

Louisiana Believes

Distance Learning Support for OpenSciEd Grade 7 Unit 6.1 Light & Matter Field Test Unit

This resource is designed to support teachers in implementing distance learning for OpenSciEd Unit 6.1, Unit 1 in 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 6.1 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:

- [Leading an Anchor Phenomenon Routine](#)
- [Navigation Routine](#)
- [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.

Last Updated August 12, 2020



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 7-9](#)

Lesson Set 2: Lessons 7-9		
Provided Resources Students Will Need	Additional Resources Students Will Need	Additional Materials for Students Without Internet Access
<p>Lesson Slideshows for each lesson: L7, L8, L9</p> <p>Thinking Deeper Documents for each lesson: Lesson 7 TDD, Lesson 8 TDD, Lesson 9 TDD</p> <p>Additional Documents: A Window From Day to Night Assignment</p> <p>Optional: Sample Parent Letter</p>	<p>Home Investigation (Lesson 7) - Mirror</p>	<p>Prior to Lesson: Lesson 7 Video clip 1: and Video clip 2:</p> <p>After Lesson Completion: Virtual Class recordings (Lessons 8 and 9) Driving Question Board (Lesson 7,8,9) Consensus Model (Lesson 8 and 9) Discussion Board (Lessons 7 and 9)</p>
<p>Students should ideally join VIRTUAL CLASS on the following days:</p> <p style="text-align: center;">Day 16 - Lesson 8 Day 18 - Lesson 9</p>		
<p>Formative and Summative Assessment Opportunities:</p> <p>Lesson 8: Explaining what we see in setup 1 & 2 on Thinking Deeper Document</p> <p>Lesson 9: Explaining Rooms on Thinking Deeper Document</p> <p>Lesson 9: Explaining Windows from Day to Night</p> <p>Lesson 9: C.E.R. on Thinking Deeper Document</p>		

Lesson 1 (4 days) - Anchoring Phenomenon

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Notice/Wonder assignments - *teacher made*
- Driving Question Board 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](#)
- [Anchor Phenomenon Video](#)- video needs play on silent
- Notice/Wonder Assignments - *teacher made*
- Virtual Class Recording - *after completion*
- Driving Question Board Assignment - *teacher made*
- Driving Question Board - *after completion*
- Consensus Model - *after completion*

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

- Day 3

Lesson 1 (4 days) - Anchoring Phenomenon

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (10 min) INTRODUCE A PUZZLING PHENOMENON Slides A & B	1. Share Lesson Slideshow with students. Make sure students know to play video on SILENT. 2. Share Thinking Deeper Document with students_ 3. Create Notice/Wonder assignment for students to submit 1 notice and 1 wonder for the Mr. Bean Video (example google form) 4. Review Notice/Wonder responses from students in preparation to facilitate virtual class discussions.	VIRTUAL CLASS PRE-WORK: 1. Watch the anchoring phenomenon video and record noticings and wonderings on the chart. (Video needs to be played on silent.) 2. Reflect on video and answer questions of what they think is happening.
Part 2 (10 min) SHARE NOTICINGS AND WONDERINGS FROM THE MIRROR/WINDOW VIDEO Slides C	<i>Revisit in VIRTUAL CLASS on Day 3</i>	VIRTUAL CLASS PRE-WORK: 1. Turn in individual Notice/Wonder assignment to the teacher.
Part 3 (20 min) IDENTIFY THE MIRROR/WINDOW SYSTEM PARTS AND DEVELOP A DIAGRAM Slides D & E	<i>Revisit in VIRTUAL CLASS on Day 3</i> NOTE: Students can draw the model electronically using the drawing feature on Google docs or another app. They may also choose to draw on paper. If drawing on paper, students can take a picture and insert it into their document	VIRTUAL CLASS PRE-WORK: 1. Identify parts of the system that needs to be included in the initial model 2. Create an initial model to develop an understanding about the phenomenon as a system.

