Louisiana Believes

Distance Learning Support for OpenSciEd Grade 6
Unit 8.2 Sound Waves

This resource is designed to support teachers in implementing distance learning for OpenSciEd Grade 6 Unit 8.2 Sound Waves, Unit 3 on the Louisiana Guide to Piloting OpenSciEd Grade 6. It is intended as a supporting document and should be used in conjunction with the OpenSciEd Unit 8.2 Instructional Resources. The resources contained in this document have been adapted from OpenSciEd with permission under Creative Commons 4.0 licensing.

The OpenSciEd Remote Learning Resources linked below contain detailed information about adapting specific routines to a remote learning environment and a wide variety of options including those for students who do not have internet access:

- Fostering Productive Norms
- Anchor Phenomenon Routine
- Navigation Routine
- Supporting Discourse
- Problematizing Routine

This guidance document is considered a "living" document as we believe that teachers and other educators will find ways to improve the document as they use it. Please send feedback to STEM@la.gov so that we may use your input when updating this guide.

Updated September 16th, 2020

DEPARTMENT of EDUCATION
Louisiana Believes

Norming Language	
Term	**Description**
Virtual Class Pre-Work	Assignments that students should do prior to virtual class meetings in order to be prepared to engage in discussions, there may be multiple assignments throughout a given lesson
Virtual Class Post-Work	Assignments designed for students to apply learning from virtual class meetings, there may be multiple assignments throughout a given lesson
Virtual Class	Live sessions with students through any digital conferencing platform, teachers may choose to allow students without internet to call in during these sessions and record virtual class sessions to share with those who cannot join
Thinking Deeper Documents	Progress trackers for students to use throughout each lesson to record and revise their thinking about science concepts related to the phenomenon; contain assignments for students to complete before, during, and after virtual classes, discussion boards, and home investigations
Lesson Slideshows	Lesson progression specific to each lesson used to guide student work; used during pre-work, post-work, virtual classes, home investigations, and discussion boards; can be shared with students in their entirety at the beginning of the lesson or broken into small portions and shared as needed
Discussion Boards	Assignments designed for students to share ideas and engage in discussion with one another over time rather than a live environment; students will use their Thinking Deeper Documents to brainstorm prior to submitting; teachers may choose to allow students without internet to text in responses and may screenshot/download and share portions of or full discussions via text (ex. through apps like Remind)
Home Investigations	Investigations with readily available materials designed for students to perform at home; teachers may choose to substitute videos or photos of data collection for students who cannot complete investigations at home

Lesson Set Overview: Lessons 1, 2, 3, 4, 5, 6

Lesson Set 1: Lessons 1-6		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for **each** lesson: L1, L2, L3, L4, L5, L6 Thinking Deeper Documents for **each** lesson: Lesson 1 TDD, Lesson 2 TDD, Lesson 3 TDD, Lesson 4 TDD, Lesson 5 TDD, Lesson 6 TDD Additional Documents: Lesson 2: Reference Peer Feedback Guidelines Lesson 6 Assessment	• Teacher Made Discussion Boards - Lessons 1 (2), 2, 5 • Driving Question Board - Lessons 1 & 6 • Consensus Model - Lessons 1, 2, 6 • Teacher Made Video of How the Motion Detector Works - Lesson 4	**Prior to Lesson**: • Anchor Phenomenon Video - Lesson 1 • Turn it Up Simulation Data and Stick Apparatus Data - Lesson 3 **After Lesson Completion:** • Virtual Class recordings - Lessons 1, 2, 3, 4, 6 • Discussion Boards - Lessons 1, 2, 5 • Driving Question Board - Lessons 1, 6 • Consensus Models: Lessons 1, 2, 6
Students should ideally join VIRTUAL CLASS on the following days: Day 2- Lesson 1 Day 5 - Lesson 2 Day 7- Lesson 3 Day 9 - Lesson 4 Day 12 - Lesson 6		
Formative and Summative Assessment Opportunities: Lesson 1: Anchor Phenomenon Initial Model Lesson 2: Individual Instrument Model Lesson 3: CER on “Thinking Deeper” document Lesson 5: Independent Activity on “Thinking Deeper” document Lesson 6: Lesson 6 Assessment		

Lesson Set Overview: Lessons 7, 8, 9, 10, 11

Lesson Set 2: Lessons 7-11		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for **each** lesson: L7, L8, L9, L10, L11 Thinking Deeper Documents for **each** lesson: Lesson 7 TDD, Lesson 8 TDD, Lesson 9 TDD, Lesson 10 TDD, Lesson 11 TDD Additional Documents: Lesson 11: Lesson 2: Reference Peer Feedback Guidelines	• Teacher Made Discussion Boards - Lessons 8 • Driving Question Board - Lesson 10 • Consensus Model - Lessons 7, 11 • Teacher Made Assignments: o L7 - Claim and Evidence Assignment o L8 - Exit Ticket (optional) • Additional Materials: o L7 - Student Initial Models - *Lesson 1 TDD or shared document where student models were displayed in Lesson 1* o L7 - Shared document for models with claims - *teacher made* o L11 - Thinking Deeper Documents from previous lessons	**Prior to Lesson**: • Investigation 1 Video, Investigation 2 Video - Lesson 7 • Vacuum Chamber Video, Rocks Under Water Video - Lesson 8 • Visualizing Sound in a Medium Simulation, Anchor Phenomenon Video - Lesson 10 • New Phenomenon Link - Lesson 11 **After Lesson Completion:** • Virtual Class Recordings - Lessons: 9, 10, 11 • Discussion Boards - Lesson 8
Students should ideally join VIRTUAL CLASS on the following days: Day 3 - Lesson 9 Day 5 - Lesson 10 Day 7 -Lesson 11		
Formative and Summative Assessment Opportunities: Lesson 7: Claim and Evidence Assignment Lesson 8: Progress Tracker Discussion Board & Exit Ticket (on TDD, option to create separate assignment) Lesson 11: Revising Our Initial Models: Lesson 11 Rubric		

