

Connecting Literature and Math

#12: *Inch by Inch* by Leo Lionni & *Actual Size* by Steve Jenkins

Introduction	<p>Through two books, <i>Inch by Inch</i> by Leo Lionni, and <i>Actual Size</i> by Steve Jenkins, children are introduced to measurement. Leo Lionni uses the sharp definition of cutouts against white space to illustrate <i>Inch by Inch</i>, a story of an inchworm who is proud of its ability to measure anything under the sun. Through collages of cut and torn paper, Steve Jenkins illustrates animals both large and small in <i>Actual Size</i>, an information book.</p>
Content Standards and Benchmarks	<p>Content Standard: Number and Operations</p> <ul style="list-style-type: none"> • Counting <p>Content Standard: Measurement</p> <ul style="list-style-type: none"> • Comparing and ordering objects on basis of attributes such as length, weight and capacity • Linking a number and a unit (5 pounds, 2 hours) • Using standard units such as inches, cups and pounds and standard tools such as rulers, thermometers, scales and measuring cups • Using non-standard units such as hands, feet and paper clips <p>Benchmarks will be included for each activity</p>
Materials to Collect and Make	<ul style="list-style-type: none"> • Provide measuring tools: ruler, metal measuring tape, cloth measuring tape, yard stick • Provide cardboard or card stock, marker and Unifix cubes • Provide balance scale, rocks of different sizes and weights • Make a Purple Cow recipe chart • Provide grape juice (plastic jar), frozen vanilla yogurt, cups, spoons (one per child), 2 or more measuring cups (1/4), 2 or more liquid measuring cups with the ¼ cup measure clearly marked
Story Presentation	<p>Benchmarks: 3.1 Shows enjoyment of books and stories and discussion of them 3.5 Understands that print conveys a message 3.20 Uses senses to learn about the characteristics of the environment and to collect data (scientific process; observing) 3.21 Uses words to describe the characteristics of objects (scientific process: communicating) 3.22 Makes comparisons (scientific process: comparing) 5.3 Expands vocabulary 5.8 Participates in group discussion</p> <p>Book: <i>Inch by Inch</i> by Leo Lionni</p> <p>First Reading of <i>Inch by Inch</i></p> <ul style="list-style-type: none"> • Prepare to read the book, <i>Inch by Inch</i>. • Show cover; give title, author and illustrator. (Explain that author is the person who writes the book and the illustrator is the person who draws the pictures.) • Ask children to look at the cover and predict what the story is about. Call attention to the inchworm and say, "This is an inchworm. Let's read and find out what

happens to the inchworm in the story.”

- Read the story so all children can see the pictures in the book.
- Follow up by showing pictures and inviting children to help you name the different birds that the inchworm met and which parts of each bird’s body the inchworm measured.

Second Reading of *Inch by Inch*

- Bring measuring tools to story time: ruler, metal measuring tape, cloth measuring tape, yard stick. Keep them out of sight of the children until you have read the story to them.
- Prepare to read the book, *Inch by Inch*.
- Show cover, give title, author and illustrator.
- Ask children why they think the title of the book is *Inch by Inch*.
- Ask children to show how big they think an inch is.
- Read the story so all children can see the pictures in the book.
- Follow up the second reading by showing the children the measuring tools. Allow them to examine the tools.
- Ask children to find the numeral 1 on their tool. Explain that this means one inch. Help children find the numeral. Children may notice other numerals on the tools. Explain that the 2 means two inches and so forth.
- Place the book on the floor and turn to the page where the inchworm is at the top of a plant looking at the nightingale. Use one of the measuring tools to measure the inchworm and say, “This inchworm is one inch long.”
- Invite children to suggest other objects in the room they might measure.
- State that some of the measuring tools will be placed in learning centers for children to use for measuring.
- Place measuring tools in Block Center and in Discovery/Science Center, for example.

