

Chase's Crazy Canola Science Experiment

Ultimate Brain-Build-A-Thon Challenge!

Simple materials and designs are sometimes the best building supplies and techniques for various projects. Canola flowers, for example, grow a very strong root system to help anchor the plant to the ground. The canola flower's shape and colour helps with the plant's pollination process. The pod is designed to protect the developing seeds from damage.

In this next set of activities, challenge yourself to see what you can design and build! You will have to make one to two batches of sugar cookies and an icing of your choice. You will then use the cookies and icing somehow in all of your designs.



Sugar Cookies ¹⁷

Ingredients:

- $\frac{2}{3}$ cup sugar (150 mL)
- $\frac{1}{2}$ cup canola oil (125 mL)
- 2 tsp vanilla (10 mL)
- 2 eggs (2)
- $2\frac{1}{2}$ cups flour (625 mL)
- 2 tsp baking powder (10 mL)
- $\frac{1}{2}$ tsp salt (2 mL)
- 1-3 Tbsp (45 mL) of milk (optional)



Directions:

1. Preheat oven to 350°F (180°C)
2. In a large bowl or stand mixer, beat together sugar and canola oil until light and fluffy; beat in vanilla and eggs, one at a time.
3. Whisk together flour, baking powder and salt; stir into canola mixture and mix until well combined.

Note: If dough seems dry add 1 Tbsp (15 mL) of milk at a time to the dough to get the dough to come together.

4. Divide dough in half; shape into discs. Wrap in plastic wrap; refrigerate for 30 minutes.
5. Roll out dough on floured board and cut cookies using favourite cookie-cutters. Transfer cookies to parchment paper lined cookie sheets. Bake for about 10 minutes or until lightly browned.
6. Clean up.
7. Cool and ice with icing of your choice to build your structure.

Other Materials for Build-A-Thon Challenge:

- Bag of mini marshmallows
- 20 toothpicks
- 1 toy car
- 1 sheet of legal paper (8.5 x 11 inches)
- 1 paper clip
- 1 hardboiled egg
- Assorted washed and sanitized coins
- Scissors
- 2-3 metres of tape (masking tape or scotch tape would be fine)
- 30 cm ruler
- Icing of your choice that hardens

Challenge 2: Eggs Away!

Materials:

- Scissors
- 8-10 sugar cookies
- 30 miniature marshmallows
- 20 toothpicks
- 1 sheet of paper [8.5 x 11 inches]
- 1 paper clip
- 1 metre of tape of your choice
- 1 Hardboiled egg
- Icing of your choice that hardens



Directions:

1. Design an egg-safe contraption that keeps your whole egg safe when dropped from different heights. Use the materials listed. Include 1-3 sketches in the Prediction/Research area of this page.
2. Next, drop your egg in its contraption from 30 cm. Then, continue to and go up by increments of 10 cm each time until the egg cracks.
3. If you have the help of an adult, determine the maximum height reached before the egg cracks. Continue to drop the egg until it is no longer safe to do so.

Prediction/Research:

Observations:

| Did your egg survive the following egg height drops? | Place a [checkmark for YES or X for No] |
|---|---|
| 30 cm | |
| 40 cm | |
| 50 cm | |
| 60 cm | |
| 70 cm | |
| 80 cm | |
| 90 cm | |
| 100 cm | |
| Max height reached before egg cracked or until it was no longer safe with the help of an adult to drop egg structure from [cm]: | |

Conclusion and Future Modifications:

How high could you drop the egg safely with the help of an adult before the egg cracked?

What worked well and not so well in your structure?

What can you do to improve your design?
Can you draw an example?

Test your new design. Did the improvement work?

Challenge 3: London Bridge Isn't Falling Down...

Directions:

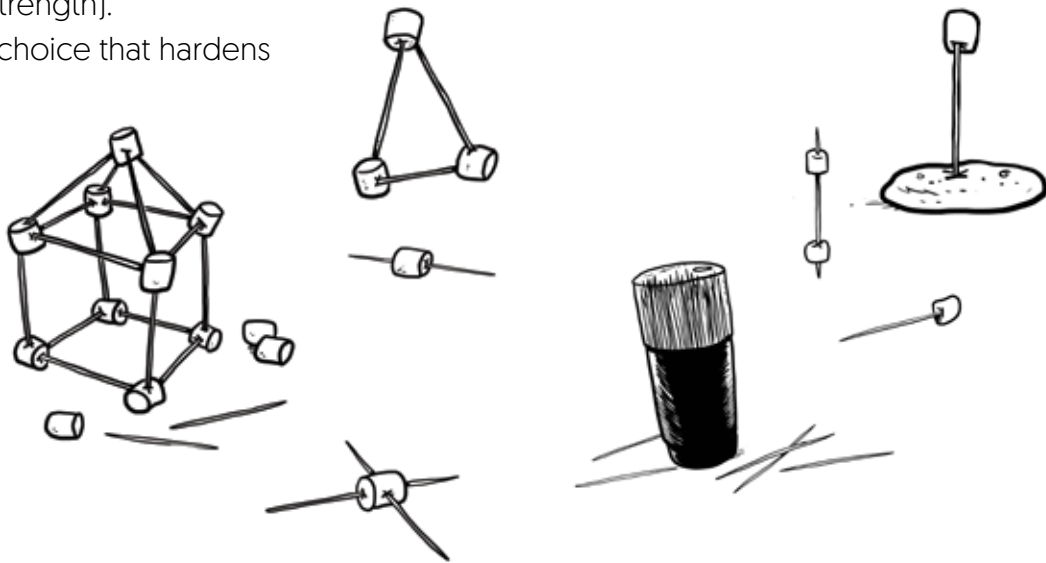
1. Research and design a bridge, using the materials below, to determine how many smaller objects, such as clean and disinfected coins it can hold.
2. Research to see what improvements can be made to your bridge so that you can add more objects or more mass to your current bridge design.

To help you with your design, in Google enter the following phrases in the search bar to help you with your research:

1. What makes bridges so strong video
2. Nova super bridge build a bridge

Materials:

- 30 miniature marshmallows
- 6-8 sugar cookies
- 20 toothpicks
- Clean and disinfected objects [e.g., coins, washers, rocks] [You may use other items that are clean and in similar mass to each other. These items will be used to determine the bridge's strength].
- Icing of your choice that hardens



Prediction/Research:

Observations:

How many items or what maximum mass did your bridge hold before it collapsed?

Conclusion and Future Modifications:

How well did your structure work? What problems arose with the build?

How tall, wide, and long is your structure?

Challenge a family member or friend to see if they can design and build a bridge and then test your bridges to determine who's bridge design can hold more mass [or amount of objects].

How many of the same items with the same mass can your structure hold compared to a classmate, adult, or friend?

What would you do to improve your design?

Can you provide a sketch?

Build and test your improvement.

Did the improvement work?
