# Introduction to ROK Blocks

v2.5

STEM Fundamentals: Engineering Basics | Teacher Lesson Plan

## Introduction

In this lesson, students will explore the engineering materials that are included in the ROK Blocks Mobile STEM Lab and become familiar with the name and function of each.

Click here **to explore the entire Kid Spark Curriculum Library.**

## NGSS Learning Dimensions

This Kid Spark lesson engages students in the following learning dimensions of the Next Generation Science Standards:

**Scientific/Engineering Practice:**
Asking questions and defining problems

**Crosscutting Concept**:
Structure and function

## Learning Objectives

- Become familiar with the engineering materials in the ROK Blocks Mobile STEM Lab.
- Understand the basics of connecting and disconnecting ROK Blocks and smaller engineering materials.
- Use Kid Spark engineering materials to complete a series of design challenges.
- Understand how to correctly organize and inventory materials in a lab.

## Resources

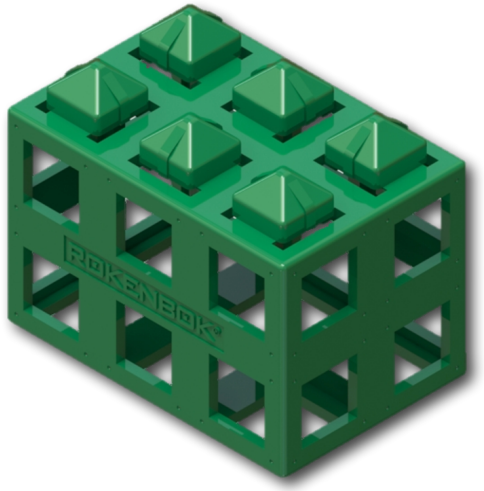
The following resources will be used to complete this lesson.

**1. Kid Spark Curriculum**

**Introduction to ROK Blocks**
a. Teacher Lesson Plan
b. 15 Student Inventory Mats (Located inside the blue folder in ROK Blocks Lab.)

**2. Kid Spark Mobile STEM Lab (Pictured Right)**

## Activity Time: 60 Minutes



## Educational Standards

### NGSS

K-5-ETS1-3 Engineering Design

MS-ETS1-4 Engineering Design

### ITEEA

STL8- Attributes of Design

STL9- Engineering Design

STL12- Use Technological Systems

## Resources

**ROK Blocks Mobile STEM Lab**
***Up to 4 students per lab**

# Procedure

Complete the following steps to introduce students to the ROK Blocks Mobile STEM Lab.

## 1. Grouping

Before class, arrange students in teams of up to 4. Group students that will work effectively together.

## 2. Disperse Materials (2 Minutes)

Provide teams with the correct Kid Spark resources. (ROK Blocks Lab and Inventory Mats)

## 3. Review Learning Objectives (1 Minute)

Review learning objectives with students.

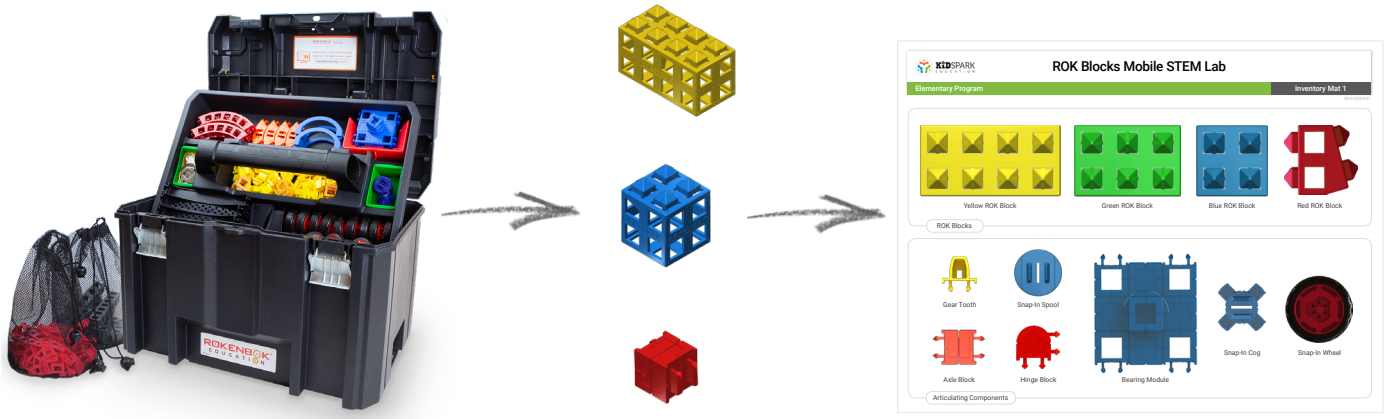
## 4. Organize ROK Blocks (15 Minutes)

