Applied Mathematics

v2.1

Unit Overview:

This unit is designed to introduce students to basic mathematics concepts such as perimeter, area, volume, ratios, proportions, and scale drawings. As students progress through the unit, they will become confident in their ability to use and apply mathematics concepts to real-world situations and challenges.

Recommended Grade Level:
3 - 5

Kid Spark STEM Lab:
Engineering Pathways OR
Young Engineers

Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the Common Core Standards in Math.

- ⚙ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.

- ⚙ NGSS Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young students.

- ⚙ Common Core Standards in Math (CCS-MA) help teachers integrate math concepts to Kid Spark curriculum. Click on the common core standards listed below for a brief overview of each standard.

Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	CCS-MA
Lesson 1: Dimensions & Measurement (120 Min.) 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 custom design and determine its dimensions.	Engineering design	Constructing explanations & designing solutions	Scale, proportion, & quantity	CCSS.MATH. CONTENT.4.MD. A.1
Lesson 2: Perimeter (120 Min.) In this lesson, students will learn how to determine the perimeters (inside and outside dimensions) of square, rectangular, and circular three-dimensional objects.	Engineering design	Developing & using models	Scale, proportion, & quantity	CCSS.MATH. CONTENT.3.MD. D.8
Lesson 3: Area (120 Min.) In this lesson, students will learn how to determine the area of square, rectangular, and circular three-dimensional objects. Then, students will work in teams to build a custom structure and determine its area.	Engineering design	Planning & carrying out investigations	Scale, proportion, & quantity	CCSS.MATH. CONTENT.3.MD. C.6
Lesson 4: Volume (120 Min.) In this lesson, students will learn how to determine the volume of rectangular prisms and cylinders. Then, students will work in teams to build a custom structure and determine its volume.	Engineering design	Obtaining, evaluating, & communicating information	Scale, proportion, & quantity	CCSS.MATH. CONTENT.5.MD. C.3
Lesson 5: Ratios, Proportions, & Scale Drawings (120 Min.) In this lesson, students will learn about ratios, proportions, and scaled drawings using Kid Spark engineering materials. Then, students apply what they have learned to complete a fun design and engineering challenge.	Engineering design	Asking questions & defining problems	Scale, proportion, & quantity	CCSS.MATH. CONTENT.7.RP. A.2
Unit Assessment: Applied Mathematics In this assessment, students will answer a series of questions to demonstrate an understanding of the core ideas and concepts that were covered throughout this unit.				

Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Area	Dimension	Perimeter	Rectangular prism
Circle	Equivalent ratio	Perspective	Scale drawing
Circumference	Height	Pi	Scale ratio
Cube	Length	Proportion	Square
Cylinder	Measurement	Radius	Volume
Depth	Metric	Ratio	
Diameter	Orthographic projection	Rectangle	

Teaching Lessons Over Multiple Class Periods

Each lesson in this unit follows Kid Spark's convergent to divergent lesson format. Lessons can easily be taught over the course of two class periods.

Class Period 1 - Convergent Learning Activity
Students building the same models, learning the same content.

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Class Period 2 - Divergent Learning Activity
Students applying their knowledge through open-ended design challenges.

Online Video Resources

The following videos are a great resource when teaching the concepts that are covered throughout this unit.

Mathantics - Perimeter (Video):
https://youtu.be/AAY1bsazcgM

Mathantics - Area (Video):
https://youtu.be/xCdxURXMdFY

Mathantics - Volume (Video):
https://youtu.be/qJwecTgce6c

Mathantics - Ratios (Video):
https://youtu.be/RQ2nYUBVvqI

Mathantics - Proportions & Scale Drawings (Video):
https://youtu.be/USmit5zUGas