

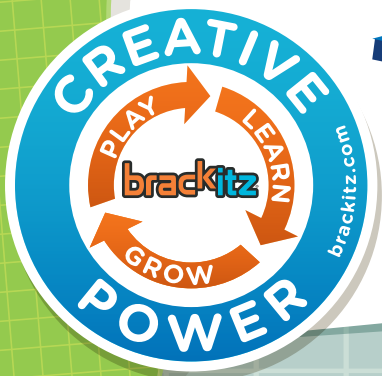
# brackitz®

U1 L2  
V2.2

LESSONS

## HOW BIG?

in **3**  
Dimensions



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# Lesson 2: HOW BIG

in 3 Dimensions?



Students continue practicing spatial thinking and vocabulary as they reconsider the figure from Lesson One, now understanding the third dimension and using Brackitz unit planks to measure height, length, and depth.

## Objectives:



Students explore two dimensional (2-D) vs. three dimensional (3-D) objects and compare to understand size and dimensions. "I can decide how big something is by describing height, length, and depth." "I can compare size by thinking about everyday objects."

## Vocabulary used in this activity:

dimension, measurement, length, height, depth, two dimensions, three dimensions, 2-D, 3-D

## Standards

### NGSS

#### 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.

### CCSS-MATH

K.MD.A.2, K.G.B.5, 1.G.A.2

### CCSS-ELA

SL.K.1.A, SL.K.5, SL.1.1.A, SL.1.5

### 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

## Time needed: Materials and Supplies:

35-40 minutes

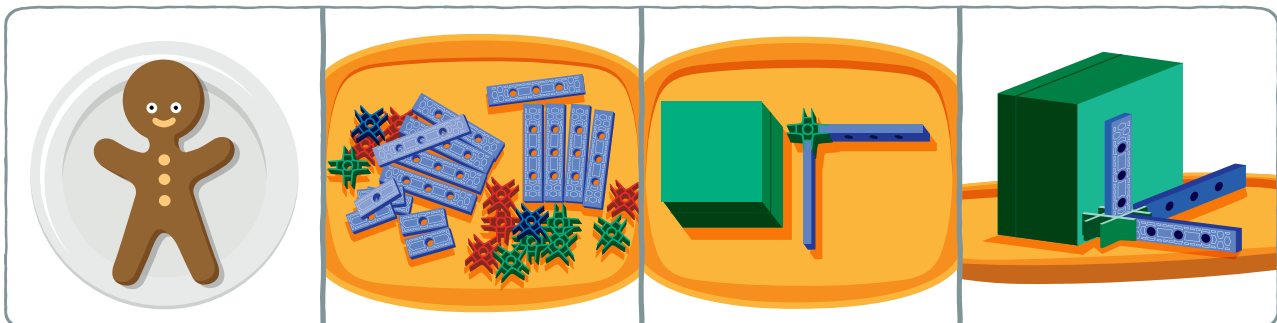
Gingerbread cutouts from Lesson One, 3-D Gingerbread(s) with some depth made out of dough or cardboard, paper, pencils/crayons, Brackitz planks and 4-way connectors. Optional: Cookie or playdough to make more Gingerbread characters, tracing paper.

## Setup and preparation:

Have trays and character cutouts for each student or group, with the same number of planks and connectors; help students cooperatively form groups of two or three to work together.

## Background knowledge:

Students who worked with the 2-D cutouts will better understand size and be able to expand their comprehension to the third dimension.



# ★ Lesson 2: HOW BIG ★

## in 3 Dimensions?

### 35-40 minutes

#### Whole Class

10 minutes



Holding the Gingerbread character from Lesson One remind the students, “Remember our small friend? S/he’s pretty small, especially compared to us. Who remembers how big s/he is?” Engage class in remembering what we learned about this Gingerbread character’s size including:

- Comparing to common objects - bigger than \_\_\_\_\_, smaller than \_\_\_\_\_
- Reference the Gingerbread character’s size in height and width
- Using Brackitz pieces to describe and measure height and width

#### Instructor Notes and Tips

Help students remember that building a frame or rectangle was one way to know how tall and wide the Gingerbread character was. If a rectangle was too short, we needed a longer Brackitz plank to make it possible to fit the Gingerbread character inside.