The ROK Blocks STEM Lab consists of a variety of engineering materials that are easy to use and excellent for building models, prototypes, or new inventions.

To help students learn about all of the engineering materials included in the ROK Blocks STEM Lab, locate the Inventory Mats that were included in the lab (mats should be located in a green folder). These mats will be used to identify, organize, and discover all of the materials that are located within the lab. There are four inventory mats included. An example student inventory mat is shown below.

***Note:*** *If you are missing mats or need to replace/update old ones, you can download and print them for free. Mats can be found in the downloads section for each lesson.*

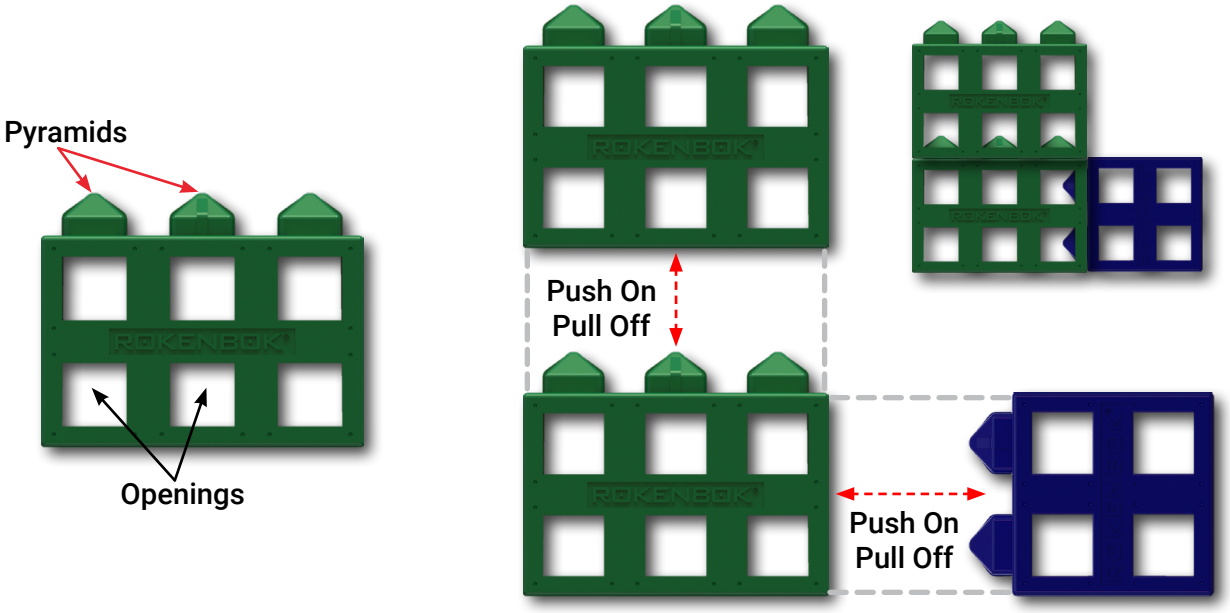
Instruct each group to lay the mats out on a table, desks, or the floor. Students should find each physical component in the lab and then match/place it with the correct two-dimensional image of the component that is represented on the mat.



## 5. Connecting/Disconnecting: ROK Blocks (3 Minutes)

The ROK Blocks STEM Lab includes four different types of large ROK Blocks that are easy for anyone to design and engineer with. ROK Blocks are designed with a pyramid and opening system that can be connected by inserting the pyramid sections into the openings.

