GRADE 4– Unit 3: Sound, Waves, & Communication

Mission Statement
The primary goal of the Swedesboro-Woolwich School District is to prepare each student with the real life skills needed to compete in a highly competitive global economy. This will be achieved by providing a comprehensive curriculum, the integration of technology, and the professional services of a competent and dedicated faculty, administration, and support staff. Guiding this mission will be Federal mandates, including No Child Left Behind, the New Jersey Core Curriculum Content Standards, and local initiatives addressing the individual needs of our students as determined by the Board of Education. The diverse resources of the school district, which includes a caring PTO and active adult community, contribute to a quality school system. They serve an integral role in supporting positive learning experiences that motivate, challenge and inspire children to learn.

Unit/Module 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.

Standards Covered in Current Unit/Module
Related Standards and Learning Goals

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.

Learning Goals

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 to vibrate and travel.

Lesson 4: Sound Waves & Wavelength

I can reason why some sounds are 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/Module Weekly Learning Activities and Pacing Guide			
Topic & # Days	**NJ Standards**	**Critical Knowledge & Skills**	**Possible Resources & Activities**
Week 1: Anchor Phenomenon: Sounds Waves & Conceptual Modeling	**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.*** **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.*** **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.*** **4-PS4-3:** ***Generate and compare multiple solutions that use patterns to transfer information.***	**Obj. We are learning to**: ● I can explain how devices make sound waves visible. **Suggested Formative Assessment(s)**: ●	**Curriculum**: Mystery Science **Day 1:** -Introduction Slides -Class Discussion -Complete See-Think-Wonder Worksheet **Day 2:** -Review Slides -Complete Seeing Sound Worksheet -Class Discussion **Material**: 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
Week 2: Lesson 1:	4-ESS2-2: *Analyze and interpret data from maps to*	**Obj. We are learning to**: ● I can explain how digital devices encode	**Curriculum**: Mystery Science **Day 1:**

Pattern Transfer & Technology	*describe patterns of Earth's features.*	complex information so that it can be transferred over long distances. **Suggested Formative Assessment(s)**: -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	-Introduction Video -Vocabulary Slides -Class Discussion **Days 2 & 3:** -Review Introduction / Vocabulary -Lab / Hands-on Activity **Day 4:** -Finish Video -Wrap up Discussions **Day 5:** -Assessment **Material**: 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
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 changes in a landscape over time.*	**Obj. We are learning to**: ● I can design a telephone to model waves and describe patterns in wavelength and amplitude. **Suggested Formative Assessment(s)**: Exit Ticket: Mystery Science Document #456 Answer Key: Mystery Science Document #246	**Curriculum**: Mystery Science **Day 1:** -Introduction Video -Vocabulary Slides -Class Discussion **Days 2 & 3:** -Review Introduction / Vocabulary -Lab / Hands-on Activity **Day 4:** -Finish Video -Wrap up Discussions

			Day 5: -Assessment **Material**: 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
Week 5: Lesson 3: Sound & Vibrations	4-ESS2-1: *Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation*	**Obj. We are learning to**: ● I can explain how air enables sound to vibrate and travel. **Suggested Formative Assessment(s)**: Exit Ticket: Mystery Science Document #250 Answer Key: Mystery Science Document #251	**Curriculum**: Mystery Science **Day 1:** -Introduction Video -Vocabulary Slides -Class Discussion **Days 2 & 3:** -Review Introduction / Vocabulary -Lab / Hands-on Activity **Day 4:** -Finish Video -Wrap up Discussions **Day 5:** -Assessment **Material**: 1. Sound Blobs Printout: Mystery Science

			Document #273 2. Scotch Tape 3. Balloons 4. Small Binder Clips
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 changes in a landscape over time.*	**Obj. We are learning to**: ● I can reason why some sounds a higher or lower based on their characteristics of their wave **Suggested Formative Assessment(s)**: Exit Ticket: Mystery Science Document #492 Answer Key: Mystery Science Document #258	**Curriculum**: Mystery Science **Day 1:** -Introduction Video -Vocabulary Slides -Class Discussion **Days 2 & 3:** -Review Introduction / Vocabulary -Lab / Hands-on Activity **Day 4:** -Finish Video -Wrap up Discussions **Day 5:** -Assessment **Material**: 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
Week 7: Unit Review & Summative Assessment	**4-ESS3-2:** ***Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*** **3-5-ETS1-2:** ***Generate and***	**Obj. We are learning to**: ● I can explain how devices make sound waves visible. ● I can explain how digital devices encode complex information so that it can be transferred over long distances.	**Curriculum**: Mystery Science **Day 1:** -Introduction Video -Vocabulary Slides -Class Discussion **Days 2 & 3:**

	compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• I can design a telephone to model waves and describe patterns in wavelength and amplitude. • I can explain how air enables sound to vibrate and travel. • I can reason why some sounds a higher or lower based on their characteristics of their wave **Suggested Formative Assessment(s)**: Summative Assessment: Mystery Science Document #2304 Answer Key: Mystery Science Document #2305	-Review Introduction / Vocabulary -Lab / Hands-on Activity **Day 4:** -Finish Video -Wrap up Discussions **Day 5:** -Assessment **Material**: Summative Assessment: Mystery Science Document #2304 Answer Key: Mystery Science Document #2305
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 changes in a landscape over time.* • 4-ESS2-1: *Make observations and/or measurements to provide 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***	**Obj. We are learning to**: • In the Performance Task, students will design and build a device that uses the vibrations of sound to make visible patterns. **Suggested Formative Assessment(s)**: My Sound Wave Watcher: Mystery Science Document #594 My Sound Wave Watcher Rubric: Mystery Science Document #595	**Curriculum**: Mystery Science **Day 1-2:** -Review Units **Days 3-4:** -Summative Assessment **Material**: 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

	compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.		-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

Google Form Versions of Mystery Science Assessments

Link to Additional Components including Cross Curricular Connections, Accommodations, Assessments, Etc
ELA Enduring Understanding Statements