

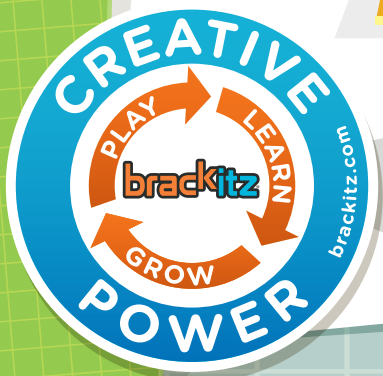
brackitz®

U1 L3
V2.0

LESSONS

FREE OUR

FRIEND!





★ Lesson 3: **FREE OUR FRIEND!** ★



Students continue with the gingerbread character as their building and engineering inspiration. Given an immediate problem to help solve, students have a play-based introduction to solving problems by designing and building devices.

Objectives:



Students will demonstrate they can create a Brackitz design to try and solve a problem, practice testing a design, and continue getting familiar with the Brackitz system. "I can create a 3D design to help solve a problem." "I can test designs and say why they work or don't work."

Standards

NY State Pre-K Foundation for Common Core

Social Development - Compares and/or contrasts self to others, Exhibits self confidence by attempting new tasks independent of prompting or reinforcement, Displays accomplishment, contentment, and acknowledgement when completing a task or solving a problem by himself/herself

NY State Pre-K Foundation for Common Core

Math - Describe and compare measurable attributes, Analyze, compare, and sort objects, Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary, Create and build shapes from components

NY State Pre-K Foundation for Common Core

Communication, Literacy - Describe and compare measurable attributes, Analyze, compare, and sort objects, Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary, Create and build shapes from components

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

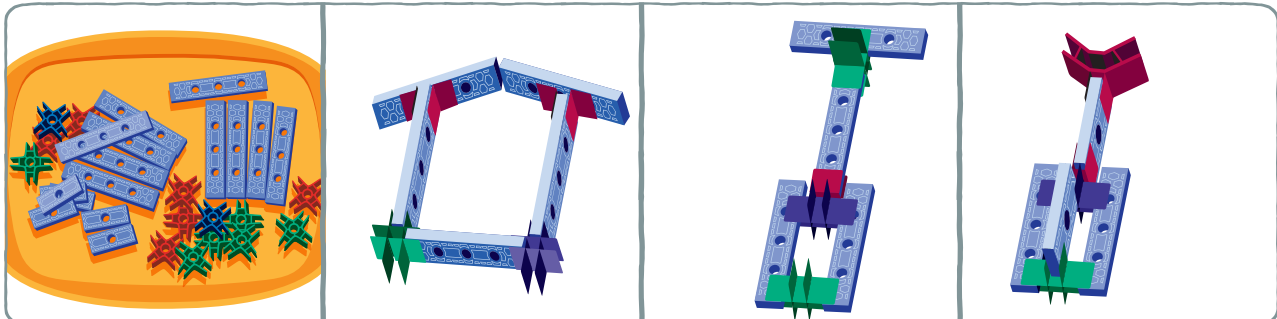
3-D figure(s) with some depth made out of dough or cardboard from lesson 2, Box, paper, pencils/crayons, Brackitz planks and 4-way connectors

Setup and preparation:

Have trays, boxes, or plates ready 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. Find a box or boxes smaller than a shoe box.

Background knowledge:

Prior to this lesson, the only background knowledge students need is to be able to pick things up and grasp them. A reminder of the agreed upon dimensions of the creature will help students build with the creature in mind.



★ Lesson 3: **FREE OUR FRIEND!** ★



40-45 minutes



Whole Class

5-10 minutes



Instructor asks, "Who remembers our special gingerbread friend? How do we understand his/her size? Can we remember we had three _____ (dimensions) What were they?" (Remind class; especially check/reinforce the agreed upon DIMENSIONS) "You built beautiful homes to keep her/him safe. I wondered if we could help our friend get ready to leave the houses and explore. But if s/he is shy and a little scared of how big we are, we want to find a way to help but not be close. We have a lot of kids and s/he could be scared if we all crowded around. It would be helpful if we could open her box without touching it. **What are ways to open something without touching it? Let's brainstorm!"**

Goal: Have students consider creating and using a tool!

