



Daisy Design with Nature

Have you ever gone on a hike and wondered where the animals were? Have you ever wanted to go bird-watching? You can listen to nature. You can look at nature.

In this badge, you'll explore nature. You'll think about what you see. You'll make and do things in nature.

Steps

1. Count with birds
2. Identify parts of nature
3. Make a map

Purpose

When I've earned this badge, I'll know how to use math to identify and sort things in nature. I'll also know how to create a map.



Words To Know

Animal track: A footprint made by an animal in soft ground, sand, or snow.

Category: A group of things that are alike in some way.

Cloud: A collection of very tiny water droplets or ice crystals that float in the air.

Field guide: A book to identify natural objects.

Landmark: A feature that is important or makes a place easy to recognize.

Map: A drawing of a place with information about it.

Map legend or key: Information about symbols on a map.

Natural objects: Things found in nature, like plants, animals, and rocks.

Sort: To put items in order, such as by color, shape, or size.

Sequence: A group or list of things in a certain order.

Symbol: A picture that represents something else.

Tally mark: A line that means 1, to count things.

Unit of measure: The words we use to describe how much of something there is.

Webbed feet: Feet with a piece of skin between the toes, usually found on animals who swim in water, like ducks.

Step 1: Count with birds

Have you ever looked at birds or listened to them? There are 10,000 different kinds of birds. Each has a different call. Depending on the kind of bird, it might eat insects, fruit, seeds, or other animals!

You can learn a lot about birds by watching and listening to them. You can see what they eat. Sometimes you can see their babies. You can hear them call to each other. You can also feed them. If you have a bird feeder, you can watch birds outside and close to your home.

Choices—do one:

Go bird-watching. Sit quietly. Watch and listen. Draw the birds you see. Add a tally mark for each bird. After, add up your tally marks. How many birds did you see? What kind of bird did you see the most? What kind did you see the least? If you went bird-watching with other people, did you count the same number of birds?

► **For more fun:** Go bird-watching again in the same place at a different time. Or go watching someplace else. Compare your tallies. Which place or time is better for bird-watching?

Mix bird food. Many birds eat seeds. People put seeds in bird feeders. You can also make your own recipe. Draw a picture or write the name of each kind of seed. Decide how many spoonfuls of each seed to use. You'll need a total of 10 spoonfuls. Use tally marks to track your spoonfuls. Then put the seed mix out to feed the birds.

► **For more fun:** Make a bird feeder for your seeds.

Measure birdcalls. If you listen carefully, you can hear birds calling to each other. Use a timer to measure birdcalls, recorded or in the real world. Draw a picture of the bird, if you can see it. Measure how long the songs are. How often do you hear a call? Tally each call and count how many times a sound repeats. Write that down, too. Listen for patterns. Can you repeat any of the patterns you heard?

► **For more fun:** Identify the birds by their calls. Listen to recordings of birdcalls and see if any match what you heard.



My Measurement Chart

Unit of Measure: _____

What are you counting?	Add a tally mark for each.	How many do you have in all?

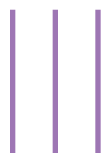
Tally marks look like this:



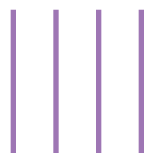
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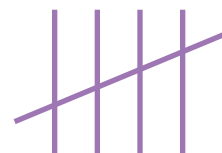
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Step 2: Identify parts of nature

How are clouds, flowers, and animals alike? They're found in nature. They're **natural objects**.



There are also many kinds of clouds. There are many kinds of flowers. There are many kinds of animals, too. Clouds, flowers, and animals are all **categories** or groups of natural objects.



So, how do you tell one flower from another? Is it the color? Is it the shape of the petal or the shape of the leaf? By looking at them carefully, you can identify what category of natural object you're looking at!



Choices—do one:



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Sort and identify natural objects. Go outdoors. Look for natural objects. Draw each on a sheet of paper. Then sort your papers by category. Put the plants together. Put the animals together. Put the rocks together. How many objects did you have of each kind? Tally them to find out. Then make a **field guide** with your pages. A field guide is a book that helps people identify natural objects. Share yours with others.



► **For more fun:** Search for and draw a field guide page for different kinds of the same natural object.

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Explore and identify animal tracks.

We make footprints when we move around. They're clues that a person has been nearby. In nature, you can find clues that animals have been nearby, like fur, feathers, or a nest. You might find animal footprints, called **animal tracks**, in soft ground, sand, or snow. Search for tracks. Tally what you find. How many tracks did you see? What kinds of animals did you find tracks for? Then create your own with modeling clay or dough. Can you make a track with 2 toes? Can you make a track with 4 toes?

