

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:



Students will continue to collaborate as they design, considering that what they make relates to more than one need. "I can design with competing factors in mind." and "I know a design will not be perfect the first time." and "I can count simple combination options given a small number of items and ways to arrange them."

Vocabulary used in this activity:

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

Standards

ECERS-R **Language-Reasoning:** Books and pictures, Encouraging children to communicate, Using language to develop reasoning skills | **Activities:** Fine Motor, Art, Math/Numbers

NGSS 3-5 ETS1, ETS1.A, ETS1.B

CCSS-Math Practice.MP2, Practice.MP5, Practice.MP7, Content.4.MD.A, Content.4.MD.A.1, Content.5.MD.A, Content.5.MD.A.1, Content.4.OA.A.2

CCSS-ELA Literacy RI.5.5, Literacy RL 5.4, Literacy SL.4.1

Time needed: 35-40 minutes

Materials and Supplies:

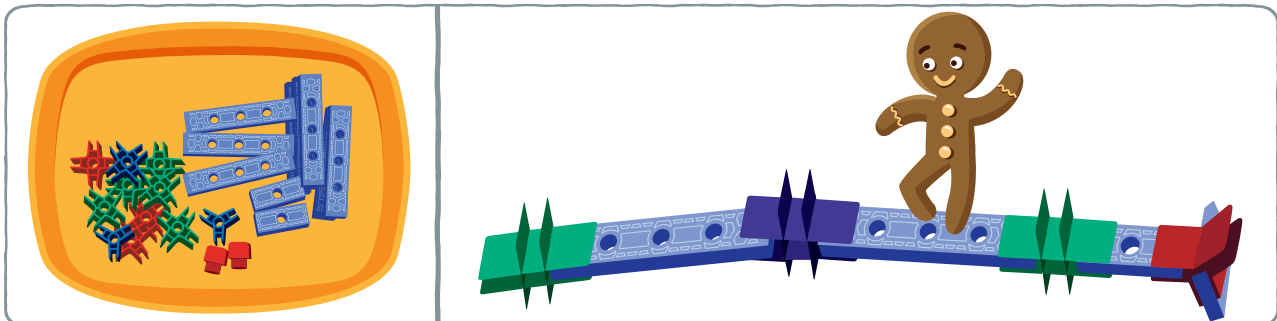
Boxes or other placeholders for the structures made in the previous two classes, something to represent and remind class of the creature's size, paper, pencils/crayons, Brackitz planks and Brackitz planks and connectors (all types).

Setup and preparation:

Have trays, boxes or other placeholders of their previous structures, or plates ready with the same number of planks and connectors for each group of 2-3; help students work in roughly the same groups as in the previous lesson.

Background knowledge:

Prior to this lesson, students don't need any special knowledge



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40 minutes



Whole Class

10 minutes



"You made our creature friend all kinds of things to make her/his life better. (List them here: furniture, gyms, playgrounds, gardens, etc.) We'd like to think about how s/he will get from place to place now. If we have four structures, and want to help our creature get from place to place, how many paths at a minimum?" Have class discuss and even come up to the board to help diagram. "If we have five structures, and want to help our creature get from place to place, how many paths will we need at a minimum? Could we make more?" Have class discuss and even come up to the board to help diagram. "Ok, Could we make more or arrange the places differently? Is there a reason to arrange structures like this? What makes the most sense for the arrangement of structures?"

Instructor Notes and Tips

If you have four places and arrange them in a grid or circle, the minimum number of paths between them is four to go "around the bases."

But even in this simple arrangement, there are three or more other easy to spot options for making more paths and path combinations.

Now, help your students consider that one place may be used more, or be home base. If we wanted to plan pathways that allowed the creature to have direct routes from that centralized location to everywhere else easily, what would that map look like? Are there real life examples of this? (e.g. many towns have a central location like a park or town hall that have more road connections than other places)

Group Exploration

10 minutes



Help your groups consider many combinations of structures and pathways. Show this by drawing five dots on the board, similar to a die or domino. "If 'home/centralized location' was in the middle, how many pathways can we make now?" (8) "Is there a reason to arrange structures like this? What makes the most sense for the arrangement of the structures we made for the small creature?" Once that is decided, then decide how many pathways need to be made." Decide as a class what way the paths should go (discussion, consensus, or vote), and lay down tape.

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 in an "around the bases" manner. But then help them see that there are other ways to arrange their pathways. (e.g. if four locations from grid, there are at least three other obvious ways to make the paths)

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



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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 creature safe. Work as a group to build the connector you think is best for our creature friend." At about the seven minute mark stop the groups and ask each group to give a 30 second partial presentation "what you are building, how it will help, and why this is the best connector between these two places creature will visit."

As students begin building, watch to make sure groups are able to share pieces and ideas functionally.

Stop groups to give their partial presentations - keep those quick and light. Just a way to have groups verbalize their thinking.

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/pathway will work best for our tiny friend and why? Which are the most stable? Which are the most safe? Which ones suit his/her needs"

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 the group exploration, ask: Do some research on how your town is designed. Show other towns that are laid out differently. For instance, many towns with a longer history have evolved their city planning around historically placed roads and sites that may no longer be central. Many newer towns are built on a grid or other pattern. Have students discuss what makes sense to them and why.

In the challenge: Ask groups if there are ever cases of hybrid connectors - bridges that are sidewalks and roads that are also tunnels. Do they need any connections like that? Why or why not?

SIMPLIFY FOR YOUNGER GROUPS

In discussion: Mention the idea of going around the bases and back to "home" and decide where that is. Help students arrange the locations as a grid or circle to reinforce this idea.

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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Examples of pathways





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Student Worksheet

Draw your first (simple) map of where Gingerbread can go:

Draw your second (complex) map of where Gingerbread can go:

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Student Worksheet



Which is best and why?

Did you see another group's design with good ideas? If you had time, what would you redesign?

Draw how your design would change here!