

sky Diver

Parachutes fall slowly because of air resistance—the force of air against the open parachute. In this activity, kids make a parachute that shows how air resistance makes for a soft landing.

Activity 2

Prepare Ahead

- Try making a parachute yourself, so you can anticipate where kids may get stuck or need guidance.
- Cut out 10" squares of the following:
 - lightweight plastic—use thin garbage, grocery, or dry-cleaning bags
 - heavyweight plastic—use lawn or heavy-duty trash bags
 - tissue paper
 - regular-weight paper—use notebook or copier paper
 - also have uncut sheets of these materials available for when kids make larger parachutes. If using trash or dry-cleaner bags, cut them open along one side and the bottom seam to make a flat sheet
- Cut 8" lengths of string for the first round of parachute making. Kids can cut their own for the second round, using a ruler to check the length.
- On the day of the activity, set up work areas with several squares of each of the materials per group—light- and heavy-weight plastics, tissue paper, and regular paper—along with string or thread, scissors, tape, paper clips, and a ruler.

Lead the Activity

1 Introduce Ruff's challenge. (10 minutes)

Tell kids that today's challenge is to design and build a parachute that will make a soft landing.

Discuss why and how things fall. Crumple a sheet of paper into a ball and hold it up. Pick up a flat sheet of paper in your other hand. Ask:

- When I drop these, do you think they will hit the ground at the same time? Why or why not?

Drop the balled paper and sheet at the same time.

- What happened? (*The ball fell faster and straight down, while the flat sheet drifted.*)
- Why did they fall differently? (*The flat sheet of paper has more surface area that's supported by the air beneath it.*)

Discuss parachutes. Ask:

- How does a parachute work? (*Air fills it, slowing its descent.*)
- What does a parachute have to do to make a safe landing? (*It must fill with air and fall slowly and steadily to the ground.*)

Materials

- activity sheet for each kid
- parachute materials (see "Prepare Ahead"): lightweight plastic, heavyweight plastic, tissue paper, and notebook or copier paper
- 8" pieces of string or thread (4 pieces per kid)
- ball of string or a spool of thread (1 per group)
- scissors (1 per group)
- clear tape (1 roll per group)
- large paper clips
- ruler (optional)

National Science Education Standards

Grades K–4

Science as Inquiry: abilities necessary to do scientific inquiry; understanding about scientific inquiry

Physical Science: properties of objects and materials; position and motion of objects

Science and Technology: abilities of technological design

Grades 5–8

Science as Inquiry: abilities necessary to do scientific inquiry

Physical Science: properties and changes of properties in matter; motions and forces

Science and Technology: abilities of technological design

2 Make Predictions and test materials. (5 minutes) Hand out the activity sheets. Tell kids that scientists and engineers often test individual materials to determine which will work best in a design. Ask them to predict which of the squares will make the best parachute; then have them test the materials.

3 Make Parachutes. (10 minutes) After deciding which material will work best, kids should attach the string and paper clips to make their parachutes.

4 Float them. (5 minutes) Have kids test the performance of their parachutes by dropping them. If they tip in the air, check that the strings are the same length and the paper clip is centered on the parachute.



5 Make another Parachute. (5 minutes) Kids will now make another parachute using a different material. Encourage them to test the new parachute against their original to see which works best.

6 Size it up. If time permits, kids may want to make a bigger parachute by cutting out a square of material twice the size (20" x 20"). They'll need to figure out how to modify the design to make the bigger parachute work (longer strings, more weight at the bottom, etc.).

7 Discuss what happened. (5 minutes) Bring the group back together. Allow kids to show off their parachutes. Ask:

- What did you use to make your first parachute? (You may want to take a tally to see which material was the most popular.)
- Which material worked well? Which didn't work as well? (*The lighter materials—lightweight plastic and tissue paper—worked best.*)
- What problems did you have with your parachute and how did you fix them? (*Answers will vary.*)

8 Award points. (5 minutes) Time to rack up some points! Review the activity's key ideas by asking the following questions, worth 50 points each.

