

Grades
1-6

**Fall-Inspired
Math STEAM
Lesson**

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OVERVIEW

With this STEAM lesson, students will engage in topics related to life science, measurement and data skills, and artistic representations to examine and analyze data.

Students will pair up to collect data. If you are lucky enough to live in an area with a variety of trees that change color in the fall, students can go outdoors to collect leaf samples. If not, students can use the leaf templates below to organize and prepare graphs for this activity.

For this math-focused STEAM lesson, you should plan to spend between three and four class periods. Making connections to science or spending time on artistic choices (such as color choices, size of labels, layout of the page) would require extra periods.

This STEAM lesson for elementary students can be used in the early elementary or upper elementary grades. You want to take your students as far as they can go along this trajectory of data topics from sorting objects in Kindergarten to making comparisons using graphs and number sentences in the higher grades.

Recommended activities, depending on the grade level, include:

- Sorting
- Counting Sorted Groups
- Pictographs and Bar Graphs
- Using Graphs to Compare Categories and Comparing Graphs to Each Other with Addition and Subtraction
- Creating Scaled Pictographs and Bar Graphs
- Making Comparisons Using Multiplication



CONNECTIONS

STEAM activities for elementary students connect with many areas of the curriculum. Here are some of the connections you can use for this lesson.

- Within the life sciences, students are learning about the different parts of plants: roots, stems, leaves, flowers, and fruit. They are learning about the functions of these structures.
- Within mathematics, students are learning to analyze and represent categorical data.
- Within the realm of art, students are discussing color, and their choices about how they set up their bar graphs include choices about the visual organization of the page. Using artistic creations to communicate a concept or idea is an important part of the art curriculum.
- Within literature, there are many fall-themed books that would pair well with this STEAM lesson. On the instruction sheet below, you'll find a list of books appropriate for the different grade levels about leaves and fall.
- For creative writing, [this post from Vocab Gal](#) uses Haiku to discuss fall themes. Or you can complete the poem-writing activity provided below.



MATERIALS

This project is not resource intensive. Most of what you need is provided with the downloads that accompany this lesson. These include:

Leaf Samples

There are four different pages that provide different samples of leaves and colors so that not every student's graph comes out the same. Some of the leaf samples have special purposes that allow you to differentiate or extend the lesson for different students. Of course if you live in an area that has fall foliage, you could collect your own leaf samples instead!

Color Printer

You will need a color printer for the downloads provided below. After all, this is about leaves having different colors!

Colored Pencils or Crayons



Students will want to use colored pencils or crayons when creating their graphs.

Pictograph and Bar Graph Templates

Students can use the templates provided below to create their bar graphs. Depending on the previous experience of your students with graphs, they might not need the templates. In that case, they can be used for differentiation opportunities for students with special needs.

Other Materials

For students who are still in a concrete stage, you might want to provide scissors and glue so that they can cut out and physically manipulate the leaves to make their pictographs.





INSTRUCTIONS

Introduce the unit by showing photos of color changes in foliage. The beauty of the pictures will help students get excited about participating in the STEAM lesson. If time permits, discuss the process of leaves changing color. Then read aloud a fall-themed book to make a reading connection to this project.

Prior to class, review and select the leaf templates, sorting charts, and graphs your students will use for this lesson. A variety of options have been provided in this download.

Select which of the templates below are most useful for your students. Are you interested in having them simply sort and count the leaves, create pictographs and bar graphs, or make comparisons between graphs? Do you want students to make a graph sorted by color or by leaf type. Alternatively, if your students have some experience with graphs, let them to decide how to sort the leaves and give them a generic, unlabeled template. Finally, do you want to give students a graph template or have them create their graph on their own. This will depend on your students' level of experience with creating graphs and their skill at setting them up.



Once you complete reading aloud a fall-themed book, pass out the leaf samples, sorting charts, and graph templates you selected. Instruct students on how they will analyze sort, and graph their data.

Give students a full class period to complete their graphs and use the questions below to prompt student thinking about their graphs. During the next class period, students should reply to the questions by writing complete sentences. Students should present their graphs and take questions from their classmates, using their artistic creation (their graph) to explain their answers connects to the art curriculum.

You can use the following sample questions with students. They are in the order of Bloom's Taxonomy from lower-level questions to questions that require higher-order thinking.

- How many leaves are in each category?
- Which category has the most leaves? The fewest leaves?
- How many brown and yellow leaves are there together? (combining categories)
- How many more maple leaves are there than birch leaves? (comparing categories)
- Can you write a number sentence that shows how many leaves there are all together?
- Can you write an inequality that compares two categories?
- Can you write a subtraction sentence that shows the difference between two categories?
- How many times more red leaves are there than yellow leaves?
- What are some similarities and differences between Level 3 Leaf Template and Level 4 Leaf Template graphs?

