Go Fly a Kite

Activity 5

Airplanes, butterflies, and birds. How do they stay up while gravity pulls them down? In this activity, kids build kites out of household materials and explore how kites use wind to overcome gravity—even indoors! Hang on to your hats ... and kites!

Prepare Ahead

- Prepare a table with kite-making materials.
- Make a sample kite, following the directions on the kids' activity sheet.

Lead the Activity

1 **Introduce Ruff's challenge.** (10 minutes) Explain that today's challenge is to make kites that catch enough air to fly indoors. Most of the time, we don't notice air. Have kids hold up their hands, keeping them still. Then have them wave their hands back and forth. Ask kids what they feel when they move their hands. *(They feel the air making contact with their hands.)* Have them blow onto their hands and feel how forceful moving air can be.

Show kids an open sheet of paper and another sheet crumpled into a ball. Point out that the two sheets of paper are identical, but that you made one into a ball. Before dropping each one, ask:

- How will the ball of paper fall when I drop it? *(It will fall straight to the ground.)* How about the flat sheet of paper? *(It will drift to the ground.)*
- What is the name of the force that pulls the paper down? *(Gravity)*
- Why did the pieces of paper act so differently when I dropped them? *(Air is something! It is made of gas particles, such as oxygen, nitrogen, and carbon dioxide. The open sheet hits more of these particles, which slows it down.)*
- Kites are heavier than air. How do they stay in the air? *(When there's a wind, the air particles push on the kite, lifting it up.)*
- What features help a kite fly? *(Key features include being lightweight to minimize the pull of gravity; big enough to catch a lot of air; strong enough to handle the wind; and flying at an angle so the air can push on the kite and lift it up.)*

Materials

- Activity sheet for each kid
- Sheets of 8.5 x 11 paper (colored paper is fun)
- Wooden skewers
- Tail materials (e.g., paper streamers, ribbons)
- Scissors
- Hole punch
- Tape
- Rulers
- Lightweight string

National Science Education Standards

Grades K–4
Physical Science:
Position and motion of objects

Science and Technology:
Abilities of technological design

Grades 5–8
Earth and Space Science:
Earth in the solar system

Science and Technology:
Abilities of technological design

2 Make predictions. (5 minutes) Show the sample kite. Point out the sail, crosspiece, tail, and string attachment point. Ask kids to predict how each part helps a kite to fly. Record their ideas. *(Air pushes on the sail. The crosspiece keeps the sail stiff when the air pushes on it. The tail and attachment point keep the sail at an angle so the push of the air lifts the kite up.)*

3 Build kites. (15 minutes) Hand out the activity sheets. Have kids make their kites, following the directions. Give a two-minute warning before the end of the building time. As an alternative, lead the group step by step through the instructions. Doing each step together can minimize confusion and everyone will finish at the same time.

4 Test predictions by flying kites. (15 minutes) Have kids experiment with how fast they need to move to keep their kites flying. Challenge them to change one thing about their kites to make them fly better.

5 Discuss what happened. (10 minutes) Bring the group back together. Ask:

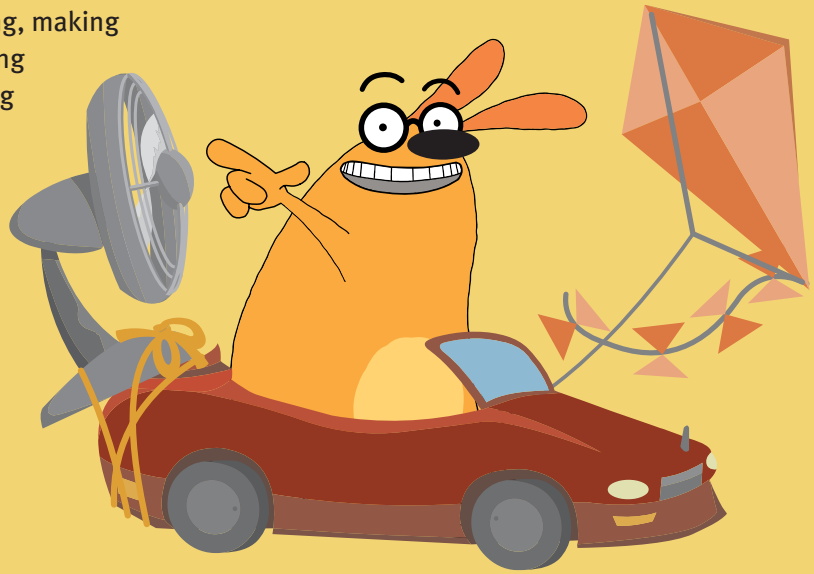
- When air pushes on the bottom of the kite, how does the kite move? *(Upwards)*
- How did you get air to push on the bottom of your kite? *(By pulling it through the air)*
- What are some ways to improve how a kite flies? *(You can increase the amount of air pushing on the kite by increasing the sail size or adjusting the flight angle. You can also minimize the effect of gravity by reducing weight.)*

6 Award points. (5 minutes) Time to rack up some points. Gather as a group. Review the activity's key ideas by asking everyone the following questions. Each question is worth 50 points. Whenever you hear an acceptable answer, award 50 points to the entire group.

