# 2. Parachutes

How do lift, weight and drag effect a parachute?

## MATERIALS


- Plastic
- Mylar
- Parachute Templates
- Nylon String
- Thin Yarn
- Washers (Various Sizes)
- Dixie Cups
- Red Beans
- Masking Tape
- Small Circle Stickers
- Paper Clips

## Do the Experiment!

1. Today you will make a parachute. Before beginning to make your parachute, you have to remember that your parachute needs to have weight on the bottom. Think about why people use parachutes.
2. Look at the materials available. Start by making one parachute. You can make your parachute out of either Mylar or plastic and you can choose either the circle, rectangle, triangle, or octagon template. Then use either string or yarn (not both) and tie the string or yarn to something that will give it weight.
3. Make your parachute. Drop it from a high area and see what happens. Did it fall quickly or slowly?
4. Now that you have the basics down for making a parachute you can make another parachute using different materials or redesign your parachute. Test different amounts of weight to see what works best for a gentle fall to the ground. Test different templates to see what parachute shape is the best. Work with a partner for maximum testing.



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## DID YOU KNOW...

Parachutes are a safe, observable example of the physics behind aerodynamics. The four main forces of aerodynamics are **lift, weight, drag** and **thrust. Thrust** is the force keeping a flying object in motion. In reality a parachute is not trying to stay in motion. **Weight,** which relates to gravity, is bringing the parachute towards the center of the earth. The parachute's design gives it minimal **lift** (the force keeping a flying object in the air), because the idea is to reach the ground gradually and safely. **Drag** opposes a flying object from moving through the air but a person in a parachute can make slight adjustments by using handheld steering devices that allow some movement so that you don't land in a body of water or trees. Although your parachute is unmanned, observing the physics behind the parachute leads to a better designed parachute to be used by people.

**(Optional) For young scientists aged 4-6**
Create a parachute in advance as an example. Demonstrate how parachutes work and explain how you made yours. Young learners are still mastering fine motor skills and might need extra assistance tying the yarn or string to their Mylar sheet. Encourage your scientists to test and retest their design.

## CHALLENGE

*1. Make a parachute using a different shape other than the templates provided. Does your shape achieve the same results or is it better or is it not as successful?*
*2. Make a parachute at home. What materials would you use?*
***STEAM CHALLENGE:*** *Calculate the speed of your parachute using this simple formula s=d/t where s = speed, d = distance and t = time. When you drop your parachute from 10-20 feet have a friend count how many seconds before it hits the ground. Based on your estimation of distance, plug in the numbers to calculate speed.*



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