



ECOQUEST

Field Ecologist Badge



_____'s
Field Journal



A Note About the Illustrations

Unless otherwise noted below*, illustrations for this EcoQuest Field Journal and the EcoQuest Badges were created by two of our extremely talented high school Eco-Leaders, Jiali Pickering and Sadie Pickering. We thank them for their amazing contributions to EcoQuest!

Sincerely,

Ashley Alred & Amelia Goldstein

EcoQuest Authors + Educators

*Illustrations retrieved from *Eco-Inquiry* (1994) by Kathleen Hogan are cited below:

p. 16 *To be a careful observer*. Eco-Inquiry (1994), p. 67

p. 61 *Habitat chamber*. Eco-Inquiry (1994), p. 90

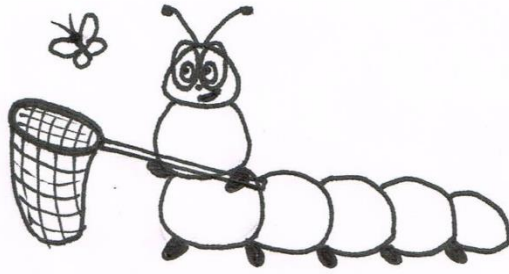
p. 61 *Supporting notetaking (Earthworm feeding)*. Eco-Inquiry (1994), p. 92

p. 62 *Food for Ants*. Eco-Inquiry (1994), p. 101

p. 64 *Signs of Animals Eating Plants*. Eco-Inquiry (1994), p. 360

p. 66 *Seed Stations*. Eco-Inquiry (1994), p. 103

Field Ecologist Badge



Field Ecologist (noun): a scientist who studies how living organisms are connected to each other and to their environment

Eco-Challenge

The mission of this badge is to design and conduct your own at-home field experiment to investigate more about animals and the food they consume.

To earn the **Field Ecologist** badge, you must:

- ☐ Ask a science question that will help you learn more about how an animal eats.
- ☐ Choose a field experiment to answer your question.
 - ☐ *You can choose one we provide or design an experiment yourself.*
- ☐ Get your question + field experiment approved by a trusted adult.
- ☐ Predict what you think is going to happen in your experiment.
- ☐ Do your field experiment!
- ☐ Make observations and collect data.
- ☐ Share what you learned by completing your Investigative Report.



Visit us online for the Field Ecologist Badge!

<https://padlet.com/caryecoquest/FieldEcologist>

Ask a Science Question & Pick a Field Experiment

Field ecologists are curious about everything! They often wonder about the lives of animals. Before doing an experiment to learn more about an animal, they always *first* ask a science question.

