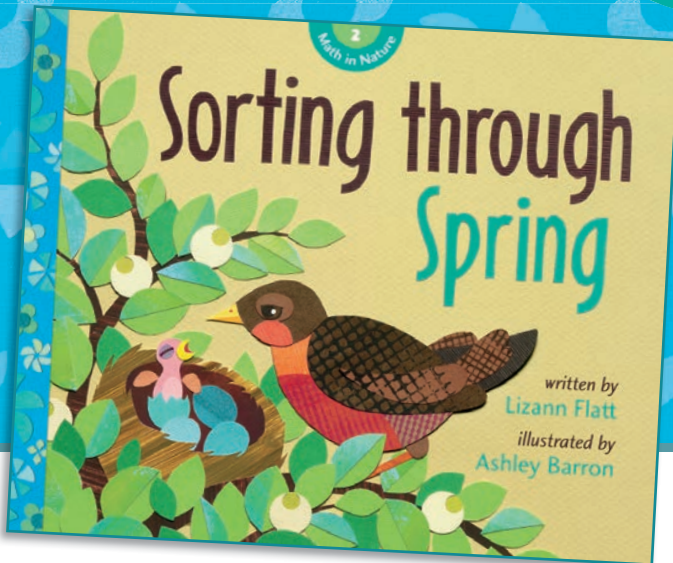


Teacher Resource Guide

for K–2 classrooms



Math in Nature: an engaging and delightful introduction to cross-curricular concepts for the primary grades

This series invites children to journey into the natural world — a world they love to discover and could explore endlessly — to find not only science but math, language arts, and visual arts, too! Written by Lizann Flatt, a former *chickaDEE Magazine* editor and author of several children's books, and using illustrated cut-paper collage art by Ashley Barron, the Math in Nature series is a veritable cross-curricular goldmine.

This educator's companion to *Sorting through Spring*, the second book in the series, contains unintimidating and enticing ways to introduce key concepts to the students in your K–2 classrooms — they will laugh, use their imaginations, and learn through these activities, which are all inspired by the book.



Pitter Patter: Patterning and Grouping Activities

In nature, patterns often repeat: the petals of a flower, the scales on a fish, or the segments of an orange are some examples. As you work through these activities, prompt your students to think about other patterns that occur in nature.

Sounds make patterns, too. Rhyming words, for instance, repeat similar sounds, and syllables can mark out a repeating pattern in their rhythms.

The word “random” is probably a difficult word for students to define. (As is the opposite of random, which is deliberate or with reason or a plan.) It is likely, however, that students intuitively understand the idea of randomness. These activities should help clarify the concept.

Random Raindrops



What you need:

- Small counters or small pieces of paper in two colors
- Art supplies

What to do:

1. Read the opening page of *Sorting through Spring* aloud to your class. Ask students to explain what they think the word “random” means.
2. Ask students for a word or phrase that describes the opposite of random (e.g., made in a pattern, made with a plan).
3. As a class demonstration or in small groups, use the counters to show randomness (e.g., toss them on the table). Then use the counters to show a deliberate pattern.
4. Have students describe natural phenomena that seem random (leaves falling) and those that seem deliberate (how petals are arranged in a flower).
5. As a class or in small groups, have students describe whether the artist has drawn the raindrops randomly or in a pattern. Have students redraw page 3 of *Sorting through Spring* with the raindrops placed randomly.

Curriculum: Mathematics, Language Arts, Visual Arts

Learning Outcomes: Comparing, Describing

Grouping: Small Groups, Whole Class

Pattern Play



What you need:

- Reproducible Page 11
- 3 different colors of paper

What to do:

1. Use a variety of classroom objects to give examples of a pattern that repeats.
2. Take a closer look at the worms on pages 5–6 in *Sorting through Spring*. Ask students to describe the pattern of the worms (partially buried, not buried, partially buried, not buried, etc.)
3. Review the patterns on pages 12–13 and 14–15.
4. Use the reproducible provided in this guide to make flowers of three different colors.
5. Give 9 flowers to each student, 3 of each color.
6. Have students create a repeating pattern. For example, ABC, ABC, ABC or AAA, BBB, CCC. (For very young students, use only 2 elements: AB, AB, AB, AB, or AA, BB, AA, BB.)
7. Have the students share their pattern with another student. Were their patterns the same or different?
8. Create patterns with other objects (e.g., with students in a lineup — boy, girl, boy, girl, etc., or beads on a string).