Lesson Set Overview: Lessons 12, 13, 14

Lesson Set 3: Lessons 12-14		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for **each** lesson: L12, L13, L14 Thinking Deeper Documents for **each** lesson: Lesson 12 TDD, Lesson 13 TDD, Lesson 14 TDD Additional Documents: Lesson 12: Optional Reading: Hearing in Elephants, Dogs, and Humans Lesson 13: Lesson 13 Assessment Lesson 14: Lesson 14 Assessment	• Teacher Made Discussion Boards: Lesson 12, 14 • Consensus Model: Lesson 12 • Driving Question Board: Lessons 12, 14 *(editable and shareable for students)*	**Prior to Lesson**: Lesson 12: • Exam Video • Videos of animations linked in the "Information from Experts" reading o Sound in the Ear Animation o Cochlear Animation o Hair Cell o Damaged Steriocolia Lesson 13: Investigation Videos: • Set-Up Video to 0:30 • Investigation Videos: Frequency Investigation, Amplitude Investigation • Lesson 13 Assessment: Video Link **After Lesson Completion:** • Discussion Board - Lesson 12 & 14 • Virtual Class Recording - Lesson 13 & 14 • Updated Driving Question Board - Lesson 14
Students should ideally join VIRTUAL CLASS on the following days: Day 3 - Lesson 13 Day 4 - Lesson 14		
Formative and Summative Assessment Opportunities: Lesson 12: Summary Discussion Board Lesson 13: Lesson 13 Assessment Lesson 14: Lesson 14 Assessment		

Lesson 1 (3 days) - Anchoring Phenomenon

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Discussion Board: Notices/Wonders - *teacher made*
- Discussion Board: Related Phenomenon - *teacher made*
- Driving Question Board - *teacher made*
- Consensus Model - *teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Anchor Phenomenon Video
- Virtual Class Recording - *after completion*
- Driving Question Board - *after completion*
- Discussion Boards on Notices/Wonders and Related Phenomenon - *after completion*
- Consensus Model - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 1 (3 days) - Anchoring Phenomenon

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (8 min) MAKE OBSERVATIONS OF A VIDEO OF A TRUCK PLAYING LOUD MUSIC Slides A, B	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students 3. Create a Notice/Wonder Discussion Board for students to submit a notice and a wonder. (This can be a shared document or discussion thread that the teacher later organizes into a chart. This is designed to begin building a class record of observations.)	VIRTUAL CLASS PRE-WORK/DISCUSSION BOARD" 1. Watch the video 2. Complete the Notice/Wonder Chart on Thinking Deeper document 3. Submit one Notice and one Wonder on the Discussion Board
Part 2 (7 min) BUILD CLASS RECORD OF OBSERVATIONS OF VIDEO OF TRUCK SPEAKER AND WINDOW Slide C		VIRTUAL CLASS PRE-WORK: 1. Read over notices and wonders. 2. Answer anchor reflection questions on the Thinking Deeper document.
Part 3 (15 min) MAKE OBSERVATIONS OF SPEAKER MAKING SOUNDS Slides D, E, F	NOTE: The teacher can continue to use the same shared document or discussion thread here or may choose to use a new one and combine information from both to share with students.	VIRTUAL CLASS PRE-WORK/DISCUSSION BOARD: 1. Complete the reflection questions about the set-up in the photo and compare it to the scenario in the anchor video. 2. Watch a video of a speaker and record notices and wonders in the chart. 3. Submit notices and wonders on the Discussion Board.

Part 4 (15 min) MAKE INITIAL MODELS OF HOW THE SPEAKER MAKES THE WINDOW MOVE Slide F	1. Create a document for comparing initial model similarities and differences using a platform of choice (shared slideshow or google doc, etc.) NOTE: Teachers may need to provide students with instructions or a short video of how to screenshot, copy, and paste models into a new document. The teacher may also offer students the option of drawing on paper and taking a photo. 2. Make sure the document with student models is available to share for the Virtual Class meeting.	VIRTUAL CLASS PRE-WORK: 1. Develop an initial model to explain, "Why would a sound coming from one thing make another thing far away move?" on the Thinking Deeper document. 2. Screenshot/take a photo of the model and submit.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 5-8 (45 min) SHARE AND COMPARE MODELS OF HOW THE SPEAKER MAKES THE WINDOW MOVE BUILD INITIAL CLASS CONSENSUS MODEL OF HOW THE SPEAKER MAKES THE WINDOW MOVE BRAINSTORM RELATED SOUND PHENOMENA DEVELOP INITIAL SOUND-RELATED QUESTIONS Slides G-L	Prior to the Virtual Class, the teacher should: 1. Have the document with student models available to share. VIRTUAL CLASS: 1. Share student models in a virtual "gallery walk" and students record similarities and differences between them in the chart on their TDD. 2. Share and discuss the similarities and differences in the student models. 3. Create a class consensus model. (The teacher can do this on a poster or share their screen and use an electronic platform. Be sure that students have access to this model when it is complete.) 4. Students brainstorm related phenomena independently using the space on the Thinking Deeper document. 5. Share and discuss related phenomena. 6. Students record questions they still have. 7. Begin building the Driving Questions Board (using Jamboard, Pinup, etc.). Have students share questions.	

