



S is for Science

Be an Entomologist! Entomology is the scientific study of insects and bugs. Entomologists observe nature very closely. With a Cannon Jar Bug Collector, you can collect, observe, document and release bugs and insects, just like an entomologist.



Canning Jar Bug Catcher — Canning jars come with a metal lid and an outer metal screw-on band. To make your bug catcher, remove the metal lid. Get some plastic or stainless steel mesh from a craft or hardware store. Cut a mesh circle to fit inside the top rim of the metal screw band. Screw the band on and you're ready to go outside to look for bugs!

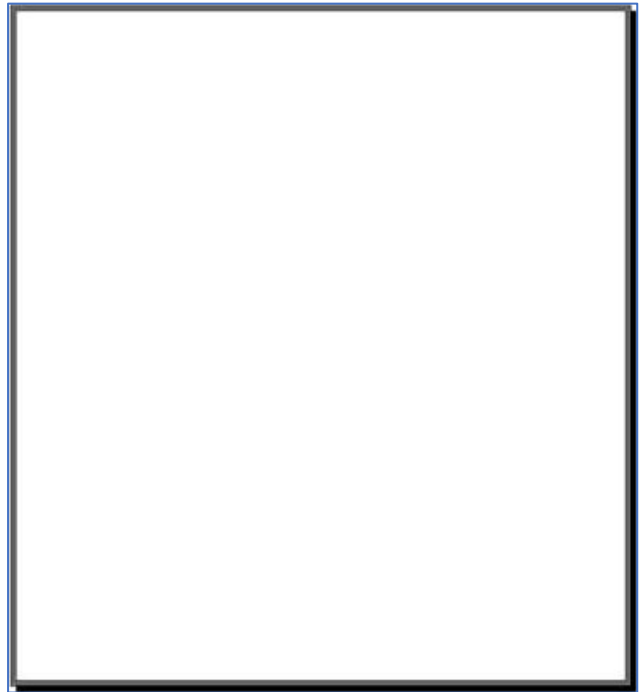
REMEMBER Gently scoop bugs into the jar. Don't use your bare hands. Put some fresh grass or leaves inside, too. Never leave your bugs in direct sun, and always release your bugs safely where you found them when you're done observing them.

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Draw Your Bug

Look very closely...

- How many legs does it have?
- Does it have wings?
- What color is your bug?
- Does it have spots or stripes?
- Does it have antennae?
- Have you ever seen this kind of bug before?
- Can you identify this bug?



My Bug is a _____





Fingerprint Bugs

Materials

- Ink pad
- Markers, pens or pencils

Directions

Fill this mason jar with bugs!
Press your finger or thumb onto an ink pad, then make a fingerprint on the jar illustration. You'll need three fingerprints to make an insect and two fingerprints to make a spider. Use a pencil or pen to add the bug's body parts.

Insects have

- 3 body parts (Head, thorax, abdomen)
- 6 legs
- 2 antennae
- and sometimes, wings

Spiders have

- 2 body parts (Cephalothorax and abdomen)
- 8 legs
- 0 antennae and wings

How many insects in the jar? _____

How many spiders? _____





T is for TECHNOLOGY

Technology allows us to explore nature in exciting new ways. There are lots of environmental apps and websites to choose from, but here are some designed to get families into the great outdoors together. Go on an outdoor adventure then, write about it or draw a picture on the next page.

Outdoors Technology Family Adventures!

1. Geocaching — Join the global treasure hunt! Download the app and follow GPS to locate hidden containers called "caches" placed by the global community of geocachers. You won't believe how many caches are hiding in your neighborhood!
<https://www.geocaching.com/play>
2. PBS Kids Nature Cat's Great Outdoors App — Access kid-friendly tools for investigating nature, including taking photos, making sound recordings and creating Online nature journals. <https://pbskids.org/naturecat>
3. Wild Time Learning Network (UK) Wild Time Learning — Running out of outdoorsy ideas? This site allows you to choose activities for older/younger children, pick a natural area (grass, trees, water, or beach) and decide how much time you have to spend - from 10 minutes to half a day— then it will provide a list of appropriate activity ideas.
<https://wildtimelearning.com/>

Be a Citizen scientist

Citizen Scientists are ordinary people who help scientists collect important data, such as counting insects, plants and birds. Visit these websites and join a citizen scientist project!

1. Monarch Butterflies – The US Forest Service provides a list of Citizen Science projects to choose from at:
https://www.fs.usda.gov/wildflowers/pollinators/Monarch_Butterfly/citizenscience/index.shtml
2. Lost Ladybug Project — Ladybug species that once were common have become increasingly rare. Help scientists track changing ladybug populations by counting and taking photos of the ladybugs in your back yard or neighborhood. Then, go to their website and share your discoveries. <http://www.lostladybug.org/>
3. eBird – Join a global community of bird watchers! Explore, identify birds and find birding hotspots near you and wherever you go! <https://ebird.org/home>





What Outdoor Technology Adventure did YOU choose?