Part 4 (5 min) NAVIGATION Slides F		VIRTUAL CLASS PRE-WORK: 1. Generate ideas for making replica systems to investigate
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Day 2

Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 5 (5 min) NAVIGATION Slides G		VIRTUAL CLASS PRE-WORK: 1. Summarize previous lesson ideas
Part 6 (10 min) COMPARE STUDENTS' SYSTEMS DIAGRAMS FOR THE MIRROR/WINDOW	<i>Addressed in VIRTUAL CLASSES</i>	
Part 7 (15 min) PLAN AND CARRY OUT THE BOX SYSTEM INVESTIGATION Slides H-J		VIRTUAL CLASS PRE-WORK: 1. Explore the box system that replicates the video clip. 2. Make observations of what they see and wonder about in the box system
Part 8 (12 min) MAKE SENSE OF THE BOX SYSTEM Slides K-M	1. Create a second Notice/Wonder assignment for students to submit 1 notice and wonder for the box system (ex. google form)	VIRTUAL CLASS PRE-WORK: 1. Reflect and answer questions about the box system 2. Turn in individual Notice/Wonder assignment to the teacher. 3. Create a diagram of the box system

Part 9 (3 min) ASSIGN HOME LEARNING	<i>Addressed in Virtual Class</i>	
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Day 3		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 10-14 (45 min) FORM THE FIRST SCIENTISTS CIRCLE DEVELOP SHARED NORMS FOR THE CLASSROOM COMMUNITY DEVELOP AN INITIAL CONSENSUS MODEL FOR THE MIRROR/WINDOW PHENOMENON SHARE RELATED PHENOMENA THAT COULD HELP US EXPLAIN Slides N-R	VIRTUAL CLASS: 1. Develop shared norms for the virtual classroom community. 2. Discuss notices/wonders from Mr. Bean Video. 3. Have students share and compare their initial Mr. Bean models. 4. Discuss notices/wonders from the box system. 5. Have students share and compare models from the box system. 6. Discuss and listen for agreement of ideas to develop the initial consensus model for the system. 7. Discuss related phenomena 8. Teacher begins building a Driving Question Board using the platform of their choice (examples include Google Jamboard, Pinup, etc.)	
Part 14 (2 min) NAVIGATION	<i>Option to have students reflect on norms at the conclusion of the virtual class.</i>	

Day 4		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 15 (2 min) NAVIGATION	<i>Not addressed in distance learning since there is not a Virtual Class meeting on this Day.</i>	
Part 16 (8 min) SHARE INITIAL QUESTIONS WITH A PARTNER	<i>Addressed in Virtual Class on Day 3 when students share out whole class.</i>	
Part 17 (20 min) DEVELOP A DRIVING QUESTION BOARD Slide S	<p><i>*NOTE: This process begins in the Virtual Class meeting on Day 3.</i></p> <ol style="list-style-type: none"> 1. Create and share assignment for students to submit new questions (examples: google forms, discussion thread) 2. Compile and organize questions to complete Driving Question Board 3. Share completed Driving Question Board with students if they do not already have access 	<p>VIRTUAL CLASS POST-WORK</p> <ol style="list-style-type: none"> 1. Submit a new question for driving question board
Part 18 (10 min) DEVELOP IDEAS FOR FUTURE INVESTIGATION Slide T		<p>VIRTUAL CLASS POST-WORK</p> <ol style="list-style-type: none"> 1. Record ideas for future investigations
Part 19 (1 min) CHECK IN ON THE NORMS	<i>Not addressed in distance learning since there is not a Virtual Class meeting on this Day.</i>	

<p>Part 20 (5 min) DECIDE WHERE TO GO NEXT Slide U</p>		<p>VIRTUAL CLASS POST-WORK</p> <ol style="list-style-type: none">1. Record ideas of how to manipulate the box system to better understand light
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Lesson 2 (1 day) - Investigation

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

- [Lesson Slideshow](#)
- [Thinking Deeper Document](#)
- Discussion Board 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](#)
- Discussion Board - *after completion*

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

- None - *NOTE: Since there are no virtual class meetings scheduled over several days, option to build this lesson out as a Virtual Class meeting if time allows.*

