nanogirl's LAB

SUPER POWER: Pitch!

XYLOPHONE

LAB NOTES...

WATCH & BUILD 25 MINS

YOU WILL NEED

- Water glasses or jars
- Water
- Pencil
- 5 x sheets A4 paper
- Tape
- Scissors

HOW DOES A XYLOPHONE WORK...

A xylophone is a musical instrument made up of different length strips of wood which make different notes when they are tapped. Your xylophones use water glasses and paper rolls as the keys but work in the same way. In the water xylophone, the length of the glass that is able to vibrate is changed by the amount of water in the glass. When water touches the glass it can't vibrate as well, the more water the less glass available and the lower the note. We say that the water 'dampens' the vibrations.

In the paper xylophone, the different notes are made because of the different lengths of space available inside each tube. Longer tubes have more space inside them, so when you hit the longest tube, the sound vibrations have more space to bounce around and off each other before they can get out and arrive at our ears. The longer the tube, the lower pitch we hear when we tap it.

TO BUILD A WATER XYLOPHONE...

1. Pour different amounts of water into a set of 3 or more.
2. Line the glasses up in order of most full to most empty.
3. Tap each glass gently with a pencil to hear what sound they make.
4. Adjust the amount of water in each glass until you get different notes.
5. See if you can play a tune!

FOR A PAPER XYLOPHONE...

1. Roll up and tape 5 pieces of paper into 5 long tubes. Make sure that they are quite tight, rolling around the handle of a wooden spoon helps!.
2. Cut each roll so that they are all a different length.
3. Arrange the rolls in order on length on a hard surface like a table.
4. Hit each one gently with a pencil to produce a sound.
5. If you want you can use some of the leftover cut-off rolls of paper to make a stand by taping the paper tubes into place and stick-ing the extra rolls horizontally across them.
6. See if you can play a tune!

Every superhero needs their own theme tune.

Can you write your own superhero song and compose a tune for it on your xylophone?

Musicians use some hard and soft objects to tap their instruments with, to produce different sounds. Try tapping your xylophone with different hard objects like a fork or your finger. Now try soft objects like a soft toy. What do you notice about the sound?

The surfaces around us can trap sound waves and make it harder to hear them. What happens to the sound of your paper xylophone if you put it on a soft surface like carpet compared to a hard surface like a table?

What happens to the sound of your paper xylophone if you put something soft like a tissue inside the tubes? Why do you think this is? Have you tried blowing in the tubes, can you hear anything?

If you have access to bigger jars or larger paper, can you build a giant xylophone? Is the sound different? What about a tiny one? Why do you think that is?