Draw a picture or write a paragraph about your outdoor adventure:

A large rectangular area with a decorative wavy border, intended for drawing or writing. A small illustration of a ladybug is located in the bottom left corner of this area.

What part did you like best?

A rectangular area with a decorative wavy border, intended for drawing or writing. A small illustration of a thumbs-up hand is located in the bottom right corner of this area.

What adventure will you choose next?

A rectangular area with a decorative wavy border, intended for drawing or writing.



R is for Research

Research is the search for knowledge. Some researchers conduct experiments and others interpret known facts. Surveys and interviews are important research tools that help us understand other people's experiences in, and ideas about, nature.

Be a Roving Reporter— Gardeners, fishermen/women, and beekeepers are examples of people who have specialized knowledge about nature. Do you know a nature expert?

Get Ready— Choose a person you would like to interview. Ask their permission and then schedule a time to meet or call.

Get Set — Prepare 3-5 interview questions. Avoid questions that can be answered by a simple yes/no. Instead, ask leading questions, such as "What made you want to become a beekeeper?" Decide if you'll take notes with paper/pencil or make an audio recording, and have your tools ready.

Go! —Be polite and state your questions clearly. Have the written questions handy to help you stay on track. Be a good listener! Ask for additional details if needed. When you're finished asking your questions, be sure to thank your interview subject.

Who did you choose to interview and why?

What did you learn from your interview?





Favorite Flying Insect Survey

Ask your friends and family, "What's Your Favorite Flying Insect?" Write the person's name in the first column. Then, place a check-mark (or a sticker) in the square above their answer.

Name					
	Dragonfly	Ladybug	Butterfly	Firefly	Honeybee

Survey Results: Which flying insect got the most votes? _____

Which got the fewest votes? _____ What's YOUR Favorite? _____





E is for Engineering

DIY Ant Farm Humans aren't the only engineers on earth. Birds build amazing nests. Earthworms, moles and insects build deep tunnels. Within a week, a large colony of ants can build an underground city big enough to house thousands of insects! Making an ant farm allows you to observe the ants hard at work.

You'll Need:

- One large mason jar with tiny holes poked in the lid
- One small mason jar (small enough to fit inside the large jar)
- A piece of light-weight fabric slightly larger than the mouth of the large mason jar
- About 2 cups of soil and 1 cup of sand
- Garden gloves and live ants



Directions

1. Put the small jar inside the larger jar, keeping the lid on the smaller jar. (The ants will build tunnels between the two jars where you can see them.)
2. Mix the soil and sand. This mixture should be slightly moist so the ants can dig and tunnel.
3. Fill the space between the large and small mason jars with the soil mixture. Leave about 1 inch of empty space at the top of the jar.
4. Look for an anthill. Wearing gloves, gently scoop ants into a cup or container. Be sure NOT to collect fire ants! You'll need about 20-30 ants to get started.
5. Carefully place your ants into your ant farm. Quickly cover the jar with the piece of fabric and screw the lid onto the jar (with air holes).
6. Watch your ants tunnel their way around the jar. Make daily observation notes. If you keep them longer than 3 days, feed them by putting a few drops of sugar water or honey on top of the soil. When you're done observing, open the jar and gently release the ants where you found them.

Important Tips: Cover the jar with a cloth or put it in a darker area when you aren't watching the ants. They will be more active in the dark. Don't shake the jar because it may harm the ants. Don't store the jar in direct sunlight or heat.

Days	Observations
1	
2	
3	





Another Awesome Ant Activity!

Ants have a highly developed sense of smell. When ants search for food, they go "scouting." As each ant travels, it leaves a scent trail, called *pheromones*, behind. When an ant finds food, it follows its own scent trail back to the nest.

1. Lay a piece of cardstock on a flat outdoor surface.
2. Dip a spoon into some honey and carefully draw the letter A or the word Ant on the cardstock.
3. Place the honey/cardstock where you think some ants will find it.
4. Make a prediction: How long do you think it will take for ants to find the honey?
5. Make a prediction: What do you think the ants will do when they find the honey?
6. Watch and wait. Check your cardstock several times over the next few days.

A large, empty rectangular box with a thin black border, intended for a student to write a paragraph or draw a picture explaining the ant activity results.

Write a paragraph or draw a picture explaining what the ants did.
Were your predictions correct?





A is for Art

Art allows us to explore and share the wonders of nature. In this art project, we use the power of the sun to capture the beauty of plants. Every living thing on earth depends on the sun. Plants gather energy directly from the sun and animals get their energy from plants and plant-eating animals.

DYI Sun Prints

Materials

- White 100% cotton fabric
- Acrylic craft paints (darker colors work best)
- Paint brushes
- Water
- A protective tarp or plastic sheet
- Flowers, leaves, etc.



