

Hoop Planes

Georgia Standards of Excellence

S4P3 Students will demonstrate the relationship between the application of a force and the resulting change in position and motion of an object.

S4P3c Explain what happens to the speed or direction of an object when a greater force than the initial one is applied?

S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.

a. Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration.

b. Construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object.

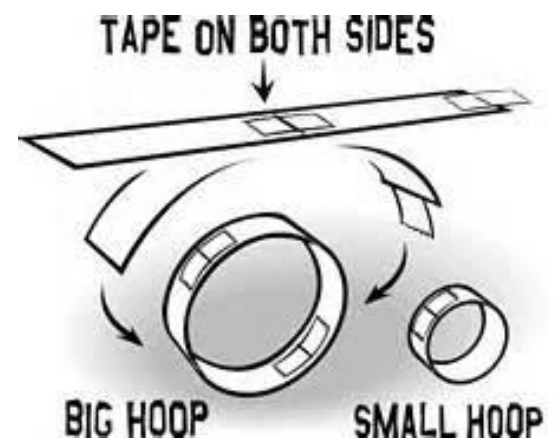
c. Construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia)

Objective:

The purpose of this activity is to experiment with airflow over an airplane and observe it fly. You will make a hoop plane and test fly it.

Supplies and Materials:

- A regular plastic drinking straw
- 3 X 5 inch index card or stiff paper
- Tape
- Scissors
- Modeling clay



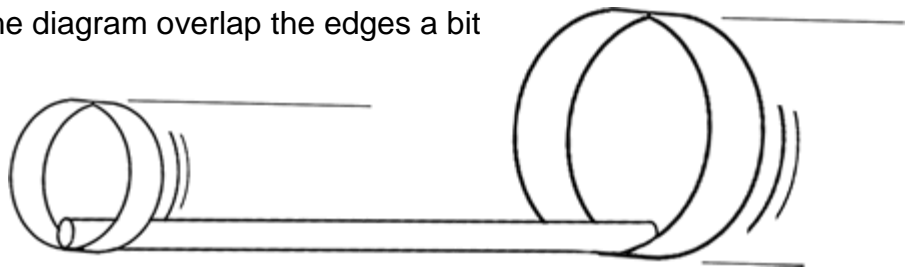
Discussion:

If you throw a plain straw, it doesn't go very far. But when you add paper hoops, the straw glides through the air. That's because the hoops act like wings. Things that fly, like insects, birds, and airplanes all have wings. But wings are not all the same shape and size. Different wings can be better for different kinds of flight. For example, an eagle

has long, wide wings that help it glide. An airplane has wings with small flaps that move up and down to turn the plane. Try changing the wings on your glider. How does it fly with different wings?

Procedure

1. Cut a 3" x 5" index card lengthwise into 3 equal pieces.
2. Make a large hoop by taking 2 of the pieces of paper and taping them together. As the diagram shows you, be sure to overlap the pieces about half an inch so that they keep a nice round shape once taped.
3. Make the smaller (leading edge) hoop by using the remaining strip of paper. Again, as shown in the diagram overlap the edges a bit like before.
4. Tape the paper loops to the ends of the straw as shown below.
5. Notice that the straw is positioned on the inside of the loops
6. If it is easier, tape the straw to the outside of the hoops.
7. Now, you are ready to fly your "Hoop Plane".
8. To make the hoop plane fly better, place a plug of clay to the inside of each end of the straw, giving it a little extra weight or ballast



What can you change?

- you make the straw smaller?
 - you change the size of the hoops?
 - you add a third hoop?
- Choose one thing to change (that's the variable), and predict what you think will happen, then test it.

