

GIVE SPARK · HANDS-ON SCIENCE LAB

The Traveling Seed

How can a paper seed travel farther in the wind?

Teacher Guide

Grades 3–5 · Engineering and plant science · 60 minutes

FREE LAB

OVERVIEW

The lab at a glance

One lesson, one driving question and paper seeds that have to ride the wind.

THE DRIVING QUESTION

How can a paper seed travel farther in the wind?

Children compare two designs of their own, then improve one of them.

What children do

Teams make two paper seeds with different shapes. Each one uses one square of paper and one paper clip, which stands for the seed itself. They release both designs from the same spot in front of a fan, measure where each one lands and repeat three times. Then they change one feature of one design and find out whether it travels farther.

What children learn

Shape changes how an object moves through air. A shape that catches more air falls more slowly, so the wind has longer to carry it. Many plants rely on this, and their seeds have wings, parachutes or fluff. Children also learn to change one feature at a time, so they can tell what made the difference.

Success looks like

1. I used one square of paper and one clip for each seed, and released every flight the same way.
2. I measured three flights for each design and recorded every distance.
3. I changed one feature and used my distances to say whether it helped.

The building rules

- Each seed is made from one 10 cm square of paper and one paper clip.
- You may fold the paper, curl it and cut slits into it.
- You may not cut any paper off, and you may not add tape or glue.
- The clip must stay on the seed for the whole flight.

AT A GLANCE

Time: 60 minutes with one fan for every two or three teams.

Grouping: teams of three, sharing a fan station with one or two other teams.

Standards link: supports NGSS 3-5-ETS1-3, carrying out fair tests to improve a design. It connects to life science work on how plants spread their seeds.

SESSION PLAN

STAGE	MIN
Introduce the puzzle	5
Design and build	12
Plan a fair test	5
Test both designs	15
Change one feature	10
Compare and explain	8
Close	5
Total	**60**

THE STUDENT RESOURCE

A separate one-page PDF with space to sketch both designs, the results table, the one change and the closing sentences.

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PREPARATION

Get ready

What to gather, how to set up a fan station and one release rule for every flight.

Materials

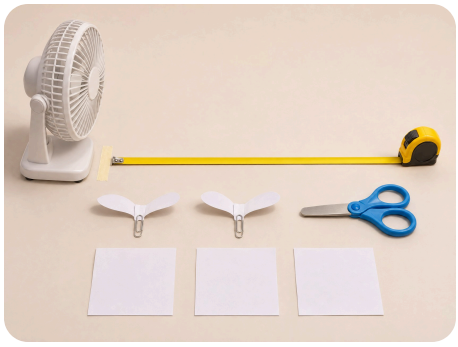
For each team

- 4 squares of printer paper, each 10 cm by 10 cm
- 3 identical paper clips
- Scissors
- The student page and a pencil

For each fan station

- A fan on a table, facing along a clear stretch of floor at least 3 m long
- A tape measure laid on the floor in a straight line away from the fan
- Masking tape for the release mark

One sheet of letter paper gives four 10 cm squares with a strip left over. Cut them before the lesson.



One fan station. The tape in front of the fan is the release mark, and the tape measure runs straight away from it.

SAFETY

Use fans with a guard. Children keep fingers, hair and paper away from the fan and never reach behind it. Tape the cord down so nobody trips.

HOW MANY STATIONS

One fan serves two or three teams, who take turns flight by flight. A class of ten teams needs four or five fans to finish in an hour. With fewer fans, run testing as a rotation and allow additional time. Set fans far enough apart that one breeze does not reach another.

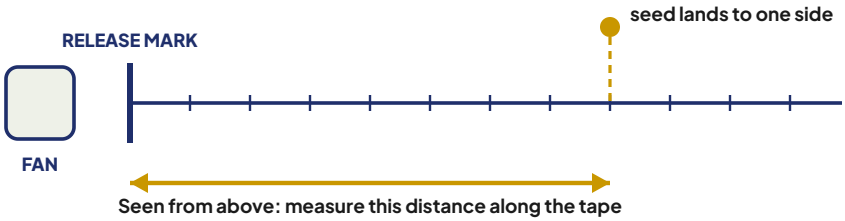
Set up a fan station

1. Position the fan securely on a table, about 30 cm behind the table's front edge, facing out over the floor. Switch it to its lowest setting, and leave it on that setting for the whole lesson.
2. Mark the release position with a strip of masking tape at that front edge, directly in front of the fan.
3. Lay the tape measure on the floor with its zero directly below the release mark, running straight away from the fan.

The release rule

1. Hold the seed by its paper clip, directly above the release mark and level with the middle of the fan.
2. Let go without pushing or throwing.
3. A spotter watches from the side and puts a finger on the spot where the seed first touches the floor.
4. Measure from zero to that spot, along the tape measure, to the nearest centimeter.

