

Can a Bigger Sail Catch More Moving Air?

Build one simple wind mover, change only the sail size, run two fair tests, and use evidence to explain what happened.

AGES 8–13

15 MINUTES

NO SPECIAL BACKGROUND NEEDED

PRINT OR USE ON SCREEN

TODAY'S MISSION

Use moving air from the same hand-held fan to push the same lightweight cup. Compare a small paper sail with a large paper sail.

MOVING AIR



SAIL MOVES



COMPARE

YOU NEED

- 1 light paper cup
- 2 paper sails: 2 × 2 in and 4 × 4 in
- Tape, ruler, pencil
- Fan:** a book or stiff card

1

2 MIN

Build the wind mover

Lay the empty cup on its side so it can roll. Tape the 2-inch paper square upright on the cup as a sail. Mark a **START** line.

Ready example: The sail should face the book like a small wall. Test one gentle fan motion to confirm the cup can roll.

If your child is unsure

- “Which one thing are we changing?”
- “Put the cup back on the same start line.”
- “Use the two trial measurements—not just the best one.”

2

3 MIN

Set up one fair comparison

Say: “We will change only the sail size.” Keep the same cup, table, start line, fan, fan distance, and five fan motions.

Ready check: Change = sail size. Same = everything else. Place the book one ruler-length away; have the same person fan both tests.

We will change _____. We will keep _____ the same.

What to notice as a parent

- ✓ Can your child name the changed variable?
- ✓ Do they keep the cup, distance, and fan motions the same?
- ✓ Can they compare both trials instead of choosing one result?
- ✓ Can they propose one next fair test?

3

2 MIN

Predict before testing

Say: “Which sail do you think will help the cup roll farther—the 2-inch sail or the 4-inch sail? Why?”

Ready examples: “The larger sail may catch more moving air.” “The larger sail might wobble and make the cup less stable.”

I predict the _____ sail will move farther because _____.

Keep the test safe and fair

This model shows moving air doing work; it does not generate electricity. Use a clear surface and a book or stiff card—no electrical fan is needed. Mixed results are useful; repeat instead of forcing an answer.

4

5 MIN

Run both tests twice

Small sail: five similar fan motions; measure. Reset and repeat. Replace only the sail. Large sail: repeat the same test twice.

Small 1: ____

Small 2: ____

Large 1: ____ / 2: ____

Example evidence: Small sail: 8 in and 9 in. Large sail: 14 in and 13 in.

Your 15 minutes together

You just practiced observing moving energy, changing one variable, repeating a test, measuring results, and using evidence to plan an improvement.

5

3 MIN

Use evidence; design the next test

Say: “What did the two trials show? Were the results consistent? What is one different variable we could test next?”

Clear example: “The large sail moved farther in both trials. Next we could change the sail angle—but keep its size the same.”

The evidence showed _____. Next we would change only _____.

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The 12-week Clean Energy Lab develops this same habit with working solar, wind, hydro, and storage models, controlled tests, observations, and evidence-based improvements.

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