LESSON 10:
FLOATING PARACHUTE

SUPPLIES

MAIN BIN

- String (2 rolls)
- Animal Figures (15)
- Hole Punch (1)

HANDOUT FOLDER

- Tissue Paper (30)
- Construction Paper (15)

PENCIL BOX

- Scissors
- Tape
- Ruler

OBJECTIVES

- [x] Understand aerodynamics, air resistance and drag
- [x] Create a floating parachute

HOOK

2-3 min

Have you ever stuck your hand out of the window of a moving car and felt the wind pushing against it? That's air resistance! Just like how the wind pushes your hand back, air resistance pushes against objects when they move through the air.

INTRODUCTION

3-5 min

Have you ever wondered why parachutes slow down a falling object? The answer lies in air resistance, a force that pushes against objects as they move through the air. When an object falls, gravity pulls it downward, but air resistance works in the opposite direction, slowing the fall. Air resistance is a type of drag, which is a force that opposes the motion of an object through a fluid, in this case, air.

The larger the surface area of an object, the more air resistance it encounters, which is why parachutes are designed with large, wide surfaces to maximize this slowing effect. Aerodynamics, the study of how air moves around objects, plays a crucial role in designing efficient parachutes, ensuring they slow down the descent without compromising safety.

By experimenting with various factors and parachute designs, we'll see firsthand how air resistance affects how quickly objects fall and learn how engineers use these principles to design parachutes that keep people safe when they jump from heights.

So, let's dive in and understand the powerful relationship between gravity, air resistance, and aerodynamics!

FLOATING PARACHUTE

ASSEMBLY DIRECTIONS

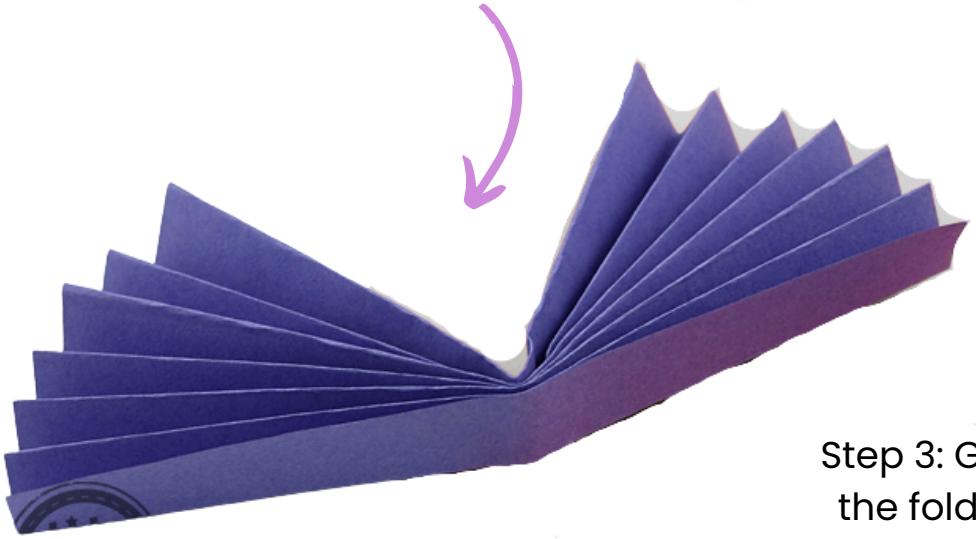
30-40 min

1. Pass out materials to each student.
2. Instruct students to fold in one corner of their tissue paper to create a perfect square and trim the excess paper or they can use their ruler to measure a 12 inch x 12 inch square and trim the excess paper.
3. Place a small piece of masking tape at each corner to reinforce and provide our paper with structural integrity.
4. Share the hole punch to place a small hole in each corner over the masking tape.
5. Use your ruler to measure four 12 inch pieces of string per student.
6. Tie one piece of string to each hole punched corner.
7. Fold your parachute into 4's so that you a have a smaller, evenly layered square. Ensure your string does not tangle and comb with your fingers so that all pieces of string are in a straight line.
8. Tie a small knot at the end of your joined string pieces.
9. Using the knot, tie your string to your figurine.
10. Using the fan template, instruct students to create a paper fan to use during the testing phase of our floating parachute project.

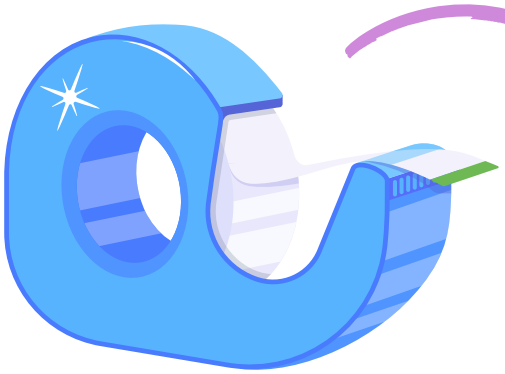
FLOATING PARACHUTE
FAN TEMPLATE

Step 1: Fold paper accordion style keeping each layer even with one another.

Step 2: Fold accordion paper in half.



Step 3: Glue or tape the top edges of the folded paper in order to create one seamless crescent fan.



FLOATING PARACHUTE

FLIGHT TEST

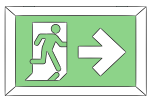
10-20 min

Designate an area of the classroom as the testing zone. Allow students to test their parachutes and discuss how air resistance, or drag, slows the effect of gravity on a falling object by opposing its motion. Allow students to use their fans to test how additional wind resistance can increasingly slow the descent of their parachute. After initial tests, allow students to continue their design adding creative finishes in an attempt to further slow the descent of their parachute.

EXPLANATION

3-5 min

We've explored the fascinating world of parachutes and how they rely on air resistance, aerodynamics, and drag to slow down falling objects. Air resistance is the force that pushes against objects moving through the air, working against the pull of gravity to slow their descent. The larger the surface area of an object, the more air resistance it encounters, which is why parachutes are designed with wide surfaces to maximize this effect. By understanding how air moves around an object, engineers can design parachutes that efficiently slow down a fall while keeping people safe. Through our experiments, we've seen how various factors and parachute designs can affect the speed of descent, giving us a deeper understanding of how these forces work together. The relationship between gravity, air resistance, and aerodynamics is essential for designing parachutes that protect people when they jump from great heights. Today, you've not only learned the science behind how parachutes work, but also how engineers use this knowledge to create safe and effective designs.



Exit Ticket

Ask each student one of the following questions as they walk out the door.

- Q: What is aerodynamics?
  - A: Aerodynamics is the study of the properties of moving air and the interaction between the air and solid bodies moving through it.
- Q: Can you define gravity?
  - A: Gravity is the natural force of attraction that pulls objects toward one another. It is responsible for keeping objects grounded on Earth,