

BREADBAG PARACHUTE

Curriculum topics

- Motion & Stability
- Forces & Interactions
- Measurement & Data
- Social Emotional Learning: Teamwork

Subjects

- Physical Science
- Math

Grade range: 2 – 8

Serves: Each kit includes materials for 1 student to create a project

Who we are: Resource Area for Teaching (RAFT) helps educators transform the learning experience by inspiring joy through hands-on learning.

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Over 200 years ago and 3,000 feet above Paris, Andre-Jacques Garnerin jumped from a hydrogen balloon. He was the first skydiver and inventor of the parachute. Since his historic jump, humans have used parachutes for a variety of purposes. From landing exploratory rovers on Mars to recreationally testing the laws of gravity, parachutes remain an exciting human innovation. Using 90% reuse materials, RAFT's Bread Bag Parachute STEAM Project Kit engages students in this exciting innovative history.



Materials

Materials in the kit may vary but generally, this kit contains the following creative reuse materials:

- Plastic bag
- Cork
- String
- Pipe cleaners
- Cardstock
- Toothpicks
- Plastic tube w/ beans
- **Not included:**
Tape, scissors



Facilitation

The Bread Bag Parachute kit is an engineering challenge that engages students in the exploration of gravity, forces and motion, wind resistance and creativity. There is no “right way” to assemble this project. Instead, students tinker, experiment and devise their own solutions. You can launch straight into the activity by having the students select from the design challenge prompts below or you can provide some scaffolding along the lines of the suggestions below.

Suggestions for getting started. Choose from the list or try them all.

- Have students explore and name the material in the kit.
- Hold a cork or similar object at chest height and ask students to predict how long it will take to hit the ground once you let it go. Have them start counting as you let go.
- Unfold the plastic bag from the kit and do the same thing as you did with the cork. Crumple it into a ball and try again. Get their reactions.
- Ask how they can use the plastic bag to slow down the rate at which the cork drops.
- Try a quick draw. Have students draw a parachute and label various parts. Make connections with materials in the kit.

Design Challenge Prompts

This kit does not come with assembly instructions. Instead, students are to respond to a design challenge prompt using available materials to create their own version. Select one of the following or choose your own.

1

Space Diving Hang Time:

Lucky you! You were selected to participate in a space dive. You will be jumping from a balloon at 128,000 meters above the Earth. You will need to engineer a parachute that will ensure your safety from a high altitude.

Challenge Statement:

Create an avatar and parachute that has at least three seconds of hangtime.

2

A Package for Survivors:

An airplane crashed in the mountains with hundreds of survivors. They need food and water as quickly as possible. The fastest way to send some relief is to parachute a container of supplies onto the crash site.

Challenge Statement:

Create a parachute that can gently land a capsule with 5 beans in it to the ground.

3

Share student creations with RAFT! Submit photos/video via email: education@raft.net

Core Content Skills:

Math

Solve problems involving distances, intervals of time, masses of objects, and money, including problems involving. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

NGSS

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Social Emotional Learning

- Self-awareness
- Social awareness
- Relationship skills

Science Behind the Activity

Falling objects push on the air underneath as they drop. The force opposing the movement of an object through the air is called “drag”. Bicycle racers can go faster when they reduce drag by bending low to the bike rather than sitting upright. Sitting upright presents a larger surface area for the air to push against and that would cause an increase in drag.

A falling object needs a way to greatly increase drag to have a safe landing. The goal is to prevent too fast of a landing that could hurt a person or damage dropped supplies. To increase drag a parachute needs to present a large surface area to the air below. The parachute also needs to be made of light weight material, so the parachute itself does not cause harm when it collapses after a landing.

A parachute will fill with air as it falls. As more air enters the underside of the parachute some will try to escape from around the edges. That escaping air can cause a parachute to tip side to side during a fall. If the tipping is too great, then the parachute could collapse into a smaller shape, increasing the speed of the fall.

Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know of any material concerns such as missing, broken, or poorly fitting parts as well as improvements or other suggestions.

Visit <https://raft.net> to view related activities!

Egg Drop
Puff Rocket
Pop Rocket
Zippy Catapult
Paper in Flight – Level 1
Paddle Boat Engineering

Resources

- How Do Parachutes Work? (YouTube video, 0:57) - <https://bit.ly/2Uxvq75>
- Playtime with Parachutes (YouTube video, 3:36) - <https://bit.ly/2UZg2Az>
- Physics Simulation: Skydiving - <https://bit.ly/3iuMjr6>