Wavelength Straw Lesson

Plan

Amount of time Demo takes: 3 mins.
Try this at home!

Materials
- Soda straws
- Scissors (2-3 pairs)
- Ruler
- Garbage can/broom

Set-up Instructions and Instructional Procedure
1. Get a trash can ready!
2. Flatten the end of a drinking straw by biting on it and cut the flattened end to a point in the style of a double reed. Ideally, the two tips should be almost touching each other.
3. Blow through straw while pressing down with teeth or lips, re-cut if necessary.
4. Show them what happens when they cut the straw while blowing or between blows (change in pitch).

SAFETY! Safe Demo

Lesson’s Big Idea and Background
- Through reducing the length of a straw, the resonant frequency of the straw becomes higher. Wavelength and pitch (frequency) are inversely proportional.
- Blowing on the cut end of the straw causes the two plastic pieces to vibrate causing sound! The two ‘reed’ pieces vibrate at a specific frequency and wavelength that is determined by the length of the straw. The vibrations travel in waves down the length of the straw and reflect at the end (reach barrier between materials -- plastic and air). The vibrations cause resonance (sound you hear). Cutting the straw changes the resonant wavelength and frequency, thus changing the sound you hear.

Assessment/sample questions to ask
- What do you think will happen if I cut the straw to a shorter length? How do
bigger instruments sound in relation to smaller instruments (flute vs. piccolo, guitar vs. ukulele etc.)?

Clean Up
- Sweep up straw clippings, put away scissors, and neatly package loose straws in the bin.

References
- Physics at Virginia.edu: http://galileo.phys.virginia.edu/outreach/8thgradesol/WavePitch.htm

Next Generation Science Standards
- K-5
  - 1-PS4-1
- 9-12
  - HS-PS4