

Louisiana Believes

Distance Learning Support for OpenSciEd - Grade 8 Unit 7.6 Natural Resources and Human Impact Field Test Unit

This resource is designed to support teachers in implementing distance learning for OpenSciEd Grade 8 Unit 7.6, Unit 5 on the [Louisiana Guide to Piloting OpenSciEd Grade 8](#). It is intended as a supporting document and should be used in conjunction with the [OpenSciEd Unit 7.6 Unit 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 May 12, 2021



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](#)

Lesson Set 1: Lessons 1-5		
Provided Resources Students Will Need	Additional Resources Students Will Need	Additional Materials for Students Without Internet Access
<p>Lesson Slideshows for each lesson:</p> <p>L1, L2, L3, L4, L5</p> <p>Thinking Deeper Documents for each lesson:</p> <p>Lesson 1 TDD, Lesson 2 TDD, Lesson 3 TDD, Lesson 4 TDD, Lesson 5 TDD</p> <p>Additional Documents:</p> <p>Lesson 1: Optional Pre-made Jamboard</p> <p>Lesson 2: Charts from NOAA Time Series site, Optional:</p> <p>Lesson 5: Optional Pre-made google slideshow, Alaska Wildfires and Sea Pre-made Jamboard Ice Assessment</p> <p>Optional: Sample Parent Letter</p>	<p>Lesson 1:</p> <ul style="list-style-type: none"> Driving Question Board <p>Lesson 2:</p> <ul style="list-style-type: none"> Predictions/Observations Discussion Board <p>Lesson 3:</p> <ul style="list-style-type: none"> Optional: Reflection on Data Assignment (Slide H) - <i>teacher made</i> Driving Question Board Consensus Model from Lesson 1 <p>Lesson 4:</p> <ul style="list-style-type: none"> Obtaining Information Checklist Discussion Board (one per group - water system components) Conclusion and Check-point Assignments 	<p>Prior to Lesson:</p> <p>Lesson 1: A Town without Water video, Floods Hit US Small Towns along Mighty Mississippi</p> <p>Lesson 3: Investigation Videos: No heat added T1, No heat added T2, Heat added T1, Heat added T2; NASA Visualization Videos: NASA Water Vapor Visualization, NASA Water Temperature and Water Vapor Visualization</p> <p>Lesson 5: Alaskan Elder Video</p> <p>After Lesson Completion:</p> <p>Consensus Model (Lessons 1, 3) Driving Question Board (Lessons 1, 3) Discussion Boards (Lessons 1, 2, 4) Virtual Class recordings (Lessons 1, 2, 3, 5)</p>
<p>Students should ideally join VIRTUAL CLASS on the following days:</p> <p style="text-align: center;">Day 2 - Lesson 1 Day 4 - Lesson 2 Day 6 - Lesson 3 Day 9 - Lesson 5</p>		

Formative and Summative Assessment Opportunities:

Lesson 1: Initial Models

Lesson 2: Earth's Water System Model (on TDD), Predictions/Observations Discussion Board

Lesson 3: Optional: Reflection on Data Assignment (Slide H)

Lesson 4: Conclusion and Check-point assignments

Lesson 5: Water Story Explanation & Feedback, [Alaska Wildfires and Sea Ice Assessment](#)

Lesson Set Overview: Lessons [6](#), [7](#), [8](#), [9](#), [10](#), [11](#)

Lesson Set 2: Lessons 6-11		
Provided Resources Students Will Need	Additional Resources Students Will Need	Additional Materials for Students Without Internet Access
<p>Lesson Slideshows for each lesson:</p> <p>L6, L7, L8, L9, L10, L11</p> <p>Thinking Deeper Documents for each lesson:</p> <p>Lesson 6 TDD, Lesson 7 TDD, Lesson 8 TDD, Lesson 9 TDD, Lesson 10 TDD, Lesson 11 TDD</p> <p>Additional Documents:</p> <p>Lesson 6: Pre-made slide show - optional Lesson 7: Premade Jamboard - optional for teacher Lesson 10: Exit Ticket Assignment Lesson 11: Version 1 or Version 2 of the Social Media Post Assessment</p>	<p>Lesson 6:</p> <ul style="list-style-type: none"> Driving Question Board Screencast of calculation example on Slide F Changes in Atmosphere Gases Discussion Board <p>Lesson 7:</p> <ul style="list-style-type: none"> Home Investigation materials - pre assembled molecules OR 15 marshmallows and 15 2.5in pipe cleaners and assembly instructions/models <p>Lesson 8:</p> <ul style="list-style-type: none"> Home Investigation Materials: ice cubes made with both carbonated and non-carbonated water, carbonated water 	<p>Prior to Lesson:</p> <p>Lesson 7: Molecule Videos Methane, Oxygen, Nitrogen, Water, Carbon dioxide Lesson 8: Carbonated Water Video, Testing Ice for Gas video, Ice Core Video , Drilling Ice Cores Video Lesson 9: Global CO2 Emissions visualization Lesson 10: Burning Fossil Fuel demonstration, Burning Methanol video</p> <p>After Lesson Completion:</p> <p>Virtual Class recordings (Lessons 7, 8, 10)</p>
<p>Students should ideally join VIRTUAL CLASS on the following days:</p> <p style="text-align: center;">Day 2 - Lesson 7 Day 4 - Lesson 8 Day 6 - Lesson 10</p>		

Formative and Summative Assessment Opportunities:

Lesson 6: Changes in Atmosphere Gases Discussion Board

Lesson 8: Model revisions (on TDD - option to create a separate assignment)

Lesson 10: [Exit Ticket Assignment](#)

Lesson 11: [Version 1](#) or [Version 2](#) of the Social Media Post Assessment

Lesson Set Overview: Lessons [12](#), [13](#), [14](#), [15](#), [16](#)

