

brackitz®

U1 L5
V2.0

LESSONS

MOVING AROUND





Lesson 5: MOVING AROUND



Students apply their understanding of designing for a user to a wider system of designs and needs.

Objectives:



"I can design to solve more than one problem or constraint," and "I know a design will not be perfect the first time." Students will continue to collaborate as they design, considering that what they make relates to more than one need.

Vocabulary used in this activity:

design, structures, protection, pathways, vehicles, connectors, bridges, tunnels

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

1.MD.A.1

CCSS-ELA

SL.K.1.A, SL.5., W.1.8, SL.1.5, SL.1.6

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:

35-45 minutes

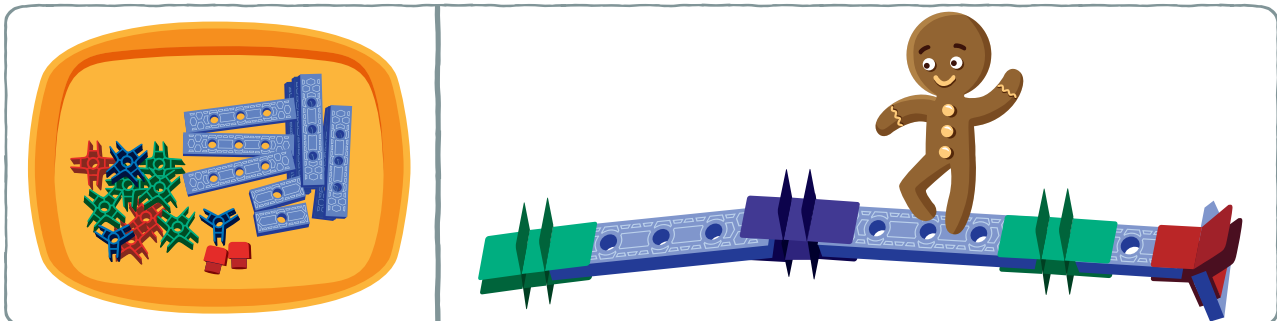
Boxes or other placeholders for the structures made in the previous two classes, something to represent and remind class of the Gingerbread character's size, paper, pencils/crayons, Brackitz planks and Brackitz planks and connectors (all types).

Setup and preparation:

Have trays, boxes, or plates ready with the same number of planks and connectors for each group of two or three students; help students work in roughly the same groups as in the previous lesson.

Background knowledge:

Prior to this lesson, the only background knowledge students need is to be able to pick things up and grasp them.



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40 minutes



Whole Class

10 minutes



"You made our gingerbread friend all kinds of things to make her/his life better. (List them here: furniture, gyms, playgrounds, gardens, etc.) If we use boxes in place of your structures can we build a way for our friend to get from place to place and stay protected from big people feet? How do we get from place to place? Let's list the ways." Brainstorm ways that we travel and connect places and locations to one another, list on class chart.

Instructor Notes and Tips

Ask students how they got to school - what was used (cars/bus and roads) to get things started. Walking will come up as a popular option - use this to remind students on the scale difference by asking, "if you lived with people 10 times your size would you want to walk on the same path as them?"

Ideas if you and your class are struggling are: Designated paths, vehicles, bridges, tunnels.

Group Exploration

10 minutes



"We made X structures over the last two classes. To connect them all so that our friend can move around all of them staying safe the whole time, we'll need at least X ways for our friend to move between them. In your groups, draw what this would look like. What kind of pathway or connector will you make to keep him/her safe as s/he is moving around? Can you draw it?"

Help small groups get started by thinking about what it would look like to connect all the structures: E.g. 1 to 2, 2 to 3, 3 to 4, 4 to 5 and 5 back to 1. (There are many other combinations, but this one may be simplest). "What kind of pathway, roadway, tunnel or bridge will be the safest and best to use?"

During this time, assign each group which two structures they will build the "connector" for.

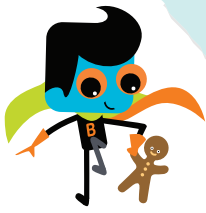
Group Challenge

15 minutes



"Time to build! I've assigned each group to build one 'connector.' (Repeat which group is connecting what for clarity). You can build any kind of connector you want - bridges, tunnels, pathways, anything else that will keep the Gingerbread safe. Work as a group to build the connector you think is best for our Gingerbread friend."

As students begin building, watch to make sure groups are able to share pieces and ideas functionally. Circulate to groups to help groups keep scale and dimensions in mind as they move from a 2-D plan to 3-D build.



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Reflection



5 minutes



Do a “silent sharing walk.” Groups can circulate around to look at all the different pathways and “connectors” that were built, but not talk or ask questions. Then hold a design debrief discussion on “which connector will work best for our friend and why?”

Some good questions to ask are, “Did you see something another group built that you really liked?”

“What would be the best way to test which builds are most useful and safe?”

CHALLENGE ADVANCED STUDENTS

In discussion: Bring up the idea that it’s easy to imagine that if there are four or five structures, the same number of connectors/paths/trails need to be in place to go from one to two, two to three, etc. “Around the bases and back to ‘home’ ” so to speak. But there are many other combinations of structures and pathways. Show this by drawing five dots on the board, similar to a die or domino. If “home” was in the middle, how many pathways can we make now? (eight) Is there a reason to arrange structures like this? What makes the most sense for the arrangement of structures? Once that is decided, then decide how many pathways need to be made. (This is a mini-city planning exercise.)

In the challenge: Consider having groups stop in the middle of their build and do “partial presentations.” Set up an expectation that their work won’t be done but that this is a chance to say “Here is what we’re making; when it’s done the way it should work is _____. One problem we are still trying to solve is _____.” This gives groups a chance to give and receive feedback before their design work is complete.

SIMPLIFY FOR YOUNGER GROUPS

In discussion: Mention the idea of going around the bases and back to “home” and decide where that is.

In group exploration: After groups draw the structures and pathways, do a walk around the room and consider leaving tape or paper to show where you and the class think connections/paths/trails should go.

In the challenge: Encourage groups to keep it very simple, building basics first before adding “extras.”

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Draw how you wanted your location to connect to the next location here!

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

1 2 3 4 5 6 7 8 9+

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If you had time, what would you redesign?

Draw how your design would change here!