Singing Pipe

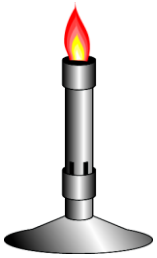
HS-14

Demonstration:

By heating the metal screen in one end of this vertically held pipe for about 15 seconds, a loud tone is produced for as much as 30 seconds. During this time, if the pipe is rotated to a horizontal position, the sound will stop. When returned to the vertical position, the sound begins again.

Materials:

In addition to the Singing Pipe, you will need a gas flame from a Bunsen burner, Fisher burner, or propane torch.



Procedure:

With the pipe held vertically so that the end with the screen is on the bottom, carefully move the pipe over a gas flame so that the flame enters the pipe. After about 15 seconds, remove the pipe from the flame, and continue holding it vertically. For about 30 seconds, a loud tone is heard and the hot turbulent resonating air can be felt exiting the top of the pipe. Be careful, as the bottom of the pipe nearest the flame can become quite hot.

Alternatively, you can pretend to pour the sound out into a container. When the pipe is held horizontally, the sound stops. You can then pretend to pour the sound back into the top of the pipe as you rotate if back to the vertical position. The sound will then return.

Explanation:

The flame heats the special stainless steel screen, which has been inserted into one end of the metal pipe. This glowing hot screen heats the air inside of the pipe, causing hot air to rise, and cool air to enter the bottom end. Because the air passes through many holes in the screen, a turbulent flow pattern of air fills the pipe.

The noise is produced because certain frequencies of sound from the turbulent flow of heated air resonate within the pipe cavity. This is similar to the operation of a pipe organ. The longer the pipe, the lower the resonant frequency.

When the Singing Pipe is rotated horizontally, this flow pattern is distributed and air no longer passes through the tube. Returning the pipe to the vertical position returns the sound.

Note: This demonstration was featured at the 1996 Clemson biennial DivCHED Convention and also at the 1996 New England Association of Chemistry Teachers Summer Conference.

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Chinese Spouting Bowl (SPT-100)

Simply fill the 15" diameter bowl halfway with water and rub the handles vigorously with wet hands. The resonance set up within the bowl is powerful enough to actually "spout" water up and out of the bowl!

Singing Rod (SNG-100)

Here's a classic science demonstration that is sure to grab your students' attention... and the people down the hallway... and every dog in the neighborhood! When you run your fingers lightly along this 60-cm-long metal rod, an ear-piercing sound is generated. You control how loud the sound gets, from a whisper to an auditorium-filling shriek. Absolutely incredible! This is a great experiment to demonstrate the difference between longitudinal and transverse waves.

Talking Tapes (TC-100)

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Basic Boomwhacker Set (BOM-150)

These eight labeled tubes produce the C Major Diatonic Scale. Includes eight tubes, 12"-24" long. See optional Octavator End Caps to lower the pitch by an octave.