- Do something that demonstrates gravity. *(Kids can drop a pencil or jump up and down.)*
- Name two things that depend on moving air to stay airborne. *(Birds, airplanes, kites, paper airplanes, hang gliders, etc.)*
- When you skip or walk faster, why does your kite go higher? *(It goes higher because there is more air pushing on the kite.)*
- What's a possible advantage and a possible disadvantage if you tripled the size of your kite? *(The larger size would catch more air, which could be an advantage. It would also weigh more, which might be a disadvantage.)*
- Doing science and engineering involves making predictions, testing them (which includes doing something, making observations, and drawing conclusions), and sharing your results. Give an example of how we did these steps today. *(Answers will vary.)*

Activity Tips

- Do this activity in a room with lots of space for moving around.
- Define a testing area where kids can safely move with their kites one at a time.
- To generate more wind for the kites, let kids walk quickly or skip.
- Kids' bodies will block the air a kite needs to fly properly. Have them start by holding their kites out to the side and walking or running with the kites away from their bodies.
- Tell kids to begin by holding the string lightly where it attaches to the kite and to let it out gradually when the kite tugs as it begins to fly.



GO FLY a KITE

Fetch! with Ruff Ruffman™

Fly a kite indoors? Yes! Just use your smarts, your science and engineering know-how, and a sense of fun, and you'll be set to go. Hang on to your hats!

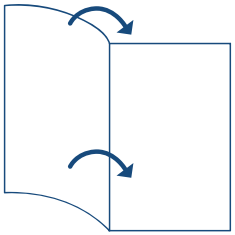
What to DO

1 Get what you need.

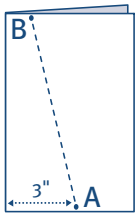
- 1 sheet of 8.5 x 11 copier paper
- 1 wooden skewer • Tail materials
- Hole punch • Ruler • Tape
- A 3-foot piece of string

2 Build your kite.

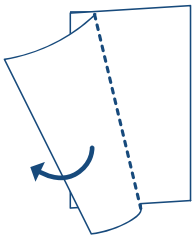
- Fold the paper in half.



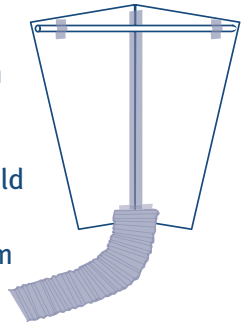
- On each side of the paper, draw two dots: one 3 inches in from the fold (Point A) and the second 1 inch in from the fold (Point B). Draw a line between Points A and B.



- Fold the paper on these lines to make the wings.

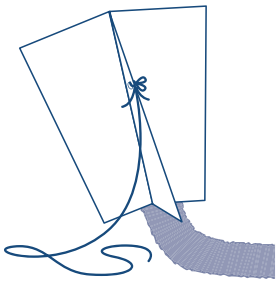


- Put tape over the centerline. Tape on the wooden skewer and tail.



- Flip the kite so it rests on its top. Fold the flap back and forth a couple of times until it stands straight up from the wings.

- Punch a hole in the flap three inches from the smallest end of the flap.



- Tie one end of the string to the hole. You're ready to fly!

3 Fly your kite.

Here are some tips for flying your kite:

- Your body can block the air that the kite needs to fly properly. Keep the kite away from your body by holding it with your arm straight out to the side.

- Hold the string lightly where it attaches to the kite. Let it out gradually when the kite tugs as it begins to fly.

Chew on This

How do kites stay in the air? Remember, air is something—it is made of gas particles, such as oxygen, carbon dioxide, and nitrogen. As kites move through the air, the air pushes on the kite. But to keep a kite up, the air has to keep moving. Think of a water skier. If the boat pulling a water skier stops, the water skier sinks. So for the kite to stay up, either you need to pull the kite through the air, or the wind needs to blow against the kite. To keep a kite from falling, the upward force of the air hitting it must equal gravity's downward pull.

Dig Deeper

Once you know how to control it, wind is a great way to get things to move. Try these ideas:

* Attach the string in a different place. Punch a hole farther up or down on the flap. See what happens.
* Experiment with different sizes of paper. Make a really small or a really big kite.
* Build a car that uses wind to move. Get the Puff Mobile challenge from the ZOOM Web site at pbskids.org/zoom/activities.

PBS KIDS GO!

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!

Go Fly a Kite

Hi there, I need your help. I want to send a love letter and some of my famous pineapple-liver biscuits to Charlene, the poodle next door. And I have a great idea. Could you build me a kite? Once you've got a good one, I'll attach the note and a few biscuits to it, fly it over her fence, and crash it in her backyard. You will? Awesome!