Big Idea/ Topic

Sound

Standard Alignment

S1P1. Obtain, evaluate, and communicate information to investigate light and sound.
   d. Construct an explanation supported by evidence that vibrating materials can make sound and that
      sound can make materials vibrate.
   e. Design a signal that can serve as an emergency alert using light and/or sound to communicate
      over a distance.

Crosscutting Concepts: Patterns, Cause and Effect, Structure and Function

Other Content Area Standards:

ELA

ELAGSE1RI1: Ask and answer questions about key details in a text.

Fine Arts – Music

ESGM1.RE.1 Listen to, analyze, and describe music.
   a. Distinguish between contrasts in music (e.g. pitch, duration, dynamics, tempo, timbre, form).

ESGM1.CN.1 Connect music to the other fine arts and disciplines outside the arts.
   b. Describe connections between music and disciplines outside the fine arts.

Instructional Design

Engage

Share the parent/family letter.

DISCLAIMER

The books used as examples for the Georgia Home Classroom’s Digital Learning Plans were selected by
Georgia teachers to reinforce skills and knowledge found within the Georgia Standards of Excellence. The
Georgia Department of Education (GaDOE) cannot and does not endorse or promote any commercial
products, including books. Therefore, the books that were selected serve as examples and are not endorsed
or recommended by the GaDOE. Please remember that when selecting books to support instruction, Georgia’s
public school teachers and leaders should consult their local school district’s policy for determining age and content appropriateness for their students.

**Phenomenon: What causes changes in sound?**

Have students listen to sounds that have different pitches. Such as the following video clips:

- **Whale sounds**
- **Bear roar**
- **Elephant trumpeting**

Ask students to think about what they heard. What did they notice? Were the sounds the same? How can so mammals make so many different sounds?

Now ask students to observe what noises they can make.

Have students place their hands on their larynx/voice box and speak normally. What do they notice about their voice? What about the sound they make? Have them talk about what they feel with their hand as they talk. They can notice that they feel the sound in their hand.

Have students place their hands on their larynx/voice box and whisper. What do they notice about their voice? What about the sound they make? Have them talk about what they feel with their hand as they talk. They can notice that they feel the sound in their hand.

Have students place their hands on their larynx/voice box and speak loudly. What do they notice about their voice? What about the sound they make? Have them talk about what they feel with their hand as they talk. They can notice that they feel the sound in their hand.

Have students place their hands on their larynx/voice box and sing. What do they notice about their voice? What about the sound they make? Have them talk about what they feel with their hand as they talk. They can notice that they feel the sound in their hand.

Did they notice differences in how their throat moved as they made noises of different kinds? What do they think? What do they wonder about the noises? Then ask them how that might compare to the animal sounds that they heard?

Have students wonder about what causes different sounds. Share a [photo of the vocal cords](#) noting that air passes through them from the lungs into the mouth. Students may realize that the vocal cords vibrate as air passes from the lungs. Have them think back to their explorations of placing their hands on their larynx/voice box. Explain the larynx/voice box contains the vocal cords.

**Unplugged:** Ask students to go outside with a member of their household and make observations about noises in the area that they live in. Have students look for sounds that are high pitched, medium pitched and low pitched. Then have students discuss the differences and similarities in the noises. Have students complete the part of the lesson, above, that has students making noises and feeling their larynx to make observations. Students can then discuss observations with a member of their household. Then students can make a hypothesis about what causes different sounds.

Teacher note: Information is [here](#) on how mammals make sound.
Exploring

Part 1

Now have students start investigating sound. If materials are available, let students hang a ruler/paint stirring stick or popsicle stick over the edge of a desk. They should push it downwards and then let it go so that the ruler vibrates and makes a sound. Have them observe what they see, hear, and feel. Let the experiment more by changing the length of the ruler that is hanging off the edge of the desk. A longer ruler hanging over makes a lower pitch, a shorter ruler makes a higher pitch. If materials are not available to a student, they may watch this video: Vibrations in a Steel Ruler.

Questions:

What did you see when the long length of ruler was hanging over the edge and was struck? What did you see when the short length of ruler was hanging over the edge and was struck?

What did you hear when….?

What did you feel when with the hand holding the ruler down after you hit it?

As students try this out, make observations, and discuss, you can show them this video in slow motion to make additional observations: Slow Motion Ruler Vibrations.

