

Unit Overview

In this unit, students will explore renewable energy concepts, such as wind, solar, hydroelectric, and energy storage, by building and testing models using Kid Spark engineering materials. Each lesson will focus on a specific energy concept, and students will gain hands-on experience in how these energy systems work. After learning about each concept, students will apply their understanding to a creative design challenge.

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.

Recommended Grade Level:
2nd - 5th grade

Kid Spark STEM Lab:
STEM Pathways



Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	ISTE
Lesson 1: Introduction to Energy (120 Min.) In this lesson, students will explore what energy is and learn the difference between potential and kinetic energy by building and testing a catapult. They will also be introduced to renewable and nonrenewable energy as an introduction to different energy sources. Finally, students will design their own creations to demonstrate potential and kinetic energy in action.	Motion and Stability; Energy	Constructing Explanations & Designing Solutions	Energy and Matter; Cause and Effect	Innovative Designer; Creative Communicator
Lesson 2: Wind Energy (120 Min.) In this lesson, students will learn how the power of wind can be used to generate electrical energy by building a small wind turbine. Then, they'll create their own device powered by the turbine.	Energy; Engineering Design	Developing and Using Models	Energy and Matter; Systems and System Models	Innovative Designer; Creative Communicator
Lesson 3: Solar Energy (120 Min.) In this lesson, students will explore how to harness solar energy to generate electrical energy using the Spark:bit as a solar panel. They'll then take part in a hands-on activity, building a small house or building with solar-powered lighting.	Links Among Engineering, Technology, Science, and Society; Engineering Design	Planning and Carrying Out Investigations	Energy and Matter; Systems and System Models	Innovative Designer; Creative Communicator
Lesson 4: Hydroelectric Energy (120 Min.) In this lesson, students will learn how moving water can generate electrical energy. They will build a small hydroelectric turbine, observe how it transforms energy, and then design their own device powered by the turbine.	Energy; Engineering Design	Developing and Using Models	Energy and Matter; Systems & System Models	Innovative Designer; Creative Communicator
Lesson 5: Storing Renewable Energy (120 Min.) In this lesson, students will learn how energy storage makes renewable energy systems more reliable. They will build a wind turbine and energy storage device to simulate generating, storing, and using energy. Finally, they will design a device powered by the stored energy.	Energy; Engineering Design	Asking Questions & Defining Problems	Energy and Matter; Structure and Function	Innovative Designer; Creative Communicator

Unit Assessment: Renewable Energy - 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.