



THINGS WITH WINGS

Grades 4-8: Day 1

OBSERVE INSECT WINGS

WELCOME

(5 min)

GAME TIME

(30 min)

Materials:

- Ball
- Two bases



EXPLORE

(5 min)



Introduction: Welcome your students. Be friendly.

GRAB AND DASH

Say: **To observe insects you need to be quick on your feet. Sometimes, scientists need to catch insects to see them close up. Today, we will play a fast, fun game called “Insect Grab and Dash.” The ball is your insect and the base is your basecamp. You will race another player to grab the ball and bring it back to your camp.**

1. Divide the players into two teams. Set up a base for each team about 40 feet apart. Place the ball in the center of the play area between the two bases.
2. Teams line up at their base, facing the center where the ball is placed.
3. When the teacher says “Go!” a player from each team runs to grab the ball in the center.
4. The player who grabs the ball must sprint back to their base. The other player will chase them, trying to tag them before they reach base.
5. If the player with the ball makes it back to their base without being tagged, their team gets a point. If the player is tagged before reaching their base, the other team gets a point.
6. Play to five points or until everyone has a turn.

VISIT A NATIONAL FOREST INVENTORY CAMP

Say: **We will be learning about the work of entomologists today. First, let's see what goes into learning about different species in the wild.**

Play the video for your class. The video only contains subtitles. Read the subtitles for your students as the video plays.:

A Day at a National Forest Inventory Camp in Papua New Guinea

<https://www.youtube.com/watch?v=oB8HHNhAqyk>

Ask: **What two flying insects did you notice?** (Example: **Fruitflies and moths**) Ask: **How did you notice the scientists collected moths?** (Example: **Moths are drawn to light so they strung up a white sheet and had a light shining on it at night time**).

READ

(20 min)

**STEM CRAFT**

(30 - 40 min)

Materials:

- Wildflower seeds
- Clay
- Dirt

**READ ABOUT LUCY EVELYN CHEESMAN**

Play this video of the amazing world of insects as you read.

<https://www.youtube.com/watch?v=uTwy7wZyiaM>

Read the profile of the British entomologist and traveler Lucy Evelyn Cheesman. Use these guiding questions to help prepare your learners for the nature expedition:

1. What made Lucy different from others when she observed bugs?
2. Did all the specimens Lucy collect have wings?
3. How did Lucy collect her samples? What equipment did she use?
4. Why couldn't Lucy go to school, and how did she keep learning despite this?
5. Lucy explored many places in different seasons. How have you noticed seasons change the kinds of insects we see?
6. How would you feel if an insect or animal was named after you?
7. If you could talk to Lucy, what would you ask her?
8. Lucy once said she wanted to 'figure out what makes glow-worms glow.' What flying insect would you love to learn more about, and why?

CRAFT A WILDFLOWER SEED PELLET!

Say: **You are going to make clay seed pellets to plant wildflowers. You will mold seeds into clay pellets which will protect the flower seed from birds, pests, and extreme weather. The clay will also keep the seed moist when it is watered.**

What you'll do:

1. Mix a tiny bit of dirt with your clay, and mush it all together. Make a lump of clay about the size of a gummy bear.
2. Add about four wildflower seeds to your lump of clay.
3. Craft your lump of clay into the shape of a gummy bear or any other interesting shape you like.
4. Have your teacher write all of your names on a piece of paper. Leave your wildflower seed pellet by your name to dry out.
5. To plant the pellet, bury it half way in the dirt.



STEM TIME

(60 min)

Materials:

- Test tubes, clear plastic bags, or other collecting containers
- Handouts
- Optional: (Magnifying glass/microscope/ phone camera)
- Blank paper



ENGINEERING

(40 min)

Materials:

- Origami ladybug Handout



INSECT WING OBSERVATION

Students will go outside to look for insects with wings. They will observe the wings and record their features.

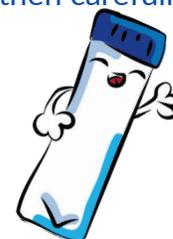
Say: **Explorers, get ready to search for insects, just like Lucy! We will look high and low, in trees and under bushes and rocks. Entomologists need to look very carefully and take time to make observations. If you catch a bug, observe it up close, then carefully let it go, just like Lucy would!**

Prep beforehand:

Gather collecting containers, magnifying glasses or microscopes if available.

What you'll do:

1. Take students outside and let them search the school ground for bugs.
2. Allow students to take time to explore! Encourage them to look under rocks, in the grass, in the bushes, and up in the air.
3. If they find a bug, they may observe it in a test tube. They can take an even closer look if you have magnifying glasses, a microscope or your phone's zoom camera available. Remind them to be gentle with the bug.
3. Allow students 15 minutes or so to draw about the things they noticed during their exploration.
4. Release the bugs outside and clean up/put away your tools.



MAKE AN ORIGAMI LADYBUG

Objective: Students see the real world application of the journey Lucy began with her study of and passion for insects.

