DESIGN A PARACHUTE

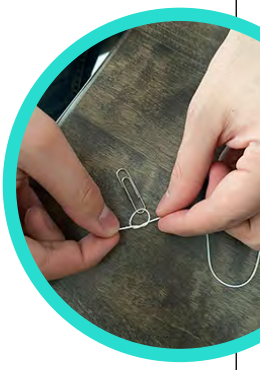
Explore the forces of gravity and drag

What you'll need:

- A plastic bag or large sheet of plastic
- A ruler
- Scissors
- A hole puncher (or sharp pencil)
- A roll of string
- Tape
- Paperclips
- Popsicle sticks

Square parachute setup:

1. Cut a square measuring 30 cm x 30 cm out of your plastic bag or sheet.
2. Use your hole puncher or pencil to poke a hole in each corner of the square.
3. Cut four 30-cm pieces of string. Tie a knot into the end of each one.
4. Pass a piece of string through one of the corner holes and tape the end with the knot onto the plastic parachute. Repeat this step for the other three corners, taping all four knots to the same side (the top) of the parachute.



5. Tie a paper clip onto the bottom end of each string (i.e. the part farthest from the plastic) using a simple knot.
6. Slide a popsicle stick through all four paperclips and place a piece of tape across the stick to secure it.

Triangle parachute setup:

1. Cut an equilateral triangle measuring 30 cm x 30 cm x 30 cm out of the remaining plastic.
2. Follow steps 2-6 above, but use three holes, strings and paperclips instead of four.

ONTARIO SCIENCE CENTRE
An agency of the Government of Ontario

DESIGN A PARACHUTE

Explore the forces of gravity and drag

Test your designs:

Find a spot with high elevation in your home to drop your parachutes from, like over the banister of the stairs or from a top bunk. Ask a parent or sibling for help so that you can drop both parachutes at the same time from the same height. Which shape do you think will fall faster? Use a timer to measure how long it takes each parachute to fall and record your results.

Try this!
Want to experiment more? Here are some things you can change about your parachute:

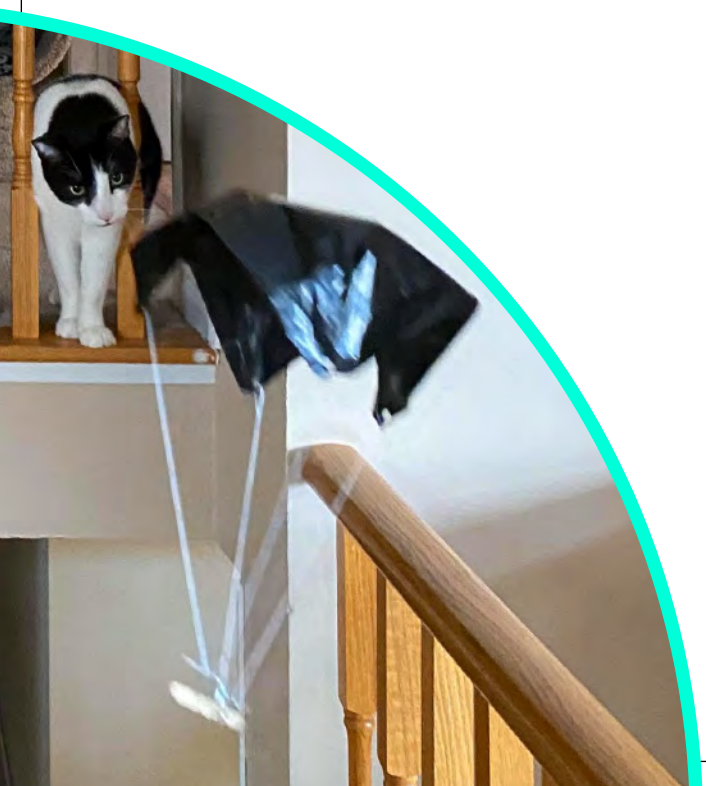
- **Shape** — Make a square, rectangle, hexagon or other shape
- **Size** — Create a parachute that's half the size, twice as big or even bigger
- **Material** — Use tissue, paper, fabric or another material
- **String length** — Cut your strings half as long, twice as long or even longer

What's happening?

When you drop an object, the force of gravity pulls it towards the ground. However, there are also other qualities that affect how quickly it falls.

Think of what happens when you drop an open sheet of paper compared to a crumpled up ball of paper. Despite being made from the same amount and type of material, the different shapes of these objects cause them to act very differently. The open sheet will float slowly to the ground while the crumpled ball will drop quickly. This difference is caused by a force called **drag** or **air resistance**.

Parachutes are designed to slow the speed of falling objects by trapping air and creating lots of drag. This force of drag acts in the opposite direction of gravity, pushing upwards. An ideal parachute creates enough drag to bring the cargo slowly and safely to the ground in a gentle landing. Parachutes are used to create safe landings for many different types of cargo, from skydiving humans on Earth to unscrewed space rovers on Mars and beyond.



ONTARIO SCIENCE CENTRE
An agency of the Government of Ontario