Teacher note: The pitch is how high or low the note is, and it will changes depending on much of the ruler is hanging over the edge. Students will observe this change and it is okay to explain pitch, but our main goal is just for students to investigate with making sounds and to notice the vibrations. (Be aware that pitch is a part of their music standards at this grade level.) Sound is produced when an object vibrates. Students will understand that vibrations are responsible for the sounds that we hear. Sound vibrations can travel through different objects. After exploration, they should be able to explain that vibrating materials can make sound and that sound can make materials vibrate. Here we focus on vibrating materials can make sound. After much observation, explain to students that vibrations are simply when objects move.

To explore sound making materials vibrate, students can observe in this video rice “dancing” on a speaker.

What is making the rice move? Discuss.

Part 2

Have students design and make sound makers using various items such as, paper towel tubes, tissue boxes, yarn, pie tin, rubber bands, string, metal buttons, oatmeal canisters, aluminum foil, and other household items. Students will discuss how their instruments use vibrations to produce sounds. Students will demonstrate their sound makers to determine how the vibrations produce the sound. Students will use different size paper towel rolls and determine if they make different sounds and why? Students will generate ideas about which paper towel holders will make the loudest sounds. Students will then explore the sound makers and determine which objects made different sounds.

Teacher note: For discussion consider how students, as instrument builders, will get sounds from their instruments? Questions for students and for discussion:

• What is vibrating (string, drumhead, air column, etc.)
• How will it be played (bowed, plucked, struck, blown, etc.)

Unplugged: If students do not have access to a ruler or paint stirring stick at home, suggest that students place their hands on their larynx/voice box and sing or speak. Have them talk about what they feel. They can
notice that they feel the sound in their hand. You can utilize children's literature dealing with musical instruments and their sounds. Have students think about how instruments make sounds (strumming a guitar, hitting a drum, etc.). Remind students that sounds are produced when objects are vibrated and have them determine what is vibrating to cause the sound. Students will discuss how various instruments make sound. Students can use various sound makers found around the home to explore such as pots and pans, lids, paper towel tubes, wrapping paper tubes, etc. Students will produce sounds using the various objects or instruments. Have them feel for vibrations as they hear the sound.

Music: In first grade, students are introduced to pitch in their music standards, ESGM1.RE.1, so you may want to reach out to the music teacher to collaborate. Maybe a concert is necessary!

Explaining

Students will compare their sound makers and how the objects made sound. (i.e., the string on the guitar is plucked and sound is produced). Remind students how sound is produced. Allow students who made similar plans to work together to revise their original design. Some students may want different sounds. Students may want to consider how their instrument is built which affects:

- getting it louder (putting it on a box, adding a cone, etc.)
- getting different pitches (longer/shorter, tighter/looser, etc.)

Make the class an audience participation session allowing each child to demonstrate their sound maker/instrument and allowing the other students to give feedback. Students can revisit their designs and make any changes, discussing why changes could improve their instruments or how changes impact the sound that is made (change in pitch, etc.). Virtual students may share recordings with their teachers. Refer to the “Teacher note” in the exploring section.

Unplugged: Allow students to draw and explain their instruments (pots, pans, paper towel tubes, box of rocks, etc.). If possible, they may be able to submit a short video from a mobile phone. They could play a short musical piece over the phone. Encourage them to host a family concert.

Elaborating

Students can watch and listen to a video clip and note that sounds (and lights) are used to alert us in emergency situations to keep us safe or to get our attention. Videos can be found online demonstrating siren differences and other alarms (such as tornado). Ask students if they think that a paper towel roll would be a good way to alert us of an emergency? Why or why not? If not, what would be a good emergency alert? (i.e., sirens, flashing lights, horn, loud bells etc.) How do sounds keep us safe? Ask students what types of sounds do we hear at schools, in the community and why? (i.e., school bells, police sirens, fire truck sirens, school announcements, tornado sirens, fire alarms, etc.). Ask students, why they think emergency sirens make louder sounds that other sounds they hear like the TV or radio? Why do alert signals use flashing lights? Teacher will explain to students that emergency sirens need to be louder than other sounds so people can hear them.

Literature:

Eric Carle’s A Very Quiet Cricket can also be used to elaborate on how some animals make sounds. How does a cricket make sound? There are various read alouds found online, such as an animated version of A Very Quiet Cricket.

Students may experiment by rubbing their fingernails across a comb.
**Sounds All Around** by Wendy Pfeffer describe how we make sounds. If you use this text, do so after students have investigated and made their own observations and explanations. Online versions of this story being read can be found, but also check with local and school libraries.

**Invention:**

After making their own noise makers, students can explore some innovative instruments that combines music with technology. Check out these lesson plans and activities from Georgia Tech and their partners at GoSTEAM!

