

Lesson Plan: Quadrata lab
Unit: Ecosystem

EALRs:

- 1.2.1 – parts of a system work together
- 1.2.4 – understand component parts of earth's systems
- 1.3.10 – understand organisms interacting with their environment
- 2.1.2 – understand how to plan and conduct a scientific investigation
- 3.2.4 – understand how human societies use of natural resource affects the equality of life and health of ecosystems

Objectives:

1. Students will be able to work together as a team to create a procedure about how non-living factors affect living factors in the outdoor research center behind the school and gather data from their procedure to complete a scientific investigation.
2. Students will be able to assess the physical characteristics of the herbaceous and woody stems including the productivity of the xylem and phloem tree rings with age, disease, fire, and water availability.
3. Students will be able to use their data to make predictions about future living factor changes including human behavior modification to the ecosystem.

Materials:

1. 0.5 meter quadrata squares
2. meter stick
3. flexible plastic meter stick
4. thermometer
5. tree height triangulation stick
6. paper/pencil

Procedure:

- Students complete a prelab questionnaire about tree physiology and practice counting tree rings on different species of tree samples (Douglas fir, Red Alder, Red Cedar) to obtain historical information about age, drought/water availability, fire, disease.
- Students create pre-lab questions about the investigation question, hypothesis, materials and create their own procedure from their own chosen manipulation and response.
- Students get signed off on pre lab completeness and correctness before going out to practice collecting samples from their quadrata.
- Students share with group how procedure worked, what they would change, how they are accuracy is in answering their scientific question.
- Students go to their study site again and obtain data about how their manipulated non-living factor affects their responding living factor.
- Students then share what results they have with their group before analyzing their data, writing a conclusion.
- Students finally make predictions based on their data about how humans have influenced the ecosystem and how humans could better live sustainably with the ecosystem.

Lesson Plan Disclaimer

The ideas and guidelines contained in the lesson plans do not necessarily reflect the opinions of The Temperate Forest Foundation. Lessons may be submissions from educators and have not been tested in classrooms by The Temperate Forest Foundation. They are published online as a service to help educators share ideas with other educators.

These lesson plans are for personal use only and may not be republished or redistributed by any method now known or developed in the future.

Quadrat Ecology Lab

Name: _____

Date: _____

Period: _____

You are about to embark on a voyage as professional Ecologists to survey the living creatures in a particular habitat. **Write all answers on a separate sheet in complete, quality and correct sentences.**

Your goals:

- To understand and be able to identify different stages of ecological succession
- To find, identify and record the living creatures in different stages of ecological succession
- To analyze data by seeing how nonliving factors influence living creatures

Curiosity question: What is the habitat like in different areas of the outdoor center

Testable Science Question: How does the upper canopy affect amount of lower canopy plants?

Your tools: 0.5m square quadrat, compass, pencil, data table, flexible ruler, non-flexible ruler

Practice Data:

Manipulated Variable: Abiotic factors →	Responding Variable: Biotic factors
Temperature: _____ C (place thermometer on north side of tree)	Ground cover: Soil _____% Leaves _____% living plants _____%
Canopy cover _____% (percent trees block sky)	Plants: <i>Stem:</i> woody _____% herbaceous _____%
Cloud cover _____% (percent clouds block blue sky)	Plants: <i>Height:</i> under _____% middle _____% upper canopy _____%
Wind strength: dangle loose paper upside down in air and see how much wind moves paper - 1=weak, 2=medium, 3=strong	Plants Biomass: <i>diameter</i> at shoulder height _____ cm
Soil Chemical Acidity (pH): color of chemical test strip shows red as Acid, Brown as Base. More Acid is more hydrogen ions H+. Most plants do not like very acidic soil	Animals: observed directly: _____ Observed evidence of: tracks, nest, scat
Rain/Moisture: place finger into top 5cm of soil and see how moist soil is – 1=dry, 2=moist/damp, 3=wet	Fungus: (decomposers) mold, mushrooms Observed directly: _____ Observed evidence of: decaying trees, leaves

Quadrat Ecology Lab

Name: _____

Date: _____

Period: _____

Your manipulated variable: _____

Your Responding variable: _____

The tools you need to measure the manipulation and responding variables: _____

Your lab's Question (MV affect RV): _____

Your lab's Hypothesis (MV, RV, because): _____

Your Data Table:

Trial	Your Manipulated Variable	Your Responding Variable	Rank/Average Responding Variable
1 (control)			
2			
3			
4			
5			
X		AVG:	

1. Write your **question** and **hypothesis** using your own manipulation variable and responding variable.
2. Write your **procedure** using:
 - Numbered, simple steps which control all variables except the one manipulated variable (no error)
 - Explain clearly How to **observe**
 - Explain clearly How to **record your one manipulation and at least one responding variable**
 - **Repeat** data collection
 - **EC=** Explain how to be valid by minimizing error (tool, observing, calculating, recording, procedure error)
 - **If you make drawings, you must label each new equipment or new action with arrows**
3. Complete all **data tables** to see if manipulation does affect your responding variable.

Quadrat Ecology Lab

Name: _____

Date: _____

Period: _____

4. Write your conclusion paragraph (at least 5 sentences):

- Restate your hypothesis
- Tell if hypothesis was rejected or accepted
- Tell one data number from control trial with units
- Tell two data numbers from experimental trial with units (low and high)
- Compare data numbers from control and experimental trials to show how trials are different.
- Tell evidence of different stages of ecological succession
- Tell one type each of human and tool error that might decrease the data's validity.
- Tell one new procedure change to better answer your scientific question using the same manipulated variable and the same responding variable.