Day 3		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 9 (7 min) DISCUSS QUESTIONS TO POST ON DRIVING QUESTION BOARD Slides M		VIRTUAL POST-WORK: 1. Revise two of the questions that you wrote using the questions stems provided and record them on the TDD.
Part 10 (23 min) POST QUESTIONS TO DRIVING QUESTION BOARD Slide N	1. Create a Discussion Board assignment for students to submit revised questions and their investigation ideas in the next section. 2. Add student questions to the DQB and make sure they have access after it is updated.	DISCUSSION BOARD: 1. Submit the two, revised questions to the teacher in the Driving Question Board assignment .
Part 11 (10 min) BRAINSTORM IDEAS FOR INVESTIGATING OUR QUESTIONS Slides O		DISCUSSION BOARD: 1. Record other Ideas for Investigations on the Thinking Deeper document. 2. Submit an idea on the Discussion Board.
Part 12 (5 min) NAVIGATION Slides P		VIRTUAL CLASS POST-WORK: 1. Reflect on questions posted on the Driving Question Board.

Return to Lesson Set Overview

Lesson 2 (2 days) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 2: Reference Peer Feedback Guidelines
- Patterns Discussion Board - *teacher made*
- Consensus Model - *after completion*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 2: Reference Peer Feedback Guidelines
- Patterns Discussion Board - *teacher made*
- Consensus Model - *after completion*
- Virtual Class Recording - *after completion*
- Discussion Board - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 2 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (3 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students.	VIRTUAL CLASS PRE-WORK: 1. Answer navigation questions about sound sources and what they might look like close up.
Part 2 (20 min) OBSERVE INSTRUMENTS AND A SPEAKER Slides B-D		HOME INVESTIGATION: 1. Students choose a sound source in their home or make an instrument from found objects to observe. 2. Record observations in the first row of the table on the TDD.
Part 3 (10 min) OBSERVE SLOW-MOTION SPEAKER AND INSTRUMENTS Slides E-H		VIRTUAL CLASS PRE-WORK: 1. Make observations of slow-motion videos of speakers and instruments (speakers, drum, guitar, and tuning fork) in the table.
Part 4 (10 min) ANALYZING OUR INSTRUMENT AND SPEAKER DATA Slides H, I		DISCUSSION BOARD: 1. Analyze the data from the instrument and slow-motion videos to identify patterns in observations. 2. Share a summary of the patterns on the Discussion Board. 3. Read and respond to other student submissions.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 5-8 (40 min) CO-CONSTRUCTING A CONSENSUS MODEL OF AN INSTRUMENT MAKING SOUND APPLY INSTRUMENT MODEL INDIVIDUALLY GIVE AND RECEIVE FEEDBACK ON THEIR INSTRUMENT MODEL ADD TO PROGRESS TRACKER Slides J-M	VIRTUAL CLASS: 1. Co-construct the class consensus model (this can be done on a digital platform or on a poster, but students will need access after completion) 2. Work individually to model what is happening when a different instrument vibrates and makes sound on the Thinking Deeper document. 3. Share the Lesson 2: Reference Peer Feedback Guidelines with students 4. Share their models with a partner and give and receive feedback in assigned Break Out Rooms. 5. Summarize what we have figured out is happening when an instrument makes sounds and add it to our Progress Tracker on the Thinking Deeper document. NOTE: Students will be asked to use the CER strategy in independent pre-work before the next Virtual Class meeting. Teacher may choose to provide some guidance for that assignment prior to concluding the virtual class.	
Part 9 (8 min) APPLY MODEL TO OTHER OBJECTS AND NAVIGATION Slide N		VIRTUAL CLASS POST-WORK: 1. Reflect on and answer questions on Thinking Deeper document 2. Complete reading activity “How Do Insects Make Sounds”

Return to Lesson Set Overview

Lesson 3 (2 days) - Problematizing, Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Rock Dropping on the Table video clip
- Laser Investigation or teacher-made video
- Virtual Class Recording - *after completion*
- Turn it Up Simulation Data and Stick Apparatus Data

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 3 (2 days) - Problematizing, Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (20 min) NAVIGATION AND PLAN INVESTIGATION TO SEE IF OTHER OBJECTS VIBRATE WHEN THEY MAKE SOUND Slides A, B, C, D	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper document with students.	VIRTUAL CLASS PRE-WORK: 1. Reflect on the last question from the Thinking Deeper document in Lesson 2 2. Reflect on the Rock Dropping on the Table video clip and the questions. 3. Examine the list of materials in the Laser Beam Set up and explain how they could be used. 4. Predict Possible Outcomes on Part 1 of the Thinking Deeper document.
Part 2 (15 min) GATHER DATA USING THE LASER AND THE MIRROR Slide E	Option to have students make observations directly from the video for setting up the investigation (Laser Investigation) or for the teacher to record their own and insert the link into the slideshow. Note that the set-up video only contains the drum and a broom hitting the table as examples.	VIRTUAL CLASS PRE-WORK: 1. Make observations of how the surfaces of two objects, a drum and a table, move when different forces are applied and sounds are made. 2. Record observations on Part 2 of the Thinking Deeper document.
Part 3 (10 min) ARGUE FROM EVIDENCE ABOUT THE MOVEMENT OF OBJECTS WHEN MAKING SOUNDS Slide F & Optional Slide F.2	Since students will be using the CER strategy independently, optional Slide F.2 is provided to offer extra support if needed.	VIRTUAL CLASS PRE-WORK: 1. Use CER strategy to argue from evidence about the movement of objects when making sounds on the Thinking Deeper document.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 4-7 (45 min) BUILDING UNDERSTANDINGS DISCUSSION ABOUT HOW OBJECTS MOVE WHEN MAKING SOUNDS GATHERING DATA AND DESCRIBING PATTERNS USING THE LASER-MIRROR APPARATUS WRITE TO ARGUE FROM EVIDENCE ABOUT THE CONNECTION AMONG FORCE, VIBRATION, AND LOUDNESS BUILDING UNDERSTANDING DISCUSSION ABOUT DIFFERENT SOUND VIBRATIONS Slides G-M	VIRTUAL CLASS: 1. Share laser-mirror evidence and reasoning in a whole-class discussion about how all objects move when making sounds. 2. Discuss (whole group or with an assigned partner in a Break-out Room) patterns noticed in the laser-mirror device and record these observations to the Thinking Deeper document, 3. Make a prediction (independently or with an assigned partner in a Break-out Room) about how you think the laser dot will move for different sounds. 4. Record Observations from the Feel The Sound Simulation on Part 2 of the Thinking Deeper document. 5. Use CER strategy to argue from evidence about the connection among force, vibration, and loudness. 6. Develop an understanding about different sound vibrations through whole group discussion. 7. Assign Home Learning - explain what students will need to do.	
HOME LEARNING Slide N		VIRTUAL CLASS POST-WORK: 1. Reading Activity on the Thinking Deeper Document.

