Howling Tube Lesson Plan

Amount of time Demo takes: less than a min.
Don’t try this at home!

Materials
- Metal pipe (Approximately 1 ft.)
- Metal Mesh (2x2 inches)
- Flame Torch

Set-up Instructions
1. Be aware of any smoke detectors!

SAFETY!
- Use safety goggles and gloves.
- Keep audience at a safe distance from flame torch.
- Use demo in a well ventilated area.

Lesson’s Big Idea
- The screen heats the air inside of the pipe and causes hot air to rapidly rise. The noise is produced because frequencies of sound resonate inside of the pipe.
- The hot air rises quickly and causes sound to vibrate off the metal pipe.

Background Information
- The pipe will only work vertically because heat rises, the pipe will not make sound if it is horizontal.
- The noise is produced because certain frequencies of sound from the turbulent flow of heated air resonate within the tube cavity. Turning the tube horizontally disrupts the flow of air and the sound stops; rotating the tube to the vertical position returns the sound.

Instructional Procedure
1. Hold the tube in a gloved hand with the mesh screen near the bottom.
2. Ignite the torch and pass the flame over the mesh screen for 5-9 seconds.
3. Remove tube from the flame and hold it perpendicular to the floor.
4. A loud tone will come from the tube.
5. Turn the tube sideways (parallel to the ground) to make the tone stop.
6. Return the tube to the vertical position and the tone will return.
7. The sound should last for around 10-15 seconds.

**Assessment/sample questions you can ask**
- Why is there a noise?
- How could we change the pitch?
- What will happen if the tube is turned horizontal?

**Clean Up**
- Make sure all items are cool before putting them back in the bin.
- Make sure the torch is tightly closed off.

**References**
- [http://www.stevespanglerscience.com/lab/experiments/singing-pipes](http://www.stevespanglerscience.com/lab/experiments/singing-pipes)

**Next Generation Science Standards**
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