Mechanisms & Movement

v3.0

Unit Overview:

In this unit, students will learn how to create and convert different types of motion using Kid Spark engineering materials. Throughout each lesson, students will learn how to create a new type of motion and then apply what they have learned through a creative design challenge.

Recommended Grade Level:
2 - 5

Kid Spark STEM Lab:
STEM Pathways **or**
Engineering Pathways (w/Spark:bit)

Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the International Society for Technology in Education Standards (ISTE).

- 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.
- ISTE standards are designed to prepare students to thrive in a constantly evolving technological landscape. Click here to view ISTE standards.

Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	ISTE
Lesson 1: The Spark:bit - Motor Override Mode (120 Min.) In this lesson, students will learn how to use the Motor Override Mode on the Spark:bit to control Motor Modules and Light Modules. This lesson does not require any computers or programming.	Engineering design	Developing & using models	Structure & function	Innovative designer, Creative communicator
Lesson 2: Rotary Motion (120 Min.) In this lesson, students will learn how to create rotary motion. Students will build a simple gear train and observe how it creates rotary motion. Then, students will create a custom design that produces rotary motion.	Engineering design	Asking questions & defining problems	Cause & effect; mechanism & explanation	Innovative designer, Creative communicator
Lesson 3: Linear Motion (120 Min.) In this lesson, students will learn how to create linear motion. Students will build a mechanism that converts rotary motion into linear motion. Then, students will create a custom mechanism that produces linear motion.	Engineering design	Planning & carrying out investigations	Systems & system models	Innovative designer, Creative communicator
Lesson 4: Oscillating Motion (120 Min.) In this lesson, students will build a mechanism that converts rotary motion into oscillating motion. Then, students will create a custom mechanism that produces oscillating motion.	Engineering design	Constructing explanations & designing solutions	Cause & effect; mechanism & explanation	Innovative designer, Creative communicator
Lesson 5: Reciprocating Motion (120 Min.) In this lesson, students will build a mechanism that converts rotary motion into reciprocating motion. Then, students will create a custom mechanism that produces reciprocating motion.	Engineering design	Developing & using models	Scale, proportion, and quantity	Innovative designer, Creative communicator
Unit Assessment: Mechanisms & Movement 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.

Dimensions	Innovation	Motion	Rotary
Gear	Invention	Oscillating	Speed
Gear Train	Linear	Reciprocating	Torque
Infrared	Mechanism	Robot	

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.

Get Engaged!

Visit our community page at **KidSparkEducation.org/Community** for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.