Return to Lesson Set Overview

Lesson 4 (2 days) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Video of How the Motion Detector Works - *teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Video of How the Motion Detector Works - *teacher made*
- Virtual Class Recording - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 4 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (7 min) PROGRESS TRACKER AND NAVIGATION Slides A, B	1. Record a video demonstrating how the motion detector works and what the graph looks like when someone moves away from it. The teacher may want to point out features of the graph like the axes and what they represent to prepare students for making predictions later - Link video in the slideshow 2. Share Lesson Slideshow with students. 3. Share Thinking Deeper Document with students.	VIRTUAL CLASS PRE-WORK: 1. Complete the right column on Progress Tracker on the Thinking Deeper document. 2. Answer the Navigation Reflection question on the Thinking Deeper document.
Part 2 (8 min) FAMILIARIZE STUDENTS WITH THE MOTION DETECTOR Slide C, D		VIRTUAL CLASS PRE-WORK: 1. Observe the images of the motion detector set-up and stick apparatus set-up as well as the video demonstration.
Part 3 (5 min) INTRODUCE THE STICK APPARATUS Slides D, E		VIRTUAL CLASS PRE-WORK: 1. Answer the reflection questions about the stick and motion detector apparatus in the Thinking Deeper Document.

Part 4 (20min) MAKE PREDICTIONS AND GATHER DATA Slide F, G, H, I	NOTE: Students will make predictions here and gather data in the Virtual Class meeting. 1. Create an assignment for students to summarize their predictions about how the graphs will be different for each condition or have them submit their Thinking Deeper Documents. 2. The teacher should review student submissions prior to the Virtual Class in order to address misconceptions about what the graph represents.	VIRTUAL CLASS PRE-WORK: 1. Predict what the motion graphs will look like for each of three conditions: stick at rest, stick pushed lightly, and stick pushed harder. 2. Submit to the teacher.

<table>
<tr><th colspan="3">Day 2</th></tr>
<tr><th rowspan="2">Lesson Components</th><th colspan="2">Distance Learning Plan</th></tr>
<tr><th>Teacher</th><th>Student</th></tr>
<tr><td>Part 4-6 (40 min)

RECORD OBSERVATIONS OF GRAPH PATTERNS

BUILDING UNDERSTANDINGS DISCUSSION ABOUT AMPLITUDE AND FREQUENCY

Slides J-M</td><td colspan="2">VIRTUAL CLASS:
1. Address any misconceptions of the graphs based on students' predictions. The teacher may choose to have students revise their predictions if time allows or wait until after the actual data is displayed to discuss differences.
2. Display data for each of these conditions and have students sketch the graphs using a solid line for each of the three conditions. Discuss differences between predictions and actual graphs.
3. Have students explore the Turn it Up Simulation on their own then demonstrate softer and louder noises for the class. Students should sketch the graphs on their Thinking Deeper Documents. (They will need to insert a drawing in the space provided.)
4. Analyze the data collected from the graphs of soft push/hard push for the stick apparatus and soft/loud sound from the speaker simulation and discuss.
5. Define amplitude and frequency and come back to the stick apparatus data to demonstrate understanding of those concepts.
6. Students answer questions about the relationship between amplitude and sound on their TDD then share out.
7. Discuss connections to the lesson question. Students make notes on their TDD.</td></tr>
<tr><td>Part 7 (5 min)
ADDING TO THE PROGRESS TRACKER
Slides N</td><td></td><td>VIRTUAL CLASS POST-WORK:
1. Complete the Progress Tracker on the Thinking Deeper document.</td></tr>
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Part 8 (5 min) EVALUATE THE STICK APPARATUS Slide O		VIRTUAL CLASS POST-WORK: 1. Explain your thinking about the limitations of the stick apparatus as a tool for representing a sound maker.
Part 9 (15 min) NAVIGATION Slides P, Q		VIRTUAL CLASS POST-WORK: 1. Consider other differences in sound and how those could be investigated with our motion detector and reflect on the Thinking Deeper document. 2. Examine a transparent music box to inspire changes to our stick apparatus and reflect on the Thinking Deeper document.

Return to Lesson Set Overview

Lesson 5 (1 day) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Navigation Discussion Board - *teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Analyze Frequency Graphs
- Navigation Discussion Board - *teacher made*
- Discussion Board - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- None

Lesson 5 (1 day) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (3 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students 3. Create and assign the Navigation Discussion Board.	DISCUSSION BOARD: 1. Record what you figured out about how the sound source (transparent music box) produced different pitches on the Discussion Board.
Part 2 (12 min) GATHER DATA FROM STICKS OF DIFFERENT LENGTHS Slide B-E		VIRTUAL CLASS PRE-WORK: 1. Predict what the motion graphs will look like for a shorter stick and a longer stick. 2. Gather data for each of these conditions using the Hitting the High Notes Simulation and sketch the graphs. 3. Compare that data to graphs of the motion a speaker makes for higher-pitch and lower-pitch sounds.
Part 3 (10 min) ANALYZE PATTERNS FROM STICK AND SPEAKER DATA Slide F		VIRTUAL CLASS PRE-WORK: 1. Analyze data to identify patterns in the stick and speaker data.

