SOAR for Science: Airplanes, Speed & Motion Grade 8 Newton's Laws Activity

This lesson is an excellent post-visit activity for the SOAR for Science program, as it reinforces the concepts of Newton's Third Law of Motion.

Materials:

1 balloon for every two students (students should work in pairs)
1 drinking straw for every two students
1 length of string
Scotch Tape
Newton's Laws Worksheet
Pens or Pencils

Procedure:

- With pieces of string cut to fit around the balloon, measure the circumference of the balloon with different amounts of air in it (full,1/4 full,1/2 full, & 3/4 full), and record the circumference in the table on the Worksheet. Set aside the pieces of string for future use.

- Slide the drinking straw onto a piece of string. Choose two people from your team to hold each end of the string taut and level.

- Place two loops of masking tape onto the straw.

- Blow up the balloon. Hold tightly onto the neck of the balloon so that no air escapes, and attach the balloon to the two pieces of tape. The neck of the balloon should be parallel to the string.

- Release the neck to let the air rush out of the balloon.

- In the table on the Worksheet, record (a) the distance that the balloon traveled (as marked on the string) and (b) the amount of air in the balloon.

- Repeat steps 4-7 above, filling the balloon with different amounts of air. Use the pieces of string you measured in step one.

- Calculate the volume of the balloon with the different circumferences using the equations on the Worksheet.

- Bring the class back together to discuss their results.

Newton's Law Worksheet

Equations:

Volume of a sphere: *(the amount of air in the sphere)*
Volume = 1/6 x PI x (Diameter)^3

Circumference of a sphere: *(how far around the sphere is)*
Circumference = PI x Diameter

Diameter, as computed from the Circumference:
Diameter = Circumference/PI

Pi = 3.14 *(a constant value)*

Amount of Air	Circumference (cm)	Diameter (cm)	Distance Traveled (cm)	Volume of Balloon (cm)^3
full				
1/4 full				
1/2 full				
3/4 full				

Newton's Third Law of Motion states that for every action there is an equal and opposite reaction. What is the relationship between the amount of air in the balloon and the distance traveled?