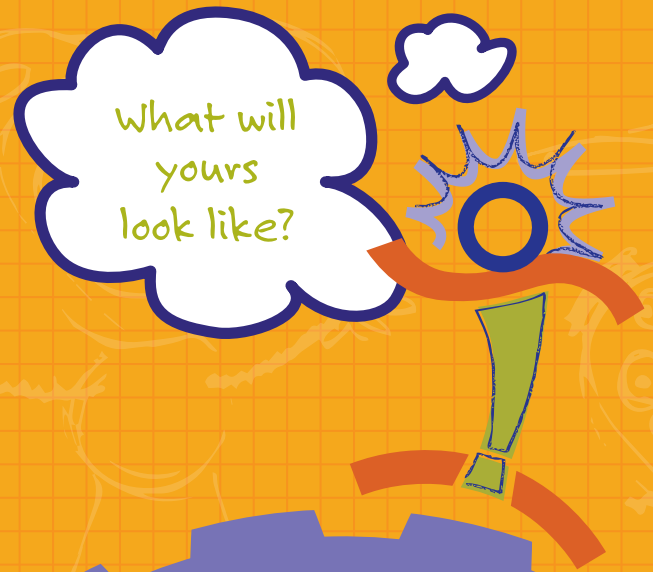
SPARK!LAB

Smithsonian

8+

Invent

Fantastic Flying Machines



Spark!Lab is a real place located in the Smithsonian's National Museum of American History. It's a hands-on invention activity center where visitors learn that invention is a process and that everyone is inventive.

Activities incorporate history, science, engineering, technology, and art. A visit to Draper Spark!Lab "sparks" imagination and curiosity, and can be the first step to exploring our own inventiveness and invention in the world around us.

To learn more, visit us at: http://www.invention.si.edu/try/sparklab

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Invent Fantastic Flying Machines #3617000
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Inventor's Guide

⚠ WARNING:
FUNCTIONAL SHARP POINT/EDGE

Did you know that we are surrounded by invention?

Life today is much easier, safer, faster and more convenient thanks to creative problem solving through invention. Since the beginning of time, people have used their imaginations as a way to solve a problem or overcome a challenge…

Your Challenge:

Your private island awaits, but you can't get there by boat or bridge because the waters are shark-infested. You need to fly there. It's up to you, the inventor, to create your own unique flying machine with what you've been given in this box. Welcome to the wonderful world of inventing!

Flying...

is the fastest way to travel long distances. There are many different ways to do that. Planes, balloons, gliders, and helicopters are just a few. Plenty of flying machines have been made over the years, and now it's your turn.

Real inventors follow a process as they create. Learn what the steps are by going through your own journey of invention. You may skip ahead or re-visit a step along the way. Let's begin!

To invent you have to:

THINK IT

Have a great idea for an invention.

EXPLORE IT

Investigate inventions and ideas of the past.

SKETCH IT

Draw pictures and diagrams to figure out how your invention might work.

CREATE IT

Build a prototype or model of your idea.

TRY IT

Test your invention.

TWEAK IT

Keep improving your idea.

SELL IT

Market your invention to people who might buy it.

THINK iT

Think of what kind of flying machine you would like to create. Write down all of your ideas no matter how crazy or weird. Remember ideas can be limitless!

1.) Explore the items in the box and what's around you to come up with ideas.

2.) How many people can your flying machine seat?

3.) How much storage will it need?

4.) How far will you need to fly?

5.) Will you fly alone or will you need other crew to help?

EXPLORE iT

How would your flying machine fly? How do modern day flying machines work? What kind of flying machines might be useful to your design?

Here are examples of a few flying machines to get your research started:

Man has been interested in flying for thousands of years. Leonardo da Vinci published a book in the early 1500s on the possibility of human flight through the study of bird flight.

The first way man was able to leave hard ground was in balloons as early as the 17th century; and just a few years ago, a balloon launched a man into space for a space jump.

