DOCUMENT RESUME

ED 480 786 SE 068 027

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TITLE	A House is a House for Me. Grades 3-5.
INSTITUTION	Tufts Univ., Medford, MA.
PUB DATE	2001-00-00
NOTE	8p.; Produced by the Office for Technology and Industry Collaboration. For other activities in series, see SE 068 011-041.
AVAILABLE FROM	Web site: www.prek-12engineering.org/activities/ .
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Building Design; *Climate; Creative Activities; Critical Thinking; Daily Living Skills; Elementary Education; Engineering; *Environmental Influences; *Experiential Learning; Hands on Science; Science Instruction; Science Process Skills; Student Motivation

ABSTRACT

This activity provides arenas in which students can brainstorm and discuss the different types of materials used to build houses in various climates. Small models of houses are built and tested against different climates. This activity requires a 75-minute time period for completion. (Author/SOE)

Activity: **A House is a House for Me**

GRADE LEVELS: 3-5

SUMMARY:

Students brainstorm and discuss the different types of materials used to build houses in various climates. Small models of houses are built and tested against different climates.

LEVEL OF DIFFICULTY [1 = Least Difficult: 5 = Most Difficult]

4-Difficult

TIME REQUIRED

45 minutes for building and 30 minutes for testing

COST

$1.50 - $2.00 per student

STANDARDS:

1.1 Identify materials used to accomplish a design task based on a specific property (i.e., weight, strength, hardness and flexibility).

2.1 Identify a problem that reflects the need for shelter, storage, or convenience.

2.3 Identify relevant design features (i.e., size, shape, weight) for building a prototype of a solution to a given problem.

WHAT WILL THE STUDENTS LEARN?

The impact climates have on the building of structures

Details about several types of climates

Basic structural design

Basic experimental skills

BACKGROUND INFORMATION:

VOCABULARY:

CLIMATE: a region with specified weather conditions; the average weather conditions of a particular place or region over a period of years

ADOBE: a brick or building material made of a sun-dried mixture of earth and straw

IGLOO: an Eskimo house usually made of wood, sod, or stone when permanent or of blocks of snow or ice in the form of a dome when built for temporary use

PAGODA: a Far Eastern tower of several stories erected as a temple or memorial

TEPEE: a cone-shaped tent usually of skins used as a home by some Native Americans

LODGE: a house set apart for residence in a special season

WIGWAMS: a hut of the Native Americans of the Great Lakes region and eastward that usually has an arched frame of poles covered with bark, rush mats, or hides

HUT: a small and often temporary dwelling or shelter

TREEHOUSE: a structure (as a playhouse) built among the branches of a tree

People in different parts of the world have different materials that they can use to build their homes and other structures. When building a home, they have to think of how to use these materials to build a house that will work well for where and how they live. In the southwestern part of the United States, where there is a lot of clay and little wood, people build houses from adobe, a mixture of clay, straw, and water. Adobe houses have very thick walls which keep the houses cool in the hot dry desert weather. Adobe houses would not be good in places where it rains a lot because too much water makes adobe crumble. The weather in certain tropical islands in the Pacific ocean is hot, but wet. People who live there make their homes from materials that are easy to find such a palm leaves, woven grasses, and bamboo. Sometimes they build the houses on stilts to keep them off

the wet ground and to let the breezes move under the house, helping to keep it cool. Most Eskimos in Alaska and Canada built their houses out of sod or snow. These dome-shaped houses are called igloos. The dome shape of the igloo made it very strong and able to withstand powerful winter storms. Some Native Americans used to build dome-shaped houses made of poles, leaves, and tree bark. These houses were called wigwams. Native American tribes that moved a lot often built cone-shaped tepees out of buffalo skins or bark. Tepees could be easily built and taken apart quickly. Some Native Americans lived in more permanent structures called lodges made from logs and sod. When early American settlers came to New England, they found the ground covered with large stones. They used these stones to build stone houses and fences that you still see in New England today. The northwest part of the United States and Canada have plenty of forests, so most of the houses in these areas are made of wood. In China, where there are few forests, there are hardly any wooden houses. The chinese people use tile, concrete, and stone to build beautiful pagodas and other buildings. In parts of Africa, where tall grasses grow, people weave the stems of dried grass together to make thatch huts. In Tibet, some people even make their houses out of wool! They shear the wool from ox-like animals called yaks. The wool walls keep the houses warm through the cold winter months. Most houses in the United States today are built of wood, brick, stone, concrete, aluminum, or even glass.

