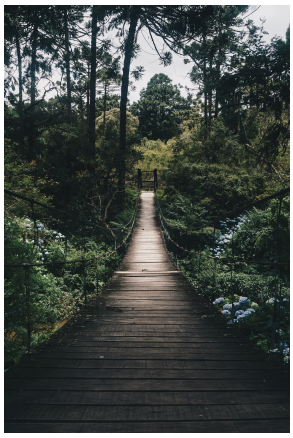
Backyard Biodiversity Student Sheets

Adapted from keslerscience.com "Biodiversity Inquiry Lab"

Backyard Biodiversity



Background:
Have you ever wondered how many animals there are on Earth, or in your part of the world? The number of different species on Earth, how they look and how they interact, is biodiversity. Biodiversity helps the Earth's ecosystems remain healthy and stable.

Organisms in a specific environment depend on one another for survival. To understand this, think about a small food chain. Producers, such as algae, provide food for other organisms, such as a variety of fish in a Minnesota lake. Eagles and other secondary consumers eat fish for energy. If some of the fish start dying for some reason, there is less food for the eagles. The same number of birds will be fighting over a smaller number of fish. Some of the birds will go hungry and may die. If one level of the food chain is removed, nearly every organism in that community is negatively affected in one way or another. A larger, more complex food web is more likely to bounce back when changes occur because of the biodiversity in an area. Biodiversity keeps the environment healthy, stable, and strong. More variety in an environment means it is more likely to be sustainable which means the environment will be able to provide for all of the organisms living there. Scientists use line transects to record the type and number or organisms in a small area of a larger ecosystem. They count the number of living organisms in between their lines. In this lab, you will use a line transect to investigate biodiversity in two different areas.

Each area you are investigating represents one of 4 quadrats. A quadrat is a rectangular area that scientists use to determine how much and/or what types of living things are in an area. In a scientific investigation where we needed to follow strict rules, this would be more random that what we're doing today.This investigation will give you an idea of how to find out what type of life, and the level of biodiversity that can exist in an area that may be too big to walk and count organisms in.

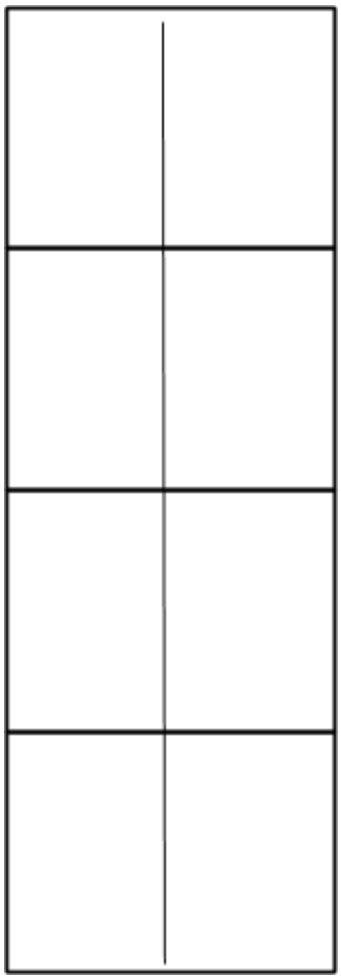
Draw your predictions

Complete the illustration below to predict which ecosystem you think will have more biodiversity. Draw in with pictures or words the types of living things (organisms) you think could be along the transect line.

Description of ecosystem #1:

_____

_____



Description of ecosystem #2:

_____

_____

Procedure:

1. Your teacher will provide you with the string needed to create your double line transect with markings along each meter for convenience. You will also receive 4 pins to hold the rope into the ground. BE CAREFUL, AS THESE CAN BE SHARP.

2. Find a location away from other groups (look for orange flags to indicate where to start/end) to anchor one end of the string into the ground.

3. Unroll the rope completely, straighten it out, and anchor the other end. Repeat this process with the other piece of rope, laying it parallel to the first piece. Do not intentionally place the rope so that it touches any particular organism, but you do want to make sure your transect comes into contact with a variety of living species. You now have a 4 meter double transect.

4. The beginning of your rope is the 0 meter mark. From 0 to 1 meter is the first quadrant. Identify all of the organisms in this area and record them on your data sheet. If you know the name of the organism, write it. If not, use generalized descriptions (purple flower, black beetle, tall green grass, etc.). It may also be helpful to use a symbol or quick sketch to identify the organisms. Be as specific yet as brief as possible.

5. Repeat steps 3 and 4 for the remaining 3 quadrats; between meter 1 and 2, 2 and 3 and 3 and 4. Do not include any organisms outside of the “box” you create at each meter mark.

Ecosystem #1 description: _____

Quadrat	Descriptions, illustrations of the PRODUCERS in the quadrat	Descriptions, illustrations of the CONSUMERS in the quadrat
1		
2		
3		
4		

Before moving on, have you:

- ❏ Carefully observed each quadrat, being sure not to walk in it?
- ❏ Allowed everyone in the group to make observations
- ❏ Agreed on what to call each organism found?

Ecosystem #2 description: _____

Quadrant	Descriptions, illustrations of the PRODUCERS in the quadrat	Descriptions, illustrations of the CONSUMERS in the quadrat
1		
2		
3		
4		

Before moving on, have you:

- ❏ Carefully observed each quadrat, being sure not to walk in it?
- ❏ Allowed everyone in the group to make observations
- ❏ Agreed on what to call each organism found?

Develop a scientific argument

Guiding Question: How can the amount of biodiversity affect an ecosystem?

My help is written in blue. Use this to guide your answers, but please delete and replace with your own words before submitting. Thank you!

My claim:
(your claim is your answer to the guiding question in one sentence. Be specific)

My Evidence:
(evidence should include facts and observations. What specifically did you find in each ecosystem? You could compare the number of producers and consumers, and display that as a data table or graph.

My Reasoning:
(Connect your evidence to your claim. Convince the reader that your claim is supported by the evidence you have. Be sure to include the "science idea" that supports what you found out. You didn't develop the idea of sustainability, a food web or food chain. Explain why and how these ideas are useful and support what you found out).

Biodiversity Rubric

Name:_____

Guiding Questions : How can the amount of biodiversity affect an ecosystem?

Concerns (1,2) *(areas that need improvement)*	**Right on** **(3)** *(do everything in this column)*	Advanced (4) *(highlights)*
• Diagram or examples are missing • Diagram or examples do not help explain the topic	Use meaningful models, diagrams, and/or examples in the evidence section	
M = missing I = used incorrectly	Use appropriate and relevant vocabulary in communication. These words are: • __organism • __food web • __food chain • __biodiversity • __Sustainability • __Producer • __Consumer • __Decomposer	
Your work does not explain: _____ _____ _____ Your work shows misconceptions about: _____ _____ _____	Reasoning is clear and complete. It includes: -An explanation of how the evidence supports the claim -how energy and matter flow through the ecosystem -how biodiversity affects the sustainability of an ecosystem when two are compared -Information about the science ideas of: food webs,food chains	