

TECHNO-WHIZ! SPARKS



PROGRAM COMMITTEE

INTRODUCTION

Techno-Whiz is designed to allow the girls to 'play' with engineering and science activities. The activities are meant to be fun for the girls and the Guiders!

The Association of Professional Engineers, Geologists and Geophysicists of Alberta provided much appreciated information on fun engineering activities. Thanks also to the Guiders who contributed to the development of the challenge. Have fun!

Select at least 2 of the following areas of interest and do an applicable activity – either the one listed here or another equivalent challenge.

Structures: Explore how to build a tower that is stable and will support itself.
Materials for each team: 15-20 Gumdrops, 20-30 marshmallows (preferably the little ones), 40 toothpicks (round ones with 2 pointy ends).

Step 1) Divide the girls into teams of three.

Step 2) Each team should build a tower with the materials provided. The goal is to build the highest tower possible, without it tipping over.

Step 3) They can now dismantle the tower and eat the marshmallows and gumdrops!

Tips: They need to build a strong base before trying to build it high. Cross bracing (i.e. triangles with the toothpicks) help to reinforce the structure. When the tower starts to tip over, quickly place some toothpicks in the way that it is tipping to support the tower better. There is no wrong design!

Buoyancy: Explore the effect of boat design on its ability to hold weight.

Materials for each Spark: piece of aluminum foil approximately 30 cm by roll width. Also, bring a large container, or several buckets, and lots of pennies (100 or so).

Step 1) Give each Spark a piece of aluminum foil. Direct them to make a boat with it. Tell them you will be counting how many pennies it will hold without sinking.

Step 2) Fill the large container or buckets (or use the sink) about halfway full of water. Float a couple of boats at a time. Drop the pennies one by one into each boat (the girls can help count!).

Step 3) Discuss the designs with the girls. Can they see why some boats took on water very quickly (perhaps there was a hole, or a fold in the foil, at the water level)? Can they see why some boats held many pennies (perhaps the boats had large flat bottoms or higher sides)?

Tips: Let their imaginations guide them in their design because you want a variety of boat designs to illustrate why some boats hold the pennies and why some sink.

Flight: Make a paper helicopter called a spinner! It will spin faster as the Sparks add more weight.

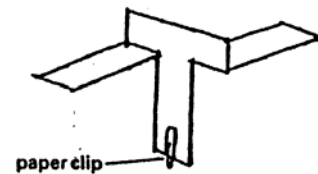
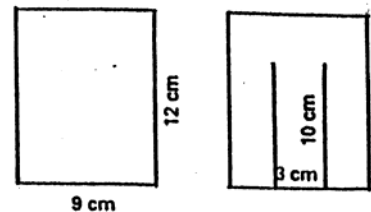
Materials for each Spark: piece of writing paper (9 cm X 12 cm), 6 paper clips, scissors, and pencil.

Step 1) Have an adult measure and cut the paper (along the lines) as shown. Label each spinner with a Spark's name.

Step 2) The girls can fold the two outside flaps in opposite directions as shown. Then they should attach a paper clip.

Step 3) Have the girls stand on a chair, on a stage, or at the top of a stairwell, and drop their spinner.

Step 4) Retrieve the spinner, add another paper clip or two and try again. Continue until you've used about 6 clips, or the girls are losing interest!



Tips: The dimensions are important. Also, the higher the girls can drop it from the more impressive the spinning will be. A loft or stage is ideal.

Why: As the spinner falls, the air rushes out from under the flaps, or wings, in all directions. Some of the air hits the edge of the body near the wing, causing it to rotate. As the weight increases, the spinner drops faster, and this increases the air movement around the wing, which causes the spinner to spin faster. Perhaps a little 'heavy' for 5 and 6 year olds, but they will enjoy the spinning!

- Sound:** Explore how to concentrate and amplify sounds using an ear trumpet. Materials for each Spark: large sheet of paper, tape, crayons. Also, bring a radio.
- Step 1) If time permits, the Sparks can decorate their ear trumpets.
- Step 2) With the help of an adult, roll the large sheet of paper into a cone shape and tape the ends. The small end of the cone should be large enough to fit over their ear (approximately 7 cm in diameter) so that they can't stick it into their ears!
- Step 3) Once everyone is quiet, play a radio or stereo quietly. Ask the girls to place their trumpet over one ear and aim the trumpet at the radio to see if the radio sounds louder.
- Step 4) The girls can turn the trumpet around and try talking into the narrow end to see how it amplifies their voice. Have them shout out their names all at the same time to see who is the loudest!
- Why: The cone shape focuses, or concentrates, sound in one direction. For example, when you are shouting in the narrow end, it focuses the sound of your voice in the direction you are aiming the trumpet, which makes the sound louder and it carries further.

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