If you would like to include creative writing in this STEAM lesson, have students complete the poem writing activity provided below. Older elementary students can also use [Vocab Gal's fall inspired poetry worksheet](#) too.



Read one of these books:

The Little Yellow Leaf by Carin Berger

Fall Leaves Fall! by Zoe Hall

Fletcher and the Falling Leaves by Julia Rawlinson

Autumn Leaves by Ken Robbins

Leaf Man by Lois Ehlert

Why Do Leaves Change Color? by Betsy Maestro

There Was An Old Lady Who Swallowed Some Leaves! by Lucille Colandro

Fall Is Not Easy by Marty Kelley

Autumnblings by Douglas Florian

Goodbye Summer, Hello Autumn by Kenard Pak

Yellow Time by Lauren Stringer




LEAF TEMPLATES

Each of the four leaf sets has certain characteristics you can use to differentiate the project by grade level or for students with different needs.

Level 1 Leaf Template

The **Level 1 Leaf Template** has only two kinds of leaves, while the others have three kinds of leaves. At the earliest grade levels, students are sorting based on characteristic; for example, in Kindergarten, students could use this set to split the leaves into birch and oak leaves. This leaf set could also be used in upper grades to make comparisons by multiplication for upper elementary students. There are: one yellow leaf, two brown leaves, four green leaves, and twelve red leaves. These numbers are all factors of twelve and lend themselves to making statements like, “There are twice as many green leaves as brown leaves.” “There are six times as many red leaves as green leaves”, and so on.



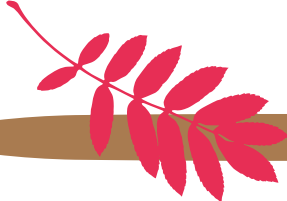



Level 2 Leaf Template

On the **Level 2 Leaf Template** there are three kinds of leaves that are three colors. This leaf set can be used in Grade One and Grade Two to limit the number of categories to sort and count leaves. They can also be used to differentiate the activity in higher grades for students with special needs.

Level 3 and Level 4 Leaf Templates

These leaf sets are intended for the upper range of students' abilities. Each set has four colors and three kinds of leaves. The **Level 3 Leaf Template** has fewer brown leaves (earlier in the fall season) while the **Level 4 Leaf Template** have more brown leaves (later in the fall season). With these two leaf sets, students in the higher grades, or advanced lower grade students, can make comparisons between the two graphs and draw conclusions.



Level 1 Leaf Template

Birch Leaf  Oak Leaf 



Level 2 Leaf Template

Birch Leaf  Oak Leaf  Maple Leaf 



Level 3 Leaf Template

Birch Leaf  Oak Leaf  Maple Leaf 



Level 4 Leaf Template

Birch Leaf  Oak Leaf  Maple Leaf 





GRAPH TEMPLATES

Leaf Sort Chart Templates

Below, you will find three variations of the **Leaf Sort Chart Template**. The sort chart your students complete will depend on the leaf template you use with students.

Leaf Sort Chart, Two Categories = Level 1 Leaf Template

Leaf Sort Chart, Three Categories = Level 2 Leaf Template

Leaf Sort Chart, Four Categories = Level 3 and Level 4 Leaf Templates

Note: Younger students who are more concrete learners, may need an organizer to sort the leaves by type and or by color. An important developmental level for the youngest students is to sort on a particular characteristic (leaf shape) while ignoring the other (color).

Pictograph Templates

Below, you will find three variations of the **Leaf Pictograph Template**. The pictographs students complete will depend on the leaf template you use with students and the particular characteristic you ask them to focus on.

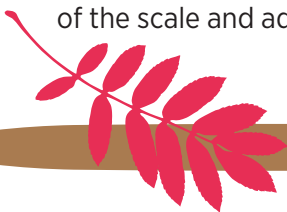
Allow students to draw or cut out the leaves and make a one-to-one correspondence by drawing or placing one leaf in each box. This is the first step for students in creating meaning for graphical representations of data.



Bar Graph Templates

The **Bar Graph Template by Ones** is the next step in developing meaning for representing categorical data. The scale on the chart is constructed by counting by ones. Students no longer draw each leaf, but color in a rectangular box whose height indicates the number of leaves.