Part 4 (10 min) BUILDING UNDERSTANDINGS DISCUSSION ABOUT FREQUENCY AND PITCH Slides G, H	1. Create and assign a discussion board for students to share their ideas about the relationship between pitch and frequency and how that helps to answer the original question about the truck. 2. Review student responses and facilitate discussion. Provide individual feedback as needed.	DISCUSSION BOARD: 1. Describe ideas about frequency and pitch based on observed patterns and relate those ideas back to the original lesson question on the discussion board. 2. Read and respond to other student ideas.
Part 5 (5 min) ADD TO OUR PROGRESS TRACKER Slide I		VIRTUAL CLASS PRE-WORK: 1. Complete the Progress Tracker on the Thinking Deeper document.
Part 6 (5 min) EXIT TICKET: ANALYZE FREQUENCY GRAPH Slide J	1. Assign the "Analyze Graphs of Sound Source Vibrations" handout. *NOTE: You will need to make a copy of the document in order to share in an editable format. - Ensure that each student gets a copy or supply the "View only" document and direct students to make their own copy to edit and submit.	VIRTUAL CLASS PRE-WORK: 1. Complete handout and submit.

Return to Lesson Set Overview

Lesson 6 (2 days) - Putting Pieces Together

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 6 Assessment
- Class Consensus Model
- Driving Question Board

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 6 Assessment
- Virtual Class Recordings - *after completion*
- Class Consensus Model
- Driving Question Board

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 1

Lesson 6 (2 days) - Putting Pieces Together

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1-5 (45 min) NAVIGATION REVISIT THE EXIT TICKET/HOME LEARNING FROM LESSON 5 PRACTICE CONNECTING GRAPHICAL REPRESENTATIONS TO SOUNDS MADE REVISIT AND REVISE OUR CONSENSUS MODEL REVISIT OUR DQB SLIDES A-F	Prior to the virtual class, the teacher should: 1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students. 3. Ensure students have access to the TDD and Exit Ticket assignment from the previous lesson as well as the Class Consensus Model and the DQB. 4. Decide how students will answer question sets (with a partner, independently) and how they will share out with those who have the other question set (break-out rooms, whole group). Make arrangements for small group collaboration during Virtual Class if that option is available. VIRTUAL CLASS: 1. Discuss how vibrations of the sound source compare for higher-pitch vs. lower-pitch sounds. *Use the Thinking Deeper Document from Lesson 5 to help. 2. Share and compare thinking for the post-work/exit ticket from the last lesson (Lesson 5). (Can be done in break-out rooms with a partner or small group if that option is available.) 3. Using graphs of the position of a sound source that is vibrating to argue for which sounds are being made. (Students can answer independently or work together by sharing documents or in break-out rooms.) 4. Share with others who had a different sound type (loudness or pitch). (Students can be placed in break-out rooms with small groups or share with the whole class.) 5. Display and revise initial class consensus model. 6. Display the driving question board and determine what questions we have answered or made progress on. 7. Assign Lesson 6 Assessment.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (30 min) EMBEDDED SUMMATIVE ASSESSMENT Slide G	1. Assign Lesson 6 Assessment and ensure the harp video on the slideshow plays. *NOTE: You will need to make a copy of the document in order to share in an editable format. - Ensure that each student gets a copy or supply the "View only" document and direct students to make their own copy to edit and submit.	VIRTUAL POST-WORK/ASSESSMENT: 1. Demonstrate understanding of how vibrating objects produce sounds and how the different types of sounds depend on the amplitude and frequency of vibrations by completing the Lesson 6 Assessment.

Return to Lesson Set Overview

Lesson 7 (1 day) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Class Consensus Model
- Student Initial Models - *refer students to their Lesson 1 TDD or ensure access to the shared document where student models were displayed in Lesson 1*
- Shared document for models with claims - *teacher made*
- Claim and Evidence Assignment - *teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Investigation 1 Video
- Investigation 2 Video
- Class Consensus Model
- Student Initial Models - *refer students to their Lesson 1 TDD or ensure access to the shared document where student models were displayed in Lesson 1*
- Shared document for models with claims - *teacher made*
- Claim and Evidence Assignment - *teacher made*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- None

Lesson 7 (1 day) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (10 min) NAVIGATION Slides A & B	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students 3. Ensure students have access to updated Class Consensus Model.	VIRTUAL CLASS PRE-WORK: 1. Revisit the consensus model and make connections between DQB questions and ideas for what happens between the speaker and the window. 2. Revisit initial model and reflect.
Part 2 (15 min) INVESTIGATE A SOUND SOURCE IN A SEALED CONTAINER Slides C-H		VIRTUAL CLASS PRE-WORK: 1. Plan an investigation to answer: Is air moving all the way from the sound source to our ears or window when sounds are produced? 2. Brainstorm possible outcomes of the investigation. 3. Watch Investigation 1 and record observations. 4. Make a claim based on the results. 5. Reflect on how we can improve the investigation.

Part 3 (7 min) INVESTIGATION THE MASS OF THE SOUND SOURCE IN A SEALED CONTAINER Slides I-K		VIRTUAL CLASS PRE-WORK: 1. Predict outcome of 2nd investigation. 2. Watch Investigation 2 and record observations. 3. Reflect on the results of the investigation and make a claim about whether air is travelling form a sound source to our ears.
Part 4 (13 Min) REVISITING OUR INITIAL MODELS Slides L-N	1. Create a shared document for models and direct students to add their initial models. 2. Monitor the shared document and ensure all students get feedback on their models. 3. Create an assignment for students to share their revised claim and evidence. 4. Review student claims and evidence and provide feedback as needed.	VIRTUAL CLASS PRE-WORK: 1. Revisit initial model to analyze their claim about what's traveling between the speaker and window. 2. Share their model and give feedback on another student model. 3. Review and reflect on feedback they were given. 4. Generate a new claim, supply evidence and submit for review.

