

FIND YOUR VOICE (LEVEL 3)

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| Description | Learners will explore how sound is created. They will use these concepts while writing, composing and performing their own songs! |
| Leading question | Can science help us make good music? |
| Subjects covered | Science, Performing Arts |
| Total time required | 40-60 min a day for 5 days |
| Resources required | Plastic bottles, cardboard, string, tape, rubber bands, plastic containers, paper, a few grains of rice/ sugar/ wheat, a balloon, scissors, a glass bowl, a metal pan, a cup, rubber bands, drinking straws, cardboard box, a tube/ pipe, a tin can |
| Learning outcomes: | <p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Identify different types of sounds. 2. Explain how vibrations produce sounds. 3. Describe the differences between different sounds and relate them with loudness and pitch. 4. Describe the human ear and relate its parts to their role in helping us hear. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Communicate the message of their song through its lyrics effectively. 2. Think creatively while making their own instruments, songs and rhythms. 3. Collaborate effectively while receiving and incorporating feedback on their song. 4. Think critically while relating the quality of sounds to variations in loudness and pitch. |
| Previous Learning | None |
| Supervision required | Medium |

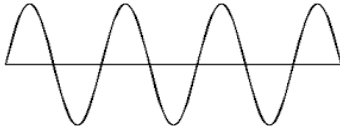
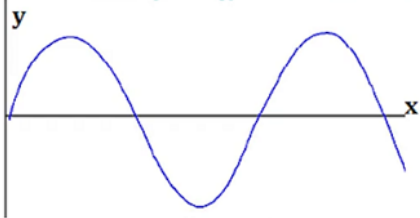
Day 1 -

Today, you will explore how sound is produced.

| Time | Activity and Description |
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| 10 minutes | <p>During this project, you will become a rock star and make your own song using your instruments! On the final day, you will put together a performance for your friends and family!</p> <p>Songs are made up of various sounds. Therefore, to make a song, we need to understand how sounds are produced.</p> <p>Note: Ask learners to draw the shown table in their notebooks. Once done:</p> <ul style="list-style-type: none"> - Listen to various sounds around them, - Write how they make them feel, and - Explain how those sounds are made. <p>If needed, give them an example as done in the table below.</p> <table border="1" data-bbox="381 682 1421 829"> <thead> <tr> <th>Sound</th> <th>How it makes me feel</th> <th>How it is made</th> </tr> </thead> <tbody> <tr> <td><i>rustling of leaves</i></td> <td><i>relaxed</i></td> <td><i>when the wind moves the leaves they hit each other</i></td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Sound is a form of energy that is produced when things vibrate (move swiftly back and forth). Vibrating matter generates waves that create sound! Let's see sound vibrating in real life.</p> | Sound | How it makes me feel | How it is made | <i>rustling of leaves</i> | <i>relaxed</i> | <i>when the wind moves the leaves they hit each other</i> | | | |
|---------------------------|---|---|---|--------------------------|---------------------------|----------------|--|----------------------|--|--|
| Sound | How it makes me feel | How it is made | | | | | | | | |
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| | | | | | | | | | | |
| 15 minutes | <p>Sound as a Form of Energy</p> <p>How do you feel when you have energy? How is it different from when you feel tired?</p> <p>When we have energy, we can do various things such as playing, drawing or cleaning out cupboards! If we say that sound is a form of energy, it should also be able to do things, right? Let's perform an experiment to find out why sound is said to be a form of energy!</p> <p>Note: Get learners to draw the table below in their notebooks and explain the method to them. Ask them to fill out their hypothesis, materials needed and method in the table.</p> <table border="1" data-bbox="381 1333 1429 1810"> <tbody> <tr> <td>Hypothesis:</td> <td>When I hit the metal pan with a spoon next to the bowl or when I speak loudly next to it, the rice/sugar will _____</td> </tr> <tr> <td>Materials Needed:</td> <td> </td> </tr> <tr> <td>Method:</td> <td> <ol style="list-style-type: none"> 1. Take a glass bowl or cup and cover it tightly with plastic wrap. 2. Place a few grains of uncooked rice/ sugar granules/ wheat on the plastic wrap. 3. Hold a metal pan close to the bowl and hit it with a spoon. You can also shout very close to the bowl! </td> </tr> <tr> <td>Observations:</td> <td> </td> </tr> </tbody> </table> | Hypothesis: | When I hit the metal pan with a spoon next to the bowl or when I speak loudly next to it, the rice/sugar will _____ | Materials Needed: | | Method: | <ol style="list-style-type: none"> 1. Take a glass bowl or cup and cover it tightly with plastic wrap. 2. Place a few grains of uncooked rice/ sugar granules/ wheat on the plastic wrap. 3. Hold a metal pan close to the bowl and hit it with a spoon. You can also shout very close to the bowl! | Observations: | | |
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| Observations: | | | | | | | | | | |