Directions

1. Take a nature walk and collect leaves and flowers. Gather your supplies on a flat surface outside, like a sidewalk or driveway. Spread out a tarp or plastic sheet to work on.
2. Wet the fabric with water and squeeze it until it no longer drips, then lay it flat on the tarp.
3. Thin the acrylic paints about 1:1 with water. Paint the fabric.
4. Lay the leaves and flowers on top of the wet paint (vein side down) in an interesting pattern. For best results, use objects that lie flat. Lightly press the objects into the paint, pressing the edges as flat as possible to make good contact with the fabric.
5. Let the fabric dry completely in the sun (this will take a few hours).
6. Carefully peel off the leaves and flowers off the fabric to reveal the patterns underneath.
7. To heat-set the paint, tumble your sun prints in a clothes dryer at high temperature for about 45 minutes.

Tips:

- Sun printing works best on a hot sunny day with little wind.
- Keep a spray bottle of water handy to lightly mist the fabric if it starts drying out before you've arranged the leaves and flowers.





Nature-Walk Leaf Rubbings

There are many different shapes of leaves: compound, lobed, and heart-shaped to name a few. Leaves can have smooth or toothed edges. Learning the shapes of leaves will help you identify the trees in your yard, park, or favorite natural area. Document the leaves you collect by creating beautiful leaf rubbings. Then, see if you can identify the trees they came from by using a tree field guide.

Materials

- Clipboard or sturdy piece of cardboard
- Several sheets of thin white paper
- Broken crayons with the paper wrapping removed • Paper towels
- Field Guide to trees in your area (print or online)

Directions

1. Take the materials listed above with you on a nature walk in your neighborhood and collect leaves from a variety of trees.
2. When you find an interesting leaf, lay it flat on the clipboard or cardboard with the "veins" side-up. pat the leaf dry if wet.
3. Lay a sheet of white paper over your leaf. If you are planning to put more than one leaf rubbing on each piece of paper, consider how you want to place the leaf to create a nice design.
4. Lay your crayon on its side and gently rub on the paper over the leaf. Watch the rubbing start to appear. Press harder on different areas as needed. Try overlapping the leaf designs and using more than one color.



What kind of leaf is this?

Now that you've collected some leaves, can you identify them?
Here are some great resources to get you started.

iNaturalist is a free app that allows you to take a photo of your discovery and compare it to a huge database of similar photos in your area. iNaturalist is a joint initiative by the California Academy of Sciences and the National Geographic Society created to help people identify local plants and animals.
<https://www.inaturalist.org/>

What is that Tree? The Arbor Day Foundation offers an online field guide for tree enthusiasts, from young children to field professionals. Also check out SEEK, and kid-friendly identification app.
<https://www.arborday.org/trees/whattree/>





M is for

Mathematics

Mathematics is everywhere in nature. Environmental scientists use their math skills everyday to collect data and conduct research. Civil engineers apply math concepts when they create parks and green spaces for us to enjoy. Map makers and surveyors use math to create new roads and preserve natural areas. Get a pencil, ruler, yard stick, and tape measure and see how nature measures-up!

This activity uses Standard Measurements like inches and yards, and Nonstandard Measurements taken with things like body parts and found objects. Which measurements do you think are most accurate?

"M is for Measurement" Scavenger Hunt







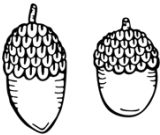


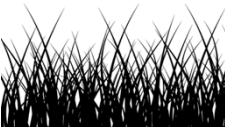
Find an object that is smaller than 1 inch in length	Measure the distance around a tree trunk (circumference)	Find an object that has about the same mass as you	Using your feet as a measuring tool, measure the width of your outdoor space or yard
Measure an object in centimeters	Measure the width and height of a blade of grass	Measure two sticks of different sizes and compare	Measure a bug
Measure the biggest rock you can find	Measure something in meters	Find an object as long as your arm	Measure something in yards
Find an object that is approximately the same height as you	Join hands with the people you're with and measure the furthest distance you can reach	Measure your foot. Sit foot-to-foot with someone else and compare sizes	Estimate the height of the tallest tree you can see





"You Can Always Count on Nature" Scavenger Hunt

Decide on a yard or green space to explore. Check the Scavenger Hunt to see how many of each item you'll need to find and/or collect, for example, you'll need to find 4 bugs (but don't collect them!) and 2 pinecones. Put an X on each square that you complete. Make it a race! Work in teams and see who can be first to collect all of the items.

1  Clover	2  Pinecone	3  Flowers	4  Bugs	5  Rocks
6  Berries or fruits	7  Acorns or Seeds	8  Sticks	9  Leaves	10  Blades of Grass

Extra Points! Find these, but don't collect them -

- A bird nest
- An earthworm
- A snail
- A rabbit or squirrel

