

## I Can Hear 1 - Pitch and Volume

*Topic: I can hear – sound*

*Time: 20 mins*

*Age group: 4 - 7*

### What you need

- The Kia Rapua playground A frame with sound panels fitted
- Drum stick with rubber tip
- Optional: Extra sound play drumsticks supplied with playground:
  - Wooden
  - Plastic
  - Foam
  - Acrylic
- Kia Rapua sound poster

### What to do

#### Set up

- Have sound panels fitted on A-frame – best to slot in bottom hook first, then top.

#### Activity

- Allow some free play with the two sound panels.
- Ask the children to let you know what they have discovered.
- Get the children use the drum stick (rubber tip) to play with the Xylophone. Go from the shorter tubes to the longer ones and vice versa - what difference do they notice?
- Ask the children to hit the same pipe gently (the drum stick is place at a short distance from the tube) and then with more force (the drum stick is place at a medium distance from the tube) – what difference do they notice?
- Discuss the concept that sound is vibrations and that you need to do an action before there can be sound. The more effort you put into the action, the louder the sound will be. Compare this with talking. If you make a little effort your voice sounds low but if you put a lot of effort in you can be very loud.

### The Science

- Sound is the result of vibrations of molecules.
- Sound can vary in volume (loud and soft) and in pitch (high and low).

**Pitch:** pitch is a measure of how high or low a sound is. The faster something vibrates the higher the pitch and vice versa. In our xylophone panel the length of the tubes create different vibration patterns. Shorter tube vibrate faster, hence the pitch is higher. The longer tube vibrate much slower, hence the pitch is lower.

**Volume:** volume relates to the amplitude of the sound. The difference of loudness of sound is due to difference of amplitude of waves it produces. The bigger the amplitude the louder the sound and vice versa.



## Science talk

### Description words

Volume, pitch, louder, softer, high, low, short, long, vibration.

### Science process words

Observe, compare, notice, listen and record

### Open ended questions

What happened when you hit the shorter tubes?

- Which made the lower/higher sound?
- What happened when you hit the tubes harder?
- Why do you think this is?

## Skills

Observing, predicting, recording, learning vocabulary around sound, learning about the concepts of pitch and volume

## Stay Safe

- Make sure the sound panel is secure on the A-frame.
- Be careful with children swinging the sticks that there aren't other children nearby that could be hit.

## Ways to document

- Record the different sounds made using an audio recorder so you can play them back and discuss them.

## Other science links

- Materials- hitting different surfaces with same drum stick to observe changes in sound.

## Cross curricular links

- Literacy (increasing vocabulary)
- Music

## I Can Hear 2 - Funky Drumsticks

*Topic: I Can Hear – Sound*

*Time: 20 min*

*Age group: 3 - 7*

### What you need

- The Kia Rapua playground A frame with sound panels fitted
- Extra sound play drumsticks supplied with playground:
  - Wooden
  - Metal
  - Plastic
  - Foam
  - Acrylic
- Sound poster to record the results of comparing the drumsticks from the one that can make the quietest to the loudest noise.
- Audio recorder (optional)

### What to do

#### Set up

Have sound panels fitted on A-frame – best to slot in bottom hook first, then top.

#### Activity

- Allow some free play with the two sound panels.
- Ask the children to let you know what they have discovered.
- Get the children to try banging the same big sound tube using a range of sticks made of the different materials. What do they notice?
- Ask them which sticks make the loudest sounds, which make the quietest.
- Ask the children to hit gently and then with more force – what difference do they notice?
- Pick a different, smaller tube to investigate using the funky drumsticks. How does it sound different to the big tube? Which sticks make the loudest sounds, which the quietest, is this still the same?
- Discuss the concept that sound is vibrations and that you need to do an action before there can be sound. The more effort you put into the action, the louder the sound will be. Discuss the idea that using different materials to make sound gives us different kinds of sounds and makes it easier or harder to make sound. For example, tapping your hand off a table versus tapping your hand off a cushion.

### The Science

- Sound is the result of vibrations of molecules.
- Sound can vary in volume (loud and soft) and in pitch (high and low).
- Different lengths of tube result in different pitch of sound.
- Hitting the metal with different materials and with different force results in different volumes of sound because the energy is transferred easier from some materials. A metal object makes a ringing noise because it's stiff but elastic. When you hit it, the energy is transferred through it without being lost. In a soft material, like foam, the energy is absorbed and turned into heat.



