Nashua River Watershed Investigations for Grades K - 8
Lesson # 8-2

Title: 8-2 Using Plots to Determine Plant Species Dominance

Grade level & Standard: Grade 8
8MS-LS4-4. Explain the mechanism of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations.

Objective: Students will record data that reflects plant dominance in a tree or grass plot. Students will record data that demonstrates that certain species are more successful and draw a conclusion as to why certain populations have genetic traits that allow them to prosper.

Background: In this lesson, plant dominance will be used to reflect which plants are most successful in the chosen environment. Average diameter or total area will be used for trees while percent coverage will be used in grassy plots.

Vocabulary:

- **Plant dominance** - the plant that dominates a plot: recorded by number, percent coverage, average diameter or total area of plot.
- **Percent coverage** - amount of area a certain plant covers
- **Plot** - a measurable study area; for herbaceous plants like grass, 1 square meter for shrubs or trees, plots are larger.

Discussion points: Why are certain plants more successful at survival. Why have pine and oak trees been successful in Massachusetts? In a given location, are pine or oak trees more successful? Why does a school yard plot have more clover or dandelions than grass?

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FOREST STUDY - If your school has a small wooded area, this activity can be done based on trees. Teachers will determine 5 plots that have good representation of trees you want to measure.

Forest study materials:

- Surveyors tape to mark of chosen plots (5 X 5 meters or other)
- measuring tapes (5)
- clip boards
- data sheet
- NRWA Tree Key: Trees of the Nashua River Watershed

Forest Survey Procedure

1. Mark your plots depending on how much forested land you have, ability to see the students, size of trees and how much time you have to be outside.
2. Assign 4-5 students to each plot. They can either measure one species only or several species.
3. Record circumference by species.
4. Inside the classroom, average the circumference of each species, i.e. oak trees might have an average of 25 centimeters and pine trees might have an average of 50 cm.
5. Draw conclusions from data averages to determine which tree species is more successful or dominant at that location.
6. To add more math, students can calculate area of each tree (see data sheet #4 below)

GRASS STUDY

Indoor activity materials:

- Percent coverage template attached
- Small items like paper clips or counting squares

Outdoor activity materials:

- 5 grass plots (1 meter by 1 meter)
- hula hoop or 1 meter plot marker
- Common Lawn Plants Key
- 5 clipboards
- data sheet
- plant press

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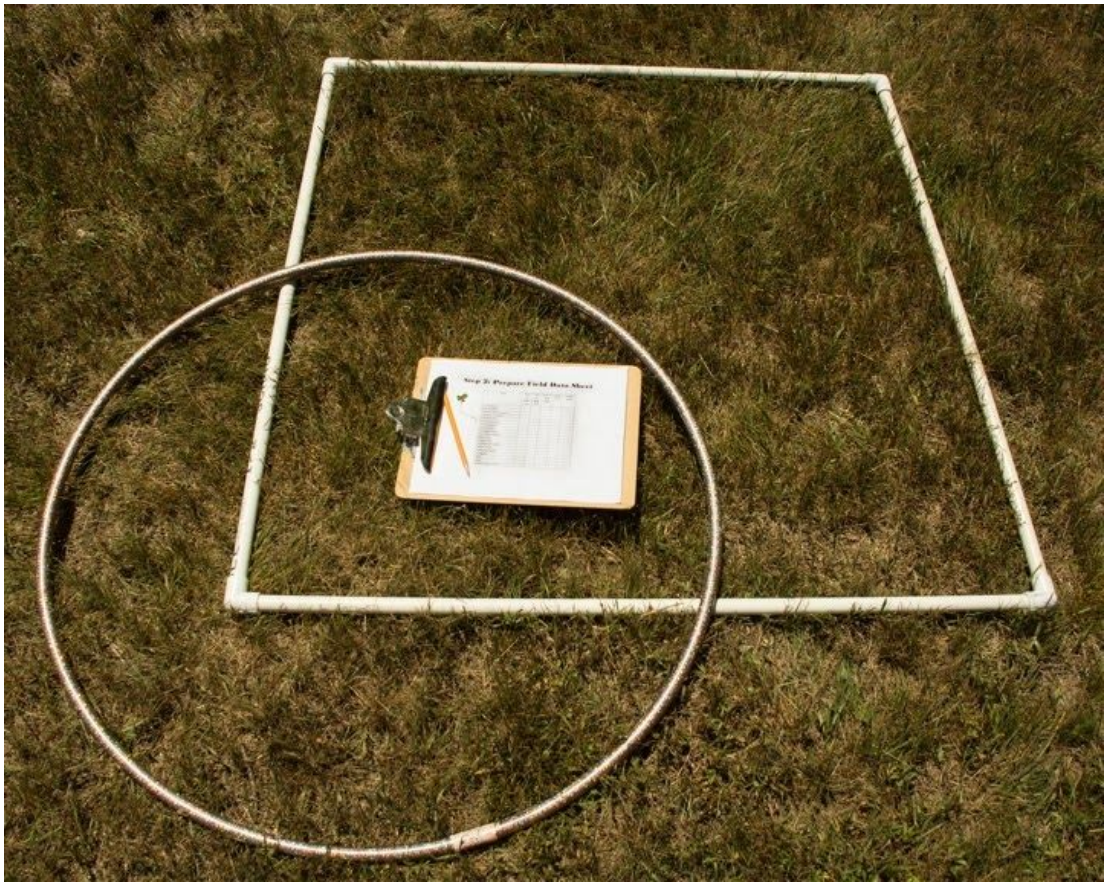