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Lesson 8 (1 day) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Progress Tracker Discussion Board - *teacher made*
- Exit Ticket Assignment - *optional, teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Vacuum Chamber Video
- Rocks Under Water Video
- Progress Tracker Discussion Board - *teacher made*
- Exit Ticket Assignment - *optional, teacher made*
- Discussion Board - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- None

Lesson 8 (1 day) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (10 min) NAVIGATION Slides A & B	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students	VIRTUAL CLASS PRE-WORK: 1. Answer questions about air and sound based on the last lesson. 2. Brainstorm ways to investigate opposing claims (sound does need air to travel, sound does not need air to travel).
Part 2 (10 min) INVESTIGATE A SOUND SOURCE WITH AIR REMOVED Slides C-F		VIRTUAL CLASS PRE-WORK: 1. Watch the Vacuum Chamber Video until 1:35 and list possible outcomes for the investigation. 2. Watch the rest of the Vacuum Chamber Video and record observations. 3. Reflect on new evidence to answer our opposing claims.
Part 3 (10 min) INVESTIGATE SOUND TRAVELING THROUGH OTHER FORMS OF MATTER Slides G-J		VIRTUAL CLASS PRE-WORK: 1. Predict whether sound will travel in water and list possible outcomes for the investigation. 2. Watch the Rocks Under Water Video and record observations. 3. Reflect on new evidence to answer our opposing claims

Part 4 (10 Min) CONSENSUS DISCUSSION ABOUT WHAT SOUND NEEDS TO TRAVEL AND UPDATE THE PROGRESS TRACKER Slide K	1. Create and assign DISCUSSION BOARD (examples include Question thread on Google Stream or a Google Document that all students in the class can edit.) 2. Review discussion board responses and provide feedback as needed.	DISCUSSION BOARD: 1. Students add evidence and what they have learned about what is needed for sound to travel on their progress tracker in the TDD. 2. Share ideas on the discussion board and respond to other student ideas.
Part 5 (5 Min) NAVIGATION Slides L & M	1. Create an assignment for students to submit their Exit Ticket or direct students to turn in their TDD. 2. Review student submissions and give feedback as needed.	VIRTUAL CLASS PRE-WORK: 1. Think and answer questions about how we can represent sound moving through matter in a model. 2. Complete Exit Ticket question and submit to the teacher.

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Lesson 9 (1 day) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 1

Lesson 9 (1 day) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-7 (43 min) NAVIGATION MODEL MATTER IN A DIFFERENT MEDIA SHARE MODELS FOR DIFFERENT STATES OF MATTER STIMULATE PARTICLE MOVEMENT WITH OUR BODIES PARTICLE MOVEMENT DISCUSSION MODEL MATTER AROUND A SOUND SOURCE SHARE MODELS OF MATTER AROUND A SOUND SOURCE Slides A-H	Prior to the Virtual Class, the teacher should: 1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students. 3. Decide how to demonstrate the way sound moves in the virtual class meeting. (since modeling with students is not possible - teacher might consider using figures to model the way the students would move in the demonstration) VIRTUAL CLASS: 1. Review what we have figured out about sound traveling lessons 7 & 8 and share new questions. 2. Students independently create models of different states of matter 3. Share models and facilitate a discussion to come to consensus on how particles behave in different states of matter 5. Have students imagine how people in a line could represent sound moving through particles. 6. Model what happens to particles when a sound source is vibrating against a medium. 7. Discuss the model and how it helps them understand interactions among particles. 8. Students draw a model of what is happening to the medium around a sound source when it starts vibrating. 9. Have students share models and discuss areas of agreement and disagreement.	
Part 8 (4 Min) NAVIGATION Slide I		VIRTUAL POST WORK: 1. Brainstorm what to include from our discoveries in a computer simulation to use during the next class.

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Lesson 10 (2 days) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Driving Question Board

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Simulation: Visualizing Sound in a Medium Simulation
- Driving Question Board
- Anchor Phenomenon Video
- Virtual Class Recording - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 10 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (5 min) NAVIGATION: ADD TO OUR LESSON 9 PROGRESS TRACKER Slide A	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students 3. Ensure students have access to Driving Question Board	VIRTUAL CLASS PRE-WORK: 1. Update progress tracker on TDD to add what they figured out from Lesson 9.
Part 2 (5 min) NAVIGATION: SHARING INITIAL IDEAS DISCUSSION Slides B		VIRTUAL CLASS PRE-WORK: 1. Look back and reflect on DQB and answer questions
Part 3 (10 min) MAP REPRESENTATIONS FOR THE VISUALIZING SOUND SIMULATION Slides C-E		VIRTUAL CLASS PRE-WORK 1. Look at 2 pictures of the simulation and consider what is different between them 2. Complete the analogy map to compare the simulation to the real world
Part 4 (20 Min) INVESTIGATE: GATHER EVIDENCE FROM THE VISUALIZING SOUND IN A MEDIUM SIMULATION Slides F-K		VIRTUAL CLASS PRE-WORK Students use the Visualizing Sound in a Medium Simulation to investigate what happens to particles in a medium when they are pushed by a vibrating object and record their findings.

Part 5 (10 Min) NAVIGATION WHAT ARE WE SEEING IN OUR SIMULATION? Slide L		VIRTUAL CLASS PRE-WORK 1. Answer the making sense of your results questions

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 6-9 (45 min) NAVIGATION: WHAT DID WE SEE IN OUR SIMULATION? MAKE SENSE OF OUR SOUND SIMULATION OBSERVATIONS ADD TO OUR PROGRESS TRACKER NAVIGATION: CAN WE EXPLAIN OTHER THINGS WITH OUR MODEL? Slides L-O	VIRTUAL CLASS 1. Students share patterns they noticed during the investigation. 2. Teacher leads a discussion about how the simulation relates to the real world. 3. The class co-constructs a representation of what happens to particles in a medium over time as sound travels through the medium. Students record on their TDD. 4. Students add to their progress tracker about what they figured out about what is happening when sound travels through a medium. 5. As a class, discuss if we can apply what we learned to other phenomena. 6. Students examine DQB and identify questions they can explain, questions they would like to revise, and questions not answered yet. 7. Teacher assigns home learning assignment.	
Part 9 HOME LEARNING Slide P		VIRTUAL CLASS POST-WORK: 1. Students used what they learned to re-sketch their initial model.