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| | <p>Inferences:</p> <p>What happens when you shout or hit a metal pan with a spoon next to the bowl? (<i>the rice/ sugar/ wheat grains move</i>)</p> <p>Why did the rice grains/sugar granules start jumping?</p> <p>When we hit the pan with the spoon or speak loudly next to it, we create vibrations in the pan or through our mouth that are transferred through the air surrounding the bowl creating a sound wave.</p> <ul style="list-style-type: none"> - When these sound waves reach the plastic wrap, they disturb the objects placed on the plastic wrap causing them to vibrate. - These vibrations in the plastic wrap cause the small objects to move. - This tells us that sound is a type of energy! - Sound waves travelling through the air also allow us to hear the noise of the spoon hitting the pan or someone talking. Sound can also travel through water – this is how dolphins and whales communicate! <p>This experiment can also help us understand how the human ear works – our eardrum is stretched like the plastic wrap covering our inner ear. When we hear sounds, the eardrum vibrates and these vibrations are sent to the inner ear allowing us to hear sounds.</p> <p>What do you think would happen if our eardrum breaks? (<i>This could lead to hearing loss.</i>) This is why it's important to protect our ears by not exposing them to loud sounds.</p> <div data-bbox="1003 972 1429 1360" data-label="Diagram"> </div> |
| <p>10 minutes</p> | <p>Production of Sounds in Humans</p> <p>Which part of our body helps us to speak? (<i>vocal cords in the neck</i>)</p> <p>Let us see how our vocal cords work to produce sound! To do this:</p> <ul style="list-style-type: none"> - Tie 4-5 rubber bands around a pencil box or tissue box making sure that they are not loose. - Using a straw, blow some air at the rubber bands. <div data-bbox="976 1474 1461 1785" data-label="Image"> </div> |

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| | <p>What do you observe? What do you hear? (<i>sounds produced by the rubber bands</i>)</p> <p>This is how we produce sound when we speak – when air passes through our vocal cords they vibrate producing sound.</p> <p>Try speaking while holding your breath (without exhaling or inhaling) – what do you observe?</p> |
| 5 minutes | <p>Introduction to Sound Waves</p> <p>Let us learn about how sound travels by singing songs! Think of:</p> <ul style="list-style-type: none"> - One loud song that you can dance on! - One soft song that you can listen to while going to bed at night! <p>Note: Ask learners to sign the songs. Once done, show the images below.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Graph A (Soft Song)</p> </div> <div style="text-align: center;">  <p>Graph B (Loud Song)</p> </div> </div> <p>If Graph A shows the sound waves produced when the soft song is played, and Graph B shows the sound waves produced when the loud song plays:</p> <ul style="list-style-type: none"> - On which axis - X or Y - do we plot the loudness of a song? - What do we plot on the other axis? <p>The loudness and intensity of the sound is its amplitude. We will represent this on the graph on the Y-axis. Sound waves are represented as waves on a graph – the lower and slower the sound the more stretched out the waves are, and the higher and more intense the sound the thinner and taller the waves. On the X-axis, we will record the time period during which these sounds are heard.</p> |
| At-home activities | Listen to two or three songs and try to plot a wave graph for the first stanza of each song. |
| Optional Literacy/ Numeracy Activity | Write a short report on 2-3 ways you can protect your ears from damage. To do this, identify potential causes of hearing loss by listing the loud sounds you are exposed to every day and suggest ways to avoid or reduce the effects of these sounds to protect your ears. |

Day 2



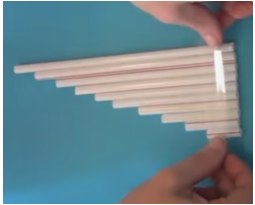
Today, you will write the lyrics of your song and make your own musical instruments!