Lesson Set 3: Lessons 12-16		
Provided Resources Students Will Need	Additional Resources Students Will Need	Additional Materials for Students Without Internet Access
<p>Lesson Slideshows for each lesson:</p> <p>L12, L13, L14, L15, L16</p> <p>Thinking Deeper Documents for each lesson:</p> <p>Lesson 12 TDD, Lesson 13 TDD, Lesson 14 TDD, Lesson 15 TDD, Lesson 16 TDD</p> <p>Additional Documents: Lesson 14: Premade digital carbon scoreboard Lesson 15: Peer Feedback Guidance, Giving and Receiving Feedback Self-Assessment</p>	<p>Lesson 12:</p> <ul style="list-style-type: none"> Potential Solutions Discussion Board <p>Lesson 14:</p> <ul style="list-style-type: none"> Lifestyle Makeover Discussion Board <p>Lesson 15:</p> <ul style="list-style-type: none"> Exit Ticket Assignment <p>Lesson 16:</p> <ul style="list-style-type: none"> Driving Question Board 	<p>Prior to Lesson:</p> <p>Lesson 12: UCAR Simple Climate Model Simulation</p> <p>Lesson 14: Carbon Emissions Calculator</p> <p>Lesson 15: What are others doing? video</p> <p>After Lesson Completion:</p> <p>Virtual Class recordings (Lessons 13, 15, 16) Discussion Boards (Lessons 12, 14)</p>
<p>Students should ideally join VIRTUAL CLASS on the following days:</p> <p>Day 2 - Lesson 13 Days 4 and 6 - Lesson 15 Day 7 - Lesson 16</p>		
<p>Formative and Summative Assessment Opportunities:</p> <p>Lesson 12: Potential Solutions Discussion Board Lesson 14: Lifestyle Makeover Discussion Board Lesson 15: Project, Peer Feedback, and Giving and Receiving Feedback Self-Assessment</p>		

Lesson 1 (2 days) - Anchoring Phenomenon

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Optional: [Pre-made Jamboard](#) for sharing patterns in headlines
- Driving Question Board
- 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](#)
- Optional: [Pre-made Jamboard](#) for sharing patterns in headlines – *alternate way to contribute ideas (ex. Texting responses and receiving screenshots of the Jamboard)*
- Videos:
 - [A Town without Water video](#),
 - [Floods Hit US Small Towns along Mighty Mississippi](#)
- Driving Question Board
- Consensus Model - *after completion*
- Virtual Class recording - *after completion*
- Optional Jamboard Board - *after completion*

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

- Day 2

Lesson 1 (2 days) - Anchoring Phenomenon

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1 (10 min)</p> <p>INTRODUCE TWO STORIES ABOUT FLOODS AND DROUGHTS</p> <p>Slides A-I</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students. 	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Watch videos about water stories in two different cities and record notices and wonders in the respective charts. <p>Reflect on what happened in those cities and how it would feel if these things happened in our town.</p>
<p>Part 2 (15 min)</p> <p>IDENTIFY PATTERNS IN HEADLINES ABOUT FLOODS AND DROUGHTS IN SMALL GROUPS</p> <p>Slides J-L</p>	<p><i>Option to create a Discussion Board using the Pre-made Jamboard for students to share ideas with one another prior to Virtual Class meeting.</i></p>	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Read a set of headlines and group them together based on similarities. 2. Record patterns across flood-related and drought-related headlines.
<p>Part 3 (5 min)</p> <p>ASSIGN HOME LEARNING</p> <p>Slide M</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Talk to members of their families or communities to share stories about floods or droughts they may have experienced.

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 4-12 (45 min) SHARE OUR WATER STORIES DISCUSS PATTERNS IN HEADLINES ABOUT FLOODS AND DROUGHTS IDENTIFY WHAT WE NEED TO INCLUDE IN OUR MODELS DEVELOP AN INITIAL MODEL BEGIN TO DEVELOP AN INITIAL CONSENSUS MODEL INDIVIDUALLY GENERATE QUESTIONS & BUILD THE DRIVING QUESTION BOARD BRAINSTORM IDEAS FOR DATA AND INFORMATION WE NEED Slides N-Z	Prior to the Virtual Class, the teacher should: <ol style="list-style-type: none"> 1. Determine how students will share their models in the virtual class meeting and set up accordingly. (ex. prepare a shared document for students to copy and paste their models into) 2. Determine how students will contribute questions for the DQB (ex. Google Jamboard, chat feature, discussion thread, etc.) and prepare accordingly. VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Share water stories from home learning with the class. 2. Return to the headlines from Day 1 and identify similarities and differences between the drought- and flood-related headlines. 3. Identify what we need to include in our models to explain how increasing temperatures could lead to increased floods and droughts and what is causing the temperatures to rise. 4. Developing initial models independently. 5. Share initial models with the class. They will see what they have in common with classmates and what they have that's different. 6. Develop a class consensus model. Teacher draws the model during discussion. (Be sure to share a picture of the finished model with students.) 7. Share questions to create a driving question board. (Teacher can do this electronically or on poster paper OR students can add questions using Google Jamboard or other similar feature.) 8. Discuss additional sources of data might we need to figure out the answers to our questions and what information we still need and fill in the table on the thinking deeper document. 9. Reflect on the Driving Question Board and decide where to move next. *Ensure that students have access to the DQB after lesson completion.	

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Lesson 2 (2 days) - What would we normally expect for these places and how do we know it's really changing?

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Predictions/Observations Discussion Board
- Optional: [Pre-made Jamboard](#)

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](#)
- Predictions/Observations Discussion Board – *alternate way to contribute (ex. Text responses to a teacher or classmate & receive screenshots of the discussion)*
- Optional: [Pre-made Jamboard](#) – *alternate way to work collaboratively during the Virtual Class*
- Discussion Board - *after completion*
- Virtual Class recording - *after completion*

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

- Day 2

Lesson 2 (2 days) - What would we normally expect for these places and how do we know it's really changing?