Instructor Notes and Tips

Help students brainstorm all solutions. Then help them focus on real world solutions. Solutions like "Magic" and "Blow the box up" are unrealistic. A good way to hone in to helpful, realistic ideas is to praise something specific about a proposal while raising the next question about it. E.g.

- Magic = "It would be handy and fast if we had magic, because we could be across the room to make our friend happy but magic is hard to come by and we might want to solve this faster."
- Explosion = "that would be exciting, but can we think of a way that won't hurt our friend?"

Group Exploration 15 minutes



Have students practice using tools that are NOT designed for this task practicing to open a box. You may assemble some options like:

- Pencils
- Spatula
- Straw
- Broom

"Are these the best tools we could use? What works about them? What doesn't work as well?"

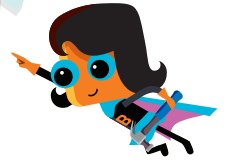
Set up boxes to simulate "the problem - we need to help our friend get out and open the box/house. "

You can have groups of students assigned to investigate one tool, or rotate groups through stations. Afterwards have a discussion helping students to note features and characteristics that helped the tool work or not work as well.

- Pencils - may be long, but too narrow
- Spatula - may be long but too flexible
- Straw - may be too short and too flexible
- Broom - may be long enough but too wide



Lesson 3: **FREE OUR FRIEND!**



Group Challenge

15 minutes



Having pre-arranged trays, boxes, or plates with the same amounts of Brackitz planks and connectors can save time on organizing tools. You may also wish to have multiple boxes so groups can test without taking turns.

As groups test their tool, keep reminding them to ask, "How will we know if our design worked?" (**Goal: If it can open the box and allow you to be far away without breaking or being unsafe**)

Reflection



5 minutes



Did you get your tool working? It's ok if you didn't. When something doesn't work the first time, or the second, or the twentieth time, it is a chance to learn what parts of your design might be working, and what parts might need to be changed.

How do you know if it works or doesn't work? (**Testing it on the box, does it open it, can you be far away, is it sturdy, is it safe**). How many times did you have to rebuild your tool or try to make it a different way?

Make sure that before this lesson closes out students understand that testing a design and finding out what is working and what needs improvement is the best way to make good designs and "be engineers." Most designs fail on the first attempt and need to be improved on many times before others can use them. Encourage students to see this as a way of making their creations better and better. Create a culture of, "what you did today was take the first steps to making better designs" rather than insisting on "finished products."

CHALLENGE ADVANCED STUDENTS

In discussion, ask: What are some tools that are used to help get something done, but with some distance from what is happening? (tongs, hoses, weed whackers, etc.)

In the challenge/build, scale up by: Help students decide how they will test their tools and what they can learn from testing and having something NOT work the first time. Create a testing zone they can visit and help list or video their testing findings to help them enthusiastically test through failures.

SIMPLIFY FOR YOUNGER GROUPS

In discussion, ask: Have you ever seen someone cooking food? Do they touch it directly or do they use something to move it so that they are safe from heat? How far away do they need to be to cook but still stay safe?

In the group exploration and challenge build: divide these sections into two lessons. Have students explore the "tools we have" deeply understanding what works and doesn't with them. Then have them design a Brackitz tool and build it. Help them make design decisions by reminding them of "what worked" when they used other tools in the previous class.

Lesson 3: **FREE OUR FRIEND!**



Student Worksheet



Draw one of the tools you tried to use from your classroom.

How many times did you have to rebuild or redesign your tool? (Circle)

1 2 3 4 5 6 7 8 9+

Draw the tool you made here!