Building an Aerodynamic Vehicle

Funded by the Donald W. Reynolds Foundation

Purpose: To determine how shape of vehicle affects the length of time it will remain in the air.

Arkansas Science Standards:

PS. 6.6.5. Understand why objects have weight.

PS. 6.6.6. Compare and contrast weight and mass.

PS. 6.6.7. Describe the effects of force:

- **Move a stationary object**
- **Speed up, slow down or change the direction of motion**
- **Change the shape of objects**

PS. 6.6.8. Conduct investigations to demonstrate change in direction caused by force.

Materials:

Inexpensive electric fan- ideally you need a fan on a stand that can be turned to blow the air straight up to the ceiling

Small disposable paper cups (such as Dixie™ cups)

Stop watch

Scissors

Activities:

1. Ask the students the following scientific question: How does shape of object affect the amount of time it will hover above an electric fan?

2. Generate a list of possible shapes for the cups. For example,  **might be one shape they could cut from the cup. The students must remember that the only variable that can be changed is shape. Therefore no part of the cup may be removed from the design. That would affect the mass of the cup.**

3. Create a class data chart such as the one below to record their information. Have each group tape an index card with their cup design under the column heading "Shape of Cup." All designs do not have to be different.

4. Conduct the experiment as a class, so each group can see the other designs and how well they hover in the air column. Have a representative from each group record the time in the chart.

How Does Shape of Cup Affect Time in the Air?

Shape of cup	Time in Air Trial 1	Time in Air Trial 2	Time in Air Trial 3	Average Time in Air
				

5. Discuss the results of the experiment. Make sure students discuss what they could have done to their design to make it more effective, and why certain designs stayed in the air longer than other designs.

<u>Why Teach This Before the Exhibit</u>? To ensure that children have some practice with the effects of wind resistance, gravity, and mass on an object. This activity VERY closely matches an activity that the students will complete on board the "Race to Planet X" exhibit.

<u>Expected Results</u>: The results will vary, but the balance of the design has an impact on the object's ability to remain floating in the column of air.