What really changed the world of flight happened in 1903, when two bicycle makers, Wilbur and Orville Wright from Ohio, took their historic flights in Kitty Hawk, North Carolina. Their invention was the first piloted, powered, heavier-than-air aircraft to achieve sustained, controlled flight.

From there, man was able to rocket to the moon, then travel into space and back on a reusable space transportation system called a space shuttle. ***Discovery*** was one of many shuttles to journey to space and back.

SKETCH iT

Use the space provided to do a few quick sketches of what your flying machine could look like.

CREATE iT

Start putting your pieces together to build your creation. Think about which items will help your flying machine look and work the way you imagine.

TRY iT

Does your flying machine fly like you thought? If yes, congratulations! If not, think about how you can improve or tweak it.

TWEAK IT

How could you adjust your flying machine to make it work better? Make the changes you need.

Look to books and websites like http://howthingsfly.si.edu/, or ask a friend or family member to help explain "lift" and how it helps something fly.

SELL IT

If your flying machine were going to be sold, think about these questions. Try talking to your friends and family about your invention to help promote your sales.

1.) Who do you think would want to buy your flying machine?

2.) Would your flying machine be for people?

3.) Where would you sell it?

Helpful Tips:

Use the sticks to give structure to your designs.

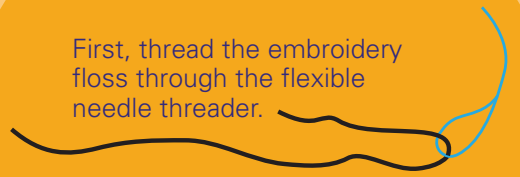
Use the hand held pump to thrust the foam rockets into space.

Cut or re-design the foam rockets to make something different.

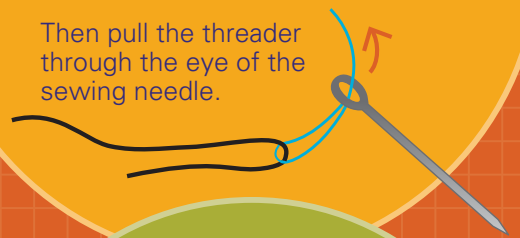
Straws can become frames, supports or used to inflate items.

To use the needle & threader

First, thread the embroidery floss through the flexible needle threader.



Then pull the threader through the eye of the sewing needle.



A rubber band and the thick gray sticks can be used as a sling shot launcher.

Use the printed papers to make paper airplane designs. Keep adding to make them more complex.

Attach a rubber band and the propeller to create a helicopter.