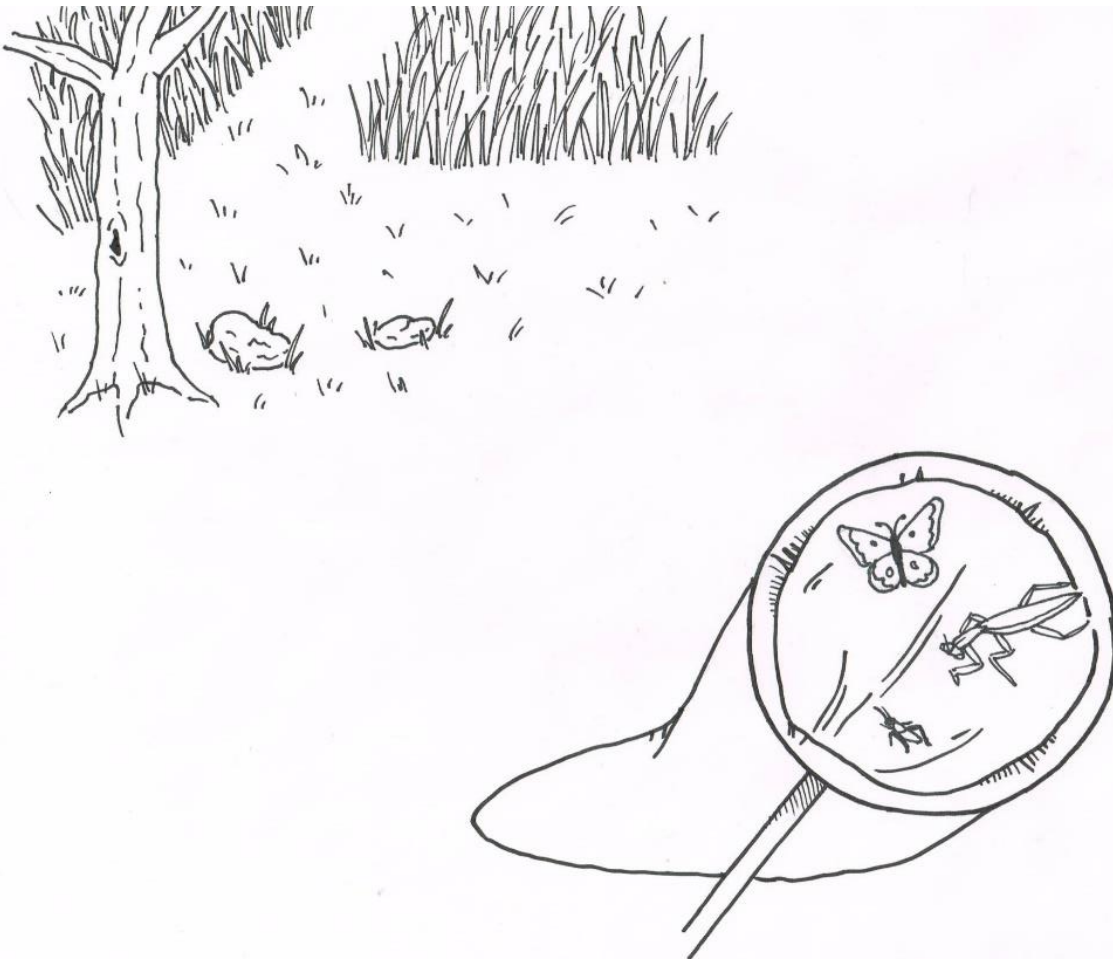
Think about the study animal you picked. What is a question you could ask that you could *answer* by doing a field experiment?

Hmm...I wonder...

Asking a good science question is not always easy! Lucky for you, we have some ideas to get you started. After all, good field ecologists need practice! Try out an experiment or two from Option 1:

Choose a Field Experiment.

If you would like to do Option 2: **Design Your Own Experiment**, skip ahead to page 13.

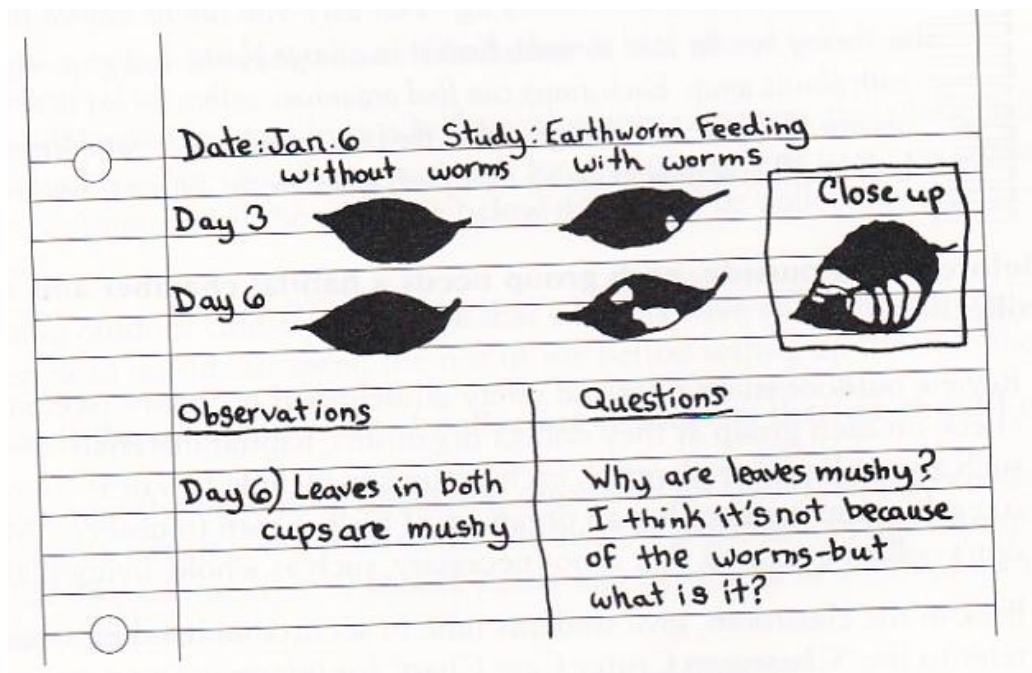


Option 1: Choose a Field Experiment

We have some field experiments for you to try if you'd like practice before designing your own experiment. Read through each field experiment and pick the one that is most interesting to you!