Third Reading of *Inch by Inch*

- Prepare to read the book *Inch by Inch*.
- Show cover and invite children to recall the title. Give name of author and illustrator.
- Involve children in discussing the objects in the room they measured. “How many inches long was _____?” (objects they measured)
- Read the story so all children can see the pictures in the book.
- Follow up the third reading by asking children why the inchworm could not measure the nightingale’s song. (Inchworm measures things, not songs) How did the inchworm keep the nightingale from eating him? (He inched out of sight of the nightingale).

Book: Actual Size by Steve Jenkins

First Reading of *Actual Size*

- Be familiar with the book, *Actual Size*.
- Show the cover, give title, author and illustrator. (Explain that the author is the person who writes the words and the illustrator is the person who creates the pictures. In this book, Steve Jenkins is both the author and illustrator)
- Show the cover and invite children to discuss what they see. Accept all comments. If they say they see a hand, ask whose hand they think it might be. Say, “There are some really interesting animals in this book. Let’s read and find out about them.”
- Read the story so all children can see the pictures in the book.

	<ul style="list-style-type: none"> • Show the first page and allow children to comment about what they see, then read the text on both pages. • Call attention to the dwarf goby at the bottom of the page and invite children to show you with their fingers how small it is. • Continue reading and allowing children time to see and discuss the pictures. • Comment about some of the sizes and illustration. For example, call attention to the eye of the squid, say it is 12 inches across and invite children to show you with their hands 12 inches. • Continue reading the book and encourage children to comment about the animals and their sizes. • Show the pages with the gorilla’s hands and the pygmy mouse lemur, ask if they have seen this picture before. Show the cover so children can see that the two illustrations are of the same two animals; a gorilla and a pygmy mouse lemur. • Invite children to notice that both the huge gorilla and the pygmy mouse lemur have hands a lot like ours. • Follow up the reading by showing the pages of the book and inviting children to name the animals and/or their body parts and to discuss what they remember about them. <p>Teacher Note: <i>As you are reading the story, if it seems appropriate, explain that words such as giant and goliath mean something is really big, while words such as dwarf and pygmy means something very small.</i></p> <hr/> <p>Second Reading of <i>Actual Size</i></p> <ul style="list-style-type: none"> • Bring a cloth measuring tape and a ruler to story time. Keep them out of sight until you have read the story. • Invite a small group of 3 to 5 children to join you in reading <i>Actual Size</i>. • Recall with children some of the animals they saw in the book. • Read the story so all children can see the pictures in the book. • Allow children time to see and discuss the pictures. • Follow up by showing children the measuring tape and ruler. • Ask if any of them know what they are and what they are used for. • Explain that one is a measuring tape and one is a ruler. • Allow children time to explore the tape and ruler. • Ask children to find the numeral 1 on their measurer. Explain that this means one inch. Children may notice other numerals. Explain that the 2 means 2 inches and so forth. • Involve children in measuring the pygmy shrew on the title page, the wingspan of the atlas moth, the dwarf goby, and the eye of the giant squid. <p>Teacher Note: <i>For a child who seems to really be interested in the various animals in the book, spend time discussing some of the in-depth information at the end of the story. Know the children and judge how much of the information to share.</i></p>
<p>Additional Language Activities</p>	<p>Benchmarks:</p> <ul style="list-style-type: none"> 3.5 Understands that print conveys a message 3.15 Demonstrates an understanding of number (how many) and numeral (3 is a numeral) relationship (numeration) 3.20 Uses senses to learn about the characteristics of the environment and to collect data (scientific process: observing) 3.21 Uses words to describe the characteristics of objects (scientific process (communicating) 3.25 Applies information or experience to a new context (scientific process (applying) 3.27 Uses numbers in daily activities

Activity: Measuring with Our Feet

Materials: cardboard or card stock, marker, note paper or index cards, pencils

Directions:

- Recall with children that in the book, *Inch by Inch*, the inchworm used its body to measure the birds. We can use our feet for measuring things.
- Help children trace around a foot on a piece of cardboard or card stock. Have them cut out the foot.
- Demonstrate how to use the cardboard foot to measure the length of a table or a storage shelf.
- Suggest that children use their foot to measure other items in the room.
- Provide note paper or index cards and pencils so children can “write” down the measurements of the items they measure or ask you to record the information.
- Read back with the children the recorded information. For example, “The table in dramatic play is 6 of my feet long.”

