

# Discovery Education Science

## 5-E Lesson Plan

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Grade Level: Grade 4	Subject Area: Science
Lesson Title: Sound, Frequency, Tone	Lesson Length: 50 minutes

### The Teaching Process

<b>Lesson Overview:</b> Students will complete activities to explore the relationship between the sounds being heard and a visual representation of the sound waves created.
<b>Unit Objectives:</b> 104-6 Demonstrate that specific terminology is used in science and technology contexts. 207-6 Work with group members collaboratively.
<b>Outcomes Addressed:</b> 303-9 Identify objects by the sounds they make. 303-10 Relate vibrations to sound production. 303-11 Compare how vibrations travel differently through air and a variety of solids and liquids. 301-3 Demonstrate and describe how the pitch and loudness of sounds can be modified.
<b>List of Materials:</b> Bongo, tambourine, morocco, whistle, recorder, guitar, kazoo, yarn cut at varied lengths shortest to longest (10cm-150cm)
<b>Multiple Intelligences Addressed Directly:</b> Bodily kinesthetic, musical, interpersonal
<b>Vocabulary:</b> Sound wave, pitch, frequency, amplitude, bass, vibrations

### Instructional Sequence

<b>Phase One: Engage the Learner</b>
Teacher has a variety of instruments set up at the front of the classroom on a table for students to see as they enter class. The instruments used will depend on resource availability. This arrangement will spark students' interest and initiate thoughts about instruments and by extension sound. Students will begin to think about their previous knowledge relating to instruments and sound. Teacher will then ask students to sort the instruments in a way that makes sense to them. Prompting questions for students struggling may include:  -How could we sort them? -Are some high pitched, are some low? -What sounds do they make? Do any sound similar? -Do any instruments look the same?  Students are encouraged to explore the instruments and to make sounds if they feel it would aid them in sorting the instruments provided. After students feel that they have sorted the instruments, each group will take turns explaining their sorting method to the class.
<i>Accommodations/Modifications: To ensure that all students are actively involved high-low level groups can be created where the high level students can assist lower level students with their learning. Additionally, students should be reminded that the classroom is a safe place where all ideas are appreciated and welcome to encourage all students to take risks and try their ideas.</i>

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#### Phase Two: Explore the Concept

Teacher will then distribute an instrument to each group table to explore. Instruments will be rotated from group to group, allowing each group member to observe, handle, and play each instrument. Students will discuss in their small groups:

- How students knew what do with each instrument to create a sound
- The type of sound produced and how it can be described
- Where they may have heard the sound before
- Any everyday sounds that it is similar to
- How many different sounds each instrument can produce?

*Accommodations/Modifications: Again high-low groups will aid in actively involving all students. Helping students to make connections to sounds they are familiar with will provide extra support and as a result increase understanding. Students needing more time to make connections between their experiences and the questions are encouraged to use more time, as a variety of instruments will be readily available so not shortage should occur.*

#### Phase Three: Explain the concept and define terms

Students will share small group findings in a whole class discussion and confirm agreeable findings and address any misconceptions. Teacher will introduce the idea of sound travelling through vibrations and in the form of waves as well as the idea that sounds can bounce off hard objects (rafters) or be muffled by soft materials (foam in recording studios) in a lecture format. Students will then consider various mediums through which sound can travel being prompted by the question:

-Would sound travel best under water, through wide open areas, outdoors, in confined spaces, through technology (phones, speakers)?

To aid them in answering this question and considering various mediums of sound travel students will be encouraged to draw on previous experiences familiar to them. Such experiences may include swimming in a pool and trying to talk under water, yelling across a field to a friend, and talking over the phone.

*Accommodations/Modifications: Students will be encouraged to relay both their own ideas as well as the ideas of others during the whole class discussion. This way students too shy to participate in the larger group will still have their ideas represented. If needed teacher can prompt students using the experiences stated above to generate some more ideas.*

#### Phase Four: Elaborate the Concept

Teacher will have students complete a modeling activity where they will use a piece of yarn to visually represent the sounds they are hearing. Half the students will be provided with yarn pieces all the same length and the other half of the class with instruments. Students will shake their yarn vertically in a wave-like motion to indicate the sound vibrations they feel are taking place as each instrument is played individually. The higher pitched instruments (whistle) will correspond to faster motions, as a higher pitch sounds have shorter wavelengths and therefore higher frequencies. On the other hand, lower pitched instruments (bongo) will correspond to slower motions, as lower pitch sounds have longer wavelengths and therefore lower frequencies. After visually representing half of the instrument's sounds the groups will switch. NOTE: If there are not enough instruments for each child to have one of their own students may play one instrument simultaneously in a group to ensure that all students are involved. Also students are encouraged throughout the activity to discuss their ideas with their peers as they attempt to show a visual representation of the sounds being

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produced.

Students will explore all the instruments as well as the vibrations of sound waves (yarn) in order to negotiate the order of instruments from lowest to highest pitch (based on vibrations created with the yarn) or vice versa.

Students will then create lists of high, moderate, and low pitched sounds in our everyday lives. Some examples include:

High = baby crying, fire alarm, a boiling kettle

Moderate = car engine, toilet flushing, knock at the door

Low = bass guitar, church bells, Barry White's voice in "Can't get enough of your love, baby"

*Accommodations/Modifications: Students will all be working collaboratively and helping each other as needed. Also by having students model sounds visually and in a group, students who may feel shy performing alone are accommodated.*

#### **Phase Five: Evaluate students' Understanding of Concept**

Throughout the lesson, students will be evaluated on their participation, cooperation, comprehension, and contribution to class discussion formatively. Students will also be evaluated on the accuracy and visual representations of their high, moderate, and low pitch lists. Students will then be given the choice to show what they have learned in one of the following ways: journaling, creating a collage, composing a poem or song, completing a write-up, making an artistic expression, or a project of their choice that has been discussed and approved by the teacher. By providing students with choice students are able to use their strengths to show what they have learned.

*Accommodations/Modifications: Providing students with choice allows for students to accommodate themselves and demonstrate their knowledge in a way that they are comfortable with.*