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Lesson 11 (2 days) - Putting Pieces Together

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Thinking Deeper Documents from previous lessons
- Class Consensus Model
- Lesson 2: Reference Peer Feedback Guidelines

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Thinking Deeper Documents from previous lessons
- Class Consensus Model
- New Phenomenon Video
- Lesson 2: Reference Peer Feedback Guidelines
- Virtual Class Recording - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 11 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (5 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students 3. Ensure students can access their TDD's from previous lessons	VIRTUAL CLASS PRE-WORK: 1. Think about the phenomena that was experienced in this unit and jot down what we figured out.
Part 2 (10 min) CONSIDER THE PHENOMENON OF BOUNCING SALT Slides B-D		VIRTUAL CLASS PRE-WORK: 1. Observe a new phenomenon of beating a drum that can make salt on a nearby surface jump and record observations. 2. Reflect on the phenomena and answer questions.
Part 3 (15 min) DEVELOP GOTTA-HAVE-IT CHECKLIST Slides E, F	1. Create a discussion board for students to share ideas about the Gotta-Have-It checklist for the model. 2. Review and compile students ideas to share at the virtual class meeting.	DISCUSSION BOARD: 1. Reflect on Gotta-Have-It parts of a model about how sound is caused and how it moves things. 2. Share ideas on the Discussion Board, review classmates' ideas, and record the most important ideas on the chart in the TDD.

Part 4 (15 Min) MODEL THE BOUNCING SALT Slide G	1. Create a document for comparing initial models using a platform of choice (shared slideshow or google doc, etc.) NOTE: Teachers may need to provide students with instructions or a short video of how to screenshot, copy, and paste models into a new document. The teacher may also offer students the option of drawing on paper and taking a photo. 2. Make sure the document with student models is available to share for the Virtual Class meeting.	VIRTUAL CLASS PRE-WORK 1. Create a model of the drum sound causing the salt to bounce on the plastic covering on the bowl using the Gotta-Have-It checklist. 2. Submit models to the teacher for sharing in the Virtual Class meeting.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 5 FINISH MODELS OF BOUNCING SALT FROM LAST TIME	*Students complete their models on Day 1*	
Part 6-8 (30 min) GALLERY WALK TO GIVE FEEDBACK FOR MODELS CONSENSUS DISCUSSION ABOUT HOW SOUND CAN MAKE SOMETHING MOVE USE OUR CHECKLIST TO MODEL THE TRUCK SPEAKER AND WINDOW PHENOMENON Slides G-J	Prior to the Virtual Class, the teacher should: 1. Have the document with student models available to share. 2. Decide how feedback on models will be given (students could be assigned a partner's model, groups of students could be assigned multiple models on which to provide feedback - ensure that every model receives feedback) VIRTUAL CLASS: 1. Discuss what we have been up to: briefly have students share and discuss progress trackers from the TDD, observations about the new phenomenon and our new, more general question: "How are sounds caused, and how can they make something move?" 2. Review helpful feedback protocols. Reference Lesson 2: Reference Peer Feedback Guidelines as needed. 3. Hold a virtual gallery walk and have students provide feedback on classmates' models 4. Students revise their model based on feedback. 5. Choose one model from the gallery walk and display it to facilitate a consensus discussion about the key parts necessary in an explanation of how sound can make something move. 6. Create a checklist of those necessary parts in order to revise our initial models of how the truck speaker makes the window move. 7. Assign post work for students to revise their initial models based on new evidence and our new consensus checklist.	

Part 8 (15 min) USE OUR CHECKLIST TO MODEL THE TRUCK SPEAKER AND WINDOW PHENOMENON Slide K		VIRTUAL CLASS POST-WORK: 1. Revise the initial model with new evidence and our consensus checklist to describe how the truck speaker makes the window move.

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Lesson 12 (1 day) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Class Consensus Model
- Driving Question Board
- Summary Discussion Board - *teacher made*
- Optional Reading: Hearing in Elephants, Dogs, and Humans

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

1. Lesson Slideshow
2. Thinking Deeper Document
3. Class Consensus Model
4. Driving Question Board
5. Exam Video
6. Videos of animations linked in the "Information From Experts" reading
    - Sound in the Ear Animation
    - Cochlear Animation
    - Hair Cell
    - Damaged Steriocolia
7. Summary Discussion Board - *teacher made*
8. Discussion Board - *after completion*
9. Optional Reading: Hearing in Elephants, Dogs, and Humans

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- None

Lesson 12 (1 day) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (10 min) NAVIGATION Slides A -D	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students 3. Share Consensus Model and Driving Question Board	VIRTUAL CLASS PRE-WORK: 1. Revisit consensus model and DBQ to determine where we have been and where we are going. 2. Reflect on what is happening inside the human ear that allows us to hear sounds and create an initial model. 3. Brainstorm possible investigations we can do to figure out how we hear and determine what evidence we will need to answer our question.
Part 2 (5 min) VIEW VIDEO OF EAR EXAM Slides E-F		VIRTUAL CLASS PRE-WORK: 1. Watch Exam Video of the inside of the ear and record notice/wonders. 2. Reflect on video and answer questions about how structures within the ear and how we can learn more about them.
Part 3 (12 min) READING ABOUT HOW WE HEAR Slide G		VIRTUAL CLASS PRE-WORK: 1. Read an interview with an ENT and a neurobiologist which includes embedded links. 2. Record thoughts and answer questions on Lesson 12 Student Activity Sheet in TDD.