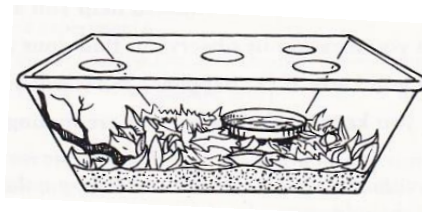
There are three experiments to choose from: **Ant Hotel**, **Plant Munchers**, and **Stupendous Seeds**.
Choose ONE of these for now.

After you complete your Field Ecologist badge, you are welcome to try more experiments!



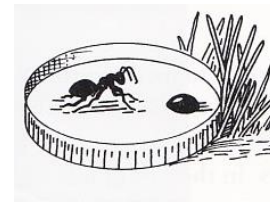
From *Eco-Inquiry* (1994) by Kathleen Hogan

If you are interested in creating an **indoor** critter habitat for your experiment, email caryeducation@caryinstitute.org for ideas or watch "How to Make a Habitat Chamber on the Padlet page. Great for rainy days!



From *Eco-Inquiry* (1994) by Kathleen Hogan

OUTDOOR FIELD EXPERIMENTS



Field Experiment 1: Ant Hotel

Ants are everywhere—let's learn more about them and what they like to eat!

Check the field experiment you want to do. Pick ONE!	Research Question	Possible Method for Field Experiment
☐ Option 1	Do ants like some food better than others?	Create a bait station: In a jar lid or on a paper plate, put tiny amounts of food like peanut butter, honey, seeds, lettuce, or cookie crumbs—get creative with what you have! What foods do ants like best?
☐ Option 2	Do different kinds of ants like different kinds of food?	Create a bait station: In a jar lid or on a paper plate, put tiny amounts of food like peanut butter, honey, seeds, lettuce, or cookie crumbs. Do different kinds of ants (big black ants, small black ants) like certain foods?
☐ Option 3	Do ants that live in different habitats eat different things?	Put the bait station in different places or habitats outside to see if the type of ant attracted to the foods differ based on the habitat.
☐ Option 4	Are there differences in how ants eat their food? Do some ants take food away in big chunks, or do some suck liquid out of their food?	Take a close look (use a magnifying glass!) to watch ants at the bait station to see how different ants handle their food. Try to follow them to see where they take their food!

Adapted from *Eco-Inquiry* (1994) by Kathleen Hogan

Ant Hotel Data Collection – Use extra paper if you need & stick it in your Journal!

Date: _____ Time of day: _____ Weather: _____.

What do you PREDICT will happen in your field experiment?

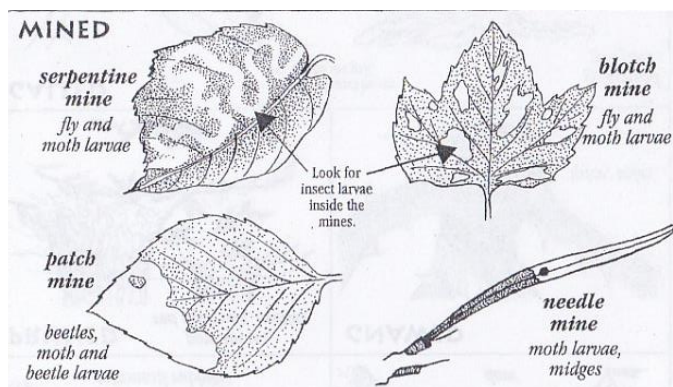
Sketch your Method for the field experiment. How will you set it up, what materials will you use?

What did you notice and observe?

What was the most interesting thing you noticed?

Field Experiment 2: Plant Munchers

A lot of bugs love to eat plants, but bugs have favorite plants—as well as interesting ways of eating them!



