Sensing Resistance – Answer Key

Materials: 11 narrow diameter drinking straws, 3 medium diameter drinking straws, 1 wide diameter drinking straw, tape and water.

Step 1) Cut all the straws the same length

Straw configuration	Blowing Ease (difficult, medium, easy)	Air Flow Rate (fast, medium, slow)	Resistance to Air Flow (large, medium, small)
One narrow drinking straw.			
One medium drinking straw			
One wide drinking straw			
Four narrow drinking straws in series			
Four narrow straws in parallel			
One narrow drinking straw and one medium drinking straw in series			
One narrow drinking straw and one medium drinking straw in parallel.			

1) Why was it important to cut all the straws to the same length?

It is important to cut all the straws the same length because this way the only difference between the straws would be the diameter of the openings.

2) Which of the three single tubes has the greatest resistance to air flow?

The straw with the narrowest diameter had the greatest resistance to air flow.

3) Which arrangement, series (end-to-end) or parallel (side-by-side), has the greatest resistance to air flow for the four narrow drinking straws and for the two tubes have different diameters?

The series arrangement had the greatest resistance to air flow.

4) To use the "air tube" model to make predictions about electrical circuits, it must accurately model the electrical resistance of wires to current. Explain how your answer to question # 2 guarantees the tubes are good models. Hint: refer to the information about factors affecting resistance in wires in Table 10.4 on page 342.

Narrow diameter wires have greater resistance than wide diameter wires. The same way narrow straws have a greater resistance than wide straws.

5) Use your answer to question # 3 to predict which electrical circuit will have the greatest overall resistance to the flow of current, a set of resistors in series or in parallel.

Since the straws in series have a greater resistance than the parallel arrangement, then the series circuit should also have a greater resistance than the parallel circuit.