| Time | Activity and Description |
|------------|---|
| 5 minutes | <p>The Message</p> <p>Think about the message you want to send out from your song. It could be anything! Some examples of messages are:</p> <ul style="list-style-type: none"> - Peace among all living things; - The joy of playing games; - Importance of friends <p>You can think of any message that you feel strongly about!</p> |
| 15 minutes | <p>Lyrics</p> <p>Now, you will write your song! Make sure that the words of your song communicate the message that you want to send out.</p> <p>If you notice, most songs have rhyming words and they are like poems! Let us write the lyrics (or words) to your song as a poem.</p> <ul style="list-style-type: none"> - There are different rhyme schemes you can consider. One example is where the first line of the poem rhymes with the second, and the third line rhymes with the fourth. We call this a (AA-BB) scheme. For example <p style="text-align: center;"><i>The morning has come and the sun will <u>shine</u> Let's have some fun for the weather is <u>fine</u> Raise your hands up and repeat Clap them together and feel the beat</i></p> <ul style="list-style-type: none"> - Another example is (A-B-A-B) – this is when the first line rhymes with the third line and the second line rhymes with the fourth <p style="text-align: center;"><i>Clap your hands to the beat Raise them up to touch the <u>sky</u> Jump up and stamp your feet Let the music make you <u>fly!</u></i></p> <p>Complete about 8 lines or two verses of the song</p> <p>Once you are done with your lyrics, think about different ways you can sing the song:</p> <ul style="list-style-type: none"> - Will you use the same tone throughout or will your voice be higher or lower at certain points? - Sing the song without musical instruments first. |
| 20 minutes | <p>Making the First Musical Instrument</p> <p>Now, let us make some instruments that you can play as you sing your song! There are five different types of instruments:</p> <ul style="list-style-type: none"> - String instruments: In these instruments, strings produce sound (such as in a guitar or a violin). |

- Percussion instruments: In these instruments, a membrane or a surface produces sound (such as in a drum).
- Wind instruments: In these instruments, sound is produced because of air vibrating in a column (such as in a flute or a saxophone).

Think about the tune that you would like for your song. Now based on the tune, think about the kind of musical instrument you would like to use (percussion/ wind/ string).

Note: Based on the kind of musical instrument chosen, ask learners to find ways to make their own musical instruments! if needed, help them using the steps given below for a few examples.

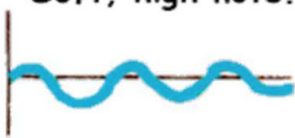
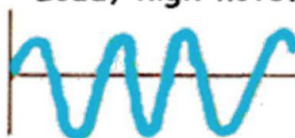

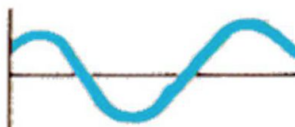
| Type of Instrument | Steps | Description |
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| Percussion (Drum) | <ul style="list-style-type: none"> - Tie a balloon over a tin can. - Beat the balloon using sticks to make a sound. |  |
| String (Guitar) | <ul style="list-style-type: none"> - Insert a cardboard tube into a cardboard box. - Wrap rubber bands from the top of the tube to the bottom of the box and then tape them in place. - Cut a round hole in the middle of the cardboard before you insert the tube to make playing the instrument easier. |  |
| Wind (Flute) | <ul style="list-style-type: none"> - Gather drinking straws of different lengths. - Assemble the straws in ascending order and tape them together to make the flute. |  |

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| | <p><i>Percussion (Shaker)</i></p> | <ul style="list-style-type: none"> - Place small objects such as pebbles, rice or wheat in small bottles. - Cap the bottles and shake them to make sounds (think about how the size of objects affects the sound!) |  |
| <p>At-home activities</p> | <p>Share the song you wrote and the message you want to communicate, with your family and get their feedback on it:</p> <ul style="list-style-type: none"> - What do they like about it? - Does it send the message you intended to share? - How can it be improved? | | |

Day 3 –

Today, you will find out what the pitch of a sound is, and make one more musical instrument for your song!

