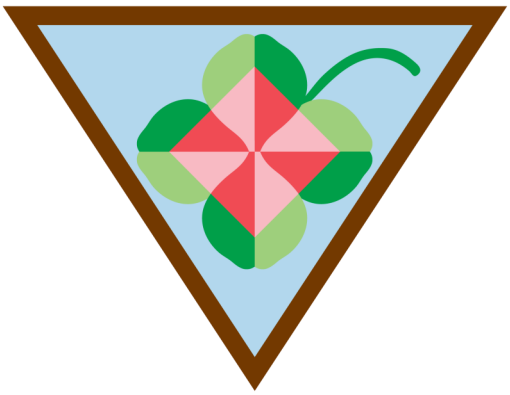
Girl Scout Brownie

Shapes In Nature



Marjorie Merriweather Post, who once lived at Hillwood, surrounded herself with art, even outdoors in her gardens. Nature is full of shapes and patterns, and is often reflected in the art here at Hillwood. Explore the gardens and look carefully at nature to discover the shapes and patterns around you.

How to Earn Your *Shapes in Nature* Badge:

- Complete all five "Try This!" activities in this booklet.
- Use a Hillwood map to find the locations mentioned.
- Mark the checkbox next to activities you've completed.
- Show your troop leader your completed packet. Your troop leader can purchase Shapes in Nature badges from the Girl Scout Council of the Nation's Capital.

HILLWOOD
ESTATE, MUSEUM & GARDENS

Step 1 — Track natural objects: Search for many kinds of trees, then make a wire tree sculpture

Try This!

Check here when you complete this step. ☐

There are many different types of trees in nature. Trees can be grouped into categories based on different characteristics such as whether they lose their leaves in fall, if they have flowers or pinecones, or what shape they are.

Visit the **JAPANESE-STYLE GARDEN** to find trees of different shapes. Make tally marks to keep track of how many trees of each shape you find. An example tree is pictured in each category.

ROUND	PYRAMID	ASYMETRICAL
 Dwarf Japanese Cedar	 Japanese Cedar	 Cherry Blossom

Visit the **ART PROJECT** to make a wire tree sculpture inspired by the trees you've seen in Hillwood's gardens. What shape will your tree be?

Step 2 — Make a spiderweb with symmetry

Try This!

Check here when you complete this step. ☐

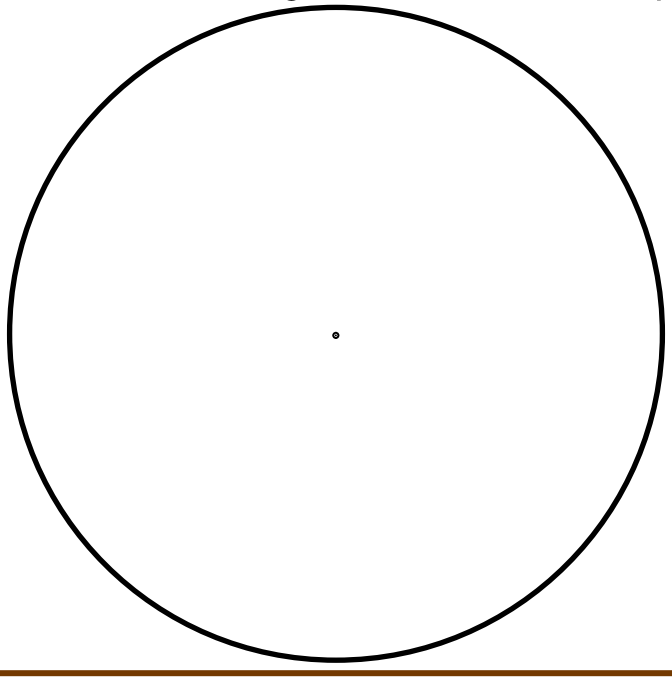
Hillwood's gardens are home to wildlife of many kinds, including spiders. Photographer Erik Kvalsvik captured this picture of a spiderweb in Hillwood's gardens.

Orb-weaver spiders make circular webs like this one. **Orb** means something that is round or ball-shaped. Circular webs have radials. **Radials** are lines that extend from a center point. The web's radials are connected by a spiral that circles from the center of the web. A **spiral** is a shape that curls around a center point.