Check the field experiment you want to do. Pick ONE!	Research Question	Possible Method for Field Experiment
☐ Option 1	Do different bugs eat different parts of plants? (like fruits, flowers, branches, leaves, bark, buds, & roots)	Take a close look (use a magnifying glass!) on a plant to look for insects feeding on leaves. Notice what insects are found on different parts of the plant.
☐ Option 2	Do different kinds of plants have different kinds of bugs feeding on them?	Look for evidence of bugs eating leaves (like holes, tunnels, & scrapes). Compare different leaves to each other. Do different leaves have the same kind of evidence left by bugs?
☐ Option 3	Which plants have the most different kinds of insects?	Spread a light-colored cloth/sheet on the ground below tree branches or bushes. Gently shake branches (or use the "Beat Sampling" technique from your Field Tech Badge) to see what insects fall out. Note which types of insects fall off of different kinds of plants.

Adapted from *Eco-Inquiry* (1994) by Kathleen Hogan

Plant Munchers Data Collection – Use extra paper if you need & stick it in your Journal!

Date: _____ Time of day: _____ Weather: _____.

What do you PREDICT will happen in your field experiment?

Sketch your Method for the field experiment. How will you set it up, what materials will you use?

What did you notice and observe?

What was the most interesting thing you noticed?

Field Experiment 3: Stupendous Seeds

Create **seed stations** to see how some animals have special abilities for finding their food.



Check the field experiment you want to do. Pick ONE!	Research Question	Possible Method for Field Experiment
☐ Option 1	Do small or larger seeds disappear more quickly in the open or under cover?	Create a seed station: Put large & small seeds (like a bird seed mix, peanuts, sunflower seeds on three plates—get creative!) in three places: 1. Put seeds on a plate in an open space, like the middle of a yard. 2. Put seeds on a plate under a bush or other “shelter.” 3. Put seeds on a plate under a box with a hole cut out of it. *Check stations every day for a week.
☐ Option 2	Does the size and position of the entry holes into a container with seeds make a difference for how quickly the seeds disappear?	Put equal numbers of the same kinds of seed in two containers with different entry holes (like big or small, covered by a flap, located on the top or side of a container, etc.) to compare how quickly the seeds disappear.

Adapted from *Eco-Inquiry* (1994) by Kathleen Hogan

Stupendous Seeds Data Collection –Use extra paper if you need & stick it in your Journal!

Date: _____ Time of day: _____ Weather: _____.

What do you PREDICT will happen in your field experiment?

Sketch your Method for the field experiment. How will you set it up, what materials will you use?

What did you notice and observe?

What was the most interesting thing you noticed?

OFFICIAL ECO-EXPLORER INVESTIGATIVE REPORT

Field EcoExplorer Name:
Your study animal:
Type of food your study animal consumes:
Sketch your animal and its food.
From your field experiment, what did you discover about your animal and how it eats? What patterns did you notice?
What do you think is AMAZING about your animal?
Did you discover any other organisms during your study? <i>Sketch and write about them here!</i>

***Eco-Alert!** Have you added all of the heterotrophs (organisms that eat other things) you found during your Field Experiment to your Eco-List?

Option 2: DESIGN YOUR OWN EXPERIMENT

Reminder: Before setting up your study, please FIRST share your science question + field experiment design with a Cary Educator or another trusted adult.

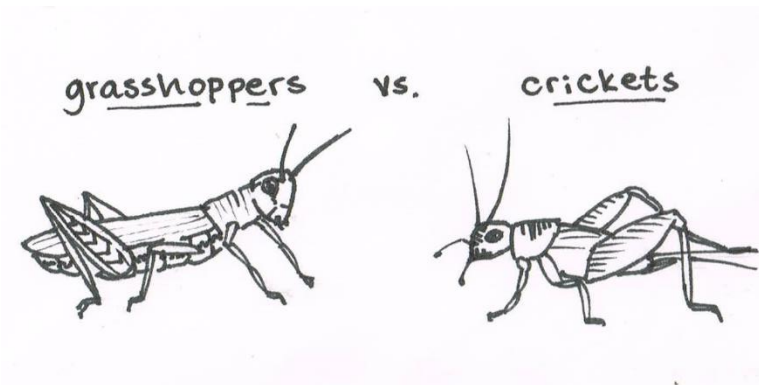
Reflection: Pick a study animal in your home habitat.

