

# Unit 2: Sound

Content Area: **Science**  
Course(s): **Science Gr 1**  
Time Period: **NovDec**  
Length: **5 Weeks Grade 1**  
Status: **Published**

## **Title Section**

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**Department of Curriculum and Instruction**



**Belleville Public Schools**

**Curriculum Guide**

## **Science: Grade 1**

## **Unit 2: Sound**

**Belleville Board of Education**

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Board Approved: August 30, 2017

## **Unit Overview**

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Kids are born scientists. They want to know WHY: Is the sun a star? How do magnets work? It's our job to encourage their curiosity, creativity, and exploration while preparing them for careers in science, technology, engineering, and math.

### **Unit 2 Performance Expectations:**

PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound, and that sound can make materials vibrate.

PS4-4 Use tools and materials to design and build a device that uses sound to solve the problem of communicating over a distance.

Throughout Unit 2, students will develop skills to

- explore the relationship between sound and vibration.
- compare the volume and the pitch of different sounds.
- investigate how sound makes materials move.
- identify ways people communicate using sound.
- explore how technology is used to help people communicate with sound over distances.

**Unit Vocabulary:** sound, vibrate, volume, pitch, communicate

**Unit Project:** Explore Sound

Lesson 1:

In Lesson 1, students will begin by observing that sound can cause materials to move and that vibrating materials can make sound. They will ask questions and explore the concepts of vibration, pitch, and volume. They also plan and conduct investigations to produce data about the relationship between sound and vibrations. Students will use the results of their observations from their investigations to make claims about the cause-and-effect relationship between sound and vibration.

**Essential Question:** What is sound?

**Can You Explain It? (Lesson 1 Engagement Question):** Why does the water move?

**Hands-On Activity:** Make Something Move With Sound

Lesson 2:

In Lesson 2, students will explore the different ways people communicate with sound, including devices that allow people to communicate over long distances. Students will use tools and materials provided to build and modify a tool for making sound and communicating over a distance. They will investigate technologies people use to communicate with one another and how sound engineers and people in other careers make use of technology to study and modify sound.

**Essential Question:** How can we communicate with sound?

**Can You Solve It? (Lesson 2 Engagement Question):** How could you use sound to send a message over a distance?

**Hands-On Activity:** Communicate Over Distance

**Online Interactive Activity:** Getting the Band Together

## **Enduring Understanding**

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Unit 2 Performance Task: Students will plan materials to test sound signals in order to communicate a message.

(Refer to Scoring Rubric TE page 75)

By the end of Lesson 1, students will be able to plan and conduct an investigation in order to gather evidence of how sound and vibration are related.

By the end of Lesson 2, students will design a solution to the problem of communicating a message over a distance.

## Assessments

### **Pre-Assessment**

Assessment Guide, Unit Pretest

### **Formative Assessment**

Interactive Worktext, Apply What You Know, Lesson Check, and Self Check

## **Summative Assessment**

Assessment Guide, Interactive Worktext, Lesson Quiz and Unit Test

## **Online Assessment**

## **Essential Questions**

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### **Essential Questions for Unit 2 Project:**

Students can be prepared for their Unit 2 Project by asking the following questions:

- How does sound affect materials?
- What does a material do when it makes sound?

### **Essential Questions:**

- What is sound?
- How can we communicate with sound?
- Why does the water move?
- How could you use sound to send a message over a distance?

## **Exit Skills**

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By the end of Grade 1, Science Unit 2, the student should be able to:

- describe how sound affects materials
- explain what caused the water to move
- describe how people use technology to communicate over a distance
- explain how they think life would be different without the technology they describe

## **New Jersey Student Learning Standards (NJSLS-S)**

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SCI.1-PS4-4	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
SCI.1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

## **Interdisciplinary Connections**

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### **Lesson 1:**

#### **Connections to Math**

1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and ones digits, recording the results of comparisons with the symbols  $>$ ,  $=$ , and  $<$ .

#### **Connections to English Language Arts**

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

### **Lesson 2:**

#### **Connections to Math**

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with

no gaps or overlaps.

### **Connections to English Language Arts**

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

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LA.SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
MA.1.MD.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
MA.1.NBT.B.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$ , $=$ , and $<$ .