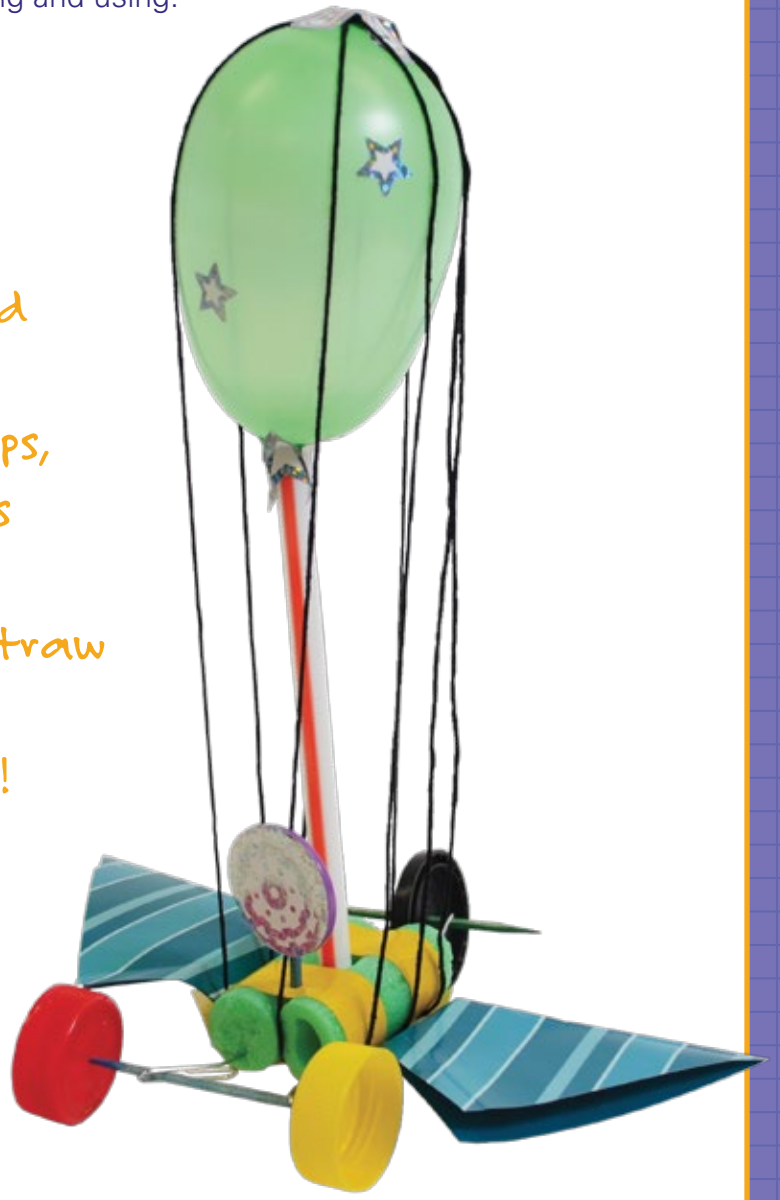
The square plastic pieces fold easily and hold less of a crease. These can be used for soft shapes like hot air balloons or pontoons.

The round pieces of plastic can be used for floating items like a parachute, or to make an inflatable creation.

Project Hack!

Using items found around the house, try to create another flying machine or enhance the one you've just made. Always ask before taking and using.

We added a balloon, bottle caps, toothpicks and a drinking straw to make this hack!

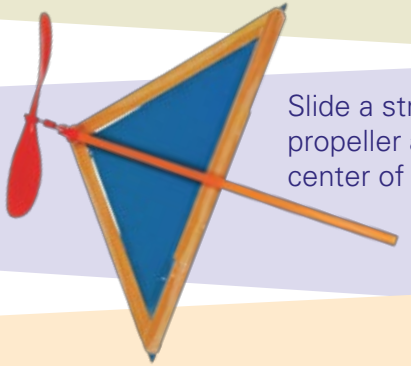


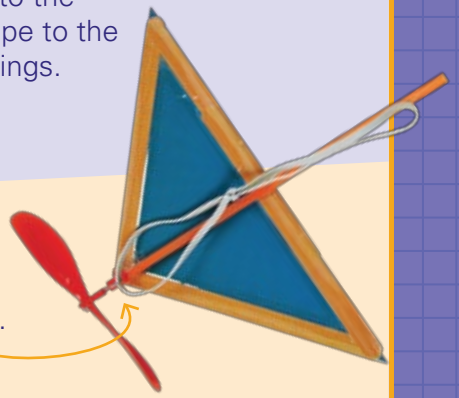
How we made a propeller plane

1. Cut a printed paper square diagonally in half.

2. Tape sticks around the edge creating a frame. Be sure to wrap the tape around the front and back of the paper.

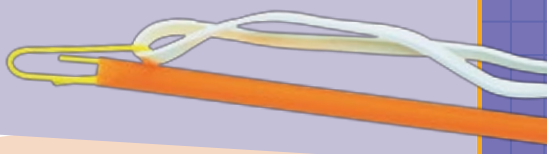
3. Slide a straw into the propeller and tape to the center of the wings.





4. Knot two rubber bands together then attach one end to the propeller.

5. Attach the other rubber band end to a paper clip and slide into the back of the plane.



6. Use a scrap piece of paper to create a tail and add stickers to decorate.