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (5 min) NAVIGATION Slide A	<ol style="list-style-type: none"> 1. Watch the Lesson 2 video to get directions for finding local weather graphs. 2. Go to the NOAA Time Series site, get your local data graphs, and insert the images on your students' thinking deeper document. 3. Share Lesson Slideshow with students. 4. Share updated Thinking Deeper Document with students. 	VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> 1. Brainstorm and record all places on Earth freshwater can be found.
Part 2 (10 min) DEVELOP A SYSTEM MODEL FOR WATER COMPONENTS AND INTERACTIONS Slide B		VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> 1. Develop a system model using the Navigation ideas to represent key components and interactions in Earth's Water System.
Part 3 (10 min) OUR COMMUNITY Slide C		VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> 1. Determine which data is helpful to look at and why it can help us figure out what is normal or not normal in these places.

<p>Part 4 (5 min)</p> <p>THINK ABOUT IT</p> <p>Slides D-E</p>	<p>1. Create and assign a Discussion Board for students to share their predictions and later “What I See” statements.</p>	<p>VIRTUAL CLASS PREWORK/DISCUSSION BOARD:</p> <ol style="list-style-type: none"> 1. Reflect on how looking at data from today compared to long ago might help us determine whether what we are experiencing is normal or not. 2. Make predictions about what they will see in the data. 3. Share predictions on the discussion board.
<p>Part 5 (20min)</p> <p>EXAMINE LOCAL DATA FROM LAST 10 YEARS</p> <p>Slides F-G</p>		<p>VIRTUAL CLASS PREWORK/DISCUSSION BOARD:</p> <ol style="list-style-type: none"> 1. Analyze and interpret local, short-term temperature and precipitation data. 2. Share What I See statements on the class Discussion Board.
<p>Part 6 (5 min)</p> <p>NAVIGATION</p> <p>Slide H</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Students will make sense of the data they gathered and decide what else may be needed to see what is normal or not.

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 7-10 (45 min) NAVIGATION ANALYZING AND INTERPRETING LONG TERM DATA EXPAND TO NEW CASE SITES CONSENSUS ACROSS CASE SITES Slides I-P	Prior to the Virtual Class, the teacher should: <ol style="list-style-type: none"> 1. Insert your long term graphs onto Slide J. 2. Set up break-out groups for Case Studies if your platform allows. (NOTE: Pre-made Jamboard can be used for groups to work collaboratively. Make a copy then insert the link into Slide O). VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Class discussion about the data from Day 1 and reflection questions. 2. Make observations about the new data and what it means independently. 3. Class discussion of the long term data where students share out the WIS and WIM from their TDD. 4. Work in groups pre-determined by the teacher to look at new cases. They will complete parts 1 and 2 and begin part 3 of this assignment. It will be finished at a later time. 5. All groups share claims and evidence about their case site. Each group has 2 minutes to share. Students will keep notes in their thinking deeper document focused on similarities and differences between their site and the other sites investigated. 	
Part 11 (2 min) PROGRESS TRACKER Slide Q		VIRTUAL CLASS POST-WORK: <ol style="list-style-type: none"> 1. Answer the lesson question to begin their progress tracker.
Part 12 (2 min) NAVIGATION Slide R		VIRTUAL CLASS POST-WORK: <ol style="list-style-type: none"> 1. Reflect on what we already know and record ideas on what the class should investigate.

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Lesson 3 (2 days) - How would increased temperatures affect evaporation?

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Optional: Reflection on Data Assignment (Slide H) - *teacher made*
- Driving Question Board
- Consensus Model from Lesson 1

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 Videos: [No heat added T1](#), [No heat added T2](#), [Heat added T1](#), [Heat added T2](#)
- NASA Visualization Videos: [NASA Water Vapor Visualization](#), [NASA Water Temperature and Water Vapor Visualization](#)
- Optional: Reflection on Data Assignment (Slide H) - *teacher made*
- Driving Question Board
- Consensus Model from Lesson 1
- Virtual Class recording - *after completion*

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

- Day 2

Lesson 3 (2 days) - How would increased temperatures affect evaporation?

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.	VIRTUAL CLASS PREWORK: 1. Answer questions in the TDD to reflect on past lab experiences with humidity and temperature.
Part 2 (10 min) COLLABORATIVELY PLAN THE EVAPORATION LAB Slides B-C		VIRTUAL CLASS PREWORK: 1. Use a modified version of a lab set-up from the Storms Unit to plan an investigation to determine how temperature can affect evaporation rates over time.
Part 3 (20 min) DATA COLLECTION AND INVESTIGATION Slides D-F	<i>Option to create an assignment for students to submit and explain their answer to the question on Slide H prior to the Virtual Class for formative assessment.</i>	VIRTUAL CLASS PREWORK: 1. Determine what data would be collected in an experiment to determine how temperature can affect evaporation rates over time. 2. Watch videos of the experiment and collect data.

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 4-9 (45 min) COMPARE BOTTLE DATA CONSIDER THE CHANGES IN WATER VAPOR FOR OPEN AND CLOSED SYSTEMS REVISIT DQB TRACING WATER VAPOR VISUALIZATION AND DISCUSSION UPDATE CONSENSUS MODEL NAVIGATION Slides G-O	Prior to the Virtual Class, the teacher should: <ol style="list-style-type: none"> 1. Ensure that students have access to the consensus model from Lesson 1. VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Class discussion about the patterns in the data from Day 1 and whether or not the data supported the original hypothesis. 2. Discuss as a class how the bottles represented closed systems, which is different from our atmosphere in the real world, and the implications that has on water vapor. 3. Discuss what they think would happen in an open system like our atmosphere. 4. Revisit the DQB and add any other questions that may arise. 5. Make observations from simulated water vapor and temperature data, tracing its origins and pathway across the United States. Record Notices and wonders in the TDD. Facilitate a Building Understanding Discussion. 6. Look back at the Earth’s Water System model from Lesson 2 and add in the effects of increased temperatures on water vapor and precipitation. 7. Discuss how temperatures could affect other community water sources. 8. Predict what changes they believe will happen to the water source due to increased temperature. 	

