

Pioneer Federation
Medium term plan
Cycle 1, Term 5
Science LKS2



Subject: Science			
Key Concept/ Theme: Sound			
Prior Learning links: KS1 – sound is not taught as a separate topic in KS1 science however children may have some knowledge of pitch and volume through their music lessons.			
Vocabulary: Vibrate/vibrations - forward and backward movement of an object (usually rapidly). Volume - how loud or quiet a sound is. Pitch - how high or low a sound is. Pinna - the outer portion of the ear (ear flap). Cochlea - the sound reception part of the inner ear. Eardrum - the membrane which collects sound from the pinna and passes it to the inner ear.			
Working Scientifically skills: Scientific questioning, Taking measurements, Presenting results, Predicting, Fair test, Suggesting improvements			
School specific areas to cover (Add in any local areas of study, trips and people)			
CP		EH	SMV
1.	Prior learning reconnection (year group, cycle & term): Music in KS1 lessons LO: I can recognise that sounds get fainter as the distance from the sound source increases. Working Scientifically Skill: scientific questioning Enquiry skill: pattern seeking <i>Activity ideas to achieve the LO:</i> Starter: Survey – What different sounds can be heard? Take the children into an open space. Ask them to close their eyes and listen for the different sounds.		

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	<p>Recording</p> <p>The children can draw themselves as a cross in the middle of a sheet of paper. They must show where they heard the different sounds; i.e. the relative distance of the thing, and the direction from them.</p> <p>Comparative test – What happens to the sound of the drum when we get further away from it?</p> <p>Ask the children how they could set up an investigation to find the answer to this question. Discuss with children what is being changed (distance from the source), and what is being observed (loudness of sound – probably just by ranking it or giving it a score. Alternatively, they could try using a data-logger) and which variables need to stay the same (i.e. how hard we hit the drum, the person doing the hearing, where outside we do the investigation).</p> <p>Recording</p> <p>Using a table, the children could record how loud it was at the different distances.</p> <p>The children could draw the drummer and the listener at different distances from the drummer. They could then place some comparative vocabulary under each of the listener pictures.</p> <p>.</p> <p>The following short video of a ringing clock will reinforce this concept for the children: http://www.bbc.co.uk/learningzone/clips/the-effect-of-distance-on-sound/2418.html</p> <p>resources:</p> <ul style="list-style-type: none"> • A home-made loudness chart • Data logger • A drum <p>End point: To know that sounds gets fainter when the distance from the sound source changes.</p>
2.	<p>LO: I can to identify how sounds are made, associating some of them with something vibrating.</p> <p>Working Scientifically Skill: Recording,</p> <p><i>Activity ideas to achieve the LO:</i></p> <p>Explore – What is a ‘sound’?</p> <p>The following activities will allow children to find out that sounds are caused by vibrations.</p> <p>.</p> <p>Begin by trying the following activities:</p> <ul style="list-style-type: none"> • Allow the children to place their fingertips against their throats as they speak. • Place filled balloons between two children. One talks against it and the other places their ear against it.

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	<p>Children could try each of the following activities:</p> <ol style="list-style-type: none"> 1. Place some rice on a piece of paper. Hold this paper a small distance above a drum that has been struck. 2. Hang a metal coat hanger upside down. Tie a piece of string from each of the two corners and place each one on ear. Someone else strikes the coat hanger. 3. Hit a tuning fork on a table and then place into a bowl of water. 4. Tie a metal fork on a piece of string and place one end against the ear. Swing the fork so it hits the table. 5. Hang a table tennis ball from a length of string. Touch the ball with a vibrating tuning fork. <p>Record</p> <p>Children could possibly try using drawings to communicate what was happening in each of the activities.</p> <p>Resources:</p> <ul style="list-style-type: none"> • Balloons • Drum • Rice • Tuning fork • Bowl • Metal form • String • Table tennis balls <p>End point: to be able to identify how sounds are made.</p>
3.	<p>LO: I can recognise that vibrations from a sound travel through a medium to the ear.</p> <p>Working Scientifically Skill: fair test</p> <p>Enquiry skill: pattern seeking</p> <p><i>Activity ideas to achieve the LO:</i></p> <p>Exploration – Where does sound go when it has been made?</p> <p>Explore sound in a listening circle. Blindfold child and ask the other children in a circle to make a noise. Can they identify where it came from? Were some directions easier/harder - in front/behind, high/low, high up or low down?</p> <p>Discuss with children what ‘sound’ travels through and where it ends up (i.e. through the air and into their ears).</p> <p>Children can then explore listening through other items whilst they are tapped or a drum played near to them (e.g. a water-filled balloon, objects made from different materials, their head on the table, etc). They can also find out what happens when these things are hit harder.</p> <p>Health and Safety – ensure that children know that they shouldn’t make loud noises next to people’s ears.</p>

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Modelling - How can we represent a sound wave?

