

Lengths of Ladybugs

Summary

Students will explore the concept of using units to measure length.

Main Core Tie

Mathematics Kindergarten

[Strand: MEASUREMENT AND DATA \(K.MD\) Standard K.MD.1](#)

Additional Core Ties

Mathematics Kindergarten

[Strand: MEASUREMENT AND DATA \(K.MD\) Standard K.MD.2](#)

Mathematics Kindergarten

[Strand: MEASUREMENT AND DATA \(K.MD\) Standard K.MD.3](#)

Materials

- *Ladybug on the Move*
 , by Richard Fowler
 black medium- point marker
 chart paper
 red cardstock
 yarn
- [Ladybug rulers](#)
 Ladybug lima beans
- [Go Ladybug Go!](#)
- ["Flaps" for interactive book](#)
 re-sealable sandwich bags

Additional Resources

Books

- *Ladybug on the Move*
 , by Richard Fowler; ISBN 0-15-200475-0
- *Super Sand Castle Saturday*
 , by Stuart J. Murphy; ISBN 0-06-446720-1

Background for Teachers

Definition: Nonstandard units of measure are objects such as connecting cubes, paper clips, or toothpicks, that have the same size but are not typically used to find length.

Not only are measurement problems common in daily human affairs and therefore, competence in measuring immediately practical, but measurement can be made the instructional basis for most of the mathematical concepts we need.

The concept of using units to measure length will be explored in these activities. We will use nonstandard units of measure, familiar to children, to avoid formalities that are inappropriate for Kindergarten students. As the students use units to measure length or distance, they should be taught to: place the first unit at the end of the object, have each unit touch the unit that is placed before it, and describe the length of the object to the nearest unit. Children should be encouraged to estimate before they measure objects or distance.

Another concept that children need to take into account is the notion that the total length of a path is

the sum of the individual units that compose it. They learn from this to assign number to length. The children will be exploring this concept as they count the individual units used to measure distance and record their findings.

Finally, when children make the transition from non-standard measurements to using a ruler to measure standard units, teachers can develop concepts and procedures such as accurate alignment, starting at zero, and focusing on the lengths of the units rather than only the numbers on the ruler. Using manipulable units to make their own rulers helps students connect their experiences and ideas. Therefore, in this activity, children will learn to align ladybug rulers, bead counters, and single non-standard units (ladybug lima beans) at the beginning and ending points, and focus on the length of the object according to units rather than only numbers.

Intended Learning Outcomes

5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Instructional Procedures

Invitation to Learn

Gather students in a large group appropriate for listening to the story *Ladybug on the Move* by Richard Fowler. The book is designed to be interactive and involves the adventures of a ladybug as she travels in search of a new home. Unfortunately, every place she finds is already occupied. A manipulable ladybug moves from page to page throughout the story to engage student interest. The book provides a great opportunity for measuring short increments of distance on each page.

Instructional Procedures

After reading the story to students, turn back through the book and allow students to estimate which page shows the longest trip the ladybug made. Measure the trip on three or four pages using precut yarn. Tape each piece of outstretched yarn onto chart paper or poster board in front of the class and record which path it represents (for example, "leaf to stone"). This exercise illustrates measuring distance with yarn (a nonstandard measure). Ask students to compare the lengths. This activity will give students the chance to compare length and discuss such concepts as shorter, longer, and more than, less than.

Teacher will provide each student with their own adapted version of [*Go Ladybug Go!*](#). Attached to each booklet will be a laminated cardstock ladybug which will be hole-punched and connected to the spine of the booklet with yarn. On the back of the booklet, a construction paper pocket will be glued onto the back, which will hold the "ladybug" ruler. Each child will assemble the booklet using the following steps:

Page 1: Cut out and glue a leaf flap

Page 3: cut and glue a rock flap over the printed spider

Page 5: cut and glue a flower pot flap over the ant

Page 7: cut and glue a blanket flap over the cat

Page 9: cut and glue a watering can flap over the slugs

Pages 11: cut and glue a flower flap over the bees

Page 12: cut and glue a leaf flap

After the booklet is assembled, each child will receive a plastic bag with 10-15 ladybug lima beans inside. As a class, read the *Go Ladybug Go!* booklet together. Invite children to use the laminated ladybug on the string to move through the pages as the teacher reads the text aloud. After the initial reading of the booklet, begin again, but as the story progresses, instruct the children to measure the distance the ladybug travels on each of the pages by using the ladybug lima beans. Model for students how to measure the length of each path by placing the beans at the beginning of the path and placing them from end-to-end until the end of the path. Have

students record the number of lima beans they used in the space provided on each page of the booklet. Have them follow this exercise by then using the [ladybug ruler](#) to measure the same path, being sure to align the ruler at the beginning of the path and model for children how to count the ladybug units until they come to the end of the path. Have them record their responses on the space provided.

Continue through the entire book, pausing at each page for children to make their measurements.

Extensions

Curriculum Extensions/Adaptations/ Integrations

Besides using the ladybug ruler, students may be equally engaged using a "Bean Counter". Lay a 12" piece of clear packaging tape on a table with the sticky side up. Lay 12 ladybug lima beans end to end in the middle of the tape. (Write the numbers 1-12 on the beans if you desire with a fine tip marker.) Fold the bottom of the tape up and the top of the tape down to seal in the beans. Trim off the ends. Children can then perform their lima bean measurements in the interactive story of Ladybug on the Move, or they can find objects within the classroom to measure. You may assign them to find objects that are one bean long, five beans long, etc. You may also use nonstandard units such as paperclips or buttons.

Using the interactive book, *Go Ladybug Go!*, have children estimate how many lima beans long each pathway is before they actually measure it. Follow this activity by having them estimate how many ladybug units will be needed on their ladybug ruler to measure each path before it is actually done. Have children compare their estimates with their measurements.

Family Connections

Invite children to explore the length of objects at home using their ladybug ruler. Ask them to find two things that are shorter and two things that are longer than their foot.

When their interactive book *Go Ladybug Go!* is completed in class, have the children take their books home to share and read with family members. Encourage the children to use their manipulable ladybug to visit each page as they read the story to their family.

Lima Bean Ladybugs

Instructions for making Lima Bean Ladybugs

Purchase the following:

- Several bags of large, dry lima beans

- Red spray paint

- Black permanent marker with medium point

Put the lima beans on newspaper and spray with red paint. When first side is dry, turn and repeat painting process.

When the lima beans are completely dry, use the black marker to decorate one side of the red lima bean to look like a ladybug. On the other side you may wish to write a numeral if you are making a ladybug bean counter.

Assessment Plan

It is important to determine whether students understand the concept of lengths and how to measure them using nonstandard units of measurement. Take anecdotal records about the following information:

How accurately do students measure using a particular choice of units?

Can students transfer their skills for measuring length to other objects and measurement activities?

Can students measure the length of assorted objects using a variety of materials?

Use the assessment form entitled [Ladybug Line-Up](#) to assess the ability of students to measure lines using nonstandard units of measurement.

Discuss with students as to why more lima beans were needed to measure each path than ladybug units on the ruler. Explain the concept that more lima beans were needed because they were smaller than the ladybug units on the ruler.

Bibliography

Hiebert, J. (1984). Why do some children have trouble learning measurement concepts? *Arithmetic Teacher*, 31 (7), 19-24.

In this study, researchers found that even though children do not yet conserve or reason transitively on standard Piagetian tasks, they still benefit from concrete measuring activities. It was also determined that children in both control and experimental groups experienced some common difficulties and showed some basic misconceptions.

Clements, D.H., (1999). Teaching length measurement: Research challenges. *School Science and Mathematics*, 99,(1), 5-11.

Researchers have found that standard units need to be utilized simultaneously with non-standard units as young children are learning measurement skills. Teaching young children to measure with only non-standard units does not necessarily lead to competence in measuring skills.

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