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Lesson 4 (1 day) - Are rising temperatures affecting anything else in Earth's water system?

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Obtaining Information Checklist Discussion Board (one per group - water system components) - *teacher made*
- Conclusion and Check-point Assignments - *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](#)
- Alternate way to share and discuss with their group for the Discussion Board - ex. Text responses to teacher or group member & teacher/groups member shares screenshots of Discussion Board
- Discussion Board - after completion
- Conclusion and Check-point Assignments - *teacher made*

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

- None

Lesson 4 (1 day) - Are rising temperatures affecting anything else in Earth’s water system?

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1 (20 min)</p> <p>OBTAIN INFORMATION FROM TEXT AND VISUALS</p> <p>Slides A-B</p> <p>Slides G-K (Pictures/graphs/maps from readings, use if you need to see close up)</p>	<ol style="list-style-type: none"> 1. Replace the picture on Slide C with your class consensus model. 2. Assign each student a component of the water system to read about. 3. Create a discussion board for each component so students can share information from their Obtaining Information Checklist. (option to include the link on Slide B and/or on TDD) 4. Create an assignment for students to submit their conclusions. (option to include the link on Slide B and/or on TDD) 5. Share Lesson Slideshow and Thinking Deeper Document with students. 	<p>VIRTUAL CLASS POSTWORK:</p> <ol style="list-style-type: none"> 1. Read about an assigned component of the water system and complete the Obtaining Information checklist. 2. Participate in a discussion board with students that read about the same component. 3. Write a conclusion based on discussion and submit to the teacher.
<p>Part 2 (10 min)</p> <p>REVIEW CONSENSUS MODEL</p> <p>Slide C</p>		<p>VIRTUAL CLASS POSTWORK:</p> <ol style="list-style-type: none"> 1. Look back at the consensus model and compare the claims and evidence from the reading with initial claims from the model.

<p>Part 3 (10 min)</p> <p>CHECK POINT</p> <p>Slide D</p>	<p>1. Create and share an assignment for students to submit their answers to the check-point questions. (option to include the link on Slide D)</p>	<p>VIRTUAL CLASS POSTWORK:</p> <p>1. Answer the check-point questions and submit them to the teacher.</p>
<p>Part 4 (5 min)</p> <p>UPDATE PROGRESS TRACKER</p> <p>Slide E</p>		<p>VIRTUAL CLASS POSTWORK:</p> <p>1. Students will reflect on what they figured out in this lesson.</p>
<p>Part 5 (5 min)</p> <p>NAVIGATION</p> <p>Slide F</p>		<p>VIRTUAL CLASS POSTWORK:</p> <p>1. Students will reflect on how their understanding of the problem has changed since the first lesson.</p>

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Lesson 5 (3 days) - How are rising temperatures changing water stories in these communities?

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Alaska Wildfires and Sea Ice Assessment](#) - You will need to make a copy for each student or have students make their own copy in order for students to be able to edit.

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](#)
- Google Slide to Turn in Assignment
- [Alaskan Elder Video](#)
- [Alaska Wildfires and Sea Ice Assessment](#) - You will need to make a copy for each student or have students make their own copy in order for students to be able to edit.

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

- Day 2

Lesson 5 (3 days) - How are rising temperatures changing water stories in these communities?

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (5 min) NAVIGATION Slides A-B	<ol style="list-style-type: none"> Determine how students will share their Water Story Explanations and create the assignment. (Option to use the premade google slideshow and include the assignment link on Slide C/TDD.) Share Lesson Slideshow with students. Share Thinking Deeper Document with students. 	VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> Reflect back on what was figured out so far. Determine the audience, purpose, and key ideas that will need to be included in the case site explanation.
Part 2 (15 min) CONSTRUCT AN EXPLANATION Slides C-D		VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> Create a clear and convincing explanation to others to (1) explain how or why water is changing in one community and (2) support the how or why with evidence.
Part 3 (10 min) PEER FEEDBACK Slide E	<ol style="list-style-type: none"> Teachers may consider assigning each student two classmates' explanations to review or use another method to ensure every student gets peer feedback. 	VIRTUAL CLASS PREWORK: <ol style="list-style-type: none"> Review classmates' work and provide feedback.

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 4-7 (45 min) NAVIGATION LOOK BACK AT ALASKA HEADLINE INTRODUCE AND LISTEN TO ELDER CLAIMS INVESTIGATE NEW GRAPHS FROM ALASKA Slides G-M	VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Look at some examples of the class's explanations. Discuss takeaways and idea changes so far in the lesson. 2. Review the headline from Lesson 1 about Alaska. Determine what we would need to figure out if the Alaska case site is related to increases in temperature. 3. Watch a video of some Alaskan elders, record the claims, and come up with some data needed to support the claims. Share out and discuss. 4. Investigate the new graphs and information from Alaska then discuss. 5. Preview the assessment that students will complete on their own. 	
Part 8 (20 min) ASSESSMENT Slides P	<ol style="list-style-type: none"> 1. Assign Assessment to students. 	VIRTUAL CLASS POST WORK: <ol style="list-style-type: none"> 1. Complete and submit the assessment.

