

Kindergarten - Lesson K1.6 Designing a Shade Structure NGSS Alignment

Performance Expectations

Weather and Climate

K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Engineering Design

K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each perform.

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer

- Sunlight warms Earth's surface. (K-PS3-1), (K-PS3-2)

ESS2.D: Weather and Climate

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. (K-ESS2-1)

ETS1.A: Defining and Delimiting Engineering Problems

- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)

Students go outside as a class on a sunny day and experience the temperature in the sunlight and in the shade cast by a building or a tree. Students think about how they could build a structure to block the sun's rays to make the temperature cooler.

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. (K-2-ETS1-2)

Students draw a sketch of what their structure might look like and what materials they would use to build it. Students then build and test the structure and make changes to make it work better.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

Students go outside and feel the difference in temperature between a sunny and shaded area. They also look at pictures of structures like tents and umbrellas designed to create shade and think about what makes them work.

Planning and Carrying Out Investigations

- Make observations (first hand or from media) to collect data that can be used to make comparisons.

Students create sketches for the design of their shade structures and build and test them. Based on their results, students modify their structures and test them again.

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Cause and Effect

- Events have causes that generate observable patterns. (K-ESS3-2), (K-PS3-1), (K-PS3-2)

Students observe the way objects of a particular material, size, position, and angle cause the sun to cast a shadow. After making these observations, students use this information to design and build a structure that will cast a shadow.