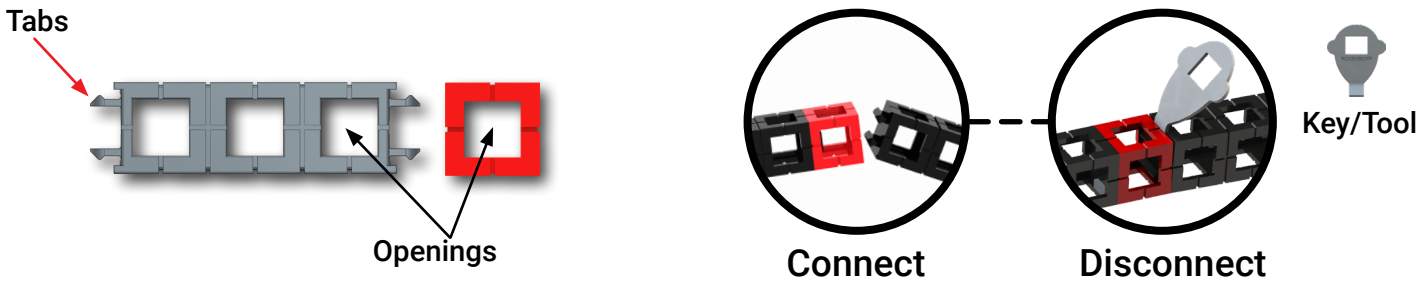
Hold up a ROK Block and point out the pyramids and openings on the block. Use another ROK Block to demonstrate how to connect and disconnect the blocks. Demonstrate to students how blocks can be connected in multiple ways. Instruct students to practice connecting and disconnecting the ROK Block building components.



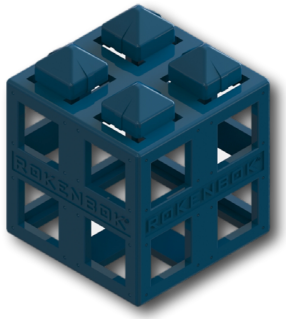

## 6. Connecting/Disconnecting: Smaller Engineering Materials (3 Minutes)

Smaller engineering materials connect slightly different than the larger ROK Blocks. These materials use a tab and opening system to connect. These materials are more difficult to snap together, so using the correct technique will make things much easier.

Hold up a half beam and connector block. Demonstrate to students how the smaller engineering materials connect. Inserting the tabs of the half beam at an angle to the opening of the connector block, and snap into place. Next, demonstrate how the Key/Tool is used to disconnect materials. Insert the key into the slot and twist to separate. Instruct students to practice connecting and disconnecting smaller engineering materials.



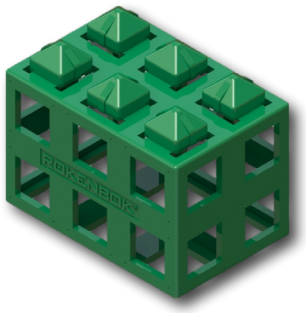
## 7. Building with ROK Blocks - Blue ROK Blocks (5 Minutes)



The Blue ROK Blocks are shaped like a square and can be combined with other blocks to make different patterns and structures.

Hold up a Blue ROK Block and instruct each student to grab one. Ask students how many openings there are on the Blue ROK Block. Ask them how many pyramids there are. Challenge students to make the first letter in their name using only the Blue ROK Blocks.

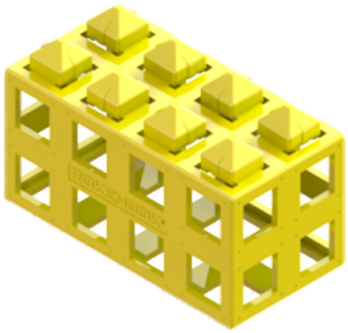
## 8. Building with ROK Blocks - Green ROK Blocks (5 Minutes)



The Green ROK Blocks are shaped like a rectangle and can be combined with other blocks to make different patterns and structures.

