Unit 3: Sound, Waves & Communication

Content Area: **Science**
Course(s):
Time Period: **March**
Length: **Trimester 3**
Status: **Published**

Unit Overview

In this unit, students investigate the science of sound. Students construct physical devices to feel the vibrations that allow us to communicate across distances. Students also use digital devices to visualize the characteristics of different sound waves that cause us to hear different things

Priority Standards

SCI.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
SCI.3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
SCI.4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
SCI.4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.

Essential Questions

Lesson 1: Pattern Transfer & Technology

How do you send a secret code?

Lesson 2: Sound, Vibration & Engineering

How far can a whisper travel?

Lesson 3: Sound & Vibrations

What would happen if you screamed in outer space?

Lesson 4: Sound Waves & Wavelength

Why are some sounds high and some sounds low?

Performance Task: Sound Waves & Engineering?

How can you make sound waves visible?

Unit Learning Targets

Lesson 1: Pattern Transfer & Technology

I can explain how digital devices encode complex information so that it can be transferred over long distances.

Lesson 2: Sound, Vibration & Engineering

I can design a telephone to model waves and describe patterns in wavelength and amplitude.

Lesson 3: Sound & Vibrations

I can explain how air enables sound vibrate and travel.

Lesson 4: Sound Waves & Wavelength

I can reason why some sounds a higher or lower based on their characteristics of their wave.

Performance Task: Sound Waves & Engineering?

I design a device to make sound waves visible/

Unit Assessments

Lesson 1: Pattern Transfer & Technology

-No Assessment Listed; Just Lab Activity-

Snack Decoder Worksheet: Mystery Science Document #25575

Sound Code Worksheet: Mystery Science Document #25577

Visual Code Worksheet: Mystery Science Document #25576

Engineering Materials: Crayons, Paper, Flashlights, Musical Instruments

Lesson 2: Sound, Vibration & Engineering

Exit Ticket: Mystery Science Document #456

Answer Key: Mystery Science Document #246

Lesson 3: Sound & Vibrations

Exit Ticket: Mystery Science Document #250

Answer Key: Mystery Science Document #251

Lesson 4: Sound Waves & Wavelength

Exit Ticket: Mystery Science Document #492

Answer Key: Mystery Science Document #258

Performance Task: Sound Waves & Engineering

My Sound Wave Watcher: Mystery Science Document #594

My Sound Wave Watcher Rubric: Mystery Science Document #595

Unit 3: Sound, Waves & Communication

Summative Assessment: Mystery Science Document #2304

Answer Key: Mystery Science Document #2305

Mystery Science Google Forms Assessments:

Google Form Versions of Mystery Science Assessments

Materials & Resources for Labs/Activities

Anchor Phenomenon: Sound Waves & Conceptual Modeling

1. Seeing Sound Worksheet: Mystery Science Document #581
2. See-Think-Wonder Waves of Sound Worksheet: Mystery Science Document #616
3. Waves of Sound Teacher Guide: Mystery Science Document #617

Lesson 1: Pattern Transfer & Technology

1. Snack Decoder Worksheet: Mystery Science Document #25575
2. Sound Code Worksheet: Mystery Science Document #25577
3. Visual Code Worksheet: Mystery Science Document #25576
4. Crayons
5. Paper
6. Flashlights
7. Musical Instruments

Lesson 2: Sound, Vibration & Engineering

1. Paper Cup Telephone: Mystery Science Document #149
2. Paper Cup Telephone Answer Key: Mystery Science Document #167
3. Paper Cup Telephone Teach Tips: Mystery Science Document #178
4. Pencils
5. Coated Paper Clips
6. 8oz Paper Cups
7. String
8. Construction Paper
9. Different sized cups
10. Yarn
11. Ribbon
12. Dental Floss

Lesson 3: Sound & Vibrations

1. Sound Blobs Printout: Mystery Science Document #273
2. Scotch Tape
3. Balloons
4. Small Binder Clips

Lesson 4: Sound Waves & Wavelength

1. Be The Vibration Worksheet: Mystery Science Document #354
2. Be The Vibration Answer Key: Mystery Science Document #358
3. Sound Vibrations: Mystery Science Document #322
4. Sound Vibrations Answer Key: Mystery Science Document #417
5. Rope, Clothesline or Jump Rope

