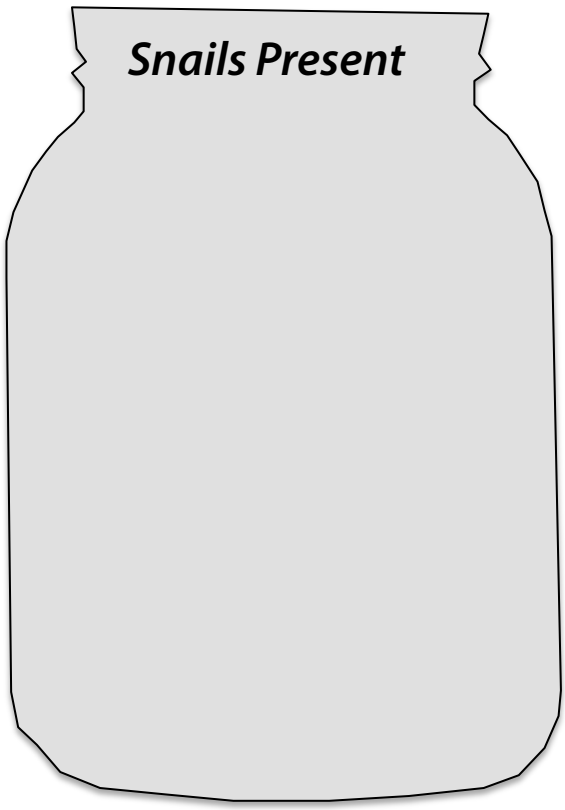
Invasive Species

1) What is an invasive species? Describe below.

2) List some invasive species in Oregon. Where are they from?

3) Hypothesize how invasive snails will affect you pond ecosystems. Draw your predictions below.



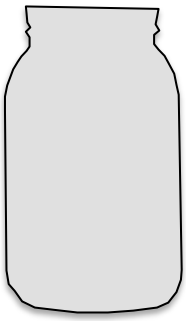


4) How can you measure the effects of snails? _____

Name _____ Date _____ **Worksheet 3**

Experimental Design

1) Name the four treatments in our experiment and describe your predictions, with drawings inside of the jars. Start with the "control" treatment. Consider the amounts of algae on the walls versus in the water column.



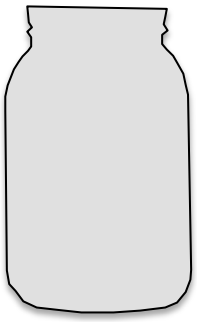
Treatment _____

Prediction

_____

_____

_____



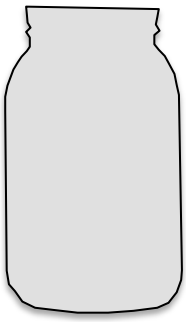
Treatment _____

Prediction

_____

_____

_____



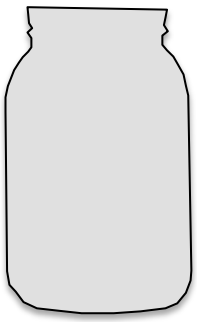
Treatment _____

Prediction

_____

_____

_____



Treatment _____

Prediction

_____

_____

_____

2) What is the purpose of the **control treatment**?

_____

_____

3) Why do we need **replication** in an experiment? What is replication?

_____

_____

4) What are the **independent variables**? The **dependent variables**?