Benchmarks: 3.5 Understands that print conveys a message
3.15 Demonstrates an understanding of number (how many) and numeral (3 is a numeral) relationship (numeration)
3.20 Uses senses to learning about the characteristics of the environment and to collect data (scientific process: observing)
3.27 Uses numbers in daily activities

Activity: Measuring Our Feet with Unifix Cubes

Materials: cardboard or card stock, marker, Unifix cubes

Directions:

- Help each child trace around one of his or her feet on a piece of cardboard or card stock.
- Allow children to write their name on their cardboard feet.
- Invite each child to predict how many Unifix cubes he or she thinks will fit into the length of his or her feet.
- Allow children to use Unifix cubes to fit into the length of their individual feet.
- Involve each child in counting the number of Unifix cubes he or she used. Ask if the number is more or less than predicted.
- Write on each child's foot outline the following: Elena's (child's name) foot is _____ (how many) Unifix cubes long.
- Invite each child to read to the group the sentence about his or her feet.

Teacher Note: *If a child can/wants to write his or her own name and the numeral, allow him or her to do so.*

Teacher Note: *Make sure that children understand what is meant by the “length” of their feet.*

Benchmarks: 3.5 Understands that print conveys a message
3.15 Demonstrates an understanding of number (how many) and numeral (3 is a numeral) relationship (numeration)
3.18 Shows an awareness of time concepts
3.20 Uses senses to learn about the characteristics of the environment and to collect data (scientific process: observing)
3.22 Makes comparisons (scientific process: comparing)

- 5.8 Participates in group discussion
- 5.9 Uses language to problem solve

Activity: Measuring Shadows

Materials: cloth measuring tape, index card, marker or pencil

Directions:

- Choose a sunny day for this activity.
- Measure each child's height at arrival and record it on an index card as follows: Today is _____ (month, date and year). ____'s (child's name) is _____ inches tall.
- Show children the time on the clock, take children outdoors, measure each child's shadow and record the information on the index card as follows: At 9:00 o'clock _____'s (child's name) shadow is _____ inches tall.
- Involve children in discussing if their shadows are the same height as they are, longer or shorter.
- Repeat this at least two more times during the day. **Try to make one of the times as close to noon as possible.**
- Gather children together, preferably in small groups, and read with them the information on their cards.
- Invite children to discuss why they think their shadows were not always the same length, or number of inches tall. Accept all answers.

Teacher Note: *Children will probably not understand that the position of the sun causes their shadows to be different lengths.*

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- Benchmarks:** 3.10 Classifies objects by physical features such as shape or color
3.22 Makes comparisons (scientific process: comparing)
3.23 Shows awareness of cause-effect relationships
3.25 Applies information or experience to a new context (scientific process: applying)
3.9 Uses language to problem solve

Activity: Weighing Rocks

Materials: balance scale, rocks of different sizes and weights

Directions:

- Take the balance scale and some of the rocks to group time.
- Show the scale to the children and invite them to tell what they know about it.
- Explain to children that you will be in the Discovery/Science Center with the scale and the rocks and invite them to join you to experiment with the scale and the rocks.
- Allow children to explore the rocks. Involve them in discussing what they notice about the rocks. Which rock is the heaviest? Which is the lightest?
- Explain that they can find out by weighing the rocks.
- Ask them to put one rock in one balance pan and another rock in the other balance pan. What do they notice about the pans?
- Involve them in discussing why they think one pan is lower than the other? Guide them to discover that the heaviest rock causes the pan to be lower than the other.
- Allow children to experiment with weighing the rocks. Can they balance the rocks on the scale?
- Suggest that children look for other objects they can weigh.