1. Allow a child to fire an air-cannon at some foil/fabric hanging up.



2. Place a Slinky on a table. One child hold one end, another child stretches it out and then sends a pulse along it. Explain to children how the wave bunches up (compression) and then spreads out (rarefactions). They could find out what happens when the slinky receives a bigger push (more energy)) – i.e. a sound wave carrying more energy (louder).

3. The children can act out a sound wave. They can do this by standing in a line so that their hands rest on the shoulders of the child in front. A child at the back hits a drum. Each child then pushes on the child in front of them. The wave should bunch up and spread out as it moves along the children. Again, find out what happens when the energy is increased; i.e. a bigger push.

The above drama can be seen on the following video - <http://www.bbc.co.uk/learningzone/clips/how-does-sound-travel-through-the-air/1608.html>

The following video demonstrates how sound needs something to travel through. This is a good point to mention the investigation by Robert Boyle.
<http://www.bbc.co.uk/learningzone/clips/how-does-sound-move-through-the-air/1607.html>

The same concepts is demonstrated in the following video: <http://www.bbc.co.uk/learningzone/clips/silencing-an-angle-grinder-with-a-vacuum/8415.html>

The following video covers many of the concepts that children will have explored throughout this unit of work so far: <http://www.bbc.co.uk/learningzone/clips/how-sound-waves-work-and-why-nothing-can-be-heard-in-a-vacuum/7913.html>

Resources:

- Slinky
- Drum
- Air cannon

End point: To be able to find patterns between the volume of a sound and the strength of the vibrations that produced it.

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4. LO: I can to find patterns between the volume of a sound and the strength of the vibrations that produced it.

Working Scientifically Skill: Observing, Measuring, Conclusions, Present results

Enquiry skill: observing over time

Activity ideas to achieve the LO:

Comparative test – How can we alter the loudness of a sound?

This is could be set up as a carousel of activities. At each station the children have to try a range of ways to make a sound.

1. Water in a washing up bowl. Provide straws, tuning forks (dry afterwards to prevent rusting), plastic spoons, balloons, etc.
2. Different types of paper (children can tear, scrunch up, blow against, wave in the air, etc.)
3. A range of instruments
4. Plastic bottles of different sizes and beakers of water. The children can fill the bottles with water and then tap them or blow over the necks (provide anti-bacterial wipes for cleaning the opening of the bottles after each child).

Recording

Quietest	Quieter	Quiet	Medium	Loud	Louder	Loudest
Pressing a drum with finger	Scratching a drum	Scrapping a drum	Tapping a drum	Hitting the drum	Hitting the drum hard	Bashing the drum really hard

Through questioning, get the children to compare the sounds.

Some of your children might be able to use data-loggers to measure the loudness of sounds in decibels.

This could also be an opportunity to provide the more able children with information in the form of a line graph which they then can interpret:

Resources:

