SCIENCE AND TECHNOLOGY ACTIVITIES FOR GRADES 1, 5, 6, 8

Robotic Arm

An Activity That Will Always Be At Arms' Reach.

Grade 1 – Structures and Mechanisms

By Ellen Webb

At this level, students are expected to make a simple, functional structure. A folded fan is the example used in the Curriculum Guide. The Robotic Arm is more exciting and fun.

What's Needed

- Strips of heavy poster paper or cardboard – at least four per student. Nylon stocking boards are a good thickness and length.
- Brads, wing clips, butterflies, or whatever you like to call them.
- Scissors.
- Paper punch.

Safety Considerations

Remind students of safe scissor behaviour. Students can avoid scratching themselves while attempting to put the brad through the cardboard by using a hole punch. If using thick cardboard, hole punching the spot instead of trying to force the brad through the cardboard is highly recommended.

What to Do

- Pre-cut cardboard in strips 2-3 cm x 6-10 cm.
- Use two strips to make an X.
- Poke a brad through the middle of the X.
- Do that again. You now have two hinged Xs.
- Use two brads to attach the tops of the Xs to each other.
- Cut a triangle on the bottom side of one of the Xs.
- Hold on to the other ends.
- As you squeeze and open the ends of the X, the whole thing will extend and contract.
- It is possible to pick-up small objects in the "teeth" created by cutting out the triangles.

What's Next

Challenge students to make theirs the "best." What does "best" mean? By changing the length and width of the strips, using different types of cardboard, and changing the number of 'X's attached together to add length, it is possible to determine the optimum conditions for lifting the greatest mass from the greatest distance.

Credit

I first read about this experiment in the Jason Project material. I regret that Dr. Ballard's program at the Ontario Science Centre was not more successful. It was incredible to attend.

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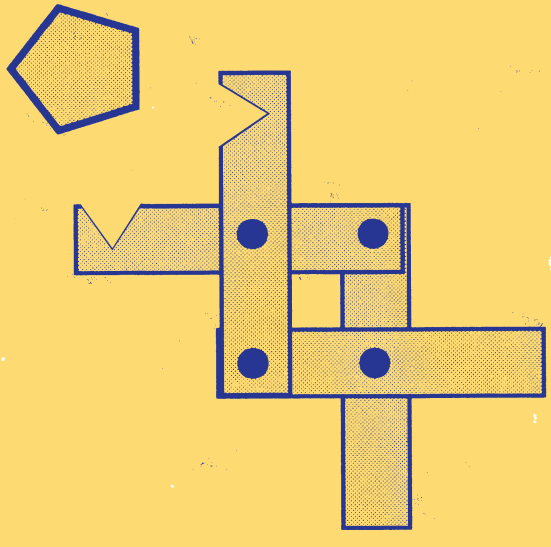

Flapjacks

An Activity That is Sure to Please the Palate.

Grade 5 – Matter and Materials

By Derek Totten

Basic Pancake Recipe

3/4 cup of all purpose flour
1 tbsp sugar
1/4 tsp baking soda
1/2 tsp baking powder
1 beaten egg
1/2 cup milk
1/2 tbsp cooking oil
1/4 tsp salt

Procedure:
In cup A, stir together flour, sugar, baking powder and salt. In cup B, combine egg, milk, and oil. Add cup B to cup A in one pour, stirring until blended but still slightly lumpy. Pour 1/4 cup batter on to a hot, lightly greased griddle or skillet for each pancake. Cook until golden brown, turning to cook other side when pancakes have a bubbly surface and slightly dry edges.

Having reviewed properties and changes in matter, a super activity is to challenge groups in your class to a "Build the Best Pancake" competition. A class discussion about what this means will likely follow. Having the class narrow "best" down to taste and fluffiness helps students to see their results, while ensuring that the final product is edible.

What's Needed

- Electric frying pans or skillets.
- Ingredients from the recipe card.
- Measuring spoons and spatulas.
- Standard recipe.
- Rules.

Safety Considerations

Due to the risks of salmonella, handling the eggs requires a specific plan. One could simply avoid using eggs altogether, or have an adult crack the eggs and put them into disposable cups ahead of time. Any electric frying pans should be supervised by adults. Students should be shown how to use the electric frying pan safely. It is a good opportunity to remind students of the precautions to take when using 110 volt A.C. equipment.

