

Musical Balloons

On SCOPE's Rock & Roll episode, Julia made balloon powered musical instruments!
Here's how you can do it at home:



What you need:

- Balloons
- Pipes of different lengths, widths and materials (i.e. PVC, cardboard)
- Masking tape
- Water/Sand

What to do:

1. Wrap the neck of a balloon around one end of a pipe.
2. Attach the balloon using masking tape.
3. Blow up the balloon through the other end of the pipe.
4. Pinch off the end so the air doesn't escape.
5. Stretch the balloon to one side of the pipe to form a skin over the end.
6. Release some of the air inside the balloon.



The balloon skin on the end of the pipe will vibrate and make a noise!

- To see the balloon vibrate, try placing drops of water or grains of sand over the end.
7. Repeat the process using pipes of different lengths, widths and materials.

How does the noise change?

What's happening?

Sounds are made by vibrations. If you put your finger on a loudspeaker you will feel it vibrate. The vibrations compress layers of air in front of the loudspeaker creating pressure. This pressure spreads out as a travelling sound wave, and when it reaches you, it causes a very tiny vibration in your ear drum.

The musical balloons work in the same way as many musical instruments, air (from the balloons) causes the skin over the end of the pipe to vibrate. The sound then resonates through the length of the pipe.

The sound or "pitch" an instrument makes depends on the length or size of the air column. The longer the column, the longer it will take for the sound wave to travel down the length of the pipe. So, if a tube is short and slim (such as a flute) it will produce a higher pitch. If the tube is long and wide (such as a tuba) it will produce a lower pitch.

In woodwind instruments, the length of time a sound wave travels can be changed by adding finger-holes or keyholes along the column. When the air escapes through the holes it changes the pitch, and when you move your fingers in a pattern, it creates musical notes!

Did you know that human ears are most sensitive to sounds between 1 and 4 kilo-Hertz? This is why piccolo players don't have to work as hard as tuba players in order to be heard in an orchestra.