Resources:

http://www2.worldbook.com/students/around_climate_index.asp - Description of climates
http://www.geography4kids.com/files/climate_climate.html - Description of climates
http://www.cotf.edu/ete/modules/msese/earthsysflr/biomes.html -Description of biomes and climates
http://folk.uio.no/kjetikj/fjellet/igloo.html - Picture of igloo
http://www.photovault.com/Link/Cities/Southwest/Teepee.html - Pictures of teepees

Hoberman, Mary Ann. A House is a House for Me. The Viking Press: New York NY, 1978.

*A good activity to coincide with this activity is "Construct and Test Roofs for Different Climates"

MATERIALS:

Hay or long grass
Clay
Popsicle Sticks
Sugar Cubes
LEGOs
Small Stones
Flour (snow)
Fan (wind)
Water (rain)
Hairdryer (heat)

PREPARATION:

Materials need to be gathered
Read Mary Ann Hoberman's "A House is a House for Me"

DIRECTIONS:

PRESENT THE CHALLENGE:

1. Have the class think about why people need houses, what materials are needed to build a house, and what the various parts of a house include.
2. Pair students, have them choose an environment where they want their house built. Have the students figure out what type of a climate their house would need to handle being in that environment. Instruct them to design and sketch a house to withstand that climate.

3. Allow each group to present their concept to the rest of the class. Have the class comment and make suggestions on each other's ideas.

BUILD:

4. Have the groups build their designs with the materials available.

TEST:

5. Test the houses against the elements that would be appropriate for the climate they build their house to withstand.

6. Compare each of the groups' houses and discuss what materials are needed in different climates.

INVESTIGATING QUESTIONS:

What different kinds of homes are you familiar with?

Why are houses around the world made of different materials?

Why do people and animals need shelter?

What types of materials are used to build houses?

What materials are best for certain climates? Why?

What would happen if the wrong materials were used for a given climate?

What does climate mean? What is a type of climate?

Which house withstood the elements best? Why?

REFERENCES:

Kessler, James H. and Andrea Bennett. The Best of WonderScience: Elementary Science Activities. Boston: Delmar Publishers. 1997. ISBN: 0827380941 p. 20*

*Adapted with permission from The Best of Wonderscience, Copyright 1997, American Chemical Society Published by Wadsworth Publishing, Inc.. If you enjoyed this activity check out www.chemistry.org/wondernet, Your Science Place in Cyberspace, for free elementary physical science activities.

Rubric for Performance Assessment						
Activity Title:	A House is a House for Me					
	1	2	3	4		
Criteria	Beginning	Developing	Proficient	Advanced	Weight (X factor)	Subtotal
DESIGN AND CONSTRUCTION	Design and construction are incomplete.	House shows evidence of hasty construction.	House shows evidence of careful craftsmanship and appropriate use of materials and tools.	House shows evidence of very careful craftsmanship and the design is well thought out for the climate given.		
PERFORMANCE OF HOUSE	Does not withstand given climate.	Able to withstand slight climate conditions.	Able to withstand the climate conditions.	Design creatively protects house from weather conditions.		
DEMONSTRATES UNDERSTANDING	Does not use terms correctly. Is unable to answer questions about climate and/or house design.	Can answer questions about climate and/or house design. Uses terms incorrectly.	Can answer questions about climate and how the conditions dictate various house designs. Uses the terms correctly.	Can answer questions about climate and house designs. Uses terms correctly and offers suggestions for houses in area.		
					Total:	
Teacher Comments:						

PreK-12 ENGINEERING

Activity Evaluation Form www.k12engineering.org

Activity Name: _____

Grade Level the Activity was implemented at:_____

Was this Activity effective at this grade level (if so, why, and if not, why not)**?**

What were the Activity's strong points?

What were its weak points?