### **Learning Objectives**

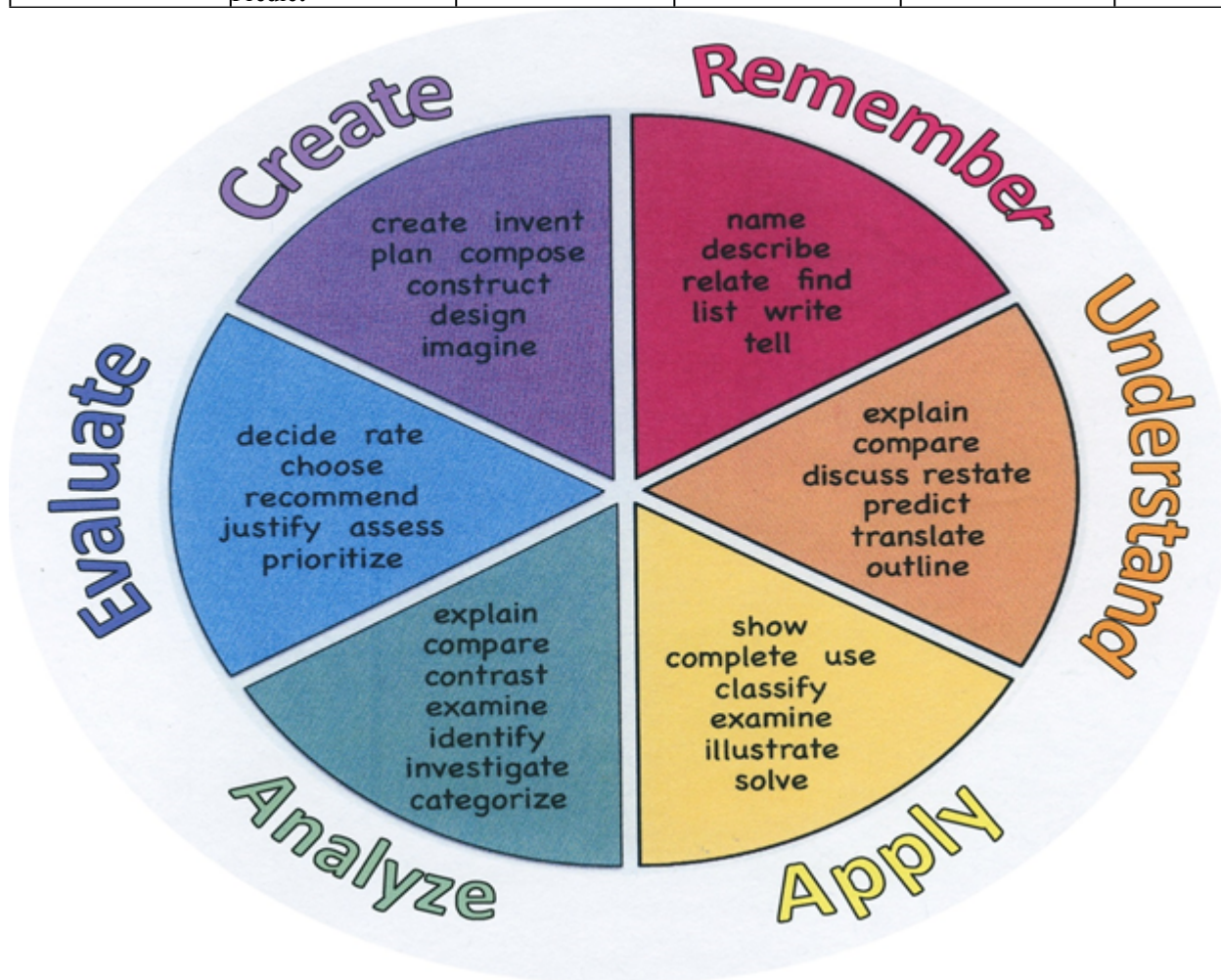
#### **Effective Learning Objectives Used in Lesson Planning:**

- SWDAT to plan and conduct an investigation in order to gather evidence of how sound and vibration are related
- SWDAT work in small groups to answer the question, "Can sound make rice move?"
- SWDAT design a solution to the problem of communicating over a distance
- SWDAT make sound to communicate over a distance
- SWDAT use materials to design something that will make the sound louder
- SWDAT use evidence from their investigation to support a claim about how they can communicate with sound over a distance

**Action Verbs:** Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

<b>Remember</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Create</b>
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive

Outline Point Quote Recall Recognize Repeat Reproduce	Represent Restate Rewrite Select Show Summarize Tell Translate Associate Compute Convert Discuss Estimate Extrapolate Generalize Predict	Calculate Change Classify Complete Compute Discover Divide Examine Graph Interpolate Manipulate Modify Operate Subtract	Diagram Discriminate Illustrate Outline Point out Separate	Support Test	Devise Generate Integrate Prescribe Propose Reconstruct Revise Rewrite Transform
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## Suggested Activities