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Lesson 6 (1 day) - Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Pre-made slide show](#) - optional (remove “Analyzing Concentrations over Time “ section of the TDD)
- Driving Question Board
- Screencast of calculation example on Slide F - *teacher made*
- Changes in Atmosphere Gases 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](#)
- [Pre-made slide show](#) - optional (remove “Analyzing Concentrations over Time “ section of the TDD)
- Driving Question Board
- Screencast of calculation example on Slide F - *teacher made*
- Changes in Atmosphere Gases Discussion Board - *teacher made*

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

- None

Lesson 6 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1 (5 min)</p> <p>COMPARE THE MIXTURES OF GASES IN THE ATMOSPHERE</p> <p>Slides A-B</p>	<ol style="list-style-type: none"> Option to use the Pre-made slide show for student annotations - remove this section from the TDD and insert link to slideshow on Slide E. Share Lesson Slideshow and Thinking Deeper Document with students. 	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> Record initial ideas of what makes up air. Analyze a chart and compare observations to initial ideas.
<p>Part 2 (5 min)</p> <p>BUILDING UNDERSTANDINGS DISCUSSION ABOUT PARTS PER MILLION</p> <p>Slides C-D</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> Examine data to understand parts per million then answer a question about gases in a zip lock bag to show understanding.
<p>Part 3 (15 min)</p> <p>ANALYZE CHANGES IN COMPOSITION OF GASES IN THE AIR</p> <p>Slides E-F</p>	<ol style="list-style-type: none"> Consider screencasting the example on Slide F to provide for students. Create and assign a discussion board for students to share conclusions from graph analysis. Review discussion board entries and facilitate as needed. 	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> Analyze graphs to examine gas concentration over time - annotate graphs, calculate gas changes, and draw conclusions. Share ideas on the discussion board.

<p>Part 4 (15 min)</p> <p>CONCLUSION AND ADD TO DQB</p> <p>Slide G-H</p>	<ol style="list-style-type: none"> 1. If students do not have access to a shared space for the DQB, ensure they have the previous version and create an assignment to submit new questions. 	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Draw conclusions about the concentration of gases in the atmosphere. 2. Submit a new question to the class DQB.
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Lesson 7 (2 days) - Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Home Investigation - pre assembled molecules OR 15 marshmallows and 15 2.5in pipe cleaners and assembly instructions/models
- [Premade Jamboard](#) - optional for charting class observations about molecule models

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](#)
- Home Investigation - pre assembled molecules OR 15 marshmallows and 15 2.5in pipe cleaners and assembly instructions/models
- Access to the molecule videos
 - [Methane](#)
 - [Oxygen](#)
 - [Nitrogen](#)
 - [Water](#)
 - [Carbon dioxide](#)
- [Premade Jamboard](#) - optional for charting class observations about molecule models
- Virtual Class recording - *after completion*

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

- Day 1

Lesson 7 (2 days) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1-4 (45 min)</p> <p>Navigation</p> <p>INVESTIGATE THE MOTION OF GAS MOLECULES</p> <p>USE AN INTERACTIVE TO UNDERSTAND MORE ABOUT GASES IN THE ATMOSPHERE</p> <p>DISCUSS OBSERVATIONS FROM THE INTERACTIVE</p> <p>Slides A-I</p>	<p>Prior to the Virtual Class, the teacher should:</p> <ol style="list-style-type: none"> 1. Share Lesson Slideshow and Thinking Deeper Document with students. 2. Distribute premade molecule models or have students assemble them with materials if available. (videos linked in the slideshow or live demo can be substituted if this is not an option) 3. If using Premade Jamboard for charting student’s ideas from molecule observations, arrange to use it during the lesson and share with students after completion. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Revisit student ideas from the Discussion Board in the last lesson. 2. Discuss what happens when things warm up, and how these ideas may apply to the atmosphere and air molecules as temperatures rise. Diagram these ideas electronically or on chart paper (students will revisit this model the next day; so, it will need to be available for them.) 3. Independently reflect on tracing energy to Earth’s surface and atmosphere, then share and discuss. 4. Conduct investigation with molecule models (or watch videos/live demo of molecules moving) and record observations in a chart. 5. As a class, map out what we will observe in the PHET simulation. 6. Make and share predictions about what we will observe. 7. Work through the PHET simulation independently and answer questions. 8. Discuss observations as a class. 	

Day 2

Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 5 (3 min) NAVIGATION Slide J		VIRTUAL CLASS POSTWORK: 1. Answer the question on your TDD to review what we learned last week.
Part 6 (10 min) BUILDING UNDERSTANDINGS DISCUSSION Slide K	1. Ensure that students have access to the model from the previous class. Consider having students insert the model into their TDD as a drawing so they do not have to recreate the entire model.	VIRTUAL CLASS POSTWORK: 1. Update model to show what happened to the energy when it reached the molecules.
Part 7 (12 min) READING GASES THAT VIBRATE Slide L		VIRTUAL CLASS POSTWORK: 1. Read the paragraphs and summarize the main ideas. 2. Reflect on how we will model how the gases respond to heat in the atmosphere.
Part 8 (20 min) SUMMARIZE AND UPDATE PROGRESS TRACKER Slides M-N	<i>(will revisit in the next virtual class - note that you may choose to have students submit their new models for formative assessment purposes and to inform facilitation in the virtual class)</i>	VIRTUAL CLASS POSTWORK: 1. Make a list of ideas and update our model to answer the lesson question.