| Time | Activity and Description | | | | | | | | | |
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| 10 minutes | <p>Pitch</p> <p>On the first day, you learned about the amplitude or the loudness of a sound.</p> <ul style="list-style-type: none"> - What are some high-amplitude sounds you hear every day? - What are some examples of low-amplitude sounds? - Do all loud sounds sound the same? How are they different? <p>A sound can have a high amplitude but a low pitch (or shrillness like a loud whistle). For example:</p> <ul style="list-style-type: none"> - You can be loud both when you shriek in a shrill voice or shout in a deep voice. <ul style="list-style-type: none"> - A loud shriek has a high amplitude and a high pitch (pitch is equivalent to the shrillness of a sound) - A shout in a deep voice has a high amplitude but a low pitch. <p>Note: Ask learners to draw the table shown below and write at least two examples of each kind of sound.</p> <table border="1" data-bbox="464 1598 1352 1787"> <thead> <tr> <th></th> <th>High pitch</th> <th>Low pitch</th> </tr> </thead> <tbody> <tr> <th>High amplitude</th> <td><i>birds chirping</i></td> <td><i>a dog barking</i></td> </tr> <tr> <th>Low amplitude</th> <td><i>a muted voice of a baby</i></td> <td><i>rustling of leaves</i></td> </tr> </tbody> </table> | | High pitch | Low pitch | High amplitude | <i>birds chirping</i> | <i>a dog barking</i> | Low amplitude | <i>a muted voice of a baby</i> | <i>rustling of leaves</i> |
| | High pitch | Low pitch | | | | | | | | |
| High amplitude | <i>birds chirping</i> | <i>a dog barking</i> | | | | | | | | |
| Low amplitude | <i>a muted voice of a baby</i> | <i>rustling of leaves</i> | | | | | | | | |

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| 15 minutes | <p>Making the Second Musical Instrument</p> <p>Now, think of one more musical instrument that you would like to use in your song and make it!</p> <p>Note: During this activity, if needed, remind learners how to make different kinds of musical instruments (as explained to them on the previous day).</p> <p>Make sure that you:</p> <ul style="list-style-type: none"> - Create a different musical instrument than the one you created yesterday (for example, if you created a percussion instrument yesterday, create wind or a string instrument today) - Choose a type of instrument that goes with the song and message you are trying to share |
| 15 minutes | <p>Pitch of the Song</p> <p>Now, let us think about the pitch of the song that you wrote.</p> <ul style="list-style-type: none"> - Is the pitch low or high? - Try singing the lyrics in a high pitch, then try singing it in a low pitch. Which one makes the most sense for the message? <p>You can sing the song using different pitches. You can also assign different pitches to different lines or stanzas in the song!</p> <p>Now draw a graph for your song correctly depicting its amplitude and pitch!</p> <p>Note: Explain the following to the learners before they draw the graph.</p> <ol style="list-style-type: none"> 1. If the pitch is high but the amplitude is low, there will still be many waves but they will be low. 2. If the amplitude and pitch are both low, the waves will almost look like a flat line – the waves will be low and fat. 3. If the pitch and the amplitude are both high, there will be thinner and higher waves. 4. If the pitch is low but the amplitude is high, there will be fewer and fatter waves that are high. <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Soft, high note.</p> <p>1</p>  </div> <div style="text-align: center;"> <p>Loud, high note.</p> <p>3</p>  </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="text-align: center;"> <p>2</p>  <p>Soft, low note.</p> </div> <div style="text-align: center;"> <p>4</p>  <p>Loud, low note.</p> </div> </div> |

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| At-home activities | <p>Experiment with instruments to see how sounds of different pitches can be created using the same instrument. For example:</p> <ul style="list-style-type: none"> - what is the difference in the sound produced by a string instrument when we use one rubber band compared to when more rubber bands are used? - Can you create drums of different materials to see the effect that has on the pitch? |
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Day 4 –

Today, you will create your third musical instrument and finalise your song!