Vocabulary Game- Make a Match

Hands-On Activities: Make Something Move With Sound & Communicate Over Distance

Interactive Activity: Getting the Band Together

Unit Project

Take It Further

- Pitch in
- Morse Code

## **Evidence of Student Learning - Checking for Understanding (CFU)**

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In addition to the assessments provided with the Houghton Mifflin Harcourt Science Series, teachers may use different formative and informative assessments to guide their instruction. Below is a checklist of possible assessment strategies to be used to check for understanding in Science.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart

- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit tests

## **Primary Resources & Materials**

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HMH Science Dimensions Text

Professional Development Video

Equipment Kits (includes consumable and non-consumable materials)

Safety Kit

The Science and Engineering Practices Online Handbook

Science and Engineering Leveled Readers (On Level, Extra Support, Enrichment)

HMH Player app

Home Letters (Online)

## **Ancillary Resources**

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Safety in Science Rules

Online Resources

## **Technology Infusion**

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[www.hmhco.com/classroom/classroom-solutions/digital-and-mobile-learning/ed](http://www.hmhco.com/classroom/classroom-solutions/digital-and-mobile-learning/ed)

3D Evaluation Rubric

Computer-Based Assessments

HMH Field Trips

Online Videos and Animations

Online access to Science and Engineering Leveled Readers (includes On Level, Extra Support, and Enrichment)

Online Glossary

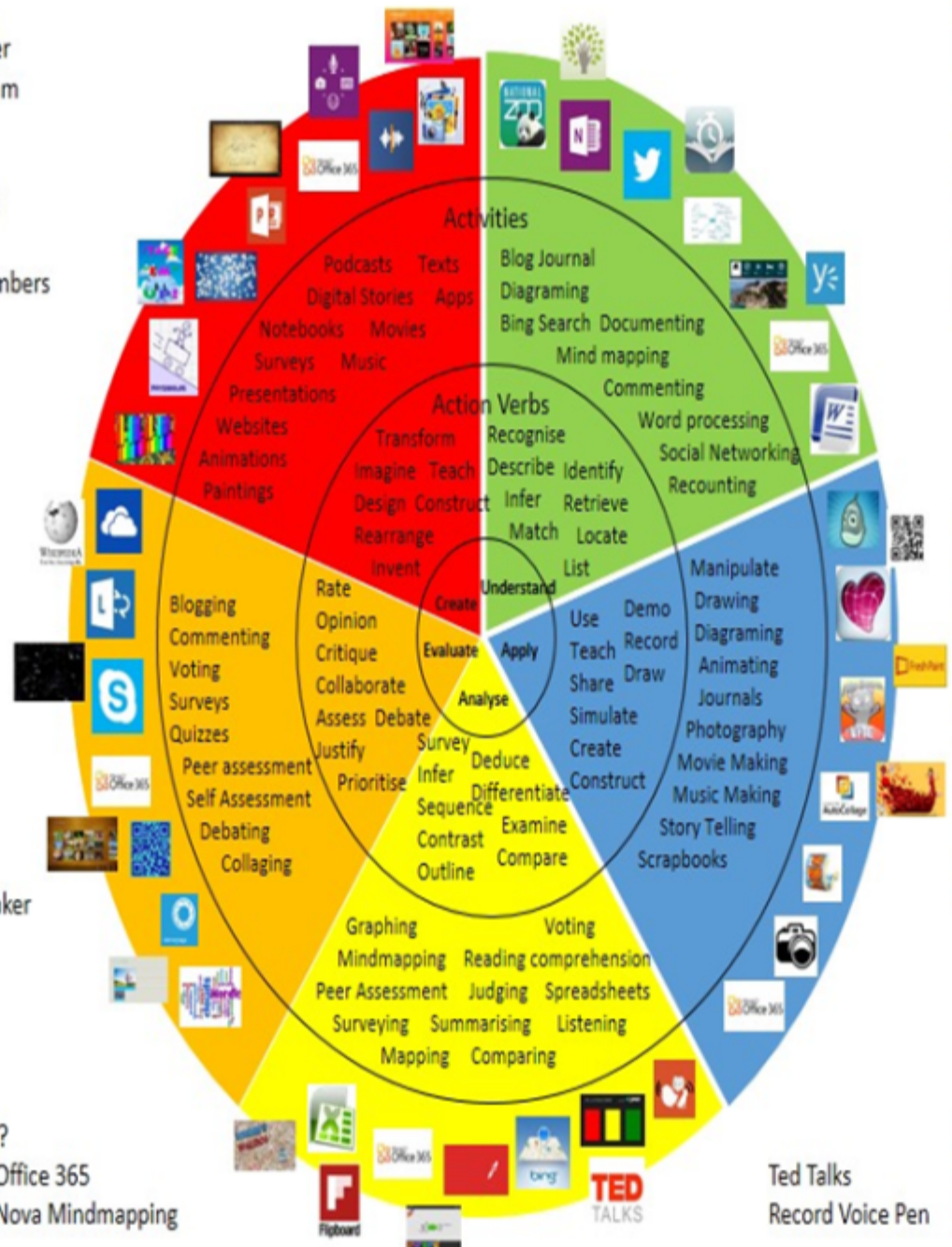
## Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts  
Photostory 3  
Kid Story Builder  
Music Maker Jam  
Paint A Story  
Office 365  
MS PowerPoint  
Stack 'Em Up  
NqSquared Numbers  
Physamajig  
Xylophone 8