<p>Part 8 (3 min)</p> <p>NAVIGATION</p> <p>Slide O</p>		<p>VIRTUAL CLASS POSTWORK:</p> <ol style="list-style-type: none">1. Reflect on whether increasing greenhouse gases is normal.
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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](#)
- Optional Home Investigation Materials: ice cubes made with both carbonated and non-carbonated water, carbonated water

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](#)
- Optional Home Investigation Materials: ice cubes made with both carbonated and non-carbonated water, carbonated water
- [Carbonated Water Video](#)
- [Testing Ice for Gas video](#)
- [Ice Core Video](#)
- [Drilling Ice Cores Video](#)
- Virtual Class recording - *after completion*

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

- Day 1

Lesson 8 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 1-4 and revisit Parts 6 & 8 from Lesson 7 (40 min) NAVIGATION PAST CO2 LEVELS ANALYZE ICE SAMPLES ANALYZING GASES TRAPPED IN ICE Slides A-F	<p>Prior to the Virtual Class, the teacher should:</p> <ol style="list-style-type: none"> 1. Share Lesson Slideshow and Thinking Deeper Document with students. 2. If choosing to have students make their own ice cubes, give them clear directions as well as any safety considerations and ensure that they get permission or assistance from a parent or guardian. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Reflect on what we have figured out about gases in the atmosphere and the effects of greenhouse gases. 2. Share and discuss changes to models from the previous lesson (updates made based on observations of molecule models and after reading about gases). Teacher updates the class model during the discussion. Brainstorm what carbon dioxide levels might have been in the long ago past. 3. Examine ice cubes made from non-carbonated water. (Students can examine ice cubes they have at home if available to make observations or photos if not.) Record notices then share. 4. Share ideas that scientists have noticed when testing ice cores and brainstorm ideas about how we might test for carbon dioxide. 5. Watch a video about carbonated water and answer questions about what carbonated water is. (If students have carbonated water at home from making their ice cubes, they can make additional observations.) 6. Examine ice cubes made from carbonated water. (Again, students can examine ice cubes they have made if possible or photos if not.) Record notices on the table and share. 7. Examine the pictures on slide F and make predictions about what will happen in the bags. 8. Watch the video and record observations of what happened. Share observations and discuss as a class. 	

<p>Part 5 (min)</p> <p>ICE CORE DATA</p> <p>Slide G</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Watch videos of scientists using ice samples to try to determine the gas composition of the atmosphere at different times in the past. 2. Record what notices and wonders.
<p>Part 6 (8 min)</p> <p>ANALYZE DATA SCIENTISTS FIND IN THE ICE SAMPLES</p> <p>Slide H</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Analyze the graphs about different amounts of carbon dioxide at different times in the past.

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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](#)
- [Global CO2 Emissions visualization](#)

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

- None

Lesson 9 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (7 min) IDENTIFY WHEN THE PROBLEM STARTED Slides A-B	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students.	VIRTUAL CLASS PREWORK: 1. Analyze graphs to get an understanding of when the CO ₂ rise started and what could have maybe caused it to rise.
Part 2 (8 min) INITIAL IDEAS ABOUT WHAT IS CAUSING THE RISE SLIDES C		VIRTUAL CLASS PREWORK: 1. Watch a visualization of when and where CO ₂ started to rise during this time. 2. Write observations and answer the questions.
Part 3 (15 min) NEW ENERGY SOURCES SLIDES D-E		VIRTUAL CLASS PREWORK: 1. Read the article. 2. Highlight or mark up the text in places connected to the rise in CO ₂ . 3. Return to the graph on slide B to find any correlation.

<p>Part 4 (10 min)</p> <p>CONNECTING ENERGY USE, POPULATION, AND PER-CAPITA CONSUMPTION</p> <p>SLIDES F-H</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Integrate ideas about how human population growth alongside increases in per-capita consumption led to a rapid increase of CO in the atmosphere. 2. Analyze graphs and write down notices. 3. Write a formula to show how human activity relates to CO2 emission.
<p>Part 5 (3 min)</p> <p>PROGRESS TRACKER</p> <p>SLIDES I</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Answer the lesson question on the progress tracker.
<p>Part 6 (2 min)</p> <p>NAVIGATION</p> <p>SLIDE J</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Reflect on fossils fuels and their connection to CO2.

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Lesson 10 (1 day) - Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Exit Ticket Assignment](#)

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](#)
- [Burning Fossil Fuel demonstration](#)
- [Burning Methanol video](#)
- [Exit Ticket Assignment](#)
- Virtual Class recording - *after completion*

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

- Day 1

Lesson 10 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1-7 (45 min) NAVIGATION BURNING FOSSIL FUEL DEMONSTRATION LAB EXAMINE FUEL AND FOOD MOLECULES FACILITATE A BUILDING UNDERSTANDING DISCUSSION SETTING UP CARBON SYSTEM MODEL	<p>Prior to the Virtual Class, the teacher should:</p> <ol style="list-style-type: none"> 1. Create an assignment for students to turn in the exit ticket. You will need to convert into an editable form unless students have access to an app like Kami that allows them to edit pdfs. 2. OPTIONAL DICE GAME *this part of the lesson is added to the end of the google slides. If you choose to use it, refer to the teacher manual to insert in the correct place in the slideshow. If you choose not to use it, delete the slide. 3. Share Lesson Slideshow and Thinking Deeper Document with students. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Review what we know about fossil fuels thus far. 2. Discuss what we think we get from burning fossil fuels besides energy. Record questions during the discussion. 3. Predict what will happen when fossil fuels react with O₂. 4. Watch a video of the burning fossil fuel demonstration and record data. 5. Share results from the demo then discuss the need for further evidence. 6. Watch another video, this time burning methane instead of butane, and record data. 7. Discuss the results of the demonstrations and come to a conclusion (CO₂ and H₂O are products of burning fossil fuels). 8. Look at the molecules of the reactants and the products and use what we figured out to predict what fossil fuels are made of and use this information to group molecules into sugars and fossil fuels. 	

