

Overview:

In this lesson, students will learn how Kid Spark engineering materials can be used to determine the dimensions of different objects. Then, students will work in teams to create a simple measuring device to determine the dimensions of several objects in the room.

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

Learning Objectives & NGSS Alignment:

- ⚙ Define length, depth, and height.
- ⚙ Understand what objects look like from different perspectives.
- ⚙ Determine an object's dimensions (in metric units) using Kid Spark engineering materials.
- ⚙ Create a simple measuring device.

Scientific/Engineering Practice - Using mathematics

Crosscutting Concept - Scale, proportion, and quantity

Activity Time:

60 Minutes

Targeted Grade Level:

2 - 8

Student Grouping:

Teams of 2

Additional Lesson Materials:

- Teacher Lesson Plan
- Student Engineering Workbook

Kid Spark STEM Lab:

STEM Pathways

Note: Two teams can share the engineering materials from one lab.

Pre-Lesson Preparation:

1. Prepare enough lesson materials for each team. (Curriculum Packets, Student Engineering Workbooks)
2. Review lesson content and prepare example objects for demonstration. *Curriculum Packet - Pages 1 - 3*
3. Prepare an example solution for the design and engineering challenge. *Curriculum Packet - Page 4*

Convergent Learning Activity:

1. Introduce students to length, depth, and height. *Note: Students should fill out lesson information in their Student Engineering Workbooks as they work through the lesson.*

All objects that exist in physical space have three dimensions: **length** (how long an object is), **depth** (how deep an object is), and **height** (how tall an object is). Whether a given dimension of an object is classified as the length, depth, or height is determined by the perspective from which it is viewed and measured. Hold up the example objects that are shown on page 1 in the Curriculum Packet and work with students to determine the length, depth, and height of each object.

In example 1, the block is a cube. This means each dimension of the block is equal, regardless of the orientation of the block or perspective from which the block is viewed. In examples 2 and 3, the objects are identical, but the orientation of the objects are different. This means the dimensions will also be different.

2. Instruct students to determine the dimensions (in number of openings) of each example. *Curriculum Packet - Page 1, Student Engineering Workbook - Page 1*

3. Work with students as they observe what objects look like from different perspectives. Prepare a couple of example objects that you can demonstrate to students and then have them create their own. *Curriculum Packet - Page 2, Student Engineering Workbook - Page 2*

Note: Make sure students don't disassemble the objects they create in this section as they will be used in the following section.

4. Work with students as they learn how to determine an object's dimensions in metric units.
Curriculum Packet - Page 3, Student Engineering Workbook - Page 2
5. Instruct students to determine the dimensions of the objects they created in the previous section.
Curriculum Packet - Page 3

Divergent Learning Activity:

1. Instruct students to create a measuring stick and use it to determine the dimensions of several objects in the room.
Curriculum Packet - Page 3

Lesson Closure:

1. Instruct each team to share the dimensions (length, depth, height) of the objects they measured in the room.
2. Lab cleanup - After teams have finished their presentations, instruct them to disassemble their designs and pack all engineering materials back into the labs correctly. *Note: Each lab includes an Inventory and Organization Guide on the top lid to help students pack engineering materials back correctly.*
3. Lesson reflection - If time permits, do a quick recap/review of the lesson.

Assessment/Evaluation:

- A. Student Engineering Workbook (23 Points)



Team Members:

1. _____ 2. _____

Total Points

Workbook: /23 pts

Exploring Length, Depth, and Height

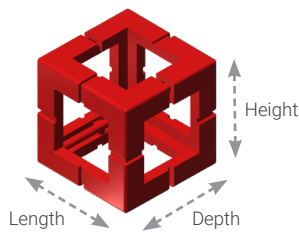
Define each term listed below.

