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ABSTRACT

Being able to recognize a problem and design a potential solution is the first step in development of new and useful products. In this activity, students create a device to get that pesky itch in the center of the back. Once the idea is thought up, students produce a design schematic (sketch). Students are given a variety of everyday materials and recyclables with which to create a back-scratching device. This activity uses a time frame of 45 minutes. (Author/SOE)

Activity: Invent a Backscratcher from Everyday Materials**GRADE LEVELS: PK-2****SUMMARY:**

Being able to recognize a problem and design a potential solution is the first step to the development of new and useful products. In this activity students will be creating a device to get that pesky itch in the center of your back. Once the idea is thought up the students will produce a design schematic (sketch). Students are given a variety of everyday materials and recyclables. With these materials, students will need to create a back-scratching device.

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

5-most difficult

TIME REQUIRED

45 minutes

COST

low to none

STANDARDS:

- 1.3 Identify and describe the safe and proper use of tools and materials.
- 2.1 Identify tools and simple machines used for a specific purpose.
- 2.2 Describe how human beings use parts of the body as tools (e.g., teeth for cutting, hands for grasping and catching), and compare their use with the ways in which animals use those parts of their bodies.

WHAT WILL THE STUDENTS LEARN?

How to use creativity and everyday materials to build something useful.

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How to utilize designs and sketches in creating a product

BACKGROUND INFORMATION:

Vocabulary

Sketch: a rough drawing or plan of an idea.

Lever: a simple machine that utilizes a ridged bar and a fulcrum (pivot point) to raise or move an object.

RESOURCES:

<http://www.vectorpark.com/levers.html> -Nice demonstration about balancing a mobile (levers)

<http://www.eecs.umich.edu/mathscience/funexperiments/agesubject/lessons/beakman/lever.html> -Examples of different types of levers and description of lever, fulcrum, load, effort

<http://www.brainpop.com/tech/simplemachines/lever/index.weml> -Activities and demos for children, which show how levers are used and the concepts of load and effort.

<http://library.thinkquest.org/J002079F/lever.htm> -Short description of different lever classes with real world examples

MATERIALS:

Tape

String

Cardboard

Paper towel tubes

Scissors

Glue

Any other materials you wish to use. Students may also bring supplies from home.

PREPARATION:

Assemble materials.

You might want to build a backscratcher as an example to show the students.

Have students bring in any backscratchers they might have at home to show.

DIRECTIONS:

Class Discussion:

Ask, Why is it hard to scratch your back?

Discuss why new products are made and innovations take place. (They solve a problem or fill a need)

Have students show the back scratchers they brought in.

Discuss what a back scratcher is, why is it a useful device or tool.

Talk about formulating an idea and sketching a picture before construction.

Talk about what makes a good sketch, why are plans/sketches an important step in the design process.

Talk about there being more than one way to make a backscratcher? (bring up different brand names of the same product)

Activity:

1. Prepare a station with the materials that the students will use.
2. Students may work alone or in pairs.
 - 2a. Always a good idea to talk about safety, do not eat the glue etc.
3. Introduce the activity to the students and allow them to examine the materials and brainstorm for ideas and sketch a design. Have the students explain their sketches to you before they start construction. Tell the students that they may use as many or as little of the materials available. (You may want to have the students explain their sketches to you before they are allowed to begin building).
4. Once the students have completed their backscratchers, have the students lay them out on a table so that everyone in the class can see each design. Encourage the students to try out the different backscratchers, but remind them to be respectful of everyone's designs.

5. After everyone has tested the designs, the class should decide which of the backscratchers was the most useful and have them explain what features they liked about it.

INVESTIGATING QUESTIONS:

What materials were the best to use for this project?

What would you have done differently?

What other materials could have worked?

What is a good design for a backscratcher?

REFERENCES:

none

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I. DOCUMENT IDENTIFICATION:

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>
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<http://www.prek-12engineering.org/data/d10/WimpyAntenna.pdf>
- 23) Portable Sundial, Grades 6-8
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- 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
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- 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
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