What to Do

Students are to work in groups of four to six. Explain that they will be making pancakes in class and following a standard recipe. Use a recipe from any cookbook or the one on the left. Look for one on the Internet. Adjust for quantity.

All measurements must be made carefully as this will improve results. Each recipe should make about two medium-sized pancakes. (This allows for calculating the mean.)

- The first time, the students follow the basic recipe.
- The next time, students double the amount of baking soda called for.
- The third time, they double the amount of baking power called for.
- Finally, students are allowed to adjust the baking soda and/or powder to make the best (fluffiest and tastiest) pancakes in the class.

Have students double-check the amounts they will be using prior to mixing the ingredients. They should keep accurate and organized observations. Fluffiness measurements can be made with a ruler. Students should use the vocabulary that has been covered in previous lessons with regard to changes in state, chemical reaction. Ask students what they know about the bubbles that appear after they mix the ingredients (chemical reaction takes place, producing CO_2).

What's Next

This activity could be done on Pancake (Shrove) Tuesday or as an early morning treat. Bring in celebrity Pancake Judges, such as the administration. Why not take a field trip to a sugar shack to see the production of maple syrup products? You can also link this to the topic of weather and identify the impact the of the 1998 ice storm of Eastern Ontario and Quebec on the syrup industry.

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Spoon Levers

Just Don't use the Good Silverware.

Grade 6 – Structures and Mechanisms

By Cory Telfer

A lever is one of six simple machines. All machines, no matter how complex, are forms of simple machines. Machines allow people to perform useful work, or specialized tasks. Levers, in particular, are used to reduce the amount of force required to move heavy loads. Examples of levers include crowbars, seesaws, wheelbarrows, and tongs.

What's Needed

- Metre stick
- Wooden block
- Weights
- String
- Tape
- Spoons
- Cup
- Eye Protection

Safety Considerations

Provide eye protection (e.g. safety goggles), lots of room, and adequate adult supervision for the spoon flipping.

What To Do

Part I

Use all of the materials, except spoons and cups, to make levers. Have students set up a First class lever with the block in the middle and the weight on one end of the metre stick. Identify the block as the fulcrum, the weight as the load, and the place where you press on the stick (to make it balance) the effort force. Have students set up a Second class lever with the block on the end and the weight in the middle. Next, have students make a Third class lever by placing the block and weight on opposite ends.

Part II

Set up two spoons in a line end to end in front of a cup. Students should put on their goggles before applying force (with their fist) to the spoon farthest from the cup. The goal is to flip the other spoon into the cup. Allow students the opportunity to experiment with the orientation of the spoons as well as the distance from the cup.

What's Next

Have students draw a diagram and write an explanation of how best to make the spoon land in the cup. Discuss which class of lever is being represented by the spoon-flip activity based on the previous experiments.

Credit

Adapted from *Science and Technology: Movement.* Pearson Education Canada 2000 and Susan Bosak's *Science Is* – Scholastic 1991.

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Viscosity

Getting to the Bottom of a Thick Concept.

Grade 8 – Matter and Materials

By Joanne Harris

Viscosity can be described as the thickness of a liquid. A very viscous or high-viscosity liquid is thick and a low viscosity liquid is thin. A high-viscosity liquid may have either more particles or more complex particles in a specific volume. The resistance to flow demonstrated by a high viscosity liquid is sometimes the result of internal friction between the particles of the liquid.

What's Needed

- A wide variety of transparent liquids with different viscosities (e.g. water, apple juice, vegetable oil, mineral oil, Glycerine, maple syrup, vinegar.)
- Graduated cylinder for each liquid or a tall transparent bottle.
- Marble or ball bearing for each liquid. Each ball should be of the same size and mass.
- Stopwatch or clock with second hand.

Safety Considerations

Never eat or drink anything in the science laboratory. Wipe up spills immediately.

What to Do

Pour 250 ml of each liquid into a separate graduated cylinder or bottle. Place a marble or ball bearing on the surface of the liquid and record the time it takes to reach the bottom of the container after it has been released. If done in small groups, record individual results and then find the class average.

Extension

Use the same liquids and heat them and/or chill them and compare the time it takes for the marble to reach the bottom of the container.

What's Next

This activity can be used as an introduction to viscosity. The follow-up could include how to describe and measure viscosity and an investigation of what causes different liquids to have different viscosities.

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