- Benchmarks:** 3.5 Understands that print conveys a message
 3.15 Demonstrates an understanding of number (how many) and numeral (3 is a numeral) relationship (numeration)
 4.3 Tries new foods before deciding whether he/she likes them
 4.6 Coordinates eye and hand movements to complete tasks

Activity: Purple Cow

Materials: Purple Cow recipe chart, grape juice (plastic jar), frozen vanilla yogurt, cups, spoons (one per child), 2 or more measuring cups (1/4), 2 or more liquid measuring cups with the 1/4 cup measure clearly marked

Directions:

- Develop a poster with the Purple Cow recipe.
- Invite children to sit at the table and say with them the poem that is written below.
- Explain that the children will now make a “Purple Cow” for snack.
- Read the recipe with the children.
- Help each child add 1/4 cup frozen vanilla yogurt into a cup and pour 1/4 cup grape juice on top.
- Eat with a spoon and enjoy.

Purple Cow

I've never seen a purple cow,
 I never hope to see one.
 But if by chance I ever do,
 I'd rather see than be one.

Teacher Note: Allow children to do as much of this food experience as possible.

Teacher Note: Teachers and children should always wash hands before participating in a food experience.

Purple Cow Recipe Chart	
Wash	
 1/4 Cup	 Frozen Vanilla Yogurt
 1/4 Cup	 Grape Juice
 Eat and Enjoy!	

Learning Environment

Manipulatives (or Math Center)

- Unifix cubes
- Ruler

Block Center

- Add rulers (6 inch and 12 inch), cloth measuring tape, basket with index cards and markers and pencils
- Provide wood unit blocks

	<p><u>Dramatic Play</u></p> <ul style="list-style-type: none"> • Add plastic measuring spoons and cups with measurements clearly marked. • Add 3 sizes of mixing bowls or plastic containers <p><u>Sand and Water</u></p> <ul style="list-style-type: none"> • Add plastic measuring cups and spoons, plastic containers in different sizes <p><u>Discovery/Science Center</u></p> <ul style="list-style-type: none"> • Add balance scale • Add objects such as rocks to weigh • Add measuring tools such as rulers and cloth measuring tape <p><u>Library</u></p> <ul style="list-style-type: none"> • Add the book, <i>Actual Size</i> • Add rulers
<p>Transition Activities</p>	<ul style="list-style-type: none"> • Have the children’s outlines of their feet. • Show an outline of a foot and ask “Whose foot is this?” When child identifies his/her foot, child transitions to next activity.
<p>Family Connection</p>	<ul style="list-style-type: none"> • Send home the cutout cardstock foot of their child’s foot with a note explaining that the children have been learning about measuring and how the cardstock foot was used to measure things in the classroom. • Suggest that families help their child measure items in the home such as the dining table or the height of a cabinet door.
<p>Additional Books</p>	<p>Allen, Pamela. <i>Who Sank the Boat?</i> Stevens, Janet. And Susan Stevens Crummel. <i>Cook-a-doodle-doo!</i> Tompert, Ann, illustrated by Lynn Munsinger. <i>Just a Little Bit</i> Wellington, Monica. <i>Mr. Cookie Baker</i></p>
<p>Assessment Ideas</p>	<p>Refer to page 4 in the guide: Activity – Measuring Our Feet with Unifix Cubes for an activity to assess the following concept and benchmarks.</p> <p>Content Standards Number and Operations</p> <ul style="list-style-type: none"> • Identifying numerals (3 and 4 are numerals) that represent quantities (how many) • Writing numerals that represent quantities (how many) <p>Content Standards Measurement</p> <ul style="list-style-type: none"> • Linking a number and a unit (5 pounds, 2 hours) • Using non-standard units such as hands, feet and paper clips <p>Benchmark: 3.15 Demonstrates an understanding of number (how many) and numeral (3 is a numeral) relationship (numeration)</p> <p>To Assess:</p> <ul style="list-style-type: none"> • Work with each child individually to complete this activity. • Assess children’s competence by observing and listening to them as they count the Unifix cubes they used and as they “read” to the group the sentence about their feet.