Lesson 2 (1 day) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (10 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students_ 2. Share Thinking Deeper Document with students_	VIRTUAL CLASS PRE-WORK: 1. Make a prediction about moving the light to Room B
Part 2 (7 min) SWAP THE LIGHT AND OBSERVE THE BOX SYSTEM Slides B-D		VIRTUAL CLASS PRE-WORK: 1. Observe pictures of the box system with light in Room B 2. Record I see, I think, I wonder statements in the table
Part 3 (10 min) DISCUSS OBSERVATIONS OF THE LIGHT SWAP INVESTIGATION USING SENTENCE STARTERS Slide E & F		VIRTUAL CLASS PRE-WORK: 1. Reflect and answer questions about observations
Part 4 (10 min) OBSERVE THE ONE-WAY MIRROR OUTSIDE THE BOX SYSTEM Slide G-I		VIRTUAL CLASS PRE-WORK: 1. Observe pictures of the one-way mirror outside of the box system 2. Record I see, I think, I wonder statements in the table 3. Answer questions about the observations

<p>Part 5 (5 min)</p> <p>DESCRIBE DIFFERENCES IN THE BOX SYSTEM AND CLASSROOM</p> <p>Slide J</p>		<p>VIRTUAL CLASS PRE-WORK:</p> <ol style="list-style-type: none"> 1. Compare the components of the box system and the one-way mirror in the room and describe the differences
<p>Part 6 (5 min)</p> <p>NAVIGATION</p> <p>Slide K</p>	<ol style="list-style-type: none"> 1. Create and assign DISCUSSION BOARD for exit ticket (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 	<p>VIRTUAL CLASS PRE-WORK/DISCUSSION BOARD:</p> <ol style="list-style-type: none"> 1. Exit Ticket: Summarize what you learned today

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Lesson 3 (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](#)
- Driving Question Board
- Virtual Class Recording - *after completion*
- Updated DQB
- Models from Virtual Gallery Walk - *after completion*
- Consensus Discussion Model - *after completion*

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

- Day 2

Lesson 3 (2 days) - Investigation

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (12 min) ADD QUESTIONS TO THE DQB Slides A	1. Share Lesson Slideshow with students_ 2. Share Thinking Deeper Document with students_ NOTE: Add new questions to DQB during VIRTUAL CLASS on Day 2 and make sure students have access to it	VIRTUAL CLASS PRE-WORK: 1. Reflect back on what was learned and record any new questions to be added to DQB during virtual class.
Part 2 (8 min) BRAINSTORM WHAT TO TEST IN THE FLASHLIGHT INVESTIGATION Slide B		VIRTUAL CLASS PRE-WORK: 1. Brainstorm ways to test the one way mirror with a flashlight
Part 3 (12 min) CONDUCT THE FLASHLIGHT INVESTIGATION Slides C & D	<i>Option to conduct the investigation and substitute your own photos or video.</i>	VIRTUAL CLASS PRE-WORK: 1. Make observations of flashlight investigation (photos) 2. Record observations of flashlight investigation on the data table.
Part 4 (13 min) MAKING SENSE OF THE FLASHLIGHT INVESTIGATION Slides E-H		VIRTUAL CLASS PRE-WORK 1. Answer reflection questions on observations 2. Brainstorm what else we can investigate to learn more 3. Make observations of flashlight investigation with plexiglass (photos). 4. Record observations 5. Answer making sense questions

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Part 5-9 (45 min)</p> <p>NAVIGATION MODEL ONE MATERIAL IN SMALL GROUPS GALLERY WALK TO VIEW OTHER MODELS FACILITATE A CONSENSUS DISCUSSION ON HOW TO MODEL LIGHT NAVIGATION</p> <p>Slides I-N</p>	<p>NOTE: Teacher will need to develop a plan to share models prior to Virtual Class meeting (example have kids hold up and share or put in shareable document)</p> <p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Have students summarize their observations of the light shining on the three materials 2. Add any new questions to DQB from Lesson 3 Day 1 (Slide A) 3. Have students choose one material and create a model to show how the light is interacting with the materials 4. Have students share models for a virtual gallery walk. 5. Students look at models and record similarities and differences between the models on their deeper thinking document 6. Discuss models from virtual gallery walk 7. Transition to a consensus discussion about how to represent the path light travels 8. Either on chart paper or virtual board, draw consensus models on agreed upon ideas of how light travels to different materials 9. Discuss how we could test whether the one-way mirror seems more like a window or mirror 	