Specifically use the words height, width, and two dimensions as you discuss this with the whole group.

#### Group Exploration 5-10 minutes

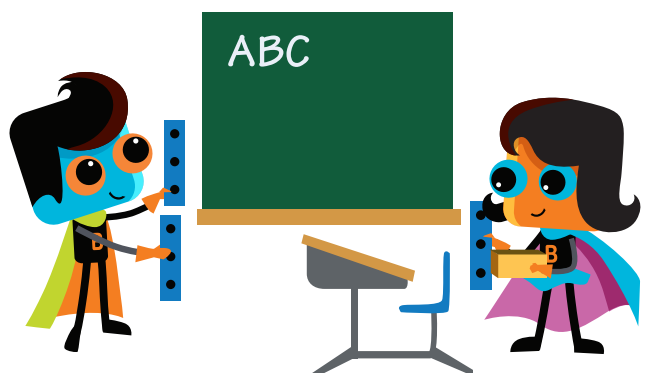


“When we draw on paper, we draw only one or two dimensions - usually HOW TALL, HOW WIDE. Each of these (Tall) is one dimension. Those are called two dimensional or 2-D. It’s how we see things in pictures and on TV. There’s a third measurement in real life. Look at this box. When I hold this plank next to it, it’s one plank wide, and one plank tall but what other way do we need to measure? (How deep!) It’s only \_\_\_ deep. I can use one of these 4-way connectors to make something that has a similar three dimensional size to this box.”

“What else in our classroom has three dimensions?” (Everything! Desk, books, cubbies, etc. )  
“In your groups, use Brackitz planks to measure three things with three dimensions!”

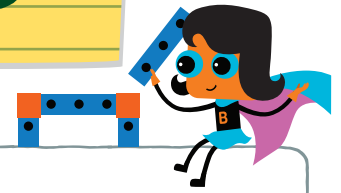
In discussion, use actual Brackitz planks to hold up alongside your box.

If students are struggling to measure things that have irregular shapes, suggest things that have more rectilinear shape like: books, book cases, cubbies, storage bins, tables.



# Lesson 2: HOW BIG

## in 3 Dimensions?



### Group Challenge

15 minutes



(Holding 3-D model) "Here is a 3-D look at our friend. I have this 3-D character that shows height, width AND the third dimension of depth! But it's fragile. Can we build homes for her/him to live safely in using your Brackitz pieces? In your groups use these planks to build a safe space for our friend that is small enough for her/his size but big enough to get in and out of? Use what we know about how BIG the our friend is in all three dimensions - how TALL, how WIDE, and how DEEP?"

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. It can help to do a hands-on demonstrations with groups on using the connector pieces. You can try monitoring sharing in the group, or have a timer to help systematize sharing.

### Group Reflection

5 minutes



(Teacher brings whole class back together and aggregates from small group builds.) "Do all of your special homes fit? What happens if we make it too small?"

And, "We need to be sure we all know how big our friend is, in all three dimensions! Use your Brackitz planks to check that measurement and record it."

Direct students to record these decisions on their worksheets or in design notebooks

Make sure that before you conclude there is some consensus of how BIG the Gingerbread character's is in **all three dimensions**. Record somewhere that you and students can reference for future class building challenges - how TALL (Hold up plank, and indicate using holes until class agrees. Repeat this question and group answer/consensus building for WIDTH and DEPTH.)

Using planks as a unit of measurement will help students continually refer to these dimensions.

### CHALLENGE ADVANCED STUDENTS

**In discussion**, ask students to consider other propositions as they consider the character's size. "What else can s/he fit UNDER?" "Could someone this size go THROUGH anything that we couldn't?"

**In the challenge**, challenge students to think of the benefits or drawbacks that a container that is not square or rectangle could offer!

### SIMPLIFY FOR YOUNGER GROUPS

**In discussion**, show students the difference between the picture of a book, and a real, 3-D book and so on.

**In the group exploration**, set up stations and have groups rotate to them. Have students measure a table, a book, a storage bin, etc. This allows you to set up more regular shaped objects for students to practice measuring and recording three dimensions.