If a seed lands to one side, children measure the distance along the tape to the point level with where it landed.



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Run the lesson

A falling paper clip raises the question. Measured flights from one release mark answer it.

Introduce the puzzle 5 MINUTES

DO At a fan station, release a bare paper clip from the mark. It drops almost straight down. Then clip it to a flat square of paper and release it again.

ASK “The clip is our seed. What could the paper do to help the seed travel farther from the plant?”

Design and build 12 MINUTES

DO Read the building rules. Each team sketches and builds two seeds that are clearly different from each other, and labels them A and B.

ASK “What is the main difference between your two designs?”

Plan a fair test 5 MINUTES

ASK “What must stay the same on every flight?”

Establish the fan setting, the release mark, the release height, the way of letting go and the way of measuring. Demonstrate the release rule once.

Test both designs 15 MINUTES

DO Teams take turns at the fan. They fly A, then B, and repeat until each design has three measured flights. They record every distance and how the seed moved.

Change one feature 10 MINUTES

DO Each team picks one design and changes one feature, such as longer wings, more slits or a different fold. They record the change, then fly the revised seed three times.

ASK “Why change only one thing?”

Compare and explain 8 MINUTES

ASK

- “Which design usually traveled farthest? Did it win every flight?”
- “Did your change help, make no clear difference or make it worse? Which distances show that?”

Close 5 MINUTES

DO Children complete the sentences on the student page. “Our results showed ___. The distances that support our answer are ___.” Allow a few minutes for cleanup within this stage.

LOOK FOR

Children who look at all three flights before they decide, and who can name the one feature they changed. Listen for “usually” and for distances quoted as evidence.

IF THIS HAPPENS

A seed drops straight down. It is catching very little air. Ask what part of it the wind can push on.

A seed flies off to the side. Measure it as the release rule says and note “went sideways”. Uneven wings often cause it.

The distances for one design vary a lot. That is normal. It is the reason for three flights.

KEEP THE PUZZLE OPEN

Do not show a finished seed. Children get more from comparing two ideas of their own than from copying one of yours.

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The science behind it

Why shape decides how far a seed travels, the ideas children bring and how to adjust the challenge.

The science behind it

Gravity pulls the seed down while the moving air from the fan pushes it sideways. How far it travels depends mostly on how long it stays in the air. A shape with a large surface catches more air as it falls, so it falls more slowly and the wind has more time to carry it.

Plants that depend on the wind have seeds built this way. A maple seed has a wing that makes it spin as it falls. A dandelion seed hangs beneath a parachute of fine hairs. Traveling away from the parent plant helps a seed find its own light, water and space.

The paper clip matters too. It is the weight the paper has to carry, which is why every seed uses the same clip and the same amount of paper. Only the shape is different.

Ideas children often bring

A CHILD MIGHT SAY	YOU COULD RESPOND
“Lighter things always go farther.”	Every seed here has the same paper and the same clip. Ask what is different.
“A bigger fan would fix it.”	The wind is the same for every seed. The challenge is the shape.
“It went farthest once, so it is the best.”	Ask what the other two flights show.

Support and challenge

Support. Offer two starting ideas to choose between, such as a seed with two wings or a seed with a fringe of strips, and let the team decide the details.

Challenge. Ask teams to find the middle distance for each design and compare those numbers. They can also predict how a second clip would change the result.

ASSESSMENT

Use the student page and the discussion.

Fair test: names what was kept the same.

Data: records three distances for each design.

One change: names a single feature and uses the distances to judge it.

TAKE IT FURTHER

Real seeds. Collect wind-carried seeds and compare their shapes with the class designs.

A second change. Change one more feature and build a record of what each change did.

FINAL EXPLANATION

Ask every team for the same three things. Tell us what you found, show the evidence, and explain what you think caused it.

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Vicky Brooks
Give Spark

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The traveling seed

How can a paper seed travel farther in the wind?

Name _____ **Date** _____

1 Seed A

Sketch it.

2 Seed B

Sketch it.

3 Our fair test

What will we keep the same on every flight?

_____

4 Our results

Measure how far forward the seed traveled along the floor tape. If it lands sideways, use the point on the tape level with its first landing.

DESIGN	FLIGHT 1	FLIGHT 2	FLIGHT 3	HOW DID IT MOVE?
Seed A	cm	cm	cm	
Seed B	cm	cm	cm	
Changed seed	cm	cm	cm	

5 Our one change

We changed seed **A** **B** The one feature we changed was

_____

The change **helped** **made no clear difference** **made it worse**

6 What we found

Our results showed

_____

The distances that support our answer are

_____

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