The Georgia Tech Guthman Musical Instrument Competition, sometimes described as the jam session of the future or the “X-Prize for music”, features the next generation of music technologists sharing their latest and greatest instrument inventions.

**Evaluating**

In science interactive notebooks or journals, students will draw pictures of sound makers and label where or how the sounds are made.

Consider viewing a video and having students select an instrument to explain how the sound is being made: The Most Unusual Musical Instruments of the World (Perdoscope via YouTube I CC BY).

You might also use a video of the Marble Machine musical instrument using 2,000 marbles (Wintergatan via YouTube I CC BY).

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<tr>
<th>Evidence of Student Success</th>
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<td>• Students can design noise makers/instruments and explain how the sounds are being made – they can identify what is vibrating. They can identify why any changes made affect the sound produced.</td>
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<tr>
<td>• In science interactive notebooks or journals, students will draw pictures of sound makers and label where or how the sounds are made.</td>
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<th>Distance Learning Supports</th>
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<td>The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson, or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student’s Individualized Education Program.</td>
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Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.
Engage:

1. The teacher should then consider showing a video of musical instruments being played and ask students to make observations.
2. The teacher should consider showing vibration and sound with a tuning fork if available. This explicitly shows the connection.
3. The teacher should have clear and consistent guidelines for class discussions. These guidelines are meant to help students feel more comfortable and be more likely to participate in the discussion.
4. The teacher should nudge students to try various sound makers.
5. The teacher should use flexible and intentional grouping to group students. Best practice is to use data to drive student groupings or student interests.
6. The teacher should consider having students draw their understanding of vibration.

Exploring:

1. The teacher should consider providing students with an organizer to assist with their design of the instrument.
2. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.

Explaining:

1. The teacher should provide clear and consistent guidelines for comparing sound makers.
2. The students should provide an explanation for any changes that they decide to make to their instrument design.
3. Students may need additional time to revise their designs.

Elaborating:

1. The teacher may need to show the video more than once.
2. The teacher should consider having a class discussion about observations of the sirens and other emergency sounds.
3. The teacher should ask students about personal experience with sirens. Most students will have, at least, heard sirens in the car with their parents.
4. Ask students to think about fire drills and the sounds related to those. Also, ask students to think about why we cannot turn the siren down.
5. The teacher should give students with an organizer to draw ideas that they have for designing an emergency signal.
6. Students may need additional time to complete their assignments.
7. The teacher should consider reading books about music and noises aloud to the class.

Evaluating:

1. Students may need additional time to complete their assignment.
2. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. This could include labeling images, drawing pictures, writing, or verbally explaining.
Engaging Families

- **The Most Unusual Musical Instruments of the World** (Perdoscope via YouTube | CC BY) could be viewed by families.
- You might also use a video of the **Marble Machine** musical instrument using 2,000 marbles (Wintergatan via YouTube | CC BY).
- **Parent Letter**: Encourage families to take a sound walk. Go for a walk and notice the sounds you hear. Do they sound near by or far away? What is making the sound? Is it a man-made sound or made by something in nature?
- **Blob Opera** – For families connected to the internet, they may enjoy playing with these 4 blobs. By dragging the blobs up or down (changing their length), they can change the pitch.

Dear Families,

We are studying sound. Students should investigate to explain that vibrating materials can make sound and that sound can make materials vibrate. Student will need to explore with various objects around the house to make sound. So, take a little time to start recycling and collecting various objects students can use to produce sounds.

Some ideas:

- Pots and pans and wooden spoons
- Plastic containers fille with objects
- The inner tube/roll from paper towels or wrapping a paper (experiment with whacking tubes of various lengths on a table)
- Empty Plastic containers
- A milk jug or something you can blow across the opening off
- Rubber bands across a box
- A ruler, paint stick or popsicle stick
- A comb

Sound is produced when an object vibrates. Students will understand that vibrations are responsible for the sounds that we hear. Sound vibrations can travel through different objects. After exploration, they should be able to explain that vibrating materials can make sound and that sound can make materials vibrate.

Take a wonder walk with your student and notice all the sounds you hear both natural and man-made. What makes those sounds? Do they sound nearby or far away? This is a great time too to talk about sounds that serve as emergency alerts. Test your fire alarm and talk about why it is so loud and what to do if they hear it go off at home. Does your community have an alarm for tornados? Have they ever noticed that firetrucks and ambulances make sounds when they are in route to an emergency?

Enjoy!