Was the suggested Time Required sufficient (if not, which aspects of the Activity took shorter or longer than expected)**?**

Was the supposed Cost accurate (if not, what were some factors that contributed to either lower or higher costs)**?**

Do you think that the Activity sufficiently represented the listed MA Framework Standards (if not, do you have suggestions that might improve the Activity's relevance)**?**

Was the suggested Preparation sufficient in raising the students' initial familiarity with the Activity's topic (if not, do you have suggestions of steps that might be added here)**?**

If there were any attached Rubrics or Worksheets, were they effective (if not, do you have suggestions for their improvement)**?**

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Title: PreK-12 Engineering Activities

1) Touch and Discover, Grades PreK-2
http://www.prek-12engineering.org/data/d2/Touchdiscover.pdf

2) Invent a Backscratcher from Everyday Materials, Grades PreK-2
http://www.prek-12engineering.org/data/d28/Backscratcher.pdf

3) Compare Human-Made Objects with Natural Objects, Grades PreK-5
http://www.prek-12engineering.org/data/d34/HumanvsNatural.pdf

4) Do Different Colors Absorb Heat Better?, Grades PreK-2
http://www.prek-12engineering.org/data/d37/Absorbheat.pdf

5) Which Roof is Tops?, Grades PreK-2
http://www.prek-12engineering.org/data/d44/RoofTops.pdf

6) Make Your Own Recycled Paper, Grades PreK-2
http://www.prek-12engineering.org/data/d56/Recycle.pdf

7) Build an Approximate Scale Model of an Object Using LEGOs, Grades 3-5
http://www.prek-12engineering.org/data/d3/LegoScaleModel.pdf

8) Design Weather Instruments using Lego Sensors, Grades 3-5
http://www.prek-12engineering.org/data/d4/LegoWeather.pdf

9) Space Shelter, Grades 3-5
http://www.prek-12engineering.org/data/d5/SpaceShelter.pdf

10) Build a Bird House, Grades 3-5
http://www.prek-12engineering.org/data/d6/BirdHouse.pdf

11) Ball Bounce Experiment, Grades 3-5
http://www.prek-12engineering.org/data/d6/BallBounce.pdf

12) Make an Alarm!, Grades 3-5
http://www.prek-12engineering.org/data/d11/MakeAlarm.pdf

13) Design Packing to Safely Mail Raw Spaghetti, Grades 3-5
http://www.prek-12engineering.org/data/d17/MailSpaghetti.pdf

14) Disassemble a Click Pen, Grades 3-5
http://www.prek-12engineering.org/data/d33/clickPen.pdf

15) Construct And Test Roofs for Different Climates, Grades 3-5
http://www.prek-12engineering.org/data/d35/ClimateRoof.pdf

16) Compare Fabric Materials, Grades 3-5
http://www.prek-12engineering.org/data/d36/Fabric.pdf

17) A House is a House for Me, Grades 3-5
http://www.prek-12engineering.org/data/d52/House.pdf

18) Water Filtration, Grades 3-5
http://www.prek-12engineering.org/data/d53/Water Filtration.pdf

19) What is the Best Insulator: Air, Styrofoam, Foil, or Cotton?, Grades 3-5
http://www.prek-12engineering.org/data/d54/BestInsulator.pdf

20) Design a Recycling Game!, Grades 3-5
http://www.prek-12engineering.org/data/d55/Recycling.pdf

21) Tower Investigation and the Egg, Grades 6-8
http://www.prek-12engineering.org/data/d7/TowerEgg.pdf

22) Wimpy Radar Antenna!, Grades 6-8
http://www.prek-12engineering.org/data/d10/WimpyAntenna.pdf

23) Portable Sundial, Grades 6-8
http://www.prek-12engineering.org/data/d30/PortableSundial.pdf

24) An Introduction To Loads Acting on Structures, Grades 6-8
http://www.prek-12engineering.org/data/d31/IntroLoads.pdf

25) Design Your Own Rube Goldberg Machine, Grades 6-8
http://www.prek-12engineering.org/data/d32/RubeGoldberg.pdf

26) Building Tetrahedral Kites, Grades 6-8
http://www.prek-12engineering.org/data/d38/tetrakites.pdf

27) Do as the Romans: Construct an Aqueduct!, Grades 6-8
http://www.prek-12engineering.org/data/d39/Aqueduct.pdf

28) Build an Earthquake City!!, Grades 6-8
http://www.prek-12engineering.org/data/d40/EarthquakeCity.pdf

29) Design a Parachute, Grades 6-8
http://www.prek-12engineering.org/data/d41/Parachute.pdf

30) The Squeeze is On, Grades 6-8
http://www.prek-12engineering.org/data/d42/Squeeze.pdf

31) Stop The Stretching, Grades 6-8
http://www.prek-12engineering.org/data/d43/StopStretching.pdf

32) Speaker Project, Grades 9-10
http://www.prek-12engineering.org/data/d13/Speaker.pdf

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