Curriculum: Mathematics

Learning Outcomes: Creating, Identifying, and Describing Patterns

Grouping: Small Groups, Individual

Adding Patterns



What you need:

- Blank sheet of paper
- Art supplies

What to do:

1. As a class, discuss the pattern of the fish on pages 10–11 of *Sorting through Spring*. Have students tell you the number of fish in each group and write the numbers on the board. Students should see that the pattern increases by 2 with each group. Continue counting to 20 by twos.
2. Have students create their own pattern drawing groups of shapes that increase or decrease in a regular pattern. They should draw their pattern on a blank sheet of paper.

3. When students are done, have them share their pattern with another student. Can they determine the pattern?

Curriculum: Mathematics

Learning Outcomes: Adding, Subtracting

Grouping: Whole Class, Individuals

Word Patterns



What to do:

1. Read *Sorting through Spring* aloud and ask students to listen for repeating or rhyming sounds.
2. As you read, have students clap out the syllables. Help students identify where the number of syllables in two lines of text is the same, even though the number of words in each line is different.

Curriculum: Language Arts

Learning Outcomes: Identifying Patterns, Listening

Grouping: Whole Class

Which Is Your Favorite Frog?



What you need:

- Reproducible Page 12
- Pencil crayon

What to do:

1. Give each student a copy of the reproducible sheet on page 12 of this guide. Have them tally the votes for each frog and then fill in the graph.

Curriculum: Mathematics

Learning Outcomes: Graphing, Counting

Grouping: Individual

Comparing and Sorting Activities

Equivalency and comparisons can sometimes be confusing. When you are comparing size or weight for instance, you could say that two halves = one whole. This could also be written as a ratio of 2:1. In other instances, however, you can use ratio just to compare whole counts. For instance, if you have 12 girls in your class and 14 boys, you write the ratio of girls to boys as 12:14. These activities should help clarify the concept of equivalency.

Equal Eggs



What you need:

- A variety of small, round objects (e.g., small beads, dried peas, ping-pong balls, marbles)

What to do:

1. Review pages 8–9 of *Sorting through Spring* with your students, pointing out how the artist showed that two hummingbird eggs are equal to the size of one robin's egg.
2. Show students the symbols for equal to ($=$), larger than ($>$), and smaller than ($<$). As a class demonstration, pick up two round objects and write an equation on the board using $=$, $>$, or $<$. In small groups, have students compare their round objects and write equations using the words/pictures and symbols (e.g., a ping-pong ball $>$ a marble).
3. Have students pretend that the round objects are bird's eggs. Then have them estimate how many of the smaller shapes would equal one of the larger shape (e.g., 6 beads = 1 ping-pong ball).

Curriculum: Mathematics

Learning Outcomes: Comparing, Equivalency, Estimating

Grouping: Whole Class, Small Groups

Cozy or Crowded Nest?



What to do:

1. Review pages 18–19 of *Sorting through Spring* with your class and have them count the number of rabbits in each nest. Label each nest A, B, C, D, or E.

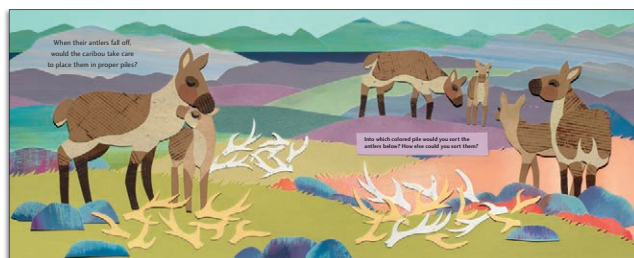
2. Review students' understanding of equal, greater than, and less than by comparing the number of rabbits in each nest.
3. Have students write word equations that compare the size of the nests. For example, Nest A > Nest B.
4. Have students place the nests in order from largest to smallest.

