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ILLUSTRATOR:**

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A quick-thinking inchworm proves that measuring is a very useful skill.

Ages: 2 to 6 years

ATOS Reading Level:
1.8

Lexile: 210L

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Inch by Inch

How would you measure the nightingale's song?

Topics: counting, measurement, comparison, problem solving

Activities To Do Together:

Inch by Inch is an imaginative way to introduce the concepts of measurement. It's important for children to have many opportunities to measure as it helps them make meaningful comparisons, make sense of their world, and make reasoned decisions. Measurement also supports children's problem solving, estimation skills, and ability to describe the world around them in ways that are commonly understood.

Before reading the book:

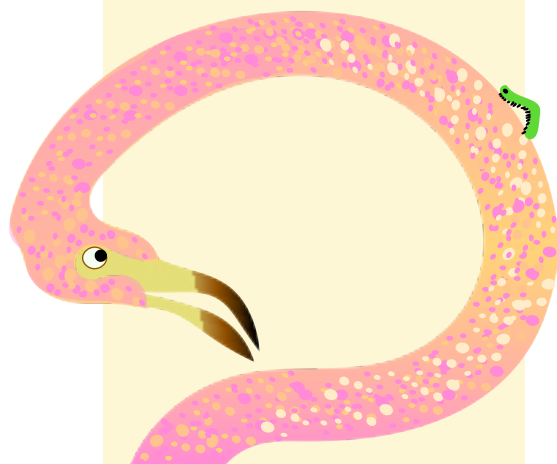
- Talk about inchworms with your child. If your child isn't familiar with inchworms, explain that they are a type of caterpillar that is often about an inch long. The unique way an inchworm moves makes it look like it is measuring. Some people even call inchworms measuring worms.

While reading the book:

- Notice the sizes of the different birds the inchworm measures. Which birds seem to be very large? Which seem to be very small? Ask your child to tell you why they think so.

When you have finished reading the book:

- Encourage your child to draw an inchworm on a piece of paper and cut it out with scissors. Using the inchworm, explore together the length, width, and height of different objects your child would like to measure.
- Put pieces of masking tape on the wall that represent the heights of different friends and family members. Explore together how many of the same object placed end to end is equal to each person's height. For example, how many cereal boxes tall is each person and how many slippers tall is each person?
- Ask your child what they think the inchworm did that was clever and why.
- Learn about inchworms together. How are real inchworms different than the inchworm in the story? How are they similar?



Conversations During Daily Routines with Toddlers:

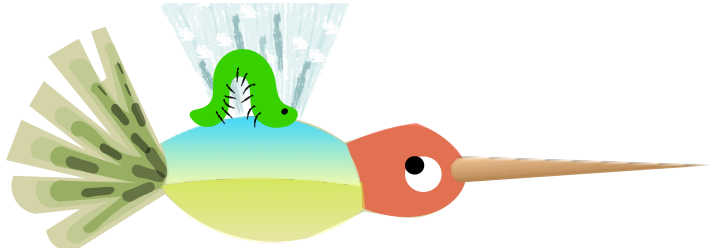
1. Story time - Compare the sizes of the books you read. Talk about which books are larger, thicker, heavier, etc.
2. Art time - Line up three markers end to end. Together, find objects that are about the same length as the three markers.
3. Outside time - Look for sticks and other objects together. Encourage your child to measure the objects using their hand or foot.
4. Cooking time - Compare different foods using words like **longer**, **bigger**, **heavier**, **smaller**, etc. "The carrot is **longer** than the zucchini. The cabbage is **heavier** than the apple."

Questions for Mathematical Thinking:

1. Why do you think inchworms are called inchworms?
2. In *Inch by Inch*, how does the inchworm measure things?
3. What do you think is the longest thing the inchworm measured? Why do you think so?
4. If you met an inchworm, what would you ask them to measure?
5. What other objects could you use to measure the length of a bird's tail, neck, or beak?
6. Do you think the inchworm was a good problem solver? Why or why not?

Early Math Project Resources:

Visit [Inch by Inch](http://countplayexplore.org/book/inch-by-inch) (countplayexplore.org/book/inch-by-inch) to find activities and related California Learning Foundations and/or Mathematics Standards provided by the California Department of Education for this book.



Vocabulary

Math words found in the story: five, four, inch, long, measure, on, one, three, two, whole, with

Related math words: centimeters, feet, formal measurement, informal measurement, meters, ruler, yards, yardstick

Words to build reading comprehension:

emerald, flamingo, gobble, heron, hummingbird, idea, inched, nightingale, pheasant, robin, toucan, twig, useful

Spanish Title: *Pulgada a pulgada*

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Also available in: Chinese, French, Galician, German, Italian, Japanese, Persian

Related Books: *Super Sand Castle Saturday* by Stuart J. Murphy; *Actual Size* by Steve Jenkins; *Measuring Penny* by Loreen Leedy

Click this link to the [World Catalog](http://bit.ly/3ZO5vUg) or enter <http://bit.ly/3ZO5vUg> to find *Inch by Inch* in the public library.