<p>FACILITATE A CONSENSUS DISCUSSION AND UPDATE MODEL</p> <p>NAVIGATION AND EXIT TICKET</p> <p>SLIDES A-T</p>	<ol style="list-style-type: none">9. Answer the progress tracker question to wrap up the idea of how burning fossil fuels puts more CO₂ into the atmosphere.10. Discuss what we know about objects on earth that give off CO₂ then create a model.11. Discuss ideas and come to a consensus that identifies that there is an imbalance in carbon dioxide in the atmosphere due to burning fossil fuels at a rate faster than can be taken up through photosynthesis. Then add these ideas to the model.12. Complete an exit ticket to show how fossil fuel use causes a change in a community's water resources.
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Lesson 11 (1 day) - Putting Pieces Together

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Version 1](#) or [Version 2](#) of the Social Media Post 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](#)
- [Version 1](#) or [Version 2](#) of the Social Media Post Assessment

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

- None

Lesson 11 (1 day) - Putting Pieces Together

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1 (15 min)</p> <p>CO-CONSTRUCT AN ARGUMENT TO A TWITTER POST</p> <p>Slides A-B</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students. 	<p>VIRTUAL PREWORK:</p> <ol style="list-style-type: none"> 1. Read a Twitter post and dissect the post for claims. 2. Evaluate the source and clarify any inaccuracies.
<p>Part 2 (10 min)</p> <p>CLARIFY CLAIMS BASED ON EVIDENCE</p> <p>SLIDES C-D</p>		<p>VIRTUAL PREWORK:</p> <ol style="list-style-type: none"> 1. Revisit claims that were inaccurate or need clarification and develop an explanation to revise each claim.
<p>Part 3 (5 min)</p> <p>CONSIDER TWEETS IN THE REAL WORLD</p> <p>SLIDES E</p>		<p>VIRTUAL PREWORK:</p> <ol style="list-style-type: none"> 1. Answer questions about an encounter with a tweet or other post that was not fully accurate and reflect on the response to that post.

<p>Part 4 (25 min)</p> <p>COMPLETE THE TWEET ASSESSMENT</p> <p>SLIDES F</p>		<p>VIRTUAL PREWORK:</p> <ol style="list-style-type: none">1. Analyze tweets for claims and compare with science ideas.2. Rewrite claims so that they are scientifically accurate and explain how our evidence and model ideas support the newly rewritten claim.
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Lesson 12 (1 day) - Problematizing

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Potential Solutions 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](#)
- [UCAR Simple Climate Model Simulation](#)
- Potential Solutions 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 12 (1 day) - Problematizing

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (5 min) REVISIT EARTH'S CARBON SYSTEM MODEL Slide A	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students. 	VIRTUAL PREWORK: <ol style="list-style-type: none"> 1. Answer questions to review what is causing the CO2 imbalance.
Part 2 (22 min) INTRODUCE UCAR SIMPLE CLIMATE MODEL & USE SIMULATION TO TEST IDEAS ON CARBON EMISSION SCENARIOS Slides B-C		VIRTUAL PREWORK: <ol style="list-style-type: none"> 1. Use UCAR Simple Climate Model Simulation to test cutting carbon emissions to different amounts and determine the effects on temperature and atmospheric carbon dioxide concentrations.
Part 3 (8 min) REFLECT ON RESULTS & MAKE RECOMMENDATIONS SLIDES D-F	<ol style="list-style-type: none"> 1. Create and assign a discussion board for students to share their answers to one or more of the reflection questions on Slide F. 2. Review submissions and facilitate as needed. 	VIRTUAL PREWORK/DISCUSSION BOARD: <ol style="list-style-type: none"> 1. Reflect on the simulation. 2. Brainstorm possible solutions to cut emissions.
Part 4 (20 min) GATHER INITIAL DATA ON SOLUTIONS SLIDES G		VIRTUAL PREWORK: <ol style="list-style-type: none"> 1. Use the spinner to determine 3 solutions to study. 2. Read about assigned solutions and consider how well the solutions meet our criteria.

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Lesson 13 (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 13 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1-4 (45 min) INITIAL SOLUTION PROPOSALS IDENTIFYING THE CONSTRAINTS REANALYZE SOLUTIONS WITH NEW CONSTRAINTS CONSENSUS DISCUSSION TO CATEGORIZE SOLUTIONS SLIDES A-H	Prior to the virtual class, the teacher should: <ol style="list-style-type: none"> 1. Share Lesson Slideshow and Thinking Deeper Document with students. 2. Prepare to record solutions on the platform of choice. VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Share which solutions seem most promising and why. TEACHER NOTE: Write down choices, or use the platform of choice, and let students vote which one they think is best. Tally up the classroom votes. 2. Create criteria and constraints for these proposed solutions. 3. Use the criteria and constraints to reanalyze solutions using the solution matrix. Fill in the 3 solutions that they did last class. 4. Share out the criteria and constraints for the 3 solutions they did last class. 5. Class discussion to categorize solutions as likely, not sure, and not good solutions. 	
Part 5 (10 min) HOME LEARNING SLIDE I		VIRTUAL CLASS POST WORK: <ol style="list-style-type: none"> 1. Use the “Home Carbon Audit” to collect information at home about what they and their family do or can do to influence the carbon imbalance

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Lesson 14 (1 day) – Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Premade digital carbon scoreboard](#) – *teacher will need to make a copy and share*
- Lifestyle Makeover 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](#)
- [Carbon Emissions Calculator](#)
- [Premade digital carbon scoreboard](#) – *alternate way to submit score and access when complete*
- Lifestyle Makeover 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 14 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 1 (15 min)</p> <p>CALCULATE INDIVIDUAL FOOTPRINT AND POST RESULTS</p> <p>Slide A</p>	<p>1. Make a copy of premade digital carbon scoreboard and share with students – <i>either share editing rights or have students submit their scores and teacher adds to the spreadsheet, adjust directions on the slideshow as needed.</i></p> <p>2. Share Lesson Slideshow and Thinking Deeper Document with students.</p>	<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Calculate their carbon footprint using the Carbon Emissions Calculator. 2. Share the score to the class scoreboard.
<p>Part 2 (8 min)</p> <p>CALCULATE CLASS AVERAGE AND COMPARE TO AMERICAN AVERAGE</p> <p>Slide B-C</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Calculate the class’s average footprint and record it. 2. Compare to the American average and record noticings.
<p>Part 3</p> <p>COMPLETE A LIFESTYLE MAKEOVER AND POST RESULTS</p> <p>Slide D</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Return to the footprint (Carbon Emissions Calculator) and choose 2-4 changes to reduce it. 2. Post the new footprint on the carbon scoreboard or submit to the teacher.