1. Length: How long an object is

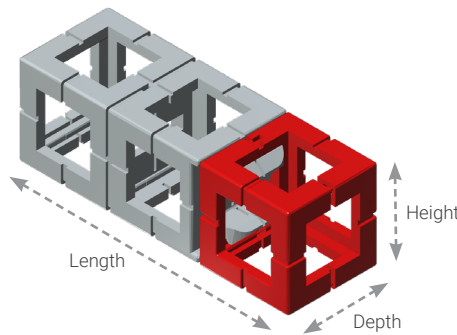
2. Depth: How deep an object is

3. Height: How tall an object is

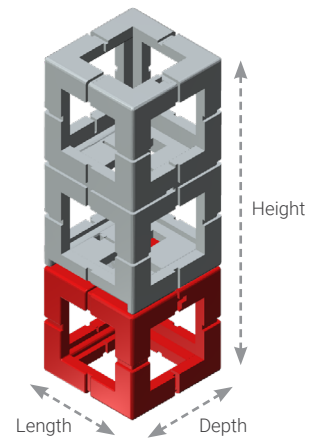
Instructions: Fill in the correct information in the spaces provided. *Note: Units of measurement for this section will be in number of openings.*



Example 1



Example 2



Example 3

4. Length: 1 opening(s)

5. Depth: 1 opening(s)

6. Height: 1 opening(s)

7. Length: 3 opening(s)

8. Depth: 1 opening(s)

9. Height: 1 opening(s)

10. Length: 1 opening(s)

11. Depth: 1 opening(s)

12. Height: 3 opening(s)

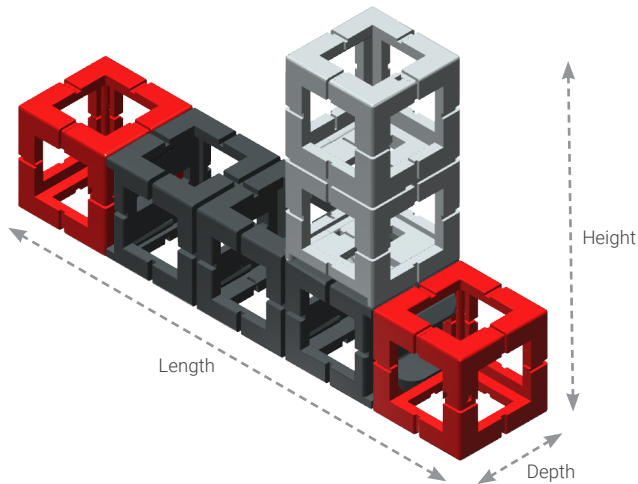
Exploring Orthographic Projections

Place a check in each box as each step is completed.

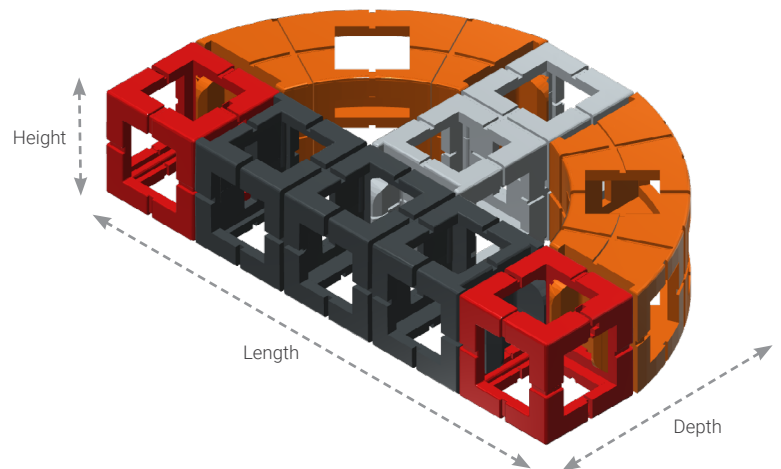
13. ☒ Using engineering materials, assemble a simple object.
14. ☒ Rotate the object and observe what it looks like from different perspectives.

Measuring In Metric Units

Determine the length, depth, and height of the example objects shown below. *Note: Units of measurement for this section will be in centimeters.*



Example 1



Example 2

15. Length: 10 cm

16. Depth: 2 cm

17. Height: 6 cm

18. Length: 10 cm

19. Depth: 6 cm

20. Height: 2 cm

Divergent Learning Activity

Create a "measuring stick" and use it to determine the dimensions of various objects in the classroom. The length of the measuring stick can be determined by each team.

21. Object: Various Answers

Length: Various Answers (cm)

Depth: Various Answers (cm)

Height: Various Answers (cm)

22. Object: Various Answers

Length: Various Answers (cm)

Depth: Various Answers (cm)

Height: Various Answers (cm)

23. Object: Various Answers

Length: Various Answers (cm)

Depth: Various Answers (cm)

Height: Various Answers (cm)