| Time | Activity and Description |
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| 15 minutes | <p>The Third Musical Instrument</p> <p>Today, you can either create your third instrument or explore how you can create a sound using different techniques like snapping your fingers or clapping.</p> <ul style="list-style-type: none"> - You can also try beatboxing as an alternative. Beatboxing is a form of vocal percussion in which a person uses their mouth, lips, tongue, and voice to create rhythmic sounds and musical patterns. Try using your mouth to imitate drumbeats or other musical instruments. - Beatboxing has many sounds some include: <ul style="list-style-type: none"> - A popping sound like “puh”. - Sounds like “tss” or “tshh” - A “pft” or “kch” sound - Sounds like boom-chick repeated slowly several times - Start by creating a basic beatboxing pattern using the sounds mentioned above. For example, a simple pattern could be (puh), (tsss). Repeat this pattern to establish a rhythm. |
| 10 minutes | <p>Beats</p> <p>Now that all your instruments are ready, begin creating a beat to go with your lyrics!</p> <ul style="list-style-type: none"> - A beat is a pattern of sounds that keeps the rhythm of our song. We can use different instruments to make the beat, like drums, clapping hands, or tapping objects. - One way is to time playing the instrument with the last rhyming word of the sentence (e.g. beat the drum twice when the singer reaches the last word of each line of the song) - Put your lyrics, message and beats all together to make your song. - Your beat should be according to the mood of your song, its lyrics, and the message you want to communicate. - You can even create a dance! |
| 15 minutes | <p>Rehearsal</p> <p>Note: Ask learners to bring two or three friends for this part of the class. Ask them to explain the song and the use of the instruments to them.</p> |

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| | Now that your song, instruments and beat are ready, divide the singing and playing of different instruments among yourselves, and rehearse the song a few times until we get it right! |
| At-home activities | <p>Investigate how sound can travel in different materials:</p> <ul style="list-style-type: none"> - Air: Place a mobile phone in a small glass cup or container and ask someone to call it. How loud or faint is the sound? Now place your mouth on the lid and try to suck the air out of the container. Ask someone to call the phone again. How loud or faint is the sound of the phone? - Solids: Tap a table gently with your hand. Do you hear any sound? Place your head on a table and tap again gently. Can you hear anything? - Liquids: Place your head sideways into a container filled with water such that your head is on the surface of the water. Make sure that water does not get inside your ear. Snap your fingers or make a sound using two marbles or other objects inside the container. Now make the same sound outside of the container. How much louder or fainter is the sound in water compared to outside? <p>Present your song and get feedback from your family. Incorporate feedback and practice your song.</p> <p>Invite your family and friends to attend your performance in the next class!</p> |

Day 5 -

Today, you will perform your song with your friends and reflect on your journey so far as a music composer!

| Time | Activity and Description |
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| 15 minutes | <p>Setting the Stage</p> <ul style="list-style-type: none"> - Set the “stage” where you and your friends will perform. - Prepare a banner or poster for your group! |
| 15 minutes | <p>Performance</p> <ul style="list-style-type: none"> - Present your song to your friends and family! - Make sure you change the pitch and amplitude as the song progresses! |
| 10 minutes | <p>Reflection</p> <p><i>Note: Ask the audience to guess the message that the song wanted to communicate.</i></p> <p>Think about:</p> <ul style="list-style-type: none"> - What did you enjoy the most about making your own song? - Which instrument was your favourite and why? - Do you think the main message of the song was clear? Why or why not? - What did you find challenging? How did you overcome the challenge? - What can be improved in your final product? |

- What is something about sound that you want to learn more about?

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| Additional enrichment activities: | <p>Learners can learn about timbre.</p> <ul style="list-style-type: none"> - Timbre is a word we use to describe the unique quality or character of a sound. - It's what makes one sound different from another, even when they have the same pitch and loudness. - They can do this through a sound exploration activity. Set up a sound exploration station with various objects and materials, such as metal, wood, plastic, glass, and fabric. - Encourage learners to tap, scrape, or strike each object to produce sounds. - Discuss and compare the different timbres or qualities of the sounds produced. - Guide them to observe how the material affects the sound's characteristics, such as being bright, dull, metallic, or muffled. <p>Learners can make multiple songs with different pitches and loudness.</p> <ul style="list-style-type: none"> - They can re-write their songs but make the pitch and loudness different. - They can even choose to write a completely new song and create a concert using different songs that have different messages. <p>Learners can create additional instruments and add them to their song for example a table, xylophone etc.</p> <p>Learners can organize a talent show where each group can perform their songs for a wider audience.</p> |
| Modifications for simplification | Learners can use a song or poem they already know and just change the lyrics, pitch and instruments used |

ASSESSMENT CRITERIA

A majority of my learners were able to:

- Explain how sound is created through vibrations.
- Create their own musical instruments
- Create multiple instruments and understand through them what is vibration, pitch and amplitude.
- Understand how human vocal cords and ears work.
- Draw a waveform graph.
- Write the lyrics of a song.