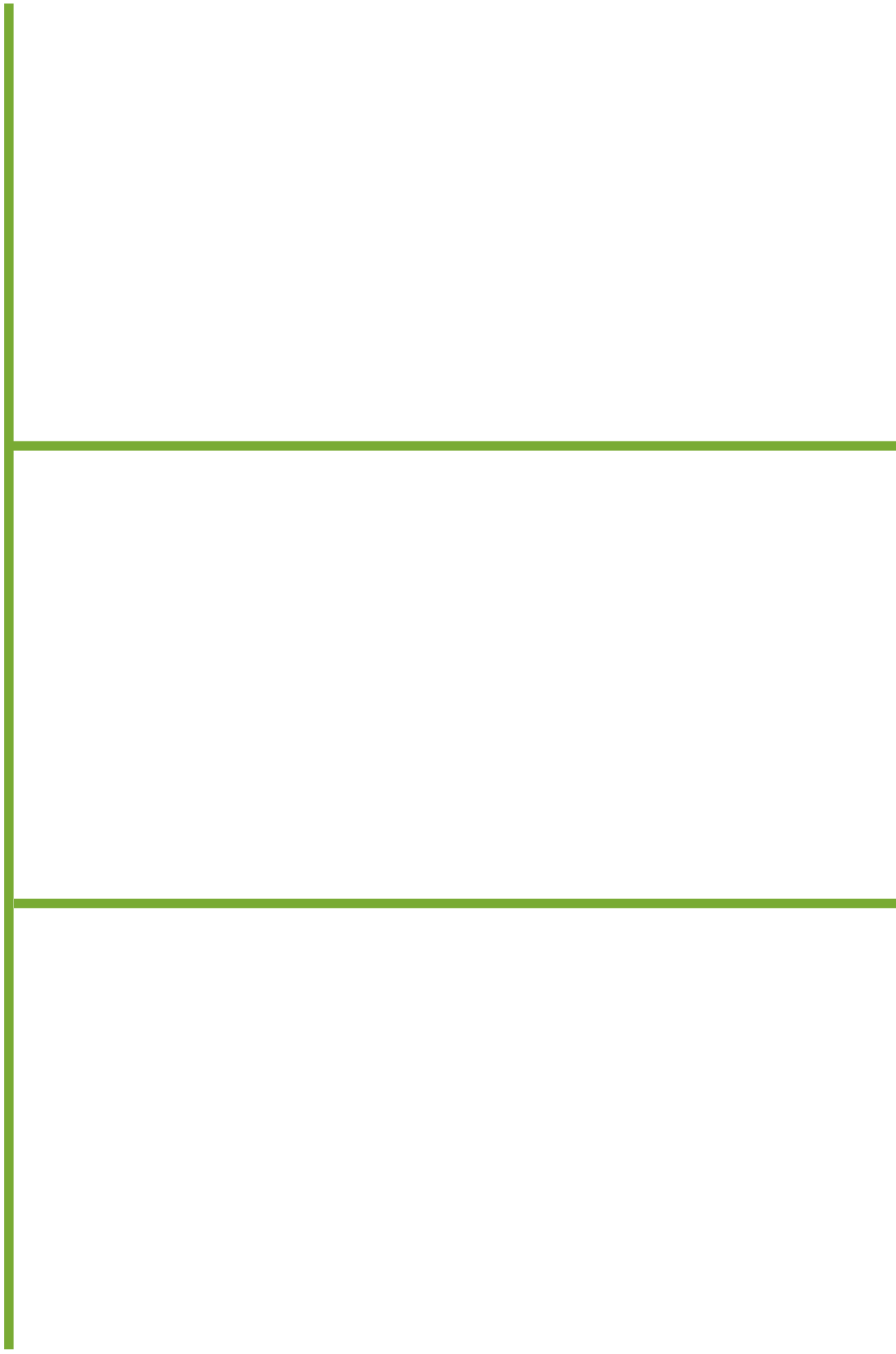
The **Bar Graph Template by Twos** will help students go to the next level of understanding as the y-axis counts by twos. Students must be aware of the scale and adjust their graphs accordingly.