Part 4 (15 Min) SYNTHESIZING WHAT WE'VE LEARNED ABOUT THE EAR Slide H	1. Create and assign a discussion board for students to share what they learned from the article (examples include a Question thread on Google Stream or a Google Document that all students in the class can edit.) 2. Review discussion board responses and provide feedback as needed.	DISCUSSION BOARD: 1. Summarize what was learned from the article and links to show how energy from sound is transmitted through the inner ear and detected by different sensory cells
Part 5 (3 Min) NAVIGATION Slides I-J	1. Assign OPTIONAL READING if desired: Optional Reading: Hearing in Elephants, Dogs, and Humans	VIRTUAL CLASS PRE-WORK: 1. OPTIONAL: Read and answers questions from Optional Reading: Hearing in Elephants, Dogs, and Humans

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Lesson 13 (2 days) - Investigation

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 13 Assessment

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Set-Up Video to 0:30
- Investigation Videos: Frequency Investigation, Amplitude Investigation
- Virtual Class Recording - *after completion*
- Lesson 13 Assessment
- Lesson 13 Assessment: Video Link

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 2

Lesson 13 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (10 min) NAVIGATION Slides A & B	1. Share Lesson Slideshow with students 2. Share Thinking Deeper Document with students	VIRTUAL CLASS PRE-WORK: 1. Connect questions from last class about what type of sounds transfer the most energy.
Part 2 (15 min) SETTING UP FOR THE ENERGY TRANSFER FOR AMPLITUDE AND FREQUENCY Slides C-F		VIRTUAL CLASS PRE-WORK: 1. Brainstorm ways to investigate what waves carry the most energy. 2. Watch a video of how the investigation is set-up: Set-Up Video to 00:30 to complete analogy map. 3. Reflect on how the investigation will answer the lesson question.
Part 3 (20 min) CONDUCTING THE ENERGY TRANSFER FOR AMPLITUDE AND FREQUENCY INVESTIGATION Slides G		VIRTUAL CLASS PRE-WORK: 1. Watch the investigations and record data in a data chart Frequency Investigation, Amplitude Investigation 2. Answer making sense questions for each investigation.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 4 & 5 (35 min) COMPILING AND ANALYZING DATA FROM THE ENERGY TRANSFER FOR AMPLITUDE AND FREQUENCY INVESTIGATION CONSENSUS DISCUSSION UPDATE PROGRESS TRACKER Slides H-K	VIRTUAL CLASS: 1. Discuss the investigation including patterns in the data. 2. Teacher supports students in graphing the data on grid paper on their TDDs. 3. Analyze the data and reflect - answer questions independently in the TDD then share and discuss. 4. Add the lesson question to the progress tracker in the TDD and discuss their conclusions about how changing the amplitude and frequency of vibrations changes how much energy is transferred in order to reach a consensus. - Students update progress tracker during discussion.	
Part 7 (10 min) EMBEDDED SUMMATIVE ASSESSMENT Slide L	1. Assign embedded summative assessment AFTER virtual class: Lesson 13 Assessment 2. Review assessments and provide individual feedback as needed or address in the Virtual Class.	VIRTUAL CLASS POST WORK/ASSESSMENT 1. Student completes embedded summative assessment and submit when done:

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Lesson 14 (2 days) - Putting the Pieces Together

In this **Lesson**, students will need the following materials to appropriately engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Shareable Driving Question Board - *if using Jamboard or other electronic platform, ensure student access; if using a poster, take a photo and include in a shareable document*
- Lesson 14 Assessment
- Quick Write Discussion Board - *teacher made*

In this **Lesson**, students who don't have home internet need the following print-outs or files to best engage in learning:

- Lesson Slideshow
- Thinking Deeper Document
- Shareable Driving Question Board - *if using Jamboard or other electronic platform, ensure student access; if using a poster, take a photo and include in a shareable document*
- Driving Question Board - *after updates*
- Virtual Class Recording - *after completion*
- Lesson 14 Assessment
- Quick Write Discussion Board - *teacher made*
- Discussion Board - *after completion*

In this **Lesson**, students should join virtual classes on the following days to engage in learning:

- Day 1

Lesson 14 (2 days) - Putting the Pieces Together

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1 & 2 (45 min) NAVIGATION: EVALUATE OUR DBQ QUESTIONS REVISIT THE DRIVING QUESTION BOARD AND REVIEW THE FEEDBACK FROM LESSON 13 ASSESSMENT Slides A & B	Prior to Class: 1. Share Lesson Slideshow and Thinking Deeper Document with students. 3. Share the Driving Question Board with students. 4. Set-up a shareable DQB with students in order for them to place dots on the questions. VIRTUAL CLASS: 1. Students evaluate and mark questions on the DQB that they think we have not answered, answered some parts, or can now answer the question. 2. In a shared document (ex. google slides), have students place dots on questions that they think we have made progress on. 3. Students then reflect on those questions in their thinking deeper document. 4. Look at the dots on the DBQ, discuss as a class the questions that were answered, partially answered, and not answered at all.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 3 (35 min) DEMONSTRATE UNDERSTANDING ON AN ASSESSMENT TASK Slide C	1. Assign individual assessment: Lesson 14 Assessment	VIRTUAL CLASS POST-WORK/ASSESSMENT: 1. Complete Lesson 14 Assessment and submit to teacher
Part 4 (10 min) QUICK WRITE: REFLECT ON OUR EXPERIENCES Slide D	1. Create and assign a discussion board for quick write. (examples include Question thread on Google Stream or a Google Document that all students in the class can edit.) 2. Review discussion board responses and provide feedback as needed.	DISCUSSION BOARD: 1. Discuss what was challenging and rewarding about the unit.

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