In all of the badges that you have done so far, which animal did you see (or see signs of!) that you would like to learn more about?

Why do you think this animal is interesting?

What do you think this animal eats?

Draw your animal here and what it eats.



Ideas for developing a Research Question:

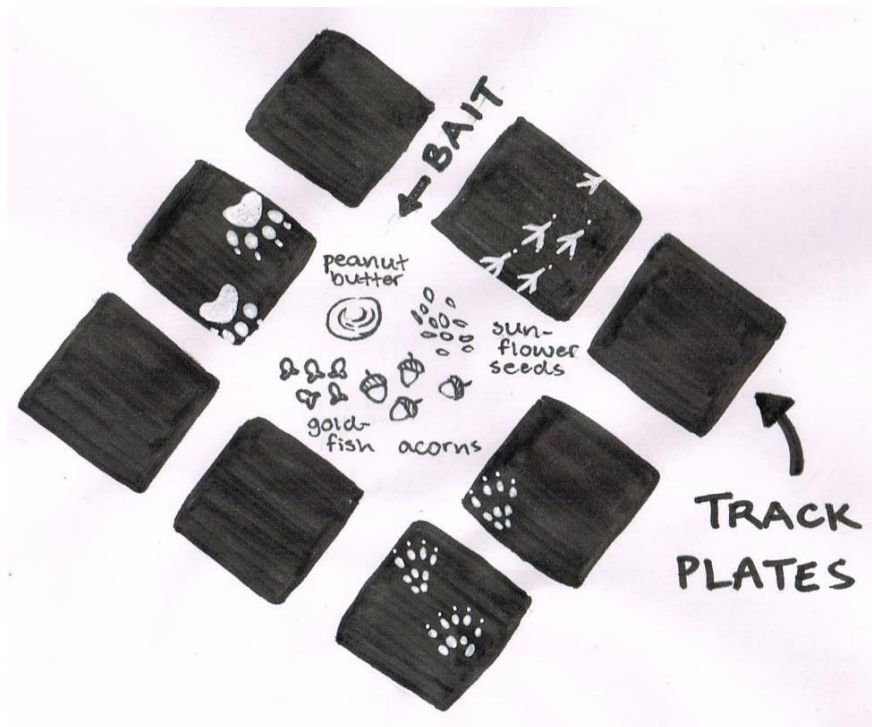
- Maybe you could use a question from your **Field Tech Brainstorm Box!**
- Compare and contrast different kinds of field methods you learned during the Field Tech Badge. *Are different kinds of bugs caught by using a coverboard versus a pitfall trap?*
- Study different habitats. *Are different bugs found in different habitats?*
- Study different food sources: *Are certain insects found on the plants they eat? Do ants prefer yogurt or peanut butter?*

Other Methods for designing a field study:

- Anything from your Field Tech Badge! (pitfall traps, cover boards, beat sampling, etc.)
- There might be another field method, like track plating, that could inspire your investigation!

<https://www.caryinstitute.org/eco-inquiry/teaching-materials/biodiversity/track-plates>

- Examples: Track plates, Leaf packs, Camera trapping, or Bait stations
- Aquatic studies like dip-netting, leaf packs, etc.



Have an idea but aren't quite sure how to set up a field experiment? Ask an Educator! Send us an email at caryeducation@caryinstitute.org or set up a phone call—we are happy to chat!

FIELD EXPERIMENT DESIGN

My Research Question

My Field Experiment

Supplies Needed:

Describe your Method (How will you set up your experiment?):

How will you collect data/ make observations?

Example: I will collect data _____ times a day for _____ days. I will write observations in my Field Journal about _____.

What do you PREDICT will happen in your field experiment?