Hold up a Green ROK Block and instruct each student to grab one. Ask students how many openings there are on the Green ROK Block. Ask them how many pyramids there are. Challenge teams to build a staircase that is five blocks high using only the Green ROK Blocks.

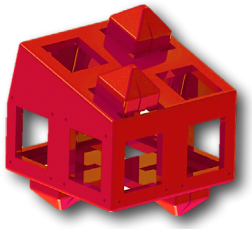
## 9. Building with ROK Blocks - Yellow ROK Blocks (5 Minutes)



The Yellow ROK Blocks are the largest building block in the ROK Blocks STEM Lab. They are also shaped like a rectangle.

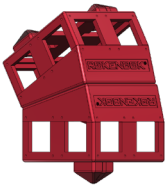
Hold up a Yellow ROK Block and instruct each student to grab one. Ask students how many openings there are on the Yellow ROK Block. Ask them how many pyramids there are. Challenge teams to build a skyscraper building that is at least five blocks high using only the Yellow ROK Blocks.

## 10. Building with ROK Blocks - Red ROK Blocks (5 Minutes)



The Red ROK Blocks are shaped like a wedge. They can be used to create angles, curves, arches, or complete circles.

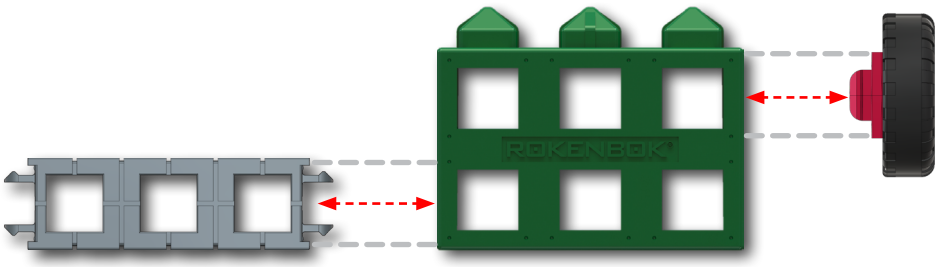
Hold up a Red ROK Block and instruct each student to grab one. Ask students how many openings there are on the Red ROK Block. Ask them how many pyramids there are. Challenge teams to build a full circle using only the Red ROK Blocks.



**Note:** When using Red ROK Blocks, connect logo to logo to form a perfect 90° angle, complete arch, or circle.

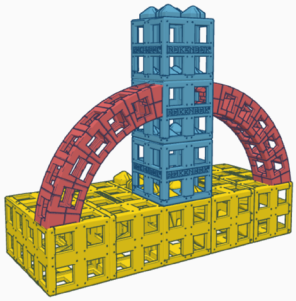
## 11. Building with ROK Blocks and Smaller Engineering Materials (6 Minutes)

ROK Blocks can also be used with smaller engineering materials to build custom designs. Demonstrate how a variety of smaller engineering materials can be snapped into a ROK Block. Challenge teams to build a small vehicle using at least two ROK Blocks and ten smaller engineering materials.

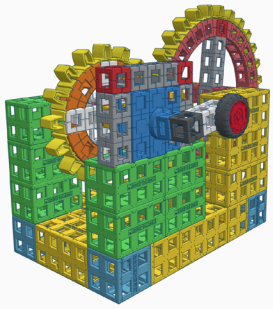



Explain to students that throughout upcoming Kid Spark lessons, they will learn how each engineering material can be used to design and engineer new things. This will include how these materials can be used to measure, make strong structures, create different types of movement, and create custom solutions of their own design. Have a couple of examples built to show the students. Creating aspirational objects to demonstrate new components or possibilities for students is an important aspect of early STEM Mentoring.

**Making Things Strong**



**Making Things Move**



**Custom Design**

## 12. Organizing The ROK Blocks Mobile STEM Lab (10 Minutes)

To keep the ROK Blocks Lab clean and organized, students should have an understanding of how to correctly pack materials in the lab after a lesson or project is complete. Have students locate the ROK Blocks Inventory and Organization Guide that was included in the lab. Instruct students to pack the lab back exactly as it shows in the guide.