Two Categories



Three Categories

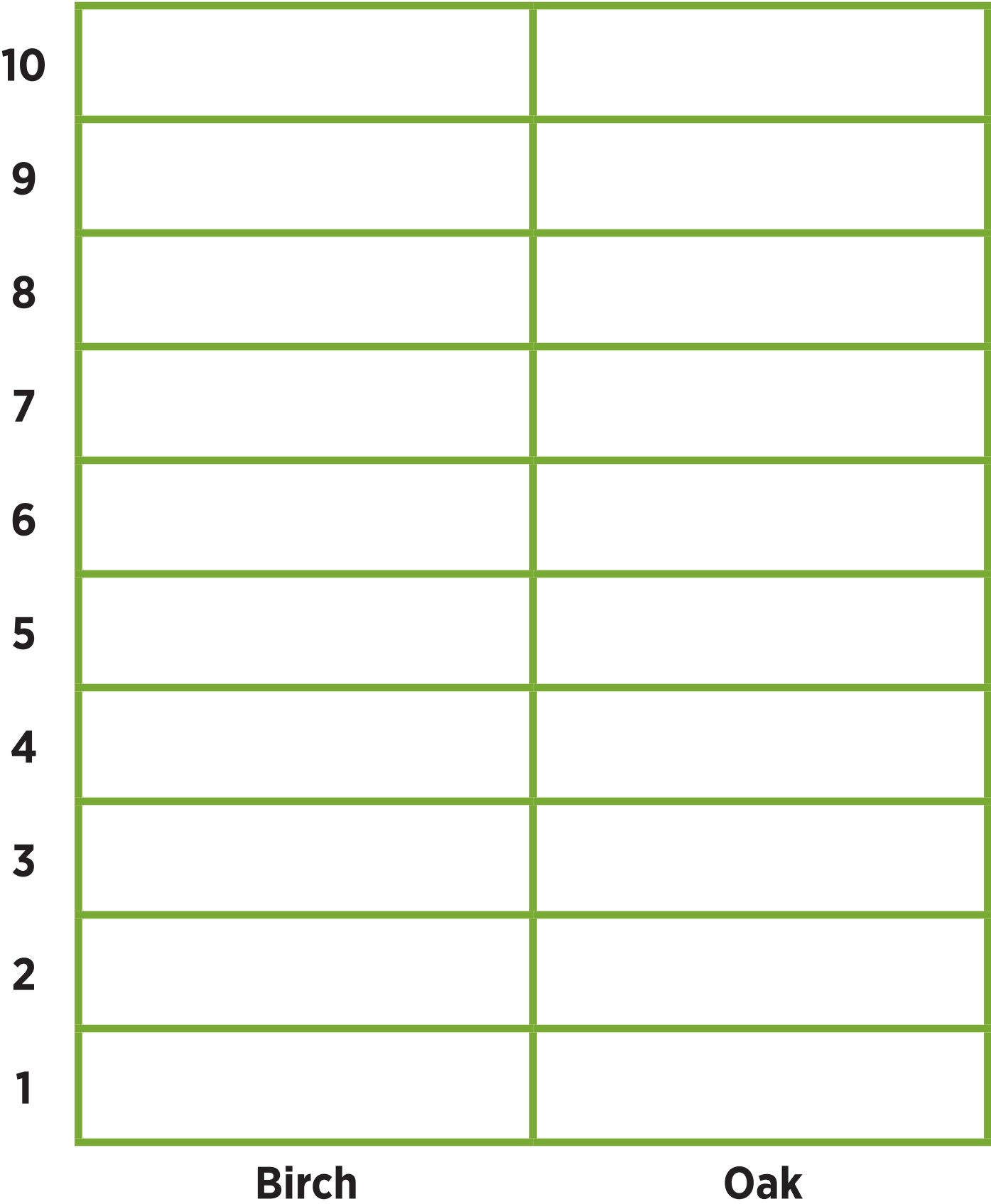


Leaf Sort Chart

Four Categories



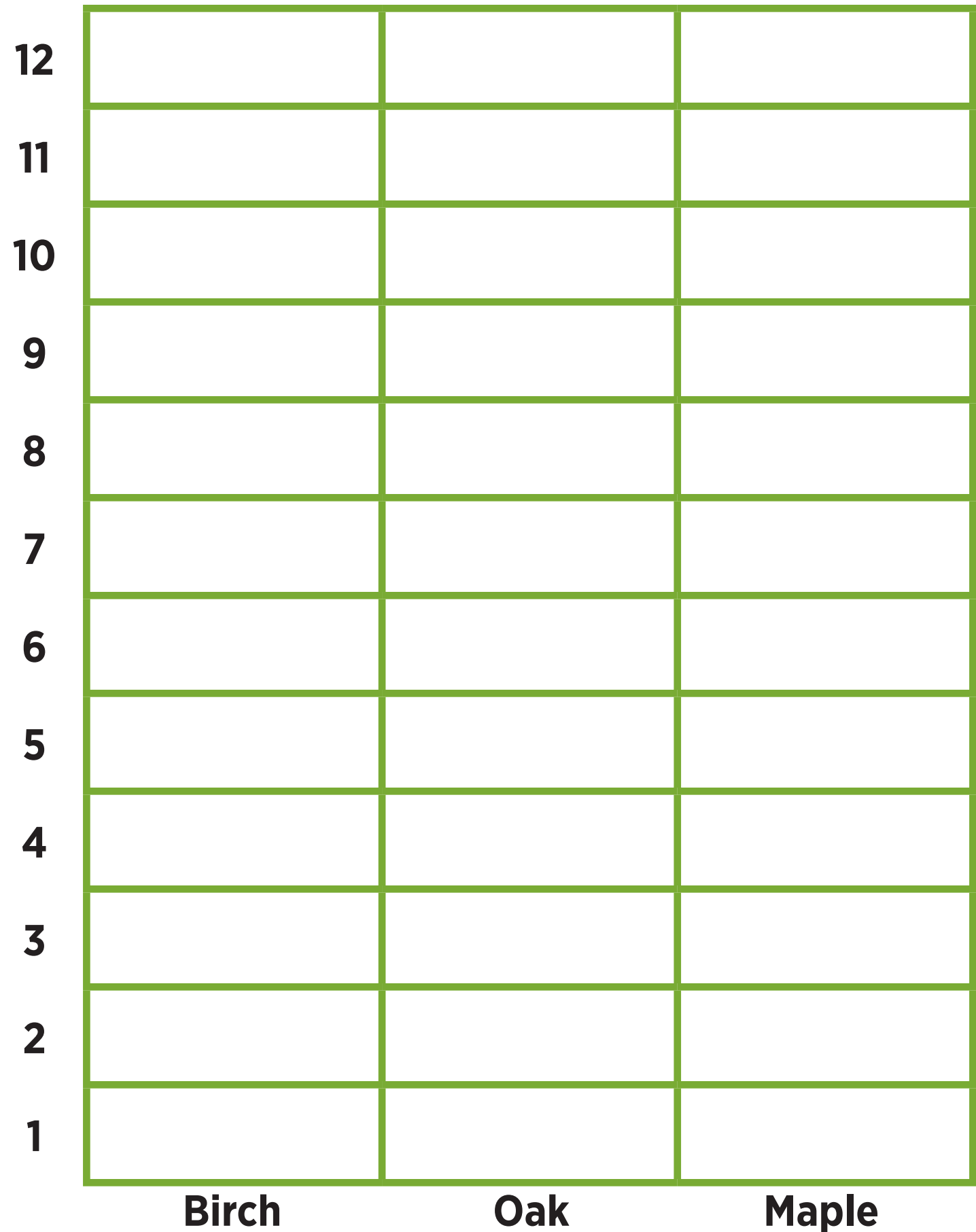