Performance Task: Sound Waves & Engineering

Possible Sound Detectors

-Cling Wrap

-Sand, Glitter or Pepper

-Construction Paper

-Water

Construction & Multipurpose Materials

-Tape or Stickers

-Paper Clips or Binder Clips or Clothespins

-Pipe Cleaners

-Plastic Cups

-String

Sound Markers

-Pencils

-Musical Instruments

-Musical Instruments

Additional Materials

-Scissors

-Paper Pouch

Worksheets

-My Sound Wave Watcher: Mystery Science Document #594

-My Sound Wave Watcher Rubric: Mystery Science Document #595

Unit 3: Sound, Waves & Communication

Summative Assessment: Mystery Science Document #2304

Answer Key: Mystery Science Document #2305

Mystery Science Google Forms Assessments:

Google Form Versions of Mystery Science Assessments

Learning Plan (Skills & Activities)

TIME	Lesson	Priority Standard
		3-5-ETS1-2: ***Generate and compare multiple possible solution to a problem based on how well each is likely to meet the crite and constraints of the problem.***
Week 1	Anchor Phenomenon: Sounds Waves & Conceptual Modeling	**3-5-ETS1-3:** ***Plan and carry out fair tests in which variables ar controlled and failure points are considered to identify aspect of a model or prototype that can be improved.***
		4-PS4-1: ***Develop a model of waves to describe patterns in ter of amplitude and wavelength and that waves can cause objec to move.***
		4-PS4-3: ***Generate and compare multiple solutions that use patterns to transfer information.***
Week 2	Lesson 1: Pattern Transfer & Technology	• **4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns of Earth's features.***

Weeks 3 & 4	Lesson 2: Sound, Vibration & Engineering	• **4-ESS1-1**: ***Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for chang in a landscape over time.***

Week 5	Lesson 3: Sound & Vibrations	**• 4-ESS2-1:** ***Make observations and/or measurements to provi evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation***
Week 6:	Lesson 4: Sound Waves & Wavelength	**• 4-ESS1-1**: ***Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for chang in a landscape over time.***

		<u>4-ESS3-2:</u> ***Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.***
Week 7	Unit Review & Summative Assessment	**<u>3-5-ETS1-2:</u>** ***Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the crite and constraints of the problem.***

Week 8	Performance Task: Sound Waves & Engineering	• **4-ESS1-1**: ***Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for chang in a landscape over time.*** • **4-ESS2-1:** ***Make observations and/or measurements to provi evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation*** • **4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns of Earth's features.*** **4-ESS3-2:** ***Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*** **3-5-ETS1-2:** ***Generate and compare multiple possible solution to a problem based on how well each is likely to meet the crite and constraints of the problem.***

Strategies for Multi-Language Learners

- Breaking down the task
- Dictionaries in First Language
- Individual and small group instruction
- Loaded vocabulary and previewing text
- Meaningful real life connections
- Modeling
- Repeated Practice
- Step-by-step prompts
- Think Aloud
- Warm Up Activities
- Clarify directions
- Reading questions/passages aloud

Strategies For Students Needing Intervention

- Additional time on assignments
- Review of directions
- Review sessions
- Provide notes

- Support auditory presentation with visuals
- Work in progress check
- Tiered assessment
- Choice of test format (multiple-choice, essay, true-false)
- Read directions to student
- Highlight directions and key words
- Provide opportunities for cooperative partner work
- Choice boards
- Graphic organizers
- Flexible groupings
- Visuals Aids
- Small group instruction
- Word banks
- Extra time

Strategies for Enrichment

- Higher-level cooperative learning activities
- Provide higher-order questioning and discussion opportunities
- Tiered assessments
- Provide texts at higher reading level
- Extension activities
- Choice boards
- Mystery Science Mini Lessons

Technology Integration

- Higher-level cooperative learning activities
- Provide higher-order questioning and discussion opportunities
- Tiered assessments
- Provide texts at higher reading level

- Extension activities

Interdisciplinary Connections

LA.W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
LA.W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
LA.RL.4.1	Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
MA.4.G.A	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
MA.4.MD.A	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
MA.4.MD.B	Represent and interpret data.
MA.4.NF.B	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
MA.4.OA.A	Use the four operations with whole numbers to solve problems.

21st century Life & Career Ready Practices

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.