Curriculum: Mathematics

Learning Outcomes: Comparing, Ordering, Equations, Adding, Subtracting

Grouping: Individual

You Make the Rules



What you need:

- A variety of counters in different colors and sizes
- Websites, books, or magazines with images of animals with horns and antlers (e.g., deer, elk, moose, sheep, cattle, antelope)

What to do:

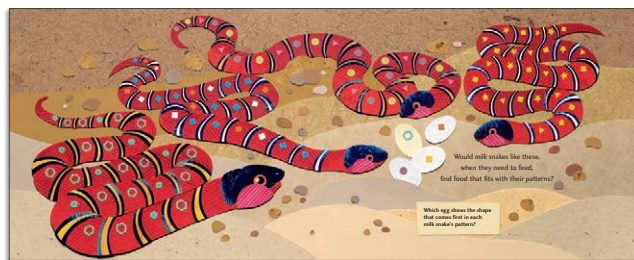
1. As a class, discuss how the artist sorted the piles of antlers on page 16 of *Sorting through Spring*. What is another way the antlers could be sorted?
2. Give each student or small group a pile of counters. Have them determine their own sorting rules. Have them share their ideas with a partner.
3. Review images of horned animals found online or in books and magazines with your class. How are they similar? How are they different? Discuss the difference between horns and antlers. (Antlers fall off each year, while horns do not.) Determine whether the animals in the images have horns or antlers.

Curriculum: Mathematics, Science

Learning Outcomes: Sorting, Comparing

Grouping: Small Groups, Individual

Mistaken Identity



What you need:

- Websites, books, or magazines with images of milk snakes, copperhead snakes, and coral snakes

What to do:

1. Show students pictures of the three snakes. How are they similar? How are they different?

2. Explain that copperhead and coral snakes are both venomous. They inject poison into their prey. Ask students why milk snakes might mimic the coloring of more venomous snakes.
3. Find examples of other animals or plants that use mimicry as a form of protection. Some examples include the pebble plant, which resembles a stone, or stick bugs which resemble twigs.

Curriculum: Science, Mathematics

Learning Outcomes: Comparing, Understanding Defense Mechanisms

Grouping: Whole Class

Describing and Observing Activities

There are many ways that animals, including humans, communicate. Students will most likely describe talking as a way people communicate, but facial expressions, hand signals, and using sounds other than words are some alternative communication strategies. Snakes are a good example to use to introduce non-verbal communication. These animals use smell (capturing molecules of scent with their flickering tongues!), sight, and vibrations to communicate.

No Talking!



What to do:

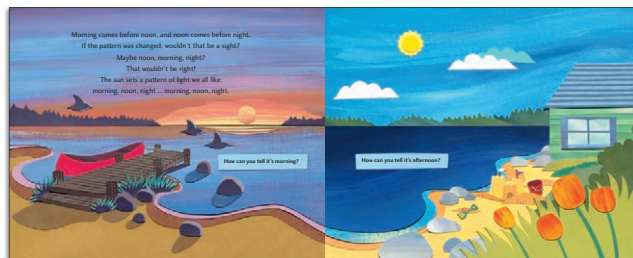
1. Explain how birds travel in flocks and some fish, like the smelts on pages 10–11 of *Sorting through Spring*, travel in schools. Ask the students why they think these animals travel in groups? (Safety is one of the primary reasons.)
2. Ask students to describe how humans communicate. Encourage the students to think of ways other than just talking.
3. Have students sit in a circle. As a class, demonstrate some different ways of communicating. First, use sound to create a “wave.” Have students count off, beginning with the number one. Second, use touch. Have the students put their hands out in front of them. Have the first student tap the right hand of the person standing to their left. Each student “passes the tap” around and around the circle. Third, use movement. Do “the wave” that people do in sports arenas. Even without talking, the class can still communicate.

Curriculum: Science

Learning Outcomes: Observing, Describing

Grouping: Small Groups

Morning, Noon, and Night



1. Observe the same spot outdoors when class begins in the morning, at lunchtime, and just before the end of the school day. Have students observe the location of the sun, the location of clouds, the brightness of light, shadows on the ground, and whatever else they find interesting.
2. Have students record their observations in words and/or pictures. This could also be done as a homework assignment.

Curriculum: Science

Learning Outcomes: Observing, Describing, Recording

Grouping: Small Groups, Individual

Listen to the Rhythm of the Falling Rain



What to do:

1. As a class, lead the students through a rainstorm using their hands and feet to make the sounds of the storm. Start with a quiet rainfall (rub hands together) and then progress to a torrential rainfall (rub hands, snap fingers, clap hands, slap thighs, stomp feet). Make sure you go back down to a quiet rainfall!
2. Students could create short verbal stories where they use the different sounds of rain in the story.
3. Look at how the author describes the rhythm of rain on pages 4–5 of *Sorting through Spring*. (This step can also be done using the sound pattern made by chickens on pages 6–7.) How is a rhythmic sound, like plop drop plop-plop, different from a random sound? To demonstrate this, have students recite and clap out plop drop plop-plop together in one rhythm. In contrast, have them make plop or drop sounds randomly, making long or short sounds, loud or quiet, etc. Contrast rhythmic versus random.