<p>PART 4 (10 min)</p> <p>FACILITATE A DISCUSSION AND COMPOUND LIFESTYLE CHANGES</p> <p>Slides E-H</p>	<ol style="list-style-type: none"> 1. Create and assign a discussion board for students to share lifestyle makeover ideas. 	<p>VIRTUAL CLASS PREWORK/DISCUSSION BOARD:</p> <ol style="list-style-type: none"> 1. Use the discussion board to share results from the lifestyle makeover activity with classmates and record ideas.
<p>Part 5 (5 min)</p> <p>NAVIGATION</p> <p>Slide J</p>		<p>VIRTUAL CLASS PREWORK:</p> <ol style="list-style-type: none"> 1. Brainstorm how to communicate about the problem and solutions to the larger community.

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Lesson 15 (3 days) - Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- [Peer Feedback Guidance](#)
- [Giving and Receiving Feedback Self-Assessment](#)
- Exit Ticket 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](#)
- [What are others doing? video](#)
- [Peer Feedback Guidance](#)
- [Giving and Receiving Feedback Self-Assessment](#)
- Exit Ticket Assignment – *teacher made*

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

- Days 1 & 3

Lesson 15 (3 days) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 1-5 (45 min) NAVIGATION WHAT ARE OTHERS DOING? CONSIDER SCHOOL OR COMMUNITY STAKEHOLDERS CHOOSE ONE SOLUTION Slide A-E	<p>Prior to the Virtual Class, the teacher should:</p> <ol style="list-style-type: none"> 1. Decide how students will turn in their projects and prepare to communicate that in class. Make any needed changes to the slideshow or TDD. 2. Share Lesson Slideshow and Thinking Deeper Document with students. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Review what the class has learned so far about reducing the CO2 emissions. 2. Watch the following video as a class. Students will answer questions as they watch. 3. The class will review the stakeholders in the school and community and discuss what solutions each stakeholder group may do. 4. As a class, vote on one solution to focus on and complete Part 2 on the TDD. 5. Communicate what students will complete and how they will turn in their project. (They will complete parts 3 and 4 on their TDD then complete the project once they have chosen a communication method.) – If time allows, students should begin this work in class then complete the project as post-work. 	

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 6 & 7 (90 min) DEVELOP COMMUNICATION ABOUT THE SOLUTION Slide F	<ol style="list-style-type: none"> NOTE: You may choose to give students an additional day to complete the project if needed. Compile projects for peer feedback during the Day 3 virtual class. 	VIRTUAL CLASS POSTWORK: <ol style="list-style-type: none"> Complete project planning portions on the TDD not already done Choose a method for communicating with the stakeholder groups and complete the project. Submit project to the teacher.

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>PRESENT FINAL PROJECTS</p> <p>Part 8 (time will vary depending on your method for presenting)</p> <p>EXIT TICKET</p> <p>Slide H</p>	<p>Prior to the virtual class, the teacher should:</p> <ol style="list-style-type: none"> 1. Determine how students will present their projects (in breakouts with groups, a few minutes per student to the class, etc.) and how feedback will be provided and make arrangements. 2. Add additional slides to Lesson Slideshow if needed and prepare to share the following resources with students: Peer Feedback Guidance, Giving and Receiving Feedback Self-Assessment 3. Create an assignment for students to submit the exit ticket. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Students present their projects in the way determined by the teacher. 2. Give feedback using the Peer Feedback Guidance. 3. Complete the Self-Assessment. 4. Assign the Exit Ticket for Post-Work or allow students to complete in class and turn in if time allows. <p>VIRTUAL CLASS POSTWORK:</p> <ol style="list-style-type: none"> 1. Complete the exit ticket – reflect on comfort level about communicating with others about climate change and solutions. 	

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Lesson 16 (1 day) - Putting Pieces Together

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](#)
- Driving Question Board

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

- Day 1

Lesson 16 (1 day) - Putting Pieces Together

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1-5 (45 min) EVALUATE OUR DQB REVISIT THE DQB ADD TO OUR PROGRESS TRACKER TWEET BLIZZARD GENERATE NEW DRIVING QUESTION BOARD Slides A-F	<p>Prior to the virtual class, the teacher should:</p> <ol style="list-style-type: none"> 1. If choosing to use padlet for the Tweet Blizzard Activity, read through the instructions and make any needed changes to the slideshow and/or TDD before sharing. 2. Share Lesson Slideshow and Thinking Deeper Document with students. 3. Ensure students have access to the DQB and can edit to add their annotations. <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Look back at the DQB and mark the questions that we can answer with a check and those they can't answer with a ?. Choose 3 questions and record the answers to on the TDD. 2. The teacher and students will revisit the DQB and review all answers. 3. Add the big question to the Progress Tracker and answer it. 4. Write a tweet with a unique hashtag. The tweet can be on a big idea, challenge, or a rewarding moment. 5. Discuss any questions that may not have been answered and how to go about answering them. 	

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