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Lesson 4 (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](#)
- Driving Question Board
- Virtual Class Recording - *after completion*
- Consensus Discussion Model - *after completion*
- Updated DQB - *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 (5 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students_ 2. Share Thinking Deeper Document with students_	VIRTUAL CLASS PRE-WORK: 1. Reflect on what students know from lesson 3
Part 2 (10 min) INTRODUCE THE PROGRESS TRACKER	<i>Students track progress during all lessons with Thinking Deeper Documents</i>	
Part 3 (12 min) REVIEW THE PLAN FOR MEASURING LIGHT LAB Slides B-E		VIRTUAL CLASS PRE-WORK: 1. Read over how a light meter works and investigation set-up 2. Answer questions about what data the light meter will collect when it is held in certain locations 3. Predict how the light will interact with different materials
Part 4 (18 min) CARRY OUT THE MEASURING LIGHT LAB Slides F-G	<i>Option to record data collection in photos or a video and provide to students.</i>	VIRTUAL CLASS PRE-WORK 1. Record provided data into their data charts 2. Make a conclusion based on the data about how the light interact with each material

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 5 (5 min) NAVIGATION Slide K	<i>Addressed in Virtual Class</i>	
Part 6 (10 min) RANKING MATERIALS BY REFLECTION/TRANSMISSION Slides H & I		VIRTUAL CLASS PRE-WORK 1. Rank the materials for reflection and transmission. 2. Reflect on data and answer questions. This will be discussed during virtual class
Parts 7-9 (35 min) FACILITATE A CONSENSUS DISCUSSION FOR THE MEASURING LIGHT LAB DEVELOP IDEAS AND QUESTIONS ABOUT REFLECTION NAVIGATION Slides J-M	VIRTUAL CLASS 1. Discuss data from the light lab and what we have figured out about the lab. 2. Review ranking data for reflection and transmission. 3. Discuss any patterns that were noticed in the investigation. 4. Using chart paper or virtual drawing board, sketch the two room system with the light on one side of the system. With students' agreement, redraw the model with new findings. 5. Introduce a dashed arrow to model for how much light reflects or transmits. 6. Have students jot down their thoughts on the thinking deeper document. 7. As discussion continues, revise the room model with new light arrows. 8. Students brainstorm ideas of what makes something reflective. 9. Discuss what could be investigated next. 10. Revisit DBQ - Have students record any new questions and add to the DBQ	

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Lesson 5 (2 days) - 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](#)
- Virtual Class Recording - *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 5 (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_	VIRTUAL CLASS PRE-WORK: 1. Jot down ideas about how the surface of an object reflects light
Part 2 (20 min) READ ABOUT THE WALT DISNEY CONCERT HALL Slides B-D		VIRTUAL CLASS PRE-WORK: 1. Use close-reading strategy to read and annotate Walt Disney Concert Hall Case Study 2. Summarize the key ideas from the reading.
Part 3 (10 min) WALT DISNEY CONCERT HALL READING DISCUSSION Slides E-I		VIRTUAL CLASS PRE-WORK: 1. Students explain related experiences of being blinded by light. 2. Observe demo (pictures) of mirror reflecting light and explain what's happening with model from reading 3. Students explain related experiences of scattering light. 4. Observe a demo (pictures) of light being reflected off of foil and explain what's happening with model from reading

<p>Part 4 (5 min)</p> <p>PROBLEMATIZE EVERYDAY OBJECTS THAT APPEAR SMOOTH</p> <p>Slide J</p>		<p>VