

Human Impact on Ecosystems

Inquiry Lab Experiment

Ecobottles Lab

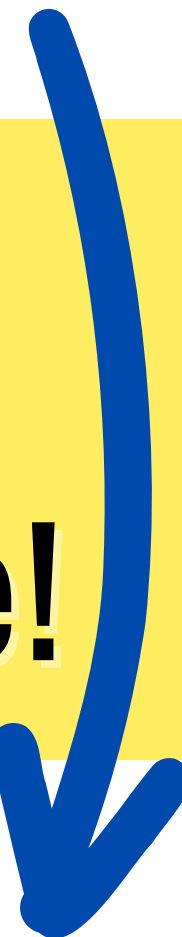
Grade 6-10

Very EASY to
set up & do



**“Who knew
growing grass
could be so
much fun!”**

SCROLL
to take a look inside!



★★★★★ **Extremely satisfied** - “Great hands-on activity that allows students the practice of designing their own experiment and test variables.”

TEACHER BENEFITS

HOW THIS UNIT WILL HELP YOU

➤ **VERY LITTLE PREP** - Just gather a couple materials and let your students explore a **HUMAN IMPACT** using the **SCIENTIFIC METHOD**

➤ Easy to follow daily instructions makes it easy for you and your students

➤ Built-in differentiation for various learning styles



Design/ Procedure:

The design of the experiment is extremely important and will count for a great deal of your mark. A lab design includes all the **numbered steps** (not a paragraph) necessary to reproduce the lab. Your lab needs to be repeatable by someone else.

1. Visualize doing the experiment yourself. Determine which steps need to be completed in a logical order.
2. Keep the list of materials in mind and include these items as you write your procedure.
3. Consider how the apparatus will be set up, how measurements will be made, and controlling the necessary variables needed to test your hypothesis.
4. Include a labeled diagram for the apparatus set-up.
5. Be sure to include 5 or more variations of your independent variable in order to obtain a trend in the data.

Your design should be based on a **2.5-week timeframe** and should include:

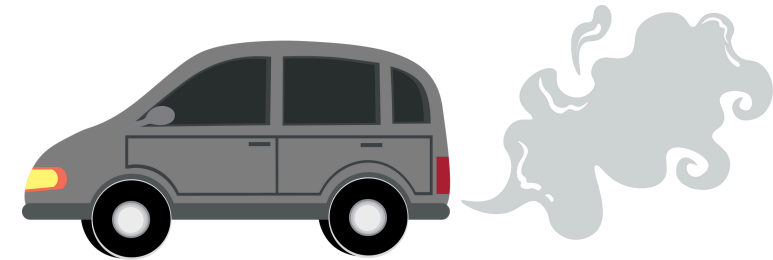
- how often will you apply your treatment (i.e., every day, once a week)?
- how much of your treatment will you apply each time (i.e., 10 mL, 2 g)?
- will you water your ecosystem in between treatments? If so, how much water will be given?
- the observations that will be recorded daily and weekly

You will need to clearly show how your experimental design will answer your question.

A large empty rectangular box with a thin black border, intended for the student to write their experimental design.

YOUR LAB

✓ **Hands-On Ecosystems Lab:** Explore human impact on the environment through student-led experiments.



✓ **Full Scientific Method Integration:** Scaffolded steps guide students from hypothesis to conclusion.

✓ **Includes Editable Digital Formats:** One-click access to Google Drive and Office versions.

✓ **Assessment-Ready:** Detailed rubric and report structure included for easy grading.



Hands-On Activity

Sustainable Ecosystems - Eco-bottle Lab

Your task

Every year humans pollute the skies and waterways, which harm the animals and plants that live there. Runoff from the fertilizer you use to make your lawn look nice, salt that keeps our roads safe in winter and pesticides we use to keep bugs away from our crops and gardens all make their way into our ecosystems. Increases in CO₂ from cars and factories can lead to acid rain, which can severely impact living things. Collectively we call this impact “The Human Factor”. The purpose of this lab is to conduct an experiment that investigates how humans impact ecosystems and determine whether these actions are sustainable or not.

You will be investigating how your “human factor” impacts the quality of soil, water, and the organisms inside your ecosystem. You will be required to analyze the effect this ‘human factor’ has on the populations of terrestrial and aquatic organisms by interpreting your collected data and drawing conclusions.

The “Human Factor”

You must choose one treatment or “human factor” to investigate.

- Different chemical fertilizers
 - Treat your terrestrial ecosystem with different fertilizers to determine which is the most effective
- Chemical fertilizers vs. ‘natural’ fertilizers
 - Are there natural alternatives to chemical fertilizers? Are they as effective?
- Sand vs. soil
 - Does it matter what your seeds are planted in?
- Pesticides
 - Keeps your plants bug free but are they harmful to the good stuff as well?
- Road salt – mix water with regular NaCl
 - Salt runoff from roads is a big problem in winter. Does the salt affect plant growth?
- Acid rain – water with straight vinegar
 - It can destroy stonework; will it affect the growth of your plants?
- Heavy metals – sprinkle iron filings after watering
 - Heavy metals make their way to all kinds of unwanted locations. What effect do they have?
- Oil
 - You can use a variety of oils here; usually vegetable oil is preferred.
- Anything else that you can think of that would be appropriate



Your chosen Factor is: _____

You will be working in pairs with a single bottle each. The bottles can be small 500 ml/16 oz. or large, 1L/32 oz. One group member will supply the control bottle (nothing altered) while the other supplies the experimental bottle (where the human factor is introduced). Each day until the end of the unit you will be making observations about your ecosystems. These observations include but are not limited to:

- Number of grass stalks coming up
- Height of your grass
- How your grass looks i.e., healthy, dark green, etc.
- What else can you think of?



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Collectively we call this impact “The Human Factor”.

The purpose of this lab is to have you plan and conduct an experiment that investigates how humans impact ecosystems and determine whether these actions are sustainable or not.

You will be required to analyze the effect this ‘human factor’ has on the populations of terrestrial and aquatic organisms by interpreting your collected data and drawing conclusions.

Steps - 3-4 Weeks

1. Students are introduced to the lab and choose a 'Human Factor'.
2. They write an introduction based on the human factor of their choice.
3. Variables, Hypothesis, and Materials list is created in a structured manner.
4. Students design their experiment using a scaffolded set of parameters.
5. Each group creates their Ecobottle lab using instructions and guiding pictures.
6. Plants are allowed to grow while being cared for each day. Notes are taken in their lab books.
7. Each day, the human factor is added data is gathered each day inside their lab notes.
8. Once the lab has concluded, students answer a set of discussion questions and write their conclusion.

WHAT TEACHERS SAY

★★★★★ Extremely satisfied - This project was an enjoyable and worthwhile experience for my students. Easy to modify, but good to go as it is. Who knew growing grass could be so fun?

★★★★★ Extremely satisfied - Thanks so much. Great resource.

★★★★★ Extremely satisfied - Students took so much ownership of their learning using this! Thanks!

★★★★★ Extremely satisfied - I like how I can tweek these to make my own. The rubric was helpful.

★★★★★ Extremely satisfied - I am so excited to try this lab with my students!! I am doing this lab with a co-taught special education Biology class, and the instructions are so thorough they are understanding it right away.

★★★★★ Extremely satisfied - My kids loved this. It took a lot of time, but it was worth it. I referred to the results many times as our year progressed. Thank you!