_____

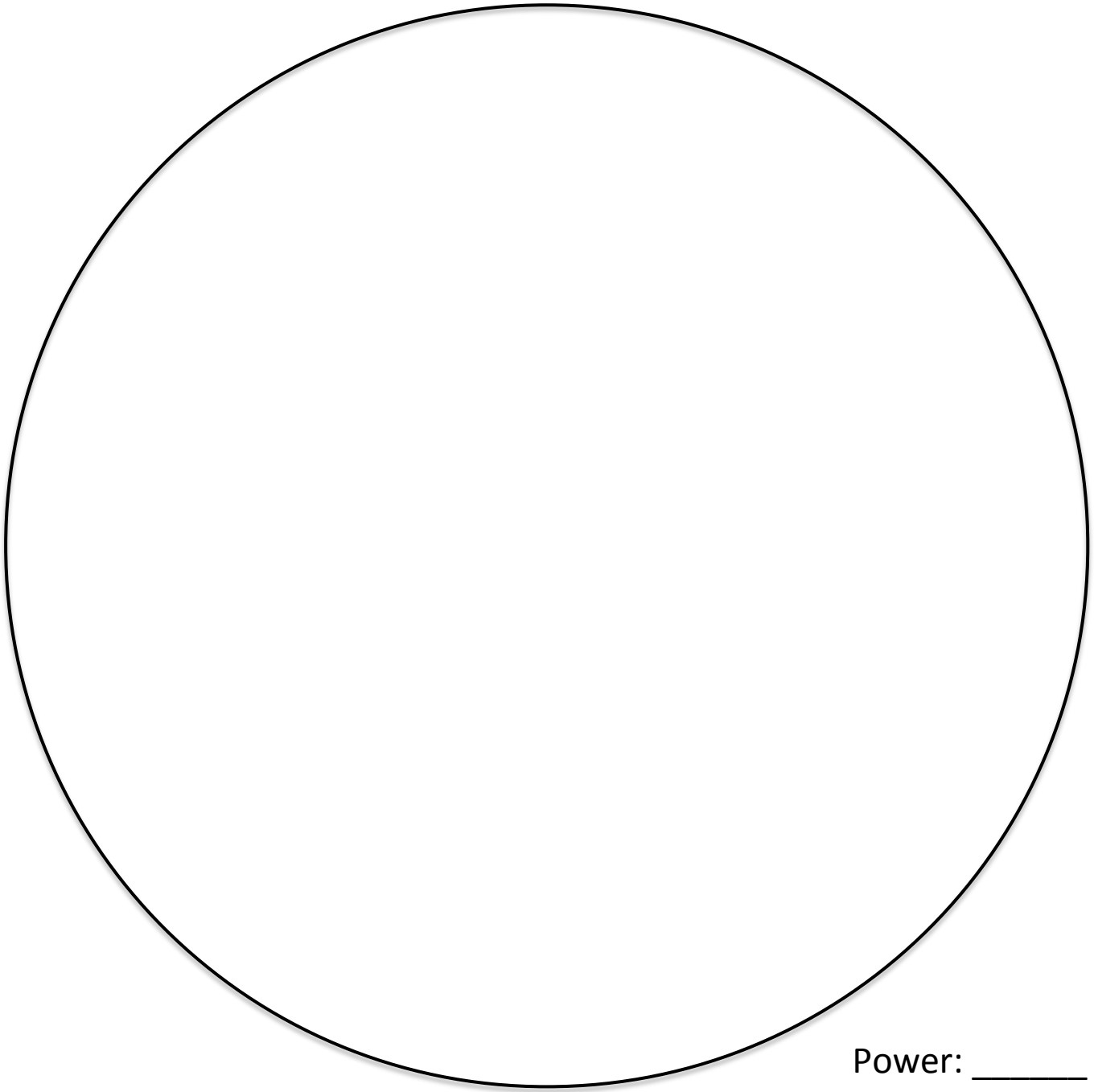
_____

Name _____ Jar Treatment _____ ***Worksheet 4***

Date _____

Microscope Field-of-View Drawing

Using a microscope, draw and label what you see! Label the **primary producers**, **benthic invertebrates** and **zooplankton**. Can you find a worm, a copepod or a snail? What about an herbivore and carnivore?



Power: _____

Name _____ Jar Treatment _____ ***Worksheet 5***

Date _____

Organism Investigation

Choose your favorite pond organism and draw it in the box below. Research how it lives in the pond ecosystem using books or the computer.

Common Name:

Scientific Name:

How does it move?

What does it eat?

Is it a producer or consumer?

Who eats it?

What is one adaptation?

Why is this organism cool?

Name _____ Jar Treatment _____ *Worksheet 6*

Date _____

Invertebrate Data Collection

Explore and count the organisms in your jar, and be sure to record any interesting observations. Record your jar treatment at the bottom.

Organism	Count	Total	Notes

Name _____ Jar Treatment _____ ***Worksheet 7***

Date _____

Periphyton Data Collection

Step 1: Hold the grid over one side of the jar, right in the middle. Estimate the percent cover of periphyton inside of each box, and write it in the corresponding box below.

	1	2	3	4	5	6	Row Totals
A							
B							
C							
D							
E							
F							

Grand Total:

Average:

Step 2: Calculate the row totals by adding all 6 values in each row. Then calculate the grand total by adding all values in the row totals column on the right. Calculate the average percent cover per box by dividing the grand total by the total number of boxes. Record any important observations in the notes section below.

Notes:

Name _____ Jar Treatment _____ **Worksheet 8**

Date _____

Phytoplankton Data Collection

Compare the color of the water in your jar to the color scale below. Record the number that most closely corresponds to your jar's color and record any observations

Number:

Observations:

Question: What controls phytoplankton growth in your jar? Consider *bottom-up effects* AND *top-down effects*.

Name _____ Jar Treatment _____ ***Worksheet 9***

Date _____

Snail Data Collection

jar, and the number of eggs in each mass. Record these below. Record the total number of snails (native and nonnative) in the Notes section. Record and observations.

Egg Mass Number	Number of Eggs

Notes:

Column Total:

Average eggs per mass:

Step 2: Calculate the column total by adding up the total number of eggs. Calculate the average number of eggs per mass by dividing the total by the number of egg masses.

Name _____ Date _____

Name

Worksheet 10

Graphing Results

Directions: Calculate average values of periphyton cover and phytoplankton abundance for each treatment. Use data from the entire class. Then make **bar graphs** below to show the data. What patterns do you see?