The web's radials are arranged in a symmetrical pattern. A **pattern** is something that repeats in a regular or consistent way. **Symmetry** is when an object is the same on both sides.

The symmetrical spacing of the radials may help make the web stronger by distributing force evenly through the web when an insect flies into it.

Draw a spiderweb on the circle below. First draw radials that go out from the center point of the circle. Then, starting at the center, draw a spiral that touches each radial.



Step 3 — Explore tessellations: Make a ginkgo leaf – shape tessellation patterned placemat

Try This!

Check here when you complete this step. ☐

Visit Hillwood's **CUTTING GARDEN** to see the leaves on the ginkgo tree starting to bud in early spring.

Ginkgo leaves have a distinct fan-like shape. They are bright green in summer and turn golden yellow in fall.

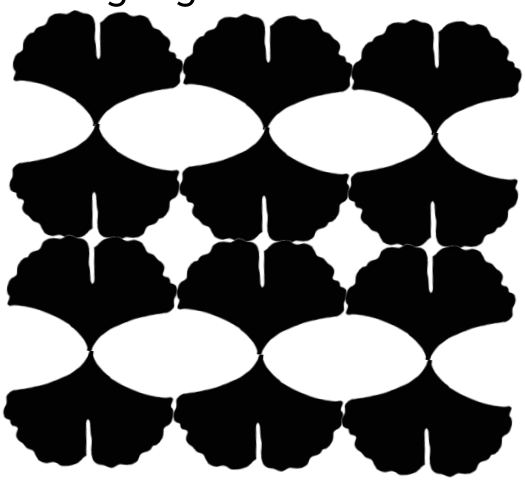
You can use the fan-shaped ginkgo leaf to make a special type of pattern called a tessellation. A **tessellation** is a repeating pattern of interlocking shapes that fit together without any gaps.

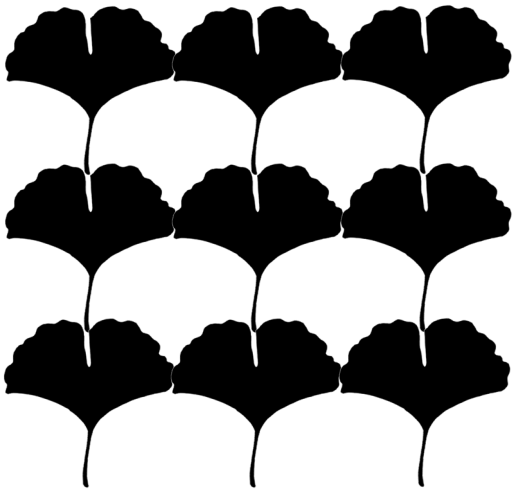
Some shapes tessellate perfectly, like a triangle or a square. You can line these shapes up side by side perfectly without any gaps. Think of a tile floor, for example.

For other shapes, like a circle, you need to combine shapes to create a tessellation. A circle does not tessellate on its own, but if you line up circles side by side with curved diamond shapes in between them, that forms a tessellation.

Visit the **ART PROJECT** to make a placemat decorated with paper cutouts of fan-shaped ginkgo leaves arranged in a tessellating pattern.

Here are two examples of ways the fan-shaped leaves can tessellate when combined with other shapes in between. What other tessellation patterns can you create with ginkgo leaves?





Ginkgo leaf drawing by Emma Grospierre

Step 4 — Collect data about birds: Meet a birding expert and create a data table to tally birds

Try This!

Check here when you complete this step. ☐

Visit the **C.W. POST TENT** to meet Sam Krause—a birding guide, photographer, and conservationist—to learn about birds and how to keep a scientific log.

Try these activities with her:

- ❑ Identify and name local birds
- ❑ Collect and record data on birds that live at Hillwood
- ❑ Create a bar graph to compare and contrast different bird species

Meet Sam Krause, a birding guide, photographer, and activist.

Sam was first introduced to birding when she was nine years old. As a young girl, she wanted to work as a veterinarian to help injured animals and to photograph animals from around the world.

She now leads birding walks in parks across the DC area, where she educates people about birds and their ecosystems. She has traveled the world to study birds and to teach people about their importance and beauty.

Her mission in life is to advocate for the protection of birds and their many habitats.

