

Weather-proof Hats

Specialized tools/technology used:	Experience level required:
found and craft supplies power and hand tools	beginner

Grade Level (of this example): 2

Topic/Content Standards (for this example):

2-PS1-1. Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency.

2-PS1-2. Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose

2-PS1-3. Analyze a variety of evidence to conclude that when a chunk of material is cut or broken into pieces, each piece is still the same material and, however small each piece is, has weight. Show that the material properties of a small set of pieces do not change when the pieces are used to build larger objects.

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

Summary of Project:

Objectives

Students will be able to:

- evaluate a variety of materials for specific properties
- understand that different sized pieces of the same material will have identical properties
- create several different plans to solve a problem
- evaluate and improve upon a solution
- defend material choices

Students will evaluate different materials for the properties of mass, reflectivity, shade (color), transparency, absorption, texture, strength and flexibility. Each property will have four materials to be tested and the results will be recorded as a comparison.

Students will reflect upon the use of different materials in every day items.

Students will be assigned an engineering challenge to design a sturdy hat that will protect the eyes from the sun, the head from sun and rain, and will remain on the head in windy conditions. Hats will be tested to determine if they have met the criteria. A spray bottle will

simulate rain, a lamp will simulate sun, and a fan will simulate wind. Hats that fail one or more tests must be improved.

Wrap-up

Students will reflect upon the success of their final prototype by justifying their material choices (in writing) and the properties sought by using those materials.

Images of finished student work