1. Students watch this media about ladybugs and how they fold their wings: **Imagine trying to fold two 20-foot tents—poles and all—onto your back, under a hard plastic shell, without using your hands. A ladybug pulls off this incredible trick every single day.**

Wing Windows Reveal Insect Origami

<https://www.youtube.com/watch?v=-zB9JFtD5o0>

Say: **You can practice making delicate folds by making an origami ladybug.**

What you'll do: Students make a simple origami ladybug. They can use the handout or color paper on their own.



(Continued)

- Origami ladybug Handout



STEM CRAFT

(40-60 min)

Materials:

- Paper or paper towels
- Glue
- Seeds
- Markers, crayons, or colored pencils for decorating



CLEAN UP / DISMISSAL

MAKE AN ORIGAMI LADYBUG (CONTINUED)

Follow along with the video to fold a ladybug:

Very Easy Origami Ladybug | Paper Ladybug Tutorial for Kids

<https://www.youtube.com/watch?v=HUaSk6yiYaw>

NATURE'S ORIGAMI FOLDING WINGS

Students watch this video about another beetle's wings and how they retract. *Ask: What did you notice? What did you wonder?*

Beetle-inspired flapping microrobots ... : Nature 2024

<https://www.youtube.com/watch?v=wRNEL7ItUkw>

CRAFT A PLANTABLE SEED FLOWER

Objective: Students will learn about plant growth and seed dispersal while making a fun art project. By creating a paper flower and adding real seeds, they can plant it at home and watch the seeds grow.

What you'll do:

1. Create the Paper Flower: Students cut out petals, leaves, and stems from colored paper. Arrange and glue the pieces together to form a flower shape.
2. Attach the Seeds: Apply a small amount of glue to the center of the flower or along the petals. Gently press real seeds onto the glue so they stick securely.
3. Decorate and Personalize: Students can color, write their name, or add designs to their flower. Discuss the type of seeds used and what conditions they need to grow (sunlight, water, soil).
4. Plant and Care: Students take their flower home and plant the seeds in soil, either directly in the ground or in a pot. Encourage them to water the seeds and observe their growth over time.

Make a flower using the paper snow flake method, cut hearts to make flower petals, or cut out the shape of a flower. Get creative!



FOREST INVENTORY CAMP

PROFILE

SEED PELLET

INSECT WING OBSERVATION

ORIGAMI

ENGINEER A SOFT LANDING

METRICS

3-LS4-3.

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-5-ETS1-2.

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (Students learn about Lucy's inventive way of designing tools and methods to collect specimens.)

5-LS1-1.

Support an argument that plants get the materials they need for growth chiefly from air and water.

Science and Engineering Practices: Conduct an open exploration, make observations and document findings.

3-LS1-1.

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

3-5-ETS1-2.





MAKE AN ORIGAMI LADYBUG

Make a simple origami ladybug. Cut out the origami square to begin.

Follow along with the video to fold a ladybug.

<https://www.youtube.com/watch?v=HUaSk6yiYaw>

 Cut on dotted line.





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Lucy Evelyn Cheesman

When Lucy was a little girl in England in 1881, girls were expected to sit still in frilly dresses and be as quiet as mice. But not Lucy! She liked mud more than lace, and going on bug hunts more than playing with dolls. Often, she came home with frogs in her pockets and moss in her hair.

Since her family didn't have very much money, they could only afford to send one of their kids to school. Her parents decided to send Robert, Lucy's brother, to school. This made Lucy sad. She had dreamed of becoming a vet. There was one problem with her dream—100 years ago, when Lucy lived, they only let men become veterinarians!

Lucy didn't give up though. She kept trying to study and help animals in every way she could. Where others saw 'just bugs', Lucy saw a world of adventure and beauty. In the world of insects, with their buggy eyes, striped limbs, and shiny bodies she saw stories that needed to be told and entire species that needed to be recognized.

Flight Camp, Nature's Aviators (Grades 4-8): Week 3, Day 1



Although she didn't have a lot of equipment, Lucy got to work! Lucy needed pants, but at the time, nobody would sell pants to women, so Lucy just stitched her own at home. Many of the bugs Lucy collected she caught using a tin can and simple net. Often, she even invited children just like you to help her collect bugs.

She walked *everywhere*, and when she noticed a new bug, fly, lizard, or leech, she would sketch it, write stories about it, and bring back a sample to the museum. She collected over 70,000 specimens for the museum and even has a fly named after her!

Her bug hunts took her far and wide. She went to many places including the Galápagos Islands, the Tuamotu atolls, and New Guinea. When it rained, she would take refuge under an umbrella made out of bark. When she got stuck in a giant cobweb, she patiently sawed at it with a nail file to set herself free.

Lucy was the first woman who got a job at the London Zoo in the insect house and became known as the entomologist of the world. Her directors wrote that no mountain top was too high, and no jungle too deep for Lucy to go adventuring and bug collecting.

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