Your task is to build a paper helicopter that mimics a flying seed!

Biomimicry is the process people use when they look to nature as inspiration for a design. A well known example of biomimicry resulted in "hook-and-loop fastener" (what we commonly refer to as Velcro™) used on shoes and clothing. The idea for the "hook-and-loop fastener" came to Swiss engineer George de Mestral while removing burs from his dog and his own clothing after a walk. Burs allow seeds to become "sticky" and grip onto clothing and fur very easily, allowing the seeds to be dispersed.

Step One: Get inspired!

For this challenge we want you to make a paper helicopter that mimics the motion of a samara. ***What is a samara you ask?*** Great question! Have you ever seen a maple seed or a seed from an ash tree? These are examples of samaras. Samaras have a "winged" design that allows them to easily catch the wind as they are floating to the ground. As they float, samaras spin - earning them the common nicknames of "helicopter seeds" or "whirligigs."

Watch maple seeds in action with this short video (1:19).

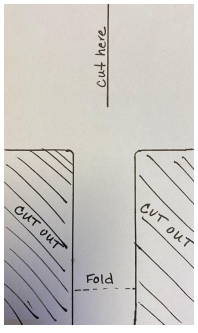
Step Two: Choose Your Materials

With the motion of samaras in mind, we want you to make a paper helicopter. While we have a template for you to start with (if you'd like), we encourage you to come up with your own designs. Questions to consider:

- ***What kind of paper do you want to use?*** You can use printer paper, construction paper, notecards or even cardstock.
- ***What do you want to use to represent your "seed" as part of your helicopter?*** We think you should use something small and not too heavy. Our design uses a paperclip but that doesn't mean you have to!
- ***What else do you need?*** Scissors and tape might help you build your design.

Step Three: Design Your Paper Helicopter

Remember to draw a picture of your ideas first. Engineers draw out their ideas to think through their designs and share their creations with others. As you draw, think about how samaras look and how they spin as they fall. If you'd like a little help jumpstarting your design process, here is a template that you can use with a standard 3x5 notecard. After marking the 3x5 notecard like the image, we cut out the two shaded portions to make the notecard look like a letter "T." Then we cut along the line (on the right side of the picture) to make two helicopter blades.



Step Four: Build Your Paper Helicopter

Once you have thought through your ideas, begin building! Periodically test out your paper helicopter to see if it spins as it falls. Remember to ask an adult for permission if you want to choose a location high off the ground from which to drop your paper helicopter. Safety first!

If you need help…

- Collaborate! Work with someone else.
- Think about more or different materials you can use.
- Take a short break and give yourself time to think of new ideas!
- Remember that both learning and creating something new takes time! Here's a fun Sesame Street video on the power of "yet"

Challenge Time!

1. **Change the amount of weight carried by your paper helicopter:** How does this change the way your helicopter travels?
2. **Fold the blades in the opposite direction**: How does this change the way your helicopter spins?
3. **Samaras can have one blade or two blades:** Can you make a helicopter with only one blade that still spins?

If you liked this challenge, here is another way to create a paper helicopter, check out this video tutorial (8:08) by Rob's World. If you want to learn about Project Red - the 2021 You Design Challenge Middle School Definition Award: team members were inspired by the Sugar Maple and Edamame when designing a way to combat deforestation!

Step 5: Sharing Your Paper Helicopter on Instagram or email.

We want to see your paper helicopter! With permission from your parent or guardian, share a picture of your paper helicopter for our instagram page. Direct messaging or emailing an image of your challenge gives us the written consent to redistribute the image on our website and official instagram page.

Instagram: @sciencecircuswhittier **Email:** sciencecircuswhittier@gmail.com