## Science talk

### Description words

Volume, Pitch, Louder, Softer, High, Low, Short, Long, Hollow, Vibration, Material

### Science process words

Observe, Compare, Listen, Notice, Record

### Open ended questions

- What happened when you hit the metal tubes with the plastic/wood/metal/acrylic/foam sticks?
- Which made the loudest sound?
- What happened when you hit the tubes harder?
- Why do you think this is?
- What are drumsticks normally made of? Why do you think this is?

## Skills

Observing, Predicting, Recording, Learning about the concepts of sound and materials

## Stay Safe

- Make sure the sound panel is secure on the A-frame.
- Be careful with children swinging the sticks that there aren't other children nearby that could be hit.

## Ways to document

- Use a poster as suggested above.
- Record the different sounds made using an audio recorder so you can play them back and discuss them.

## Extending the activity

Ask the children to assemble their own collection of sound wall items – plastic boxes, metal pots etc. to hit. Ask them to predict which will sound the loudest and which the quietest when they hit them.

### Other science links

- Materials - what other things are made of metal/wood/plastic/foam/acrylic?

### Cross curricular links

- Literacy (increasing vocabulary)

## I Can Hear 3 - Exploring Sound

*Topic: I can hear – sound*

*Time: 20 mins*

*Age group: 4 - 7*

### What you need

- The Kia Rapua playground A frame with sound panels fitted
- Drum sticks with rubber tip
- Optional: Extra sound play drumsticks supplied with playground:
  - Wooden
  - Plastic
  - Foam
  - Acrylic
- String
- Scissors
- Optional:
  - Plastic cup

### What to do

#### Set up

- Have sound panels fitted on A-frame – best to slot in bottom hook first, then top.
- Cut some string about 80-100cm long

#### Activity

- Allow some free play with the two sound panels.
- Ask the children to let you know what they have discovered.
- Get the children use the drum stick (rubber tip) to play with the Xylotune. Go from the thinner pipes to the thicker ones and vice versa - what difference do they notice?
- Ask the children to hit the same pipe gently (the drum stick is place at a short distance from the tube) and then with more force (the drum stick is place at a medium distance from the tube) – what difference do they notice?
- Discuss the concept that sound is vibrations and that you need to do an action before there can be sound. The more effort you put into the action, the louder the sound will be. Compare this with talking. If you make a little effort your voice sounds low but if you put a lot of effort in you can be very loud.
- Now they are going to repeat the same action but this time you will tide a string to each of the pipes in such way that the string has two ends, you are creating earphones!
- Help children wrap the ends of the strings around their index fingers and put their finger near their ear opening.
- Use the drum stick to gently play the xylotune and ask the children is there any different in the sounds they are hearing?
- Optional: You can extend the activity by attaching a plastic cup at the end of the string (which will act as an amplifier of the sound)



## The Science

- Sound is the result of vibrations of molecules.
- Sound can vary in volume (loud and soft) and in pitch (high and low).

Sound waves are created by the vibration of an object (the xylophone and string). When vibrations hit your ear drum, your brain interprets the vibrations as sound. The sound waves can travel through air, liquids and solids. When we listen to the xylophone with the string to our ears, the sound waves are traveling through the solid string and tube. Since sound waves travel more quickly through solids, we hear the sound more clearly. When we bang the tubes without putting the string to our ears, the sound waves are traveling through air to get to our ears making the sound quieter.

## Science talk

### Description words

Clear, quiet, softer, high, low, short, long, vibrations, solid, air, liquid.

### Science process words

Observe, compare, notice, listen and record.

### Open ended questions

- What kind of sound you heard when you hit the tube with the drum sticks?
- Did the sound change when you heard it via the string or plastic cups?
- How do you think the sound gets to your ears?

## Skills

Observing, predicting, recording, learning vocabulary around sound, learning about the concepts of vibrations and how they travel depending on the different materials.

## Stay Safe

- Make sure the sound panel is secure on the A-frame.
- Be careful with children swinging the drum sticks that there aren't other children nearby that could be hit.
- Keep an eye on the strings to prevent tangles

## Ways to document

- Record the different sounds made using an audio recorder so you can play them back and discuss them.

## Other science links

- Materials- Air, Liquid and Solid.

## Cross curricular links

- Literacy (increasing vocabulary)
- Music