8-2 Grass Plot lesson materials

Photo taken by Carolyn Perkins

Grass Plot Procedure:

1. Before class, walk around a grassy area and identify 5 spots with a good representation of grass, clover and other plants. Dead spots are fine too. Lay hoop or mark off meters.
2. Go over how to calculate percentage cover indoors. Use a template with small objects like paper clips or counting squares.. First show 25% in one corner of paper. Then have students sprinkle paper or other small objects over the paper to see what 25% looks like when it is spread out.
3. Each group of students will estimate percent coverage of each plant type on a data sheet.
4. Data can be summarized in class and graphed by species or location.
5. Have students collect a few specimens to press in their plant press.
6. Later you can create a dichotomous key for your own school.

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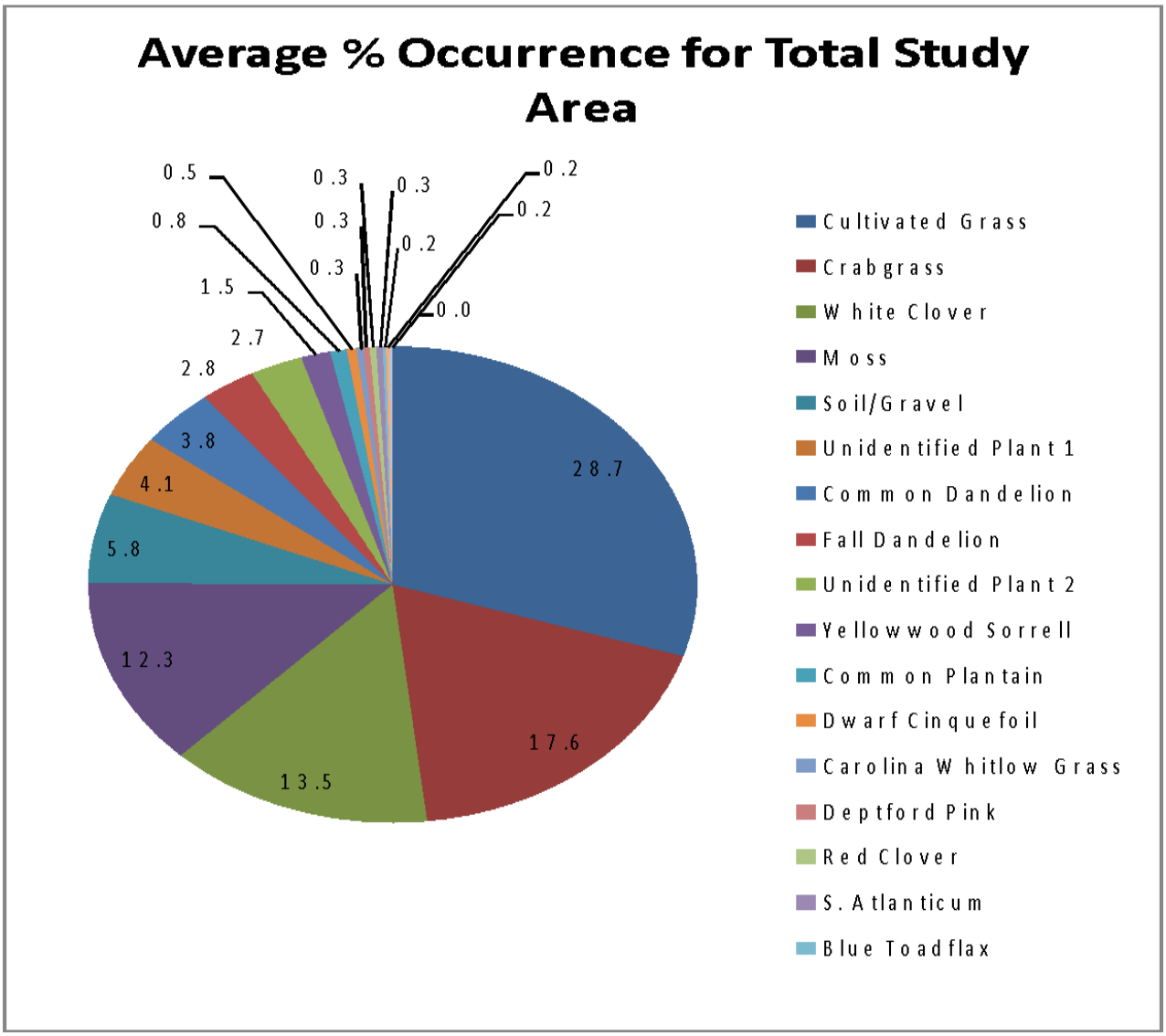
Example Pie Chart for Grass Area*



** produced by Jean Beckner 2010*

Data Sheets: (attached)

#1 Practicing Percent Coverage with Plant Plots
#2 Percent Coverage in Grass Plot Data Sheet
#3 Forest Inventory Data Sheet
#4 Tree Area Math Challenge Data Sheet
Tree Key: Trees of the Nashua River Watershed Identification Chart
Common Lawn Plants Key (UMass Extension)

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#1 Practicing Percent Coverage with Plant Plots **NRWI Lesson 8-2**

Name_____

1. Put all your objects in one section. Cover the entire area. This is 25% coverage.
2. Now sprinkle the same number of items all over the page.
3. The coverage is still 25%, but it is distributed over a larger area.
4. Try this with another set of objects and try 50% coverage.
5. Then try another amount you create.

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#2 Percent Coverage in Grass Plot Data Sheet **NRWI Lesson 8-2**

Name_____

Plant name	Sketch of plant	Percent coverage
Grass		
Clover		
Violet		
Chickweed		
Dandelion		
Plantain		
Bare soil		
Other		
Total		100%

Using the data above, I have found the the most successful plant in my plot is:

_____

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#3 Forest Inventory Data Sheet **NRWI Lesson 8-2**

Names_____

Tree Species	Circumference

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#4 Tree Area Math Challenge Data Sheet **NRWI Lesson 8-2**

Names_____

Tree Species_____

Circumference in cm.	Diameter in cm. (across tree) D = C/3.14	Radius in cm. (half of diameter)	Π= 3.14	Area = Π r² cm²
				Total area is:

Which tree species has the most coverage? (based on **area** the tree covers in the plot)

_____

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