**GYSTC First Grade STEM Lesson 1**

Unit: Sound

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| **Title of the Lesson:** Our New Emergency Alert Sound  **Estimated Time:** Three to four 45-minute class periods. | |
| **Standards:** | |
| **S1P1. Obtain, evaluate, and communicate information to investigate light and sound.**  d. Construct an explanation to observe and provide 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 distance. | |
| **Science and Engineering Practices** | **Crosscutting Concepts** |
| **Asking Questions Defining Problems**  Ask and/or Identify questions about sound that can be answered by and investigation.  **Conducting Explanations and Designing Solutions:**  Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.  **Engaging in Argument from Evidence:**  Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence | **Patterns**  Patterns in the natural world can be observed and used to describe emergency sounds and used as evidence.  **Cause and Effect**  Events (sounds) have causes that generate observable patterns. |
| **Big Ideas/Enduring Understandings:**   * + Understand that sound travels away from the source   + Understand that sounds have different pitches   + Understand that the greater distance between you and the source of sound, the weaker (lower volume) the sound   + Sounds are produced by vibrations   + Sounds are heard when they enter the ear.   + Be familiar and recognize emergency sounds   **Essential Questions:**  How can I design a new Emergency Alert System for Atlanta? | **Vocabulary:**  Sound  Vibration |
| **Materials:**  Emergency Alert Sounds Outside: <https://www.youtube.com/watch?v=wdfEFH04_eA>  Emergency Sounds on TV or Radio:  <https://www.youtube.com/watch?v=k96Bi8SE-H0>  Emergency Vehicle Sounds:  <https://www.youtube.com/watch?v=WuY2zOYFPbE>  Pictures of emergency vehicles  Balloon  Hexagonal nut  Experiment Demonstration:  <https://www.youtube.com/watch?v=-7gOyzG5Tmc>  wax paper, rubber bands, rulers, hangers, Palm Pipes, Balloons, Hexagonal Nuts, Metal spoons, anything that makes a loud sound  Access to apps with the Lino app if possible for presentation time | **Safety Considerations:**  Remind students to be careful when using the hexagonal nut in the balloon. |
| **Technology Integration:** PHASE II |
| **Project Overview:**  Tell the students today you want them to use the materials at their table to design their own Emergency Alert System. Emergency Alert Systems are used to alert people in a large area about an emergency by using vibrations. Have materials like wax paper, rubber bands, rulers, hangers, Palm Pipes, Balloons, Hexagonal Nuts, Metal spoons, anything that makes a loud sound and strong vibrations. Students will need to come up with a purpose for the emergency alert system in Atlanta. Students will be given a simple design page to record their group’s information. | |
| **Instruction:**  Show students the Screaming Balloon Experiment and compare it to the Emergency Alert sound from this video (Start 1 minute into the video) <https://www.youtube.com/watch?v=wdfEFH04_eA>)  Ask students “What do you notice about the sound of the balloon on the emergency alert system over time?” Hopefully the discussion will lead to topics like pitch, volume, vibrations, etc. Encourage students to share their experiences hearing emergency sounds  **Challenge:**  You have been learning all about sound over the past couple of weeks. Today you will design your own Emergency Alert System. Emergency Alert Systems are used to alert people in a large area about an emergency by using vibrations. You can use materials like wax paper, rubber bands, rulers, hangers, Palm Pipes, Balloons, Hexagonal Nuts, Metal spoons, anything that makes a loud sound and strong vibrations. You will need to come up with a purpose for the emergency alert system in Atlanta.  Criteria:  1. Make an emergency alert system with sounds and for a specific purpose.  2. Your alert system must be loud enough to easily hear across the classroom.  Constraints:  1. You may only use what is provided by your teacher or what you can find at home.  2. You must complete the challenge within the time frame given by your teacher.  Imagine/Brainstorm:  Introduce the constraints of the design plan and define the criteria for student success. Ask each student to work independently to come up with 1 possible design solution. Students should draw/label their designs on their student STEM journal.  Plan/Design:  Each student presents their idea to their team (teams can have 2-4 students). Student teams will then collaborate to come up with their final design plan. Students will draw and label final design plan and make a list of supplies needed on their student STEM journal.  Create/Test:  Student teams will build their design following their final design plan. Student teams will then test their design plan and record data on the student STEM journals. After students have created their successful model of a thermometer, the students will then teach a kindergarten group all about thermometers and how they are used by meteorologists.  Evaluate/Improve (repeat steps 1-5):  Students will evaluate their team’s final design for success by answering the following questions:  Did your design meet the established criteria?  Did your design match your group’s planned design?  How would you improve your design? | |
| **Closing/Culminating Activity:**  In groups, have students explain how their alert system produces sound. They should be able to explain that when any object vibrates, it causes movement of the air particles (and other particles) around it. The air particles push into other air particles and this movement creates a wave of sound. The sound wave starts at the vibrating object and travels all the way to your ears, where you hear it. | |