Curriculum: Music, Language Arts

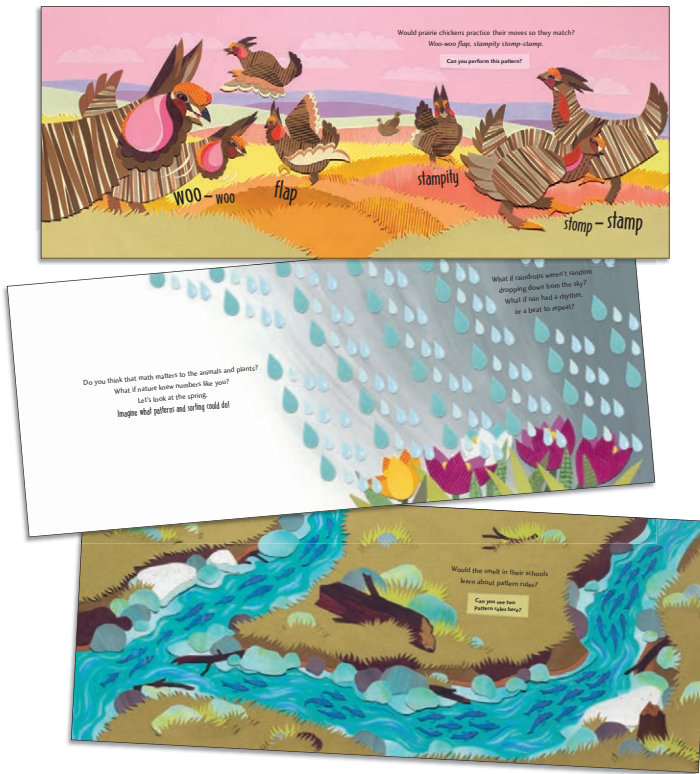
Learning Outcomes: Listening, Comparing, Creating

Grouping: Whole Class, Small Groups

Composing and Creating Activities

The illustrations in this book are deceptive. At first glance, they may seem simple, yet upon closer inspection the layers, textures, and colors used make stunning collages. To create each of the illustrations in *Sorting through Spring*, artist Ashley Barron scoured drawers and drawers of paper scraps, searching and unearthing until she found the perfect colors to bring the animals and landscapes to life.

Collage Creations



What you need:

- Blank paper
- Powdered paint and water
- Paintbrushes
- Tools to add textures and patterns (combs, doilies, straws)
- Glue

What to do:

1. As a class, review several pages of *Sorting through Spring*, focusing on the art instead of the text. Point out different patterns, colors, and shapes the artist used.
2. Have students use the paint, tools, and their fingers to create a page with color and texture. Allow the pages to dry completely.
3. Have students cut simple shapes from the paper to make their own collages. The shapes can be assembled and glued to a new sheet of paper.

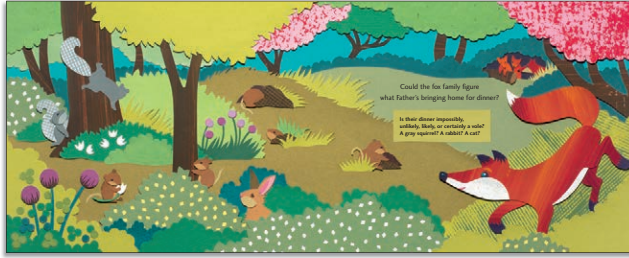
Note: Depending on the age of your students, you may also want to create shape templates that the students can trace before cutting. You may also want the entire class to participate in recreating one of the images. The flowers from pages 2–3 or the river and stones from pages 10–11 are good ones to try, since they are less detailed.

Curriculum: Visual Arts

Learning Outcomes: Art Composition, Painting, Cutting

Grouping: Individual, Whole Class

Storytelling



What to do:

1. Ask students to create a short story using their own words and observations based on pages 22–23 of *Sorting through Spring*. What is each animal doing or thinking about?

Curriculum: Language Arts

Learning Outcomes: Observing, Describing, Writing

Grouping: Individual

What's For Dinner?