Wikipedia  
Skydrive  
Lync  
SkyMap  
Skype  
Office 365  
Puzzle Touch  
Easy QR  
Memorylage  
Life Moments  
Word Cloud Maker

Where's Waldo?  
MS Excel  
Flipboard  
Office 365  
Nova Mindmapping

Ted Talks  
Record Voice Pen



## **Alignment to 21st Century Skills & Technology**

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- English Language Arts; Creativity and Innovation
- Mathematics; Critical Thinking and Problem Solving
- Science and Scientific Inquiry (Next Generation); Critical Thinking and Problem Solving
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics; Information Literacy
- World languages; Information Literacy
- Technology; Life and Career Skills
- Visual and Performing Arts; Creativity and Innovation

## **21st Century/Interdisciplinary Themes**

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Connection to Engineering Design: Defining and Delimiting Engineering Problems

Have students work with a partner to design a doorbell for people who have lost their hearing.

Connection to Earth and Space Science: Information Processing

Have students work in groups and use books or the internet to find two different animals that use sound to communicate. Students can then make a poster and share their findings with the class.

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

## **21st Century Skills**

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Collaboration (Build on Prior Knowledge, Think, Pair, Share, Small Groups)

Claims, Evidence, and Reasoning

People in Science & Engineering (Ludwig van Beethoven)

Careers in Science & Engineering (Sound Engineer)

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

## **Differentiation**

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Lesson vocabulary (sound, vibrate, volume, pitch)

Leveled Readers (On Level, Extra Support, Enrichment)

Reinforce Vocabulary- Help students connect the word vibrate to real-life experiences by inviting them to place their hand on a vibrating phone or think about what it feels like to touch a purring cat.

RTI/Extra Support- Provide additional opportunities for hands-on discovery using musical instruments.

Extension- Research how the human ear detects the vibrations that make sound.

ELL- Provide hands-on examples of important concepts such as volume, pitch, sound, and vibration.

(ELL support resources include a glossary in English and Level Readers in Spanish and English)

**Differentiations:**

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

**Hi-Prep Differentiations:**

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments

- Tiered products
- Varying organizers for instructions

#### **Lo-Prep Differentiations**

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

## **Intervention Strategies**

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- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

## **Special Education Learning**

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- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

## **English Language Learning**

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- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments

- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

## Sample Lesson

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Unit Name: Sound

NGSS: 1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate

Interdisciplinary Connection: English Language Arts (students will participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups)

Statement of Objective: SWDAT investigate to answer a question about the nature of sound and explore the relationship between sound and vibration by performing simple tests to support or refute their ideas

Anticipatory Set/Do Now: Play Lesson Video to see how placing the water over the speaker can make the water move. Ask students to record their initial thoughts about what is making the water move.

Learning Activity: Students will work in pairs to describe sounds they are familiar with. Ask students, "How do you think these different sounds might make water move in different ways?" Read aloud pages 43-45, ask guided questions.

Student Assessment/CFU's: Ask students to look at each picture and identify what is making the sound and what happens as a result of that sound. Complete "Apply What You Know" in Evidence Notebook.

Materials: Lesson video, laptop, SMART TV, text book

21st Century Themes and Skills: Collaboration, Communication, Critical Thinking and Problem Solving

Differentiation/Modifications: Lesson video, visuals, small group discussions, online glossary to define lesson vocabulary (sound, vibrate)

Integration of Technology: Lesson video

