

## Foundational Fluencies: Is It Strong?

## Teacher Lesson Plan

### Overview:

In this lesson, students are free to create something of their own design. Students can use the skills they have learned throughout previous lessons to build and improve a custom design.

[Click here](#) to explore the entire Kid Spark Curriculum Library.

### Unit Concepts & NGSS Alignment:

- Manipulate ROK Blocks to build increasingly complicated structures
- Explore a specific problem engineers often face (how to make things stronger)
- Understand that pushes on objects can have different strengths and that bigger pushes cause bigger changes in the object
- Match 3-dimensional objects to 2-dimensional pictures
- Test constructions for strength; Try to improve strength by using different designs
- Recognize symmetry

**Scientific/Engineering Practice** - Planning and carrying out investigations  
**Crosscutting Concept** - Structure and function

### Activity Time:

30 - 40 Minutes

### Kid Spark Mobile STEM Lab:

ROK Blocks

### Materials Per Team:

1 Lab serves up to 4 students.



### Lesson Introduction:

**Instructor:** *"Throughout this unit, we have learned how to add strength to different designs. In this lesson, you are going to have the opportunity to use your imagination to create your very own design that is strong and stable".*

### Core Learning Activity:

1. Provide 1 ROK Blocks Mobile STEM Lab per (4) students. Students can work individually, but will share the materials from 1 lab. Provide the ROK Blocks Inventory & Organization Mats (inside each lab), which the students may find useful.

**Note:** You may wish to start the free building lesson re-establishing the classroom norms that were discussed in the free build in the previous unit. One important "rule" to establish is there are no "mistakes" when building with ROK Blocks. There are only "improvements" and "do-overs".

2. Circulate among the students or build your own design, or both. As you interact with students ask them to tell you about their creation using these potential prompt questions:
  - a. What are you making? What do you want your design to do?
  - b. Can you show me with your hands what you're trying to make?
  - c. How have you made your design strong? What could you do to make it stronger?
  - d. Is it symmetrical? How do you know?
  - e. Where are the joints in what you're building? How could you reinforce them?

**Note:** If you build your own design, it might be helpful for you to "think aloud" about what you're doing, and to especially comment when you decide to revise your design. Here are some potential "think aloud" comments:

- a. Oh, I need a lot more blue blocks than I thought I would need.
- b. Well, I tested my \_\_\_\_\_, and it needs to be stronger. I need to reinforce the joints.

### **Learning Extensions:**

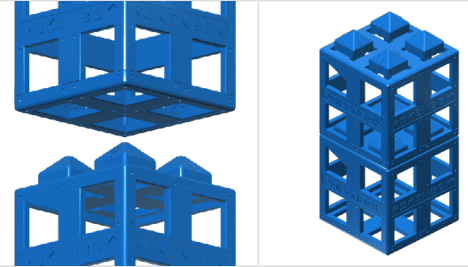
- a. Free build time offers a great opportunity to connect children's Kid Spark experience with other subjects and skills. If time permits, you can extend children's learning before they build by having them draw/sketch or describe what they intend to build.
- b. Students can strengthen speaking/communication skills by giving "show and tell" presentations about their creations to their classmates.
- c. Students can practice writing skills by taking a picture or drawing their build in their class journals and writing or dictating a few sentences about it. Children can connect to their environment or community by identifying similar objects in their home, school, or neighborhood.
- d. Following the free build, take students on a walk through their school and help them identify ways that their school building is reinforced and made stronger (prepare for the walk in advance so you have specific examples to point out to them).

## Building Basics

The following tips will be helpful when using Kid Spark engineering materials.

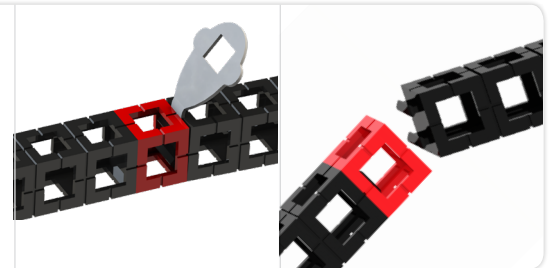
### Connecting/Separating ROK Blocks:

ROK Blocks use a friction-fit, pyramid and opening system to connect. Simply press pyramids into openings to connect. To separate blocks, pull apart.



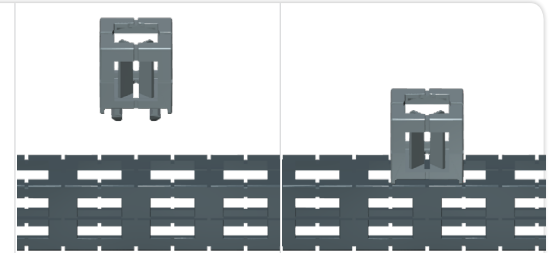
### Connecting/Disconnect Smaller Engineering Materials:

Smaller engineering materials use a tab and opening system to connect. Angle one tab into the opening, and then snap into place. To disconnect, insert key into the engineered slot and twist.



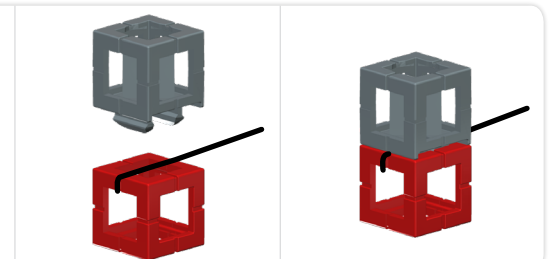
### Snapping Across Openings:

Materials can be snapped directly into openings or across openings to provide structural support to a design. This will also allow certain designs to function correctly.



### Attaching String:

In some instances, string may be needed in a design. Lay string across the opening and snap any component with tabs or pyramids into that opening. Be sure that the tabs are perpendicular to the string to create a tight fit.



### Measuring:

The outside dimensions of a basic connector block are 2 cm on each edge. This means the length, depth, and height are each 2 cm. To determine the size of a project or build in centimeters, simply count the number of openings and multiply by two. Repeat this process for length, depth, and height.