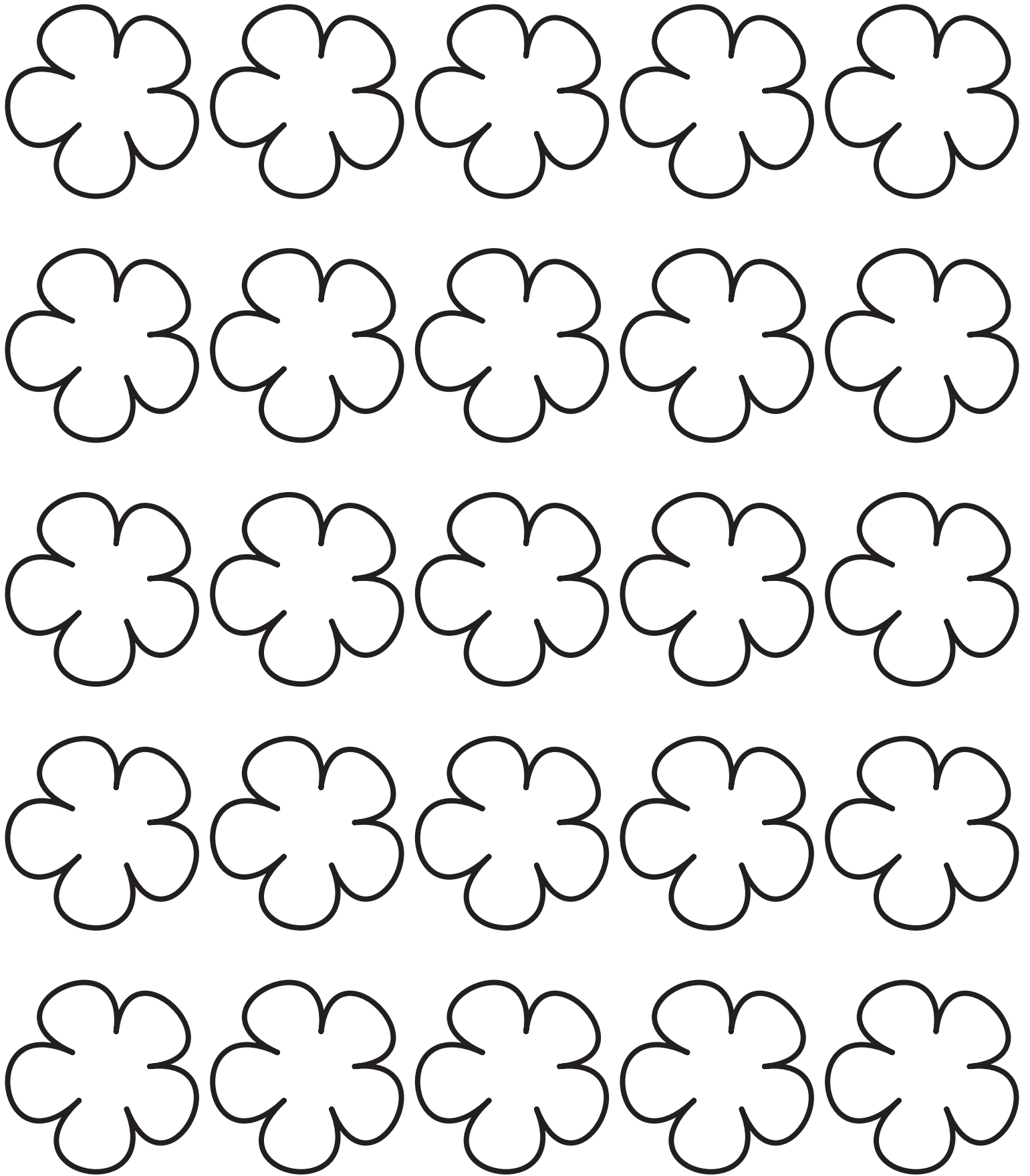
What to do:

1. Without reading the text, have students look at the picture on pages 22–23 and describe what the fox might have for dinner.
2. Emphasize that there is no single answer, since things can be unpredictable in nature. One animal may run faster or slip into a hole to escape the fox. However, based on the number of different prey items (e.g., 1 rabbit, 2 squirrels, and 5 voles), have students decide which scenario is most likely.
3. Once you have had the class discussion, read the text and again discuss whether a scenario was impossible, unlikely, likely, or certain.

Curriculum: Mathematics

Learning Outcomes: Probability, Interpretation

Grouping: Small Groups, Whole Class



Name: _____

15

10

5

Frog #1

Frog #2

Frog #3

Frog #4