



# EGG PARACHUTES!

## OVERVIEW

Campers will learn about the forces acting on flight while designing a parachute to protect an egg!

## TOPIC AREA(S)

Engineering and Physics!

## GRADE LEVEL

Grades 5-6

## QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED

- Who can describe how a parachute works?
- What is gravity?
- What is air resistance?
- What can we do to protect the egg?

## BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)

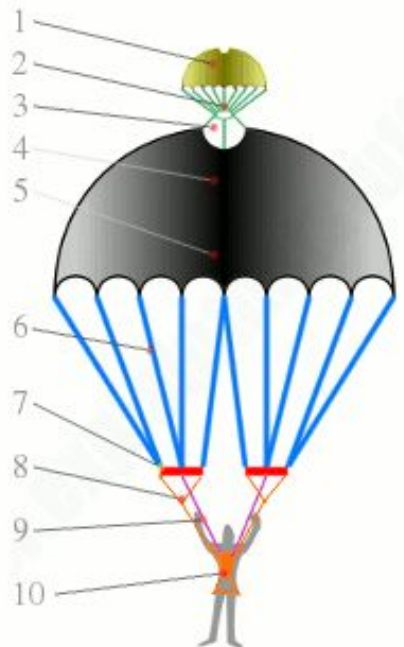
### How does a parachute work? What is gravity/air resistance?

- Throw a ball up in the air and, sooner or later, it always falls back to the ground. That's because Earth pulls *everything* toward it with a force called **gravity**. You've probably learned in school that the strength of Earth's gravity is roughly the same all over the world (it does vary a little bit, but not that much) and that if you drop a heavy stone and a light feather from the top of a skyscraper, gravity pulls them toward the ground at exactly the same rate.
- If there were no air, the feather and the stone would hit the ground at the same time. In practice, the stone reaches the ground much faster, not because it weighs more but because the feather fans out and catches in the air as it falls. **Air resistance** (also called drag) slows it down.
- Just because the air's invisible, doesn't mean it's not there. Earth's atmosphere is packed full of **gas** molecules, so if you want to move through air—by walking, in a car, in a plane, or dangling from a parachute—you have to push them out of the way. We only really notice this when we're moving at speed.
- Air resistance is a bit like the way water pushes against your body when you're in a **swimming** pool—except that air is invisible! If you jump off a diving board or do a belly flop, the awkward shape of your body will create a lot of resistance and bring you rapidly to a halt when you crash into the water. But if you make a sharp pointed shape with your arms and dive in gracefully, your body will part the water cleanly and you'll continue to move quickly as you enter it. When you jump or belly flop, your body slows down quickly because the water can't get out of the way fast enough. When you dive, you part the water smoothly in front of you so your body can glide through it quickly. With parachutes, it's the slowing-down effect that we want.

- If you fall from a plane without a parachute, your relatively compact body zooms through the air like a stone; open your parachute and you create more air resistance, drifting to the ground more slowly and safely—much more like a feather. Simply speaking, then, a parachute works by increasing your air resistance as you fall.

#### Parts of a Parachute:

1. Pilot chute: A small parachute that opens the large, main parachute.
2. Bridle: Connects the pilot chute to the main chute.
3. Apex or top vent: Allows a slow escape of air from the top of the main chute. This prevents air from leaking out of the sides of the canopy, which tends to rock the parachute wildly as it falls.
4. Canopy: Main part of the parachute.
5. Skirt: Lower part of the canopy (think of a person's skirt hanging down).
6. Suspension lines: Spread the weight of the parachutist evenly across the canopy.
7. Links: Connect the suspension lines to the risers.
8. Risers: Connect the links to the harness
9. Control lines: I've drawn only one, but there can be several different ones for steering and braking.
10. Harness and container: The harness is the part you wear (itself made of numerous components); the container looks similar to a rucksack and holds the packed-up parachute and all its bits and pieces, ready for action!





**What can we do to protect the egg?**

- provide it with a parachute to slow it down as it falls - taking gravity and air resistance into account!
- can give it cushioning from the cotton pads and paper towel
- can make it secure in the cup as a base
- and any other examples you can think of!

**RELEVANCE TO THE CURRICULUM**

Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
<ul style="list-style-type: none"> <li>€ Needs &amp; Characteristics of Living Things</li> <li>€ Growth and Changes in Animals</li> <li>€ Materials, Objects and Everyday Structures</li> <li>€ Movement</li> <li>€ Energy in Our Lives</li> <li>€ Properties of Liquids and Solids</li> <li>€ Daily and Seasonal Changes</li> <li>€ Air and Water in the Environment</li> </ul>	<ul style="list-style-type: none"> <li>€ Growth and Changes in Plants</li> <li>€ Habitats and Communities</li> <li>€ Strong and Stable Structures</li> <li>€ Pulleys and Gears</li> <li>€ Forces Causing Movement</li> <li>€ Light and Sound</li> <li>€ Soils in the Environment</li> <li>€ Rocks and Minerals</li> </ul>	<ul style="list-style-type: none"> <li>€ Human Organ Systems</li> <li>€ Biodiversity</li> <li>€ Forces Acting on Structures and Mechanisms</li> <li>€ Flight</li> <li>€ Properties of and Changes in Matter</li> <li>€ Electricity and Electrical Devices</li> <li>€ Conservation of Energy and Resources</li> <li>€ Space</li> </ul>	<ul style="list-style-type: none"> <li>€ Interactions in the Environment</li> <li>€ Cells</li> <li>€ Form and Function</li> <li>€ Systems in Action</li> <li>€ Pure Substances and Mixtures</li> <li>€ Fluids</li> <li>€ Heat in the Environment</li> <li>€ Water Systems</li> </ul>

**MATERIALS (SPECIFY WHETHER PER CAMPER, GROUP OR CLASS)**

Materials Per Camper (can be adjusted based on materials present at home):

- 1 sheet of paper
- 2 pieces of paper towel
- 5 cotton balls
- 3 cotton face pads
- 2 feet of tape
- 1 meter of string
- 1 garbage/plastic grocery bag
- assorted pieces of cardboard
- 1 recyclable “cup” (pudding, applesauce, berries, etc.)
- scissors
- 10 popsicle sticks
- 1 balloon

**SAFETY CONSIDERATIONS**

Be careful with the scissors as well as any sharp edges on the materials!



## PROCEDURE

**Step 1:** Hand out the materials to each camper (or gather them if at home), making sure that they are as equal as possible for everyone.

**Step 2:** Show the diagram of a parachute for the campers - this can be used for inspiration! There are also some websites attached that show actual egg parachutes for reference.

**Step 3:** Begin the competition! Give the campers as much time as possible to build their parachute while also providing time at the end for testing! We will throw them off a deck (or out of the arms of a tall guardian if this is easier). The purpose is to protect the egg by building it a parachute and a cushioning base in order for it to slow the air and provide support - we do NOT want to break the egg!!!

**Note:** Campers may need help from parents, guardians, or siblings and this is allowed and even encouraged!!



## REFERENCES

<https://www.science-sparks.com/gravity-and-air-resistance/>  
<https://www.explainthatstuff.com/how-parachutes-work.html>