1. How does a parachute work? (*Air fills up the parachute as it falls, slowing down its landing.*)
2. Name another material that would make a good parachute and explain why. (*Answers will vary.*)
3. What would you have to change to make a bigger parachute work? (*Increase the length of the strings; add more weight to the bottom.*)
4. The part of a parachute that fills with air is called the canopy. Which do you think would make the slowest, safest landing—a parachute with a small canopy or large canopy? Why? (*The large canopy—it has more surface area, so more air can fill it, slowing it down.*)
5. How are a parachute and a kite similar? (*Air pushing on the kite keeps it in the air, while the force of air filling the falling parachute slows down its descent.*)

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Design a parachute that floats safely to the ground—no crash landings allowed!



1 Get what You need.

- 10" squares of: lightweight plastic (like clear bags from the grocery store) • heavyweight plastic (like thick trash bags) • tissue paper
- notebook or copier paper • 8" pieces of string or thread (4 per parachute) • scissors • clear tape • large paper clips

2 Test Your materials.

Compare the different types of materials and pick the one you think will make the best parachute. What are some tests you can do to decide which material to use?

3 Make a parachute.

Tape string to each corner of the parachute—try to use even lengths of string. Then tape the ends together around a large paper clip.

4 Float it.

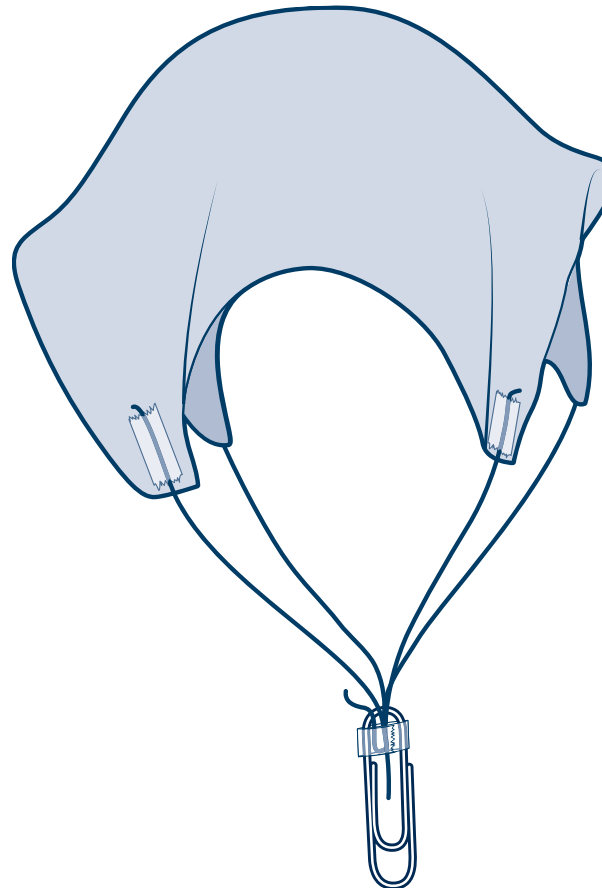
Hold up your parachute and drop it. What happens as it falls to the ground?

5 Design and test another parachute.

Select a different material and make another parachute. Compare how it falls with the parachute you made earlier.

6 Make it big!

Make a parachute at least double the size of the others you made. What adjustments do you need to make to get the bigger parachute to work?



Chew on This!

When you throw something into the air, it falls because gravity pulls it to the ground. As a parachute falls, the part that fills with air is called the canopy. A parachute works because air gets trapped in the canopy and slows its fall. This is the result of air resistance—the force of the air against the canopy.

Dig Deeper

Take it outside. Test your parachute on a windy day. What difference does the wind make?

super-size it! Can you make a really big parachute—so big, it's super-sized? Using what you know about making a parachute, make one that's big enough to float safely when dropped from a significant height, like in an open stairwell or out a window. If necessary, get permission first before dropping your extra-large parachute!

Did You Know?

In August 1960, Joseph Kittinger set the record for the highest parachute jump. He jumped from a height of 102,800 feet—three times higher than most planes fly! He was so high up, he had to wear a special pressurized suit to stay safe. As he fell, Kittinger hit a top speed of 614 mph! He landed safely in a desert in New Mexico and his record still stands today.



Watch **FETCH!** on PBS KIDS GO! (check local listings) and visit the **FETCH!** Web site at pbskidsgo.org/fetch.



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Fold

Fetch!

sky Diver



Chet's last hobby was fire ant juggling—he lost a few whiskers in that experiment! Now he wants to try sky diving, and there's no stopping him! Can you design a parachute to keep my little buddy safe?



**GOOO
FETCH!**