Hoop Glider

**Objective:** To have the children “think like a scientist” and learn about the scientific method. This is a very easy experiment demonstrating drag and lift, so we want to get the children to ask questions, thinking about ways to improve their glider and testing these ideas.

Difficulty: Easy

Cost: Very inexpensive

**Materials:**

3”x5” index cards or stiff paper

Plastic drinking straw (non-bendable preferred)

Tape

Scissors

**Directions:**

1. Cut the index card lengthwise into 3 separate strips, each measuring 1 inch (2.5 cm) by 5 inches (13 cm).
2. Take 2 strips and tape them together into a loop, making sure to overlap the pieces by about 0.5 inches (1 cm).
3. Use the last strip to make a smaller loop.
4. Tape the straw on the inside of the loops, 1 loop on each end.
5. Hold the glider in the middle of the straw and aim the smaller hoop forward. See how far you can throw it!

**Explanation:**

The hoops of the hoop glider act as a wing. When you look at a paper airplane, there is no curve or bump like you see in an airfoil. It is flat. However, the element of air resistance, or drag, is another contributor to providing lift. As the air hits the lower part of the dragging wing or hoop, the air slows down. According to Bernoulli, if the air slows down, the pressure goes up, so there is a lift for the paper airplane or the glider. The larger back hoop provides drag and lift while the front hoop keeps the hoop glider going straight. The glider stays upright because even though it is falling, each part will fall at the same speed and maintain its position.

## Lesson

We’ve done a lot of experiments with the children, but now we want them to “think like a scientist” and learn about the scientific method. First, explain that we’ve been teaching science, and now we want to them how science is done. Separate them into groups of approximately 4 kids.

Scientific Method:

1. Make a question
2. Idea or hypothesis
3. Prediction
4. Test
5. Analysis

First, we can show them the glider. Then see if anyone has ideas on how to make the glider fly better. Some questions could be:

1. Does the placement of the hoops on the straw affect its flight distance?
2. Does the length of straw affect the flight?
3. Do more hoops help the glider fly better?
4. Do the hoops have to be lined up in order for the plane to fly well?
5. Does the straw have to be inside or outside the loops?
6. Can the hoops be the same diameter?
7. Can we use two straws?

Each group should test one of these ideas. First, have them predict what would happen and why. The group can test their prediction and then analyze the results. What does the best glider look like? Finally, allow every student to make his or her own glider.

Resources:

https://sciencebob.com/the-incredible-hoop-glider/

http://mediad.publicbroadcasting.net/p/wkar/files/205-STEM-Challenge.pdf