Leaf Pictograph
Birch and Oak



Leaf Pictograph by Leaf Type



Birch, Oak and Maple



Leaf Pictograph by Color

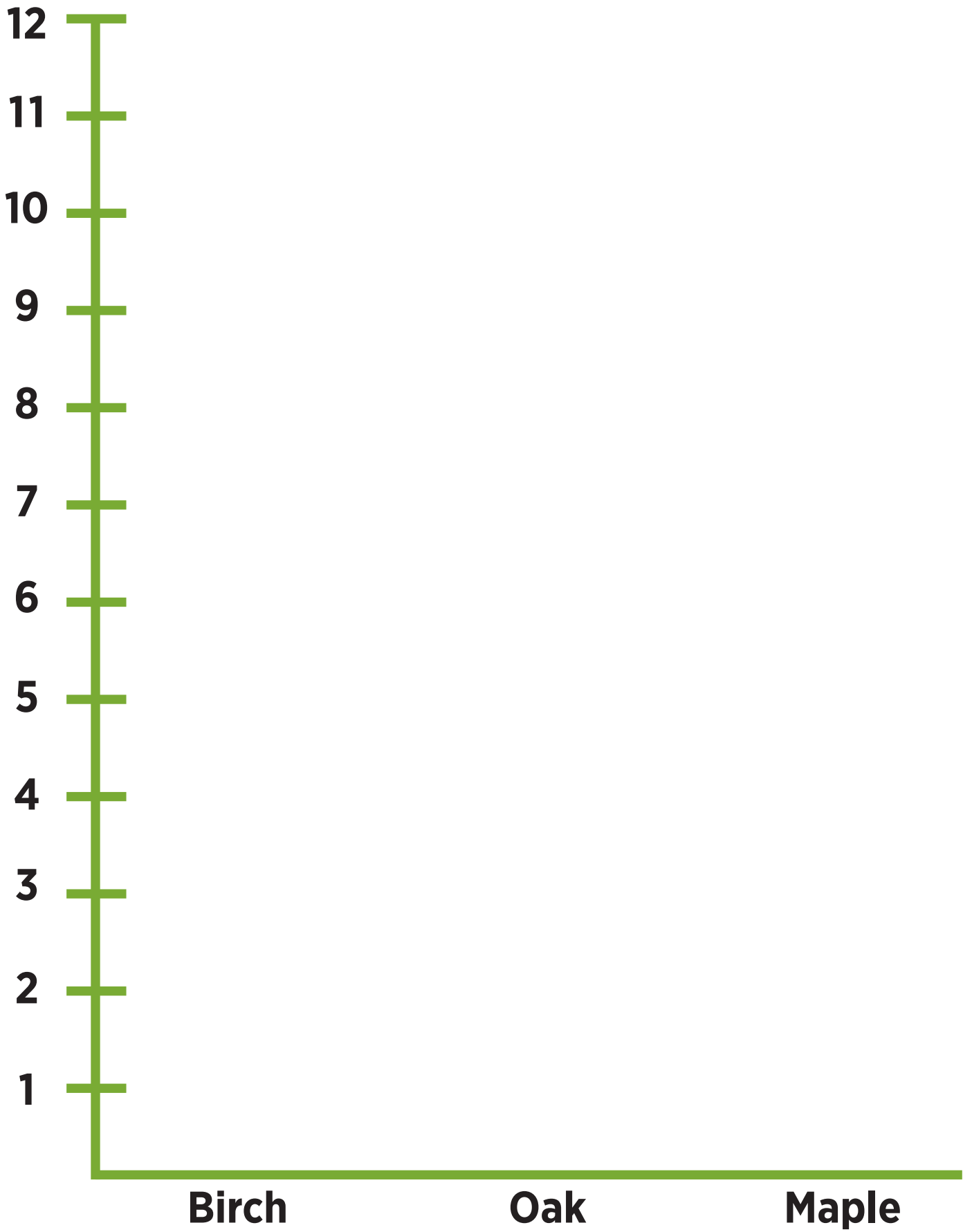


12
