

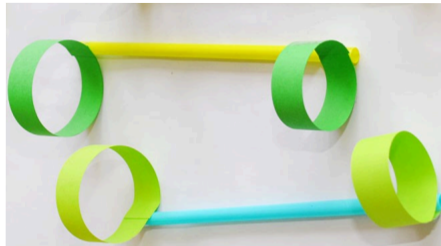
# 15-minute Family STEAM Hoop Glider & Paper Helicopter



## Hoop Glider

### Supplies Provided:

Straws  
Paper



### Supplies Needed From Home:

Scissors  
Tape  
Ruler  
Pencil

1. Cut two strips of paper that are 2cms wide. One strip needs to be 15cms long, and the other 20cms long.
2. Tape the strips into two loops, or 'hoops'
3. Tape the loops to the straw, one at each end. The big loop goes at the back and the small loop goes at the front. Try to line up the rings as you tape them onto the straw.



### The Science

The two sizes of hoops help to keep the straw balanced as it flies. The big hoop creates "drag" (or air resistance) which helps keep the straw level while the smaller hoop in at the front keeps your glider from turning off course. Why doesn't the glider flip over? Objects of different weight generally fall at the same speed, the hoop will keep its "upright" position.

### Experiment

Once you've made one hoop glider, you'll want to make a few more so you can try some experimenting. Try making slight differences to the design of your gliders so you can test them against each other.

- What happens if you change the size of the rings?
- What happens if you add more than two rings?
- What happens if you change the shape of the loops? Fold them into square shapes and see if it still flies.
- What happens if you make the straw longer or shorter?

# Paper Helicopters

## Supplies Provided:

Large index cards, usually 5 inches x 7 inches  
Template to copy  
Paper Clip

## Supplies Needed From Home:

Tape  
Scissors  
Pencil



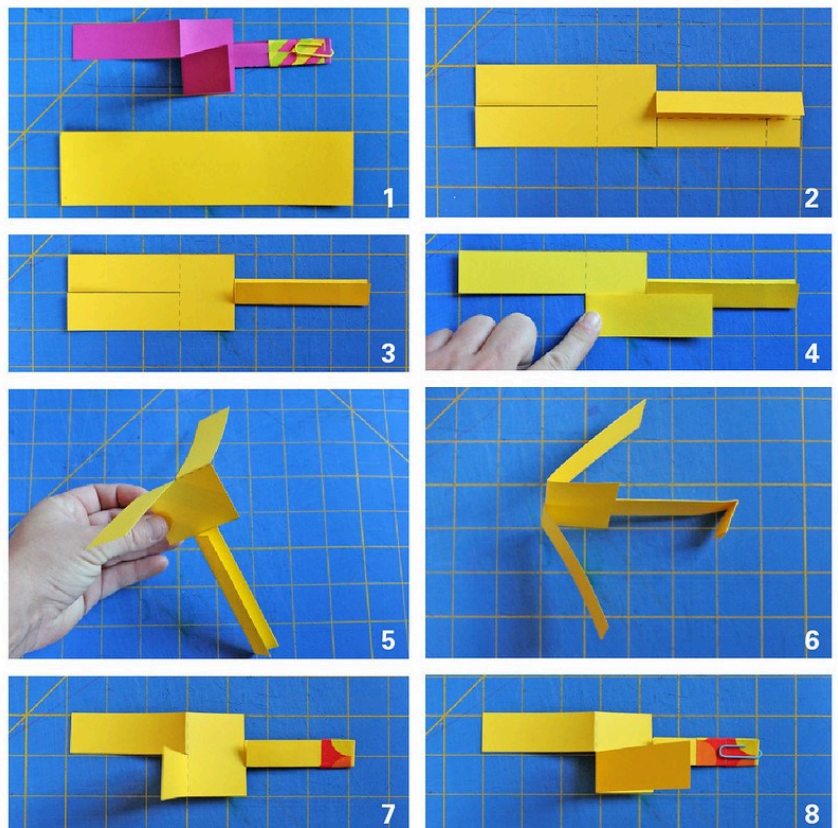
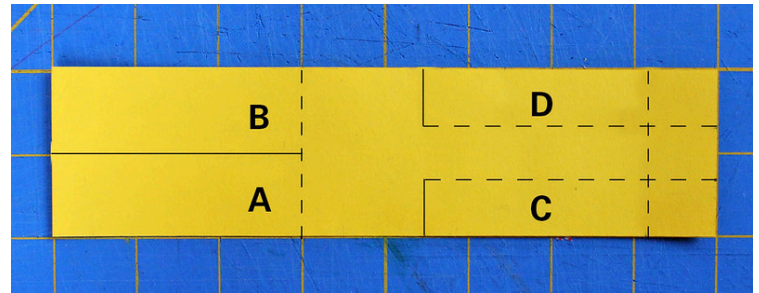
1. Copy the template onto your index card
2. Fold section D along long dotted line
3. Fold Section C along long dotted line
4. Fold Section A along dotted line towards you
5. Fold Section B along dotted line away from you
6. Fold bottom edge of section C/D towards you
7. Tape folded end of C/D.
8. Add a paper clip to the taped end
9. Throw them like you would throw a ball or paper airplane. They should spin like a helicopter to the ground. If you have a two story space you can also drop them down and watch them spin. You don't need to throw them that hard.

**The Science:** 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.

## **Experiment**

- Try switching the direction of the folds for blades A & B. Make note of the direction the helicopter spins this time.
- Weight affects how quickly the helicopter spins, try adding additional paper clips and watch how the helicopter spins faster!
- Make the helicopters in different sizes. Does any size work better or worse than the others?



[babbledabble.com/diy-toy-paper-helicopter](http://babbledabble.com/diy-toy-paper-helicopter)