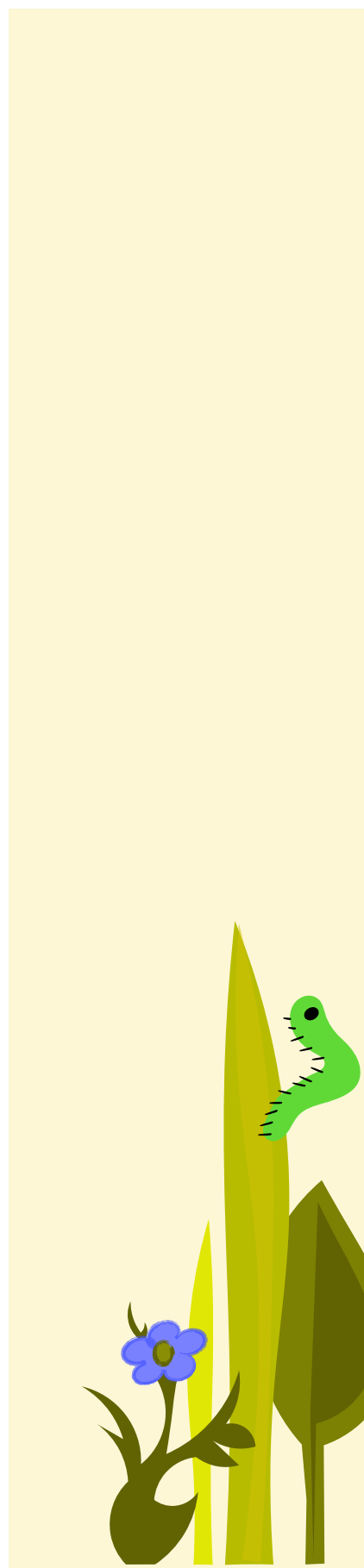
Math Connections: *Inch by Inch* is a great example of non-standard measurement. Non-standard measurement occurs when an object is placed repeatedly end to end to determine the length, width, or height of another object.

Use *Inch by Inch* to introduce the concept of measurement to your child. In the story, the inchworm uses his measuring ability to avoid being eaten by a hungry robin. After measuring the robin's tail, the inchworm measures the parts of many other birds. Talk with your child about the differences in the sizes of the birds. How can you use the pictures in the book to tell which birds are large and which are small? Ask your child to figure out how many inchworms would fit end to end on the toucan's bill.

Before children learn about formal measurement with rulers and yardsticks, it's important for them to have many opportunities to measure informally. For example, a child might explore how many of the same toy car will fit end to end across a tabletop or how many of the child's foot-lengths will fit end to end along the width of a hallway.

After your child has had an opportunity to informally measure a variety of objects, measure some of the same objects together again using your own hand or foot. Ask your child what they noticed. Is the number of hands or feet your child counted when measuring an object the same as the number they counted when measuring with your hands or feet? Ask your child to tell you why they think the numbers might be different. Why might it be correct that an object is four hand widths wide when measuring with your child's hand, but only two hand widths wide when measuring with your hand? You may want to encourage your child to find out how objects measure up against the feet or hands of several family members. Understanding that the numbers may change given the size of the object you are using to measure is an important realization that helps explain why a standard unit of measurement is important. There are many important concepts children can explore using informal measurement, such as consistency in measuring, that will help support their later success with formal measurement.

Have your child draw a picture of an inchworm of any length, cut it out, and use it to measure the length of a shoe, the width of a book, the distance across a tabletop, etc. Talk about how to place the inchworm to get an accurate measurement.



DISCOVERING THE MATH: BOOK GUIDE

Talk about other animals and objects an inchworm might measure. Ask your child what objects they would like to measure. Consider exploring informal measurement further by encouraging your child to make an inchworm ruler by cutting out ten identical inchworms and taping them end to end. As your child measures with the 10-inchworm ruler, count together by tens (10, 20, 30, 40, 50, 60, 70, 80, 90, 100).

After your child has measured objects with their inchworm ruler, ask them if they think the inchworm ruler made it easier to measure. Ask if they think it would be easier to measure some objects with a single inchworm and other objects with the 10-inchworm ruler. Ask your child to tell you about their measuring strategies and how they measure different objects. Explore with your child how changing the size of the ten inchworms would change the length of their measuring tool.

Encourage your child to invent their own type of measuring device.