11
10
9
8
7
6
5
4
3
2
1

Green Yellow Red Brown

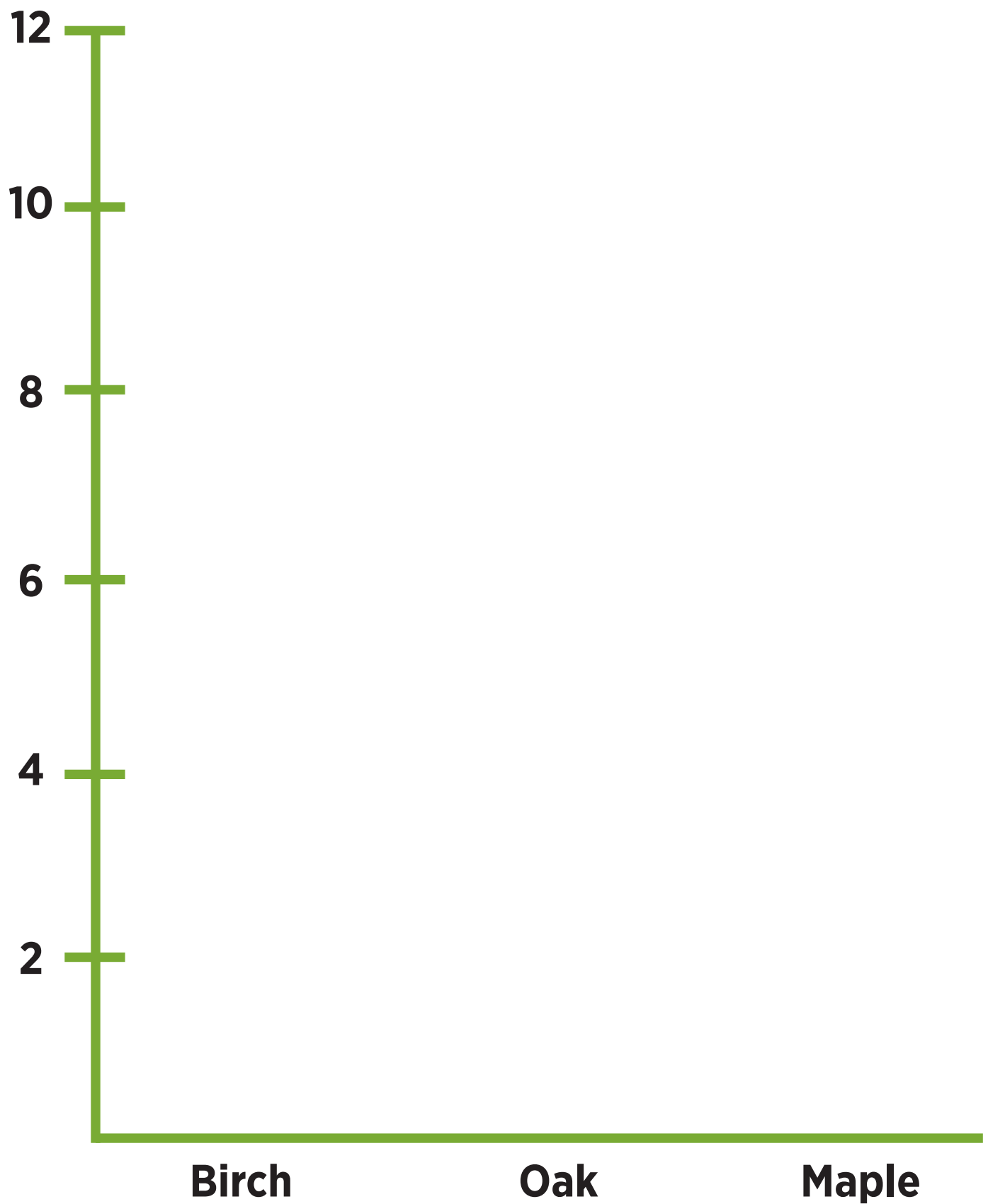
Leaf Bar Graph by Leaf Type

By Ones



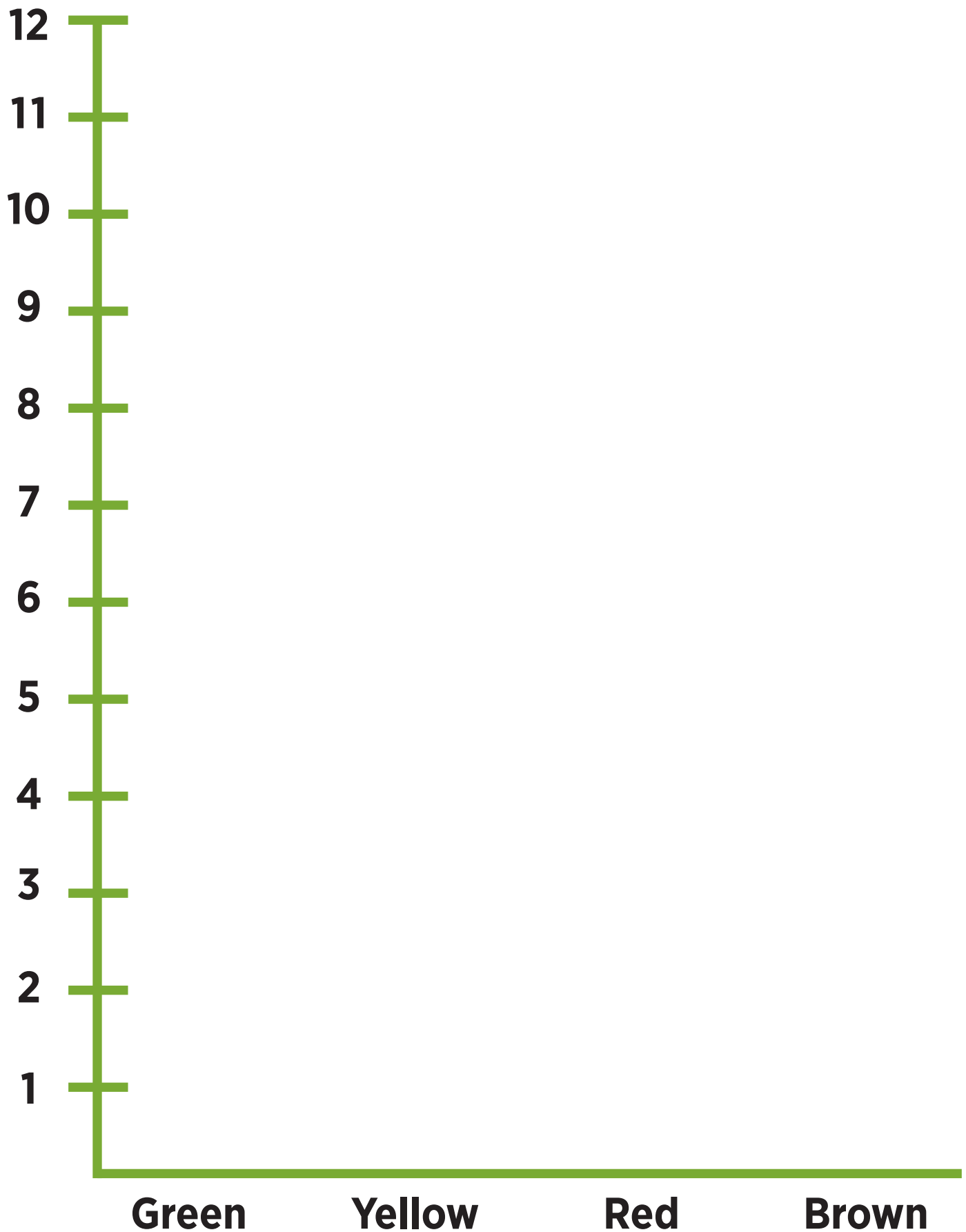
