DOCUMENT RESUME

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DESCRIPTORS	Creative Activities; Critical Thinking; Daily Living Skills; Design; Elementary Education; Engineering; Environmental Education; *Experiential Learning; Hands on Science; Natural Resources; *Recycling; Science Instruction; Science Process Skills; Student Motivation

ABSTRACT

Earth is running out of space in landfills and non-renewable resources are being depleted. In this activity, students address the question, "How can we reuse some of our garbage so that we begin to throw away less?" Students brainstorm ideas for an effective board game format and design a game in which players try to come up with alternative uses for used products. This activity requires an 80-minute time period for completion. (Author/SOE)

Activity: **Design a Recycling Game!**

GRADE LEVELS: 3-5

SUMMARY:

Earth is running out of space in our landfills and our non-renewable resources are being depleted! How can we reuse some of our garbage so that we begin to throw away less? Students will design a game where players try to come up with alternative uses for used products. Students will brainstorm ideas for an effective board game format.

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

3-average

TIME REQUIRED

Two 40-minute class times (one for designing the game and one for playing the game and discussion)

COST

none (use available materials)

STANDARDS:

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

WHAT WILL THE STUDENTS LEARN?

How to think creatively to reduce waste products.

Board game design techniques.

How to work cooperatively in a group.

BACKGROUND INFORMATION:

Natural resources are the materials in our environment that are used to make products, e.g. wood from trees to make paper.

Non-renewable resources are those materials that cannot be replaced by natural ecological cycles or sound management procedures, e.g. oil, plastics.

Recycling is done to use a product more than once so that natural resources can be saved and so that we won't need so many garbage dumps and landfills. There are different ways to recycle. One way is to find a different use for a product. For example, use empty cans as pencil holders. Another way to recycle is to use heat, chemicals, bacteria, or pressure to break a product down into its basic materials, and then to form these materials into the same or a different product.

MATERIALS:

Poster board

Markers

Spinner (can be made out of thumb tack and paper)

Dice (optional)

Game pieces (can be made out of bottle caps)

Tacks

Construction paper

Ruler

PREPARATION:

Assemble materials

Optional: make a game to show the students as an example.

DIRECTIONS:

1. Introduce the topic. Discuss recycling and different objects that are recycled. Brainstorm ideas for recycled materials. Some examples are plastic/foam cups,

old tires, old clothes, egg carton, cardboard tubes, milk cartons, milk jugs, paper bags, baby food jars, shoe boxes, bottle caps, jar lids, etc.

2. Group students and have them come up with as many different board games as they can. Once they have created a list, have the group break there list into categories such as dice, spinner, or cards. On the board document all of the different types of games that the students thought of.

3. Optional: Demonstrate a game that you made ahead of time. An example game format might be a spinner board game. On their turn, students spin the spinner, which is labeled with numbers, and move the indicated number of spaces. Each space is labeled with a used product. As the students land on the spaces, they must think of an alternative use for the product or else go back to their previously landed space. The first to reach the end wins.

4. Activity. Group the students into teams of three or four members.

5. Have each group develop a list of ideas for materials that can be recycled and reused.

6. Have each group design and build a board game. The games may be any type of game as long as they incorporate the idea of finding alternative uses for the materials that they listed. The games must include instructions.

7. After each team has designed and built their game have the class switch games between groups and play another teams game.

INVESTIGATING QUESTIONS:

What different uses for used materials could you think of?

How can used products be reused?

Why do we need to recycle?

Which board game did you like the most? Why?

What game did you find the most challenging? Why?

REFERENCES:

Kessler, James H. and Andrea Bennett. The Best of WonderScience: Elementary Science Activities. Boston: Delmar Publishers. 1997. ISBN: 0827380941 pg. 220, 222. *

*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:	Design a Recycling Game!			Grade level:		
	1	2	3	4		
Criteria	Beginning	Developing	Proficient	Advanced	Weight (X factor)	Subtotal
DESIGN OF RECYCLING GAME	Design of game is not playable.	Design of game is not very clear.	Design of game is clear and well thought out.	Design of game is clear, intricate, and goes beyond expectations.		
TEAMWORK	Student did not assist with design and construction of the game.	Student only assisted slightly with the design and construction.	Student worked well with the group.	Student worked well in the group and participated throughout the activity.		
DISCUSSION	Student did not participate in discussion.	Student does not seem to understand the concept of recycling.	Student participated in discussion.	Student participated in discussion and shows a high understanding of recycling.		
					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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