- Washing up bowls
- Straws
- Tuning forks
- Spoons
- Balloons
- Plastic bottles

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	<ul style="list-style-type: none"> • Anti-bacteria wipes <p>End point: To be able to report on findings from an enquiry.</p>
5.	<p>LO: I can find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Working Scientifically Skill: Observing, Measuring, Conclusions, Present results</p> <p>Enquiry skill: fair test</p> <p><i>Activity ideas to achieve the LO:</i></p> <p>Illustrative fair-test – How does the height from which a tube is dropped affect the loudness of the sound produced?</p> <p>The children could help to plan an investigation where they must drop an object (e.g. a tube of tablets) into a metal bowl. They could score the loudness of the sound produced or place a data-logger next to the bowl and measure the loudness of the sound each time the tube is dropped into it.. You might find you need to place a soft material into the metal trays in order that the sound is muffled and will thus register as less than a 100 on the data logger.</p> <p>Recording</p> <p>The children could draw what it is that they are investigating. They could record their results using a table or bar graph. When communicating what it is that they found out, the children could be encouraged to use comparative ‘er’ words: i.e. ‘the higher the drop, the louder the sound produced.’</p> <p>To explore this concept further, the children could try creating a bell (funnel-shaped paper) for the bowl to make the sound louder, or place different materials (e.g. sand, cotton wool, fabric) in the bowl to muffle the sounds produced.</p> <p>Resources:</p> <ul style="list-style-type: none"> • Metal bowls (e.g. dog bowls) • Object to drop in the bowl • Data logger • Sand, cotton wool, fabrics, etc <p>End point: To be able to set up simple fair tests.</p>
6.	<p>LO: I can find patterns between the pitch of a sound and features of the object that produced it.</p> <p><i>Activity ideas to achieve the LO:</i></p> <p>Explore – How do we change the pitch of a sound?</p> <p>In this session the children should learn that as well as loudness we can change the pitch of a sound. Some might make the relationship between the speeds of the vibrations and the pitch produced.</p>

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	<p>Use some 'Boomwackers' to demonstrate pitch. Different children could each have a Boomwacker which they hit against the table. The class must try to place them in the correct order from lowest to highest sound. Encourage the use of comparative and superlative words.</p> <p>They could have a carousel of activities :</p> <ol style="list-style-type: none">1. Whirly/sound tube – Can the children work out how it makes a sound? Can they discover how to change the pitch? (Spin it in a circle – spin it at different speeds).2. Glass bottles – Fill with different amounts of water and blow across the neck.3. Glass bottles 2 – Fill with different amounts of water and tap the side.4. Make a straw oboe/trombone – Gradually make the oboe shorter. <p>Flatten one end of the plastic straw by sticking the end in your mouth, biting down with your teeth, and pulling it out. Do this several times to make a flexible flat-ended straw. Cut equal pieces of straw from each side of the flat region so that the straw has two lips at the end. Put the straw in your mouth, and bite down on it gently with your front teeth just beyond the lips of the straw. If you shorten the straw, the sound takes less time to travel down the straw and back, so the frequency of the sound increases (making the pitch higher). You can demonstrate this by cutting off the end of the straw with scissors. As you snip the end off, the frequency increases. You can also find one straw that fits into another to make a longer straw with a lower frequency. If you make holes in the straw, you can make an oboe that you can play by covering the holes with your fingers. An uncovered hole acts as the end of the straw. If you can find two straws that fit one inside the other and yet slide back and forth, you can make a straw trombone. You can roll a piece of paper into a cone and tape the cone onto the end of the straw to make a straw oboe with a bell. The bell makes less sound bounce off the end of the straw so that more sound goes out into the air. This makes the sound much louder.</p> <p>Recording</p> <p>The children could draw each of their investigations, and then use words to communicate how they changed the pitch of the sound in each one.</p> <p>Developing an explanation. Encourage the children to look at the speed of vibrations (frequency).</p> <p>The following video will help support this concept:</p> <p>http://www.bbc.co.uk/learningzone/clips/what-makes-noise-sound-higher-or-lower/7911.html</p> <p>resources:</p> <ul style="list-style-type: none">• Boomwackers• Glass bottles (take care)• Plastic straws <p>End point: To be able to find patterns between the pitch of a sound and features of the object that produced it.</p>
Assess ment	

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Science End of Term Quiz LKS2 - Term 6

1

Polly cuts four identical straws into different lengths.

Her friends blow gently into the straws. The note from each straw is different.
Some notes are high and some are low.

Describe how the length of a straw affects how high or low the



2. Carly walks away from James and leaves the room. What happens to the loudness of the sound Carly hears as she goes further away from James?

3. Carly shuts the door. She can still hear James playing his guitar in the next room. One material the sound travels through is air. Name ONE other material the sound must travel through for Carly to hear it.

Things to note:

For a 5 week term 3 lessons and an assessment

For a 6 week term 4 lessons and an assessment

For a 7/8 week terms 5 lessons and an assessment

Adaptions:

- Learners at year three level may benefit from a simple word bank of relevant terms
- Using pupil voice to get recording of ideas
- Allowing pupils to present their findings in their books their own way- modelling a few examples
- Taking photos of the pupils conducting the experiments