DATA COLLECTION

Date:		Time:		Weather:	
Observations: <i>What do you notice?</i> (Write & Sketch!)			Questions: <i>What do you wonder?</i>		

Date:		Time:		Weather:	
Observations: <i>What do you notice?</i> (Write & Sketch!)			Questions: <i>What do you wonder?</i>		

DATA COLLECTION

Date:		Time:		Weather:	
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Date:		Time:		Weather:	
Observations: <i>What do you notice?</i> (Write & Sketch!)			Questions: <i>What do you wonder?</i>		

DATA COLLECTION

Date:	Time:	Weather:
Observations: <i>What do you notice?</i> (Write & Sketch!)	Questions: <i>What do you wonder?</i>	

Date:	Time:	Weather:
Observations: <i>What do you notice?</i> (Write & Sketch!)	Questions: <i>What do you wonder?</i>	

OFFICIAL ECO-EXPLORER INVESTIGATIVE REPORT

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Type of food your study animal consumes:
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Did you discover any other organisms during your study? <i>Sketch and write about them here!</i>

***Eco-Alert!** Have you added all of the heterotrophs (organisms that eat other things) you found during your Field Experiment to your Eco-List?

Field Ecologist Badge Eco-Challenge Check

When you complete this check-list, scan or take a photo of it and send to caryeducation@caryinstitute.org.

✓	Challenge Steps	Eco-Explorer Signature	Adult Initials
	Ask a science question that will help you learn more about how an animal eats.		
	Choose or Design a field experiment to answer your science question.		
	Get your question + field experiment approved by a trusted adult.		
	Predict what you think is going to happen in your experiment.		
	Do your field experiment!		
	Make observations and collect data.		
	Share what you learned by completing your Investigative Report .		



Thank You!

We at Cary Education created EcoQuest as a way to provide families with a fun ecology education opportunity since we had to cancel Cary Eco-Discovery summer camps during the COVID-19 Pandemic in 2020. We are incredibly grateful to all the families, teachers, and students who participate in this brand new program, as well as to our amazing team of high school Eco-Leaders for their creative ideas and dedicated educational contributions.

We are excited to inspire—and be inspired by—children discovering the ecosystem of their own homes and schoolyards.

Thank you for supporting our educational endeavors!

With Gratitude,

Cary Education

References

Hogan, Kathleen. *Eco-Inquiry: A Guide to Ecological Learning Experiences for the Upper Elementary/Middle Grades*. Kendall/Hunt Publishing Company, PO Box 1840, 4050 Westmark Drive, Dubuque, IA 52004-1840., 1994.

Cary Education Teaching Materials: <https://www.caryinstitute.org/eco-inquiry/teaching-materials>

About the Authors

The Cary EcoQuest (2020) curriculum and accompanying online materials were created by Ashley Alred and Amelia Goldstein, with priceless guidance from Dr. Alan Berkowitz, *Cary Head of Education*, and Shelly Forster, *Cary Educator*.

Ashley Alred, Cary Education Program Leader

Before joining Cary, Ashley served as a k-12 environmental educator at the Urban Ecology Center in Milwaukee, Wisconsin. She received her MS in Science Literacy Research at the University of Nebraska-Lincoln ('16) and her BS in Fisheries & Wildlife Biology from the University of Georgia ('12). Over the years, her academic research interests have ranged from captive chimpanzee behavior to understanding how undergraduates make decisions about conservation issues. She has been an environmental educator in five different states across the country.

As Education Program Leader, Ashley is excited to devote her skills in education, ecology, and research to teaching youth using inquiry-based and data-driven methods during local school field trips and summer camp, while also contributing to innovative ecology education research. Her career focus is to inspire youth to think critically and creatively about ecology and cultivate meaningful, fun connections to their local environment.

Amelia Goldstein, Cary Summer Camp Instructor

Amelia's path to becoming an ecology teacher began in college where she studied the *Sociology of Science*--that is, how scientists act, what rules they follow, who gets to be a scientist and how. She became passionate about making sure that everyone who *wanted* to do science *could* do science. She realized that the best way to make science accessible to everybody was to teach it! When in graduate school for *Biology Education*, Amelia discovered the incredible world of ecology, and she loved that there was room for everybody in it. There was no turning back!

Last year in summer 2019, Amelia became a summer camp instructor for the Cary Institute of Ecosystem Studies where kids spend every day outside exploring ecology. We were lucky enough to have Amelia back for a second summer as an instructor for EcoQuest. During the school year, Amelia is a high school science teacher. This fall, Amelia will be teaching a trifecta of Biology, Ecology, and Environmental Science to high school students at Oakwood Friends School in Poughkeepsie, New York.