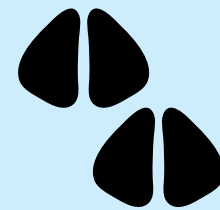
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Watch and identify clouds. Some clouds are white and puffy. Others are long and thin. Storm clouds appear darker because they carry more raindrops, letting less light through. The kind of cloud can tell you about the weather. Learn the names of different clouds and what they look like on page 9. Then look at the sky, outdoors or online. Draw, identify, and tally the clouds you see. How many clouds did you see? How many did you find of each kind? Finally, make a collage of your favorite kind of cloud with paper, paint, and cotton balls.

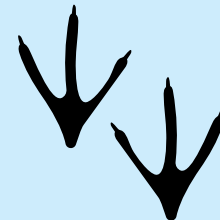
Animal Tracks



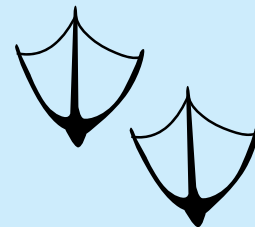
Four toes: usually from the cat or dog family



Two toes: usually from the deer or pig family



Three toes: usually from a bird



Webbed feet: usually from animals who swim in water, like ducks, who have a piece of skin between the toes

Natural Objects



Plants, like flowers and trees, grow everywhere, even in water.



Animals, like birds, fish, snakes, frogs, and mammals, live all over the world.



Rocks make mountains, canyons, and sometimes sand.



Insects, like butterflies and bees, help plants grow and provide food for animals.

Clouds



Cumulus clouds are puffy. They usually mean the weather will be nice.



Cirrus clouds are long and wispy. They usually mean the weather will be nice.



Stratus clouds cover the whole sky. Mist or drizzle falls from these gray clouds.



Nimbus clouds are dark with rain or snow. They're found in thunderstorms or snowstorms.

Step 3: Make a map

A **map** is a drawing of a place, like your town, the world, or a museum. Maps tell you information about the place. A treasure map shows where treasure is buried. A weather map shows where it is hot or cold. A bus map shows how buses move around a city.

When you follow a map and go from place to place, you create a **sequence**. A sequence is when things are put into a certain order.



Choices—do one:

Make an adventure map. Where will you go? Around your home, school, neighborhood, or park? Draw the space. Add landmarks, like your bedroom or the nurse's office. Add symbols and a legend for things like trees or trash cans. Then, choose start and end points. What landmarks will you visit? Draw a line from the start to your first stop. Then draw another line to the next stop. Keep going until you reach the end point.

Make a neighborhood map. Draw your neighborhood. Show streets, buildings, parks, and any other landmarks. Add a legend and symbols for objects you see more than once, like trees or benches. Then plan a neighborhood tour for someone else. Choose start and end points. What do you want them to see? Draw a line from the start to the first stop. Then draw another line to the next stop. Keep going until you reach the end point.

Make a sound map. Find a place with lots of sounds, like animals, people, wind, and water. Draw the place with landmarks, like buildings or lakes. Add a legend and symbols for the things you hear. Then choose start and end points. What sounds do you want to investigate? Draw a line from the start to the first stop on your trip. Then draw another line to the next stop. Keep going until you reach the end point.

► **For more fun:** Follow your map sequence. Use any method, except for a car (you want to be in nature, not just look at it!). Count the number of steps or time how long it takes to move between stops. Write what you find on your map. After, add the sections together to find the total length of your trip, in footsteps or in time.



Made possible by a generous grant from Johnson & Johnson.

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First published in 2021 by GSUSA | 420 Fifth Avenue, New York, NY 10018-2798 | www.girlscouts.org

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Printed in the United States





Volunteer's Guide to Daisy Design with Nature*

Tips and ideas to help guide your troop through this badge. *This is the third badge in the Math in Nature badge series. The order of the Math in Nature badges is: 1) Shapes in Nature, 2) Numbers in Nature, and 3) Design with Nature.*

STEP 1: Count with birds • 20–30 minutes

Ask: Have you ever looked carefully at birds? Have you noticed how many different kinds there are or what they eat? Have you listened to their songs?

Share: There are lots of different kinds of birds. They have different songs and eat different things. You can learn a lot about birds by watching and listening to them. Sometimes you can see their nests or babies. Sometimes you can see what they eat or hear their songs.

Do: Go over the “My Measurement Chart” in the Daisy Booklet and review how to make tally marks. Make a sample chart on chart paper or the whiteboard. Ask Daisies, “What’s your favorite Girl Scout cookie?” Have Daisies vote as you add cookies and tally marks to your chart. Ask, “How many people voted for each cookie? How many people voted in all?” Explain, “You can count the tally marks and find the total by writing an equation. An **equation** is like a sentence with numbers. It has two equal sides separated by an equals (=) sign.” Show them how to take the sums of the tallies and write them in an equation. For example: $3+2+4+1=10$.

Materials: *Chart paper or whiteboard and marker*

Choices—do one:

● **Go bird-watching.** Ask, “Have you noticed any birds around home or school? What were they doing? What did they look like?” Use a field guide or online resource to show Daisies different kinds of local birds. Then take them outside to look for birds. Help Daisies to identify, draw, and tally the birds they see on the “My Measurement Chart” in the Daisy Booklet. After, help them to count their tally marks for each kind of bird and write an equation to find the total number of birds. It may help for Daisies to count on their fingers. Ask, “How many birds did you see in all? What kind of bird did you see the most? What kind did you see the least?” Have Daisies compare their drawings and charts and discuss. Ask, “Did you see the same kinds of birds? Did you count

the same number of birds? Why might your numbers be different?” **For more fun:** Go bird-watching again at a different time or location. Have Daisies compare their tallies. Ask, “Which place or time is the best for bird-watching?”

Materials: *Outdoor space to go bird-watching, bird video, OR bird livestream; field guides or bird identification app for local birds; pencils; colored pencils, crayons, or markers; clipboards (optional)*

● **Mix bird food.** Ask, “What do birds eat?” Explain that depending on the bird, it may eat fruit, seeds, bugs, and even other animals. Show Daisies the seeds and ask them to compare their seeds by their size, colors, and shapes. Have them draw and label each kind of seed on the “My Measurement Chart” in the Daisy Booklet. Then explain, “Use only ten spoonfuls of seeds to make your birdseed mix. You can choose any combination of these seeds you want. Spoonfuls are our unit of measure.” Have Daisies pair up, with one Daisy scooping seeds while the other tallies each spoonful of seed. When they reach ten spoonfuls, have them switch roles and repeat. Help them count the spoonfuls for each kind of seed and write an equation to confirm that the total number of spoonfuls is ten. It may help for Daisies to confirm if their recipe adds up to ten by counting on their fingers. Daisies can take their recipe and seed mixture home to show family and put it out for the birds. **For more fun:** Help Daisies build bird feeders for their seeds.

Materials: *2–4 different types of birdseed (about 2 cups total for each Daisy); bowls with labels for each kind of birdseed; zip top bags; spoons; pencils*

● **Measure birdcalls.** Ask, “Have you ever listened to birds singing? We call their songs birdcalls.” Go outside or play recordings of birdcalls for Daisies. Have them draw the birds they hear singing (if they can see them). Show the timer and how it works before having Daisies take turns to measure the length of each call. Have Daisies write the time next to their drawing. Listen more or repeat the recordings for Daisies to tally if they hear a call more

*Detailed choice activities, meeting tools, and additional resources and materials can be found within the Volunteer Toolkit on my.girlscouts.org.

than once. Listen again for repeating sounds or patterns. Count together how many times a sound repeats and have the Daisies write that down, too. Help Daisies write an equation to add up their birdcall data. It may help for Daisies to count on their fingers. Then ask, “Which bird had the longest call? Which bird had the shortest? Can you repeat any of the patterns you heard?” **For more fun:** Help Daisies to research and identify the birds by their calls.

Materials: Pencils; access to a place with songbirds OR recordings of birdcalls; if using recordings, photos of the birds; timer

STEP 2: Identify parts of nature • 25–35 minutes

Ask: What are some things you can see in nature?

Share: There are many things to see in nature like clouds, plants, rocks, insects, and animals. They’re all **natural objects**. You can tell them apart by looking at them carefully.

Do: Review “Animal Tracks,” “Natural Objects,” and “Clouds” in the Daisy Booklet. Point out the categories and explain, “A **category** is a group of things based on something they have in common. You can **sort** things by category. By sorting natural objects, you make smaller groups and make it easier to compare them.”

Choices—do one:

● **Sort and identify natural objects.** Go outside for Daisies to draw 5–10 natural objects they see on separate sheets of paper, like plants, animals, insects, and rocks. After, have them sort their papers into categories, such as plants, animals, rocks, and so on, and tally them. Have Daisies number their pages and create a cover and table of contents. On the table of contents, have Daisies include how many of each kind of natural object they found. Ask, “How many objects did you find? Which kind of natural object did you find the most and the least of?” It may help for Daisies to count on their fingers or write an equation. Help Daisies staple their pages together. Encourage Daisies to show their guides to others and tell them about what they saw in nature. **For more fun:** Help Daisies to find different kinds of the same thing, like rocks or trees. Invite them to draw a field guide page for each. They can then add them to their existing guide or make an entirely new guide.

Materials: Access to outdoors; 12 sheets of paper for each Daisy; pencils; colored pencils or markers; stapler

● **Explore and identify animal tracks.** Ask, “Do you know what a footprint is?” Explain, “When we walk, run, jump, and move around, we make all different prints on the ground with our feet and shoes. Footprints or tracks are clues that someone has been nearby.” Show Daisies the shoes and have them brainstorm what shape footprint they would make. For example, flip-flops make a bean-shaped print while flippers make big prints that look like duck feet. Go outside for Daisies to look for tracks or show

them animal tracks online. Have them draw the tracks they see, tally them, and guess what kind of animal made each. Help them narrow down the animal category for each animal track. Then have them tally the number of 2-toed, 3-toed, 4-toed, or webbed-foot tracks they found. Ask, “How many animal tracks did you see? Which category did you see the most? The least? What animals may have been nearby?” It may help for Daisies to count on their fingers or write an equation. Then have Daisies create their own clay animal tracks with 2 toes, 3 toes, 4 toes, or webbed feet and share them with the troop.

Materials: 2–3 different kinds of shoes or boots; access to outdoors with animal tracks, photos of animal tracks OR internet access and a laptop or tablet to show animal tracks; paper; pencils; modeling clay; clipboards (optional)

● **Watch and identify clouds.** Ask, “Have you ever looked at clouds? What did they look like?” Explain that there are different kinds of clouds, with different shapes and colors, that can tell you about the weather. Review “Clouds” on page 9 of the Daisy Booklet and help Daisies learn the names and characteristics of the different types of clouds. Go outside or show Daisies some clouds online. Have them draw what they see and try to identify what kind of cloud each is. After, help Daisies tally each category of cloud. Ask Daisies, “How many clouds did you see? Which cloud did you see the most of? Which did you see the least of? How many did you see in all?” It may help for Daisies to count on their fingers or write an equation. Finally, have Daisies make and label a collage of different cloud types with paper and cotton balls.

Materials: Access to outdoors, cloud photos, OR internet access and a laptop or tablet to show clouds; paper; pencils; blue construction paper; glue sticks; cotton balls

STEP 3: Make a map • 30–40 minutes

Ask: Have you ever looked at or used a map? What kind of information did it show you?

Share: A **map** is a drawing of a place. It uses **symbols** to show where special things are (like roads, mountains, forests). When you follow a map and go from place to place, you create a sequence. A **sequence** is when things are put into a certain order.

Do: Look at the map in Step 3 of the Daisy Booklet and introduce Daisies to the different parts of a map, including landmarks, symbols, the legend, and distances. Let Daisies practice in pairs or small groups using the legend to learn what the symbols mean, finding landmarks, and navigating their way from one place to another on the map.

Materials: 3–4 different kinds of maps (street map, world map or globe, subway map, map of museum or zoo, pirate map, topographical map, hiking map, weather map, etc.); paper; crayons, markers, or colored pencils

Choices—do one:

● **Make an adventure map.** Ask, “Where do you like to

go? Is it around your home, school, or neighborhood? Is it in the woods nearby?" Have Daisies draw that space. Remind them to add important landmarks and a legend to show any symbols. Then, have Daisies choose a beginning and an end for their route, noting landmarks in between. Have them draw a line from the start to the first landmark on their walk, then draw another line to the next stop. Repeat this process until they get to their end point. Explain that the route they drew with landmarks is the sequence. Invite Daisies to share their maps with the troop.

- **Make a neighborhood map.** Ask, "Have you ever seen a map of your neighborhood? What do you see in your neighborhood? What kinds of landmarks are there?" Have Daisies draw their neighborhood with streets, buildings, parks, and any other landmarks. Have them add anything else, like plants, cars, or animals, using a symbol for objects they see more than once and a legend. Then have Daisies plan a neighborhood tour for someone else. They should choose a starting and end point and think about what they want others to see. Have Daisies draw a line from the start to the first stop, or landmark. Then draw another line to the next stop until they reach the end. Explain that the route they drew with landmarks is the sequence. Invite Daisies to share their maps with the troop.

- **Make a sound map.** Ask, "What sounds do you hear when at home or school? What about in the woods or at the beach?" Take Daisies somewhere with lots of sounds. Ask, "What do you hear? Animals or people? Wind or water? What about other sounds?" Have Daisies draw the place with important landmarks, like buildings or lakes, adding symbols and a legend for anything they hear more than once. Next, have Daisies plan a sound adventure and choose where on the map it will begin and end, keeping in mind what sounds they want to investigate. Have Daisies draw a line from the start to the first stop, or landmark. Then draw another line to the next stop until they reach the end. Explain that the route they drew with landmarks is the sequence. Invite Daisies to share their maps with the troop.

For more fun: Help Daisies to follow their sequence from place to place, counting the number of steps or tracking the amount of time between stops and writing them on the map. After, help them add the steps or time for the sections to find the total length or duration of the route, in footsteps or time.

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