

Connections to School —

In *Gliders* children test the relationships between a glider's wing design (area, shape and position), and its weight distribution (and center of gravity) to make a glider that "flies" straight and far. They think about how "flying" things (planes, birds) *use and relate* to the air, compared to "projectiles" that force their way *through* the air. These experience match well with important concepts contained in K-8 state and national science standards.

All NPASS2 after school projects are relaxed, informal and fun. They stress five common process skills that are mentioned in state and national science standards: observing, investigating, questioning, explaining and problem-solving. We call these the *Master Scientist Skills*.

NPASS₂
National Partnerships for After School Science

MASTER INVESTIGATOR

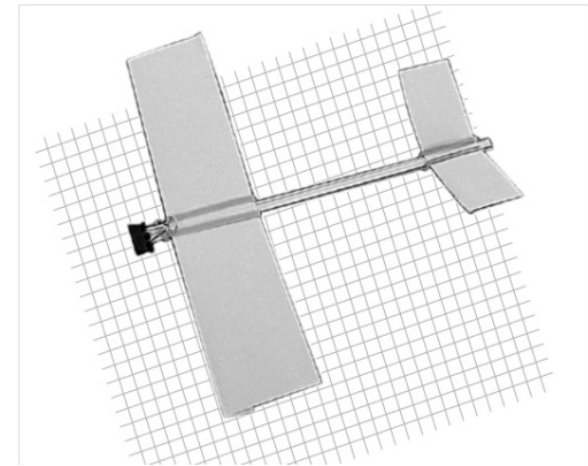
- Creative, Playful Explorer
- Fair Tester
- Quality Controller



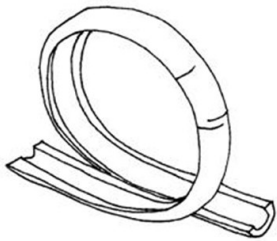
Explore creatively and playfully. Do quick tests and comparisons.
Change one thing and keep everything else the same. Always watch the results carefully.

MAKING SCIENCE FUN

Gliders: an after school science and engineering project from the *Design It!* curriculum series



Have you seen this other *Design It!* project?



Ball & Tracks

This curriculum offers a playful way to investigate the behavior of a marble rolling down a sloping track.

▶ Students design "no-fold" index card gliders that fly *straight and far*.



NPASS2 is a project of
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NPASS2 on the Web
<http://npass2.edc.org>

NPASS2 is funded by the
National Science Foundation,
grant #ESI-0917567



The National Partnerships for
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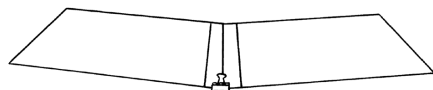
FOR PARENTS*

Summary

Children make simple index card gliders that fly straight and far. The special challenge with these gliders is that the cards that make the wings may not be folded, bent, creased, rolled, torn, or deformed in any way! The wings are just flat cards!

Design It! Gliders Activities

- The Simplest Glider
- What Use Is a Tail?
- Adding a Body
- Making a Jumbo Glider
- Making a Fair Launcher



Suggested Materials

Index cards 3"x5" Binder clips (3/4 inch) Paper clips
Clear tape Thin rubber bands (# 16)
Drinking straws
5"x8" Index cards (optional)

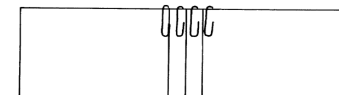
Troubleshooting & Questioning

Ask these types of questions as your child explores the activities at home:

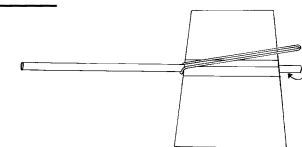
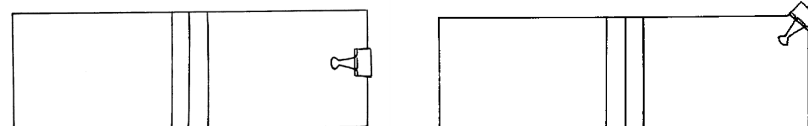
- What different shapes work well/best for the wings?
- How much weight should you add? What are the best places to put it?
- Is your glider really "flying"? (Riding ON the air, not forcing THROUGH it?)
- Is the flight safe and comfortable for the (imaginary) "passengers"?
- How does the shape and position of a tail affect the flight path (direction, distance?)

* For more information about this project go to:
<http://npass2.edc.org/resources/curriculum-guides/gliders>

FOR KIDS



Make a simple glider from just **two** index cards, and as many binder clips or paper clips as you like. You can only use about 6 inches of tape. You may not fold, bend, crease, roll, tear or deform the cards in any way. Where is the best location for the binder or paper clips? Keep redesigning your glider (new cards if you need them) until it flies 10 feet (25 feet!). Your launch technique makes some difference to flight distance but it's mostly about the design. Keep experimenting.



Add a Tail and a Body using new cards and straws. You may bend or tear the tail cards but keep the wings flat and unfolded. Try different tail shapes. What shape makes your glider fly straighter and farther? Place a "body" between the wings and tail made with one or more straws. You can attach the wings and tail to the straw(s) with small rubber bands. What effect does a longer body have on flight distance?

