



PAPER COPTERS

MATERIALS:

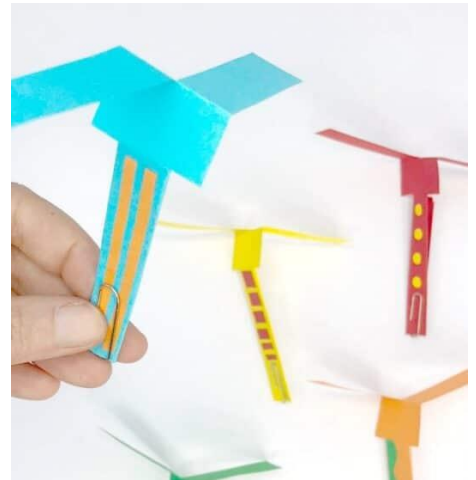
Paper Copter Template
 Copy or Construction Paper
 Scissors
 Clear Tape
 Paper Clip

VOCABULARY:

Force	Flight	Gravity	Mass	Weight
Drag	Lift	Thrust	Helicopter	Rotate
Air Pressure	Ascend	Descend		

DIRECTIONS:

1. Cut your paper and draw guide.
2. Fold section D along long dotted line
3. Fold Section C along long dotted line
4. Fold Section A along dotted line towards you
5. Fold Section B along dotted line away from you
6. Fold bottom edge of section C/D towards you
7. Tape folded end of C/D.
8. Add a paper clip to the taped end.
9. You're done! Take them outside and throw them like you would throw a ball or paper airplane. They should spin like a helicopter to the ground!



THE STEAM BEHIND THE EXPERIMENT:

Actual helicopters fly by generating lift. Lift is an upward pushing force that occurs when the blades of a helicopter rotate and a difference in air pressure is created on either side of the blades. Under the blades the air pressure is high and above the blades the air pressure is lower. This allows the helicopters to ascend into the air.

Our paper helicopters don't generate lift or ascend, but the force of air upward on the blades as they fall is what causes our paper helicopters to spin. As a paper helicopter falls, air presses on each of the blades with an equal force but in the opposite direction and the helicopter spins around.

MAKE IT AWESOME:

Use colored cardstock or construction paper and colorful washi tape to make a decorated paper copter!

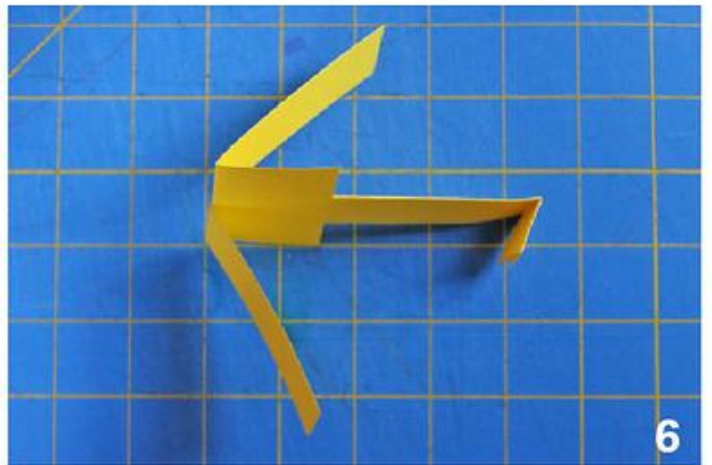
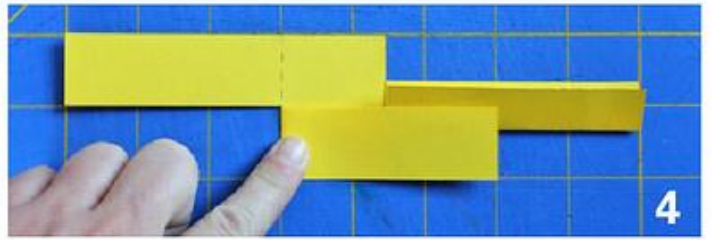
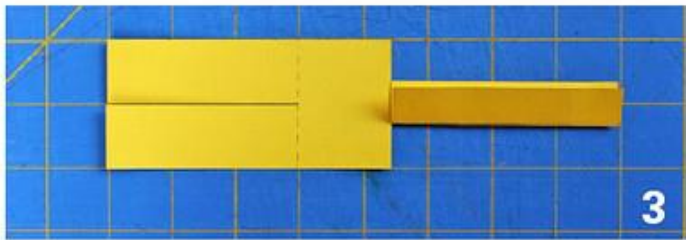
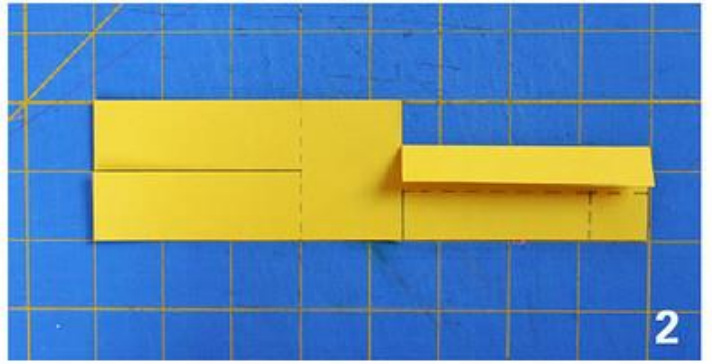
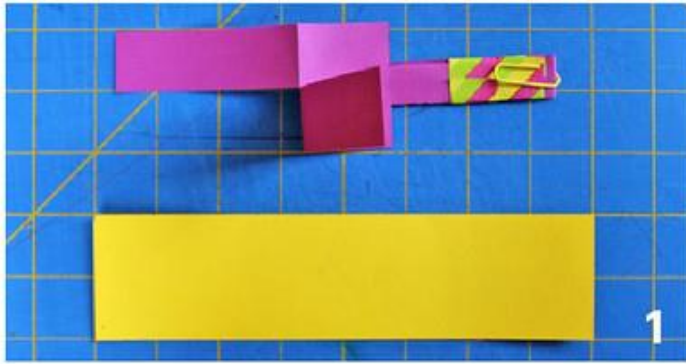
EXTENSIONS:

Try modifying the basic paper copter and explore how the modification changes how it flies.

1. Try switching the direction of the folds for blades A&B.
2. Try adding additional paper clips.
3. Try making different sizes.
4. What other changes can you come up with for this experiment?

WEBSITES AND VIDEOS:

1. NASA's Mars Paper Copter: https://www.jpl.nasa.gov/edu/pdfs/paperhelicopter_worksheet.pdf
2. Two Broke Scientists' Physics of Paper Copters Video: <https://youtu.be/3YZMXb8qZqo>



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