



Lesson 1: HOW BIG



Students practice comparison, measurement, and estimation as they're introduced to a small character and begin to comprehend 2 dimensions - height and width.

Objectives:

Students explore two dimensions, compare a figure to common objects to understand height and width dimensions, measure and record data and estimate in units. "I can" statements that students should be able to do after completing this lesson include: "I can describe how big something is by using height and width." "I can compare size by thinking about everyday objects." "I can use measurement data to estimate in another unit size."

Vocabulary used in this activity:

height, width, tall, narrow, dimension, measurement, unit, compare, data, height, describe, 2-D (2 dimensions), goal, estimate

Standards

 ECERS-R
 Language-Reasoning: Books and pictures, Encouraging children to communicate Using language to develop reasoning skills | Activities: Fine Motor, Art, Math/Numbers | Program Structure: Group time Science and Engineering Practices: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem

 COSS
 Math

CCSS-Math 2.MD.A, 2.MD.A.1, 2.MD.A.3, 2.MD.A.4, 2.MD.A.9, 3.MD.A.3, 3.MD.B.4

CCSS-ELA L.2.6, CCRA.SL.1, L.2.5, L.2.5a, L.3.6, SL.3.1, Sl.3.1b, SL.3.1d, W.3.1b

Materials and Supplies:

Time needed: 35-40 minutes

Gingerbread character, paper, pencils/crayons, Brackitz planks and 4-way connectors, Gingerbread cookie-sized "people" cut-outs (these should be not much bigger than a child's hand.) Each group will need a ruler. Optional: cookie or playdough to make more tactile figures, tracing paper.

Setup and preparation:

Have a character cutout for each kid or group and trays with the same number of planks and connectors for each group of 2-3; help students cooperatively form groups of 2-3 to work together. You may choose to pre-build the "frames" in the third part of the lesson - "Group Challenge."

Background knowledge:

Prior to this lesson, the only background knowledge students need is to be able to pick things up and grasp them. They will also need to know how to assemble and take apart Brackitz components. Optional pre-activity: Read <u>The Gingerbread Man</u>



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Whole Class

10 minutes

Holding the Gingerbread figure, introduce our character "I have a new friend here. S/he's small but lives in our big world. That presents some special challenges for our friend. S/he is bigger than a bug (most bugs are smaller than the tip of your thumb!), but smaller than a bunny (most bunnies are bigger than your two hands could hold). Take a look at the height and width of this Gingerbread cutout. Can you think of something that is taller than it? Shorter than it? About the same height? Let's brainstorm." Make a class brainstorm chart to capture all answers. "What things can you think of that would be wider than Gingerbread, narrower than Gingerbread or about the same width?" Add these answers to the chart.

Group Exploration 5-10 minutes

"Now that we've done some comparison to get an idea of our new friend's height and width, let's measure to get some accurate data. "When we draw on paper like this outline of our Gingerbread character, we draw in two dimensions - usually HOWTALL and HOW WIDE. Each of these (Tall or Wide) is one dimension and we can measure it.

I'd like you to measure the Gingerbread's height and width with the rulers. How tall and how wide is s/he?" Give groups time to measure and help them record their measurements. "Now, let's use a different unit of measurement for height and width. Use the Brackitz pieces. How many do you need to measure Gingerbread's height? Is it taller than one plank? Shorter? How many for width?" Give groups time to measure and help them record their measurements. Be sure and identify if you are measuring with the long side or the short side of the plank, or with both.

Instructor Notes and Tips

Help students compare the figure's size with other things they tangibly understand. Make a chart to capture answers.

Consider items in the classroom as comparators like: blocks, books, pencils, desks.

Guide students to measure height vertically and width horizontally along the standard axes, rather than measuring diagonally.

If the Gingerbread cutouts are all the same size students measurements should be close to one another - make sure no student or group has measured inaccurately. You could have the student or group check their neighbor's measurements to see if there is a discrepancy.





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Group Challenge

15 minutes

"I have built a picture frame with Brackitz pieces. My goal is for the frame to be just large enough for Gingerbread to fit inside, and touch the sides, but not be squished. Take a look at how many Brackitz pieces there are for the height, and how many for the width. You measured these two dimensions already so can you estimate? Will this be too short? Too tall? Too narrow? Too wide? **Estimate and tell me what you think."** Once a group has reported back ask them, "How many pieces will I need to add or take away to fix it?" Then, tell the group to fix the frame and make it, "fit just right by adding pieces or taking some away."

Group Reflection

5 minutes

Bring the whole group back together. "We need to be sure we all know how big our Gingerbread person is, in the two dimensions we built our rectangle picture frames in today. Let's trace the rectangle you built as a frame into your worksheet and write down what pieces were used and the measurements we made using the rulers."

CHALLENGE ADVANCED STUDENTS

In discussion, ask students to consider what may happen if we don't understand something's size. Are there issues with making things that are too big or small? What examples can they think of? (One real life example is if they think of mittens or shoes that are too big or small for them.)

In the group exploration, have students trace and/or cut out their own paper figures. This is great fine motor practice and making dimensions less abstract.

In the challenge section, ask students to estimate how much room between the frame and the Gingerbread will make it just right - An inch? A Centimeter?Then have them measure.

SIMPLIFY FOR YOUNGER GROUPS

answer/consensus building for WIDTH.

In discussion, as you introduce size, use several models. Have paired models (cookie or cardboard): One pair that is the same height, but different widths. One pair that are the same width but different heights. Help students understand this by having them hold them side by side, or trace them on paper and measure with rulers, and Brackitz planks.

In the group exploration, have enough paper cutout figures for each student or group to measure, without needing to trace or cut them out.

In the challenge section, you may wish to just focus on one dimension that needs to be "fixed," e.g. too short/too tall but already at a good "just right" width.



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Make sure that before you conclude there is some

consensus of how BIG the creature is in these two

challenges - how TALL (Using measurements from

until class agrees.) Repeat this guestion and group

ruler and hold up plank, and indicate using holes

dimensions. Record somewhere that you and

students can reference for future class building

This is a chance for students to begin building

with Brackitz. Watch to make sure groups are able

to share ideas and Brackitz pieces functionally. You

can try monitoring sharing in the group, or have a

in 2 Dimensions?

timer to help systematize sharing.









Student Worksheet

Trace the frame you built here:





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Student Worksheet







Contrast

The Gingerbread is **taller than** (what answers did you and your class think of)? (what answers did you and your class think of)?

| 1. | |
|----|--|
| 2. | |
| 3. | |

The Gingerbread is **shorter than**

| 1. | |
|----|--|
| 2. | |
| 3. | |

Compare

The Gingerbread is **about as tall as** (what answers did you and your class think of)?



Contrast

The Gingerbread is **wider than** (what answers did you and your class think of)?



The Gingerbread is wider than (what answers did you and your class think of)?



Compare

The Gingerbread is **about as wide as** (what answers did you and your class think of)?

| 1. | |
|----|--|
| 2. | |
| | |