Leaf Bar Graph by Leaf Type

By Twos



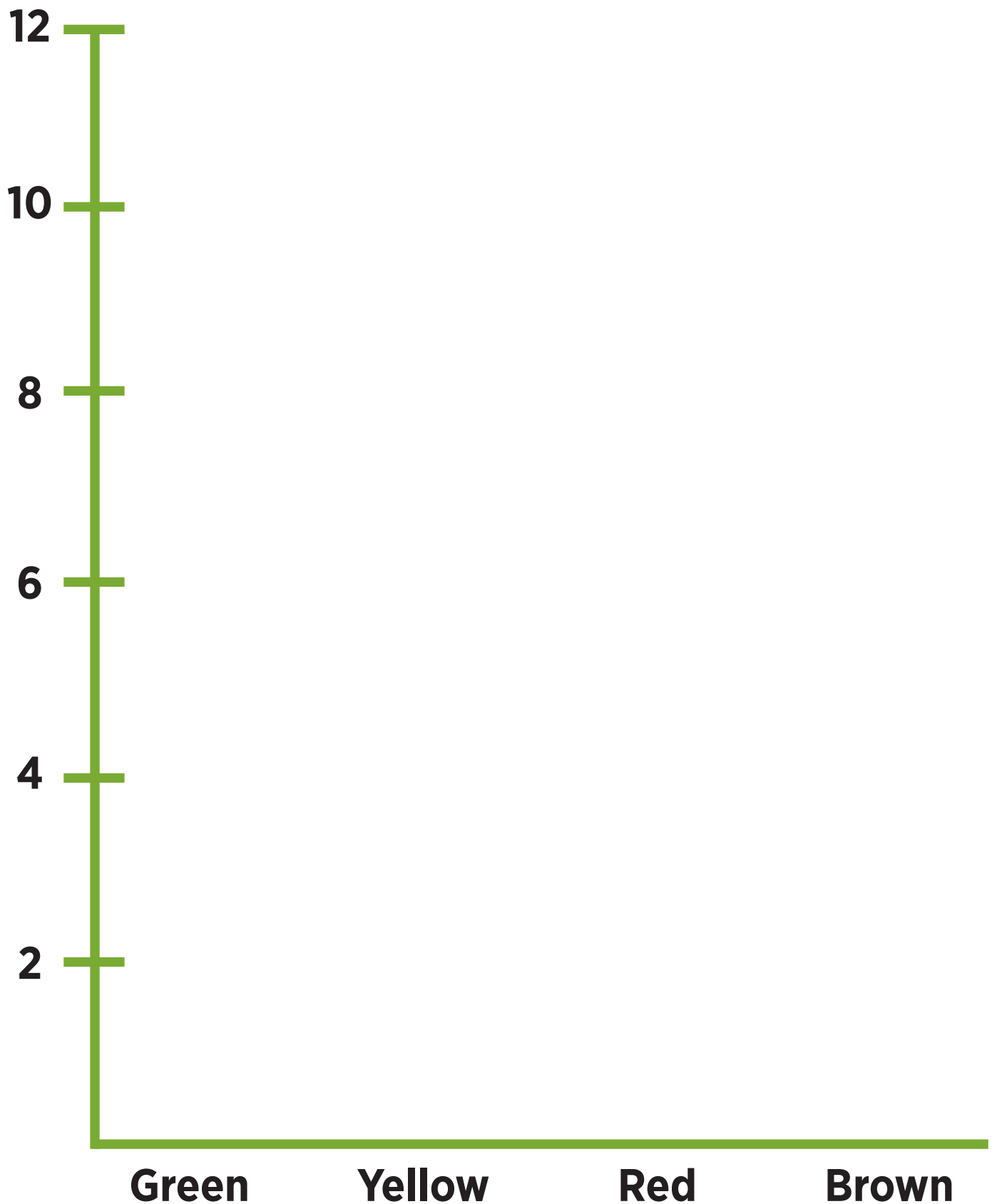
Leaf Bar Graph by Color

By Ones



Leaf Bar Graph by color

By Twos



Falling Leaf Poem

Imagine you're a falling leaf. Write a poem using at least three vocabulary words.
Once you complete your poem, color the picture.