Step 4 (continued) — Collect data about birds: Create a Bird Data Chart

Hillwood's gardens provide an important habitat for birds in the city. Here are some of the birds you are most likely to see at Hillwood in early spring.

Photographs by Sam Krause

Eastern Towhee

Northern Cardinal

Pileated Woodpecker

American Robin

With the help of birding guide Sam Krause, look for birds near Hillwood's Cutting Garden and identify the birds you see. Tally the birds you find on the chart below.

Date: _____ Time: _____ Location: Hillwood

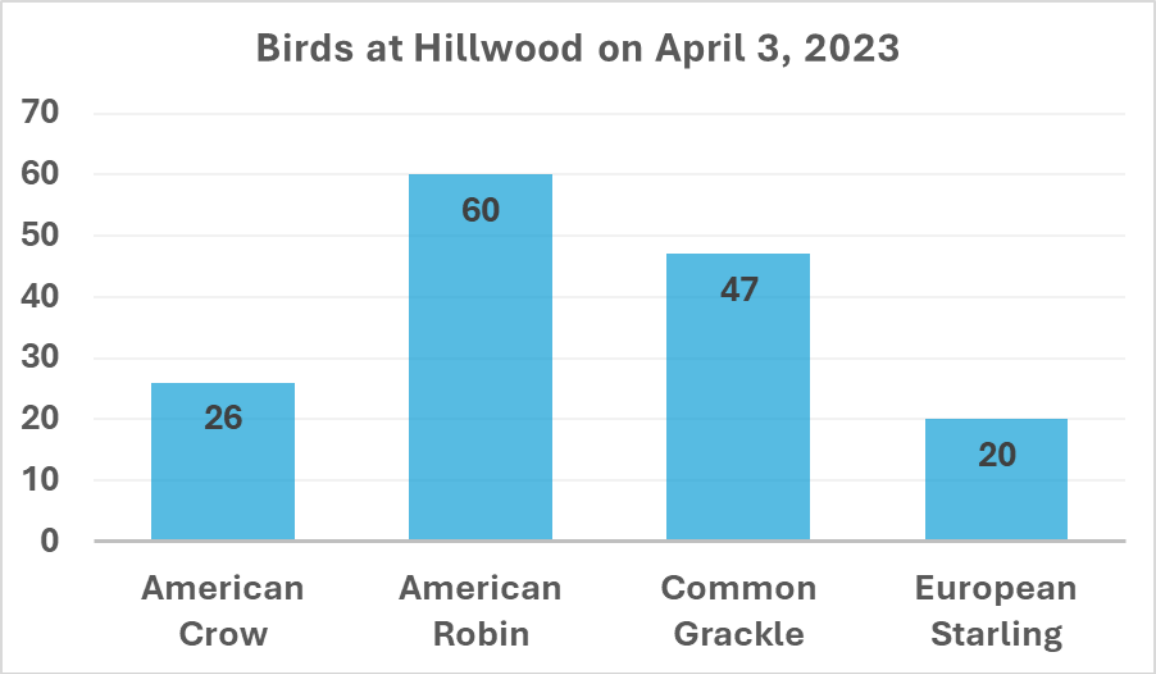
Bird Type	Tally

Step 5 — Graph natural objects: Make a bar graph with bird data

Try This!

Check here when you complete this step. ☐

Volunteer birders spent a whole year tracking how many birds they found at Hillwood. This bar graph shares information about some of the birds they found.



A bar graph is a tool that uses bars (rectangles) to share data (a collection information).

The bar graph above shares some of the data birders at Hillwood collected during two hours of birding on a day in early April. The graph shows the four kinds of birds they saw the most that day.

Now it's your turn!

Visit the **C.W. POST TENT** to meet birding guide Sam Krause, who will help you find and identify birds in Hillwood's gardens.

Use the chart on the previous page to collect your data. After you've collected your data, draw a bar graph on the next page to show how many of each type of bird you found.

Step 5 (continued) — Make a bar graph with bird data

Try This!

Check here when you complete this step. ☐

Use the data you collected while observing birds at Hillwood to fill in the bar graph below showing how many of each type of bird you found.

Give your bar graph a title and write the names of the birds you saw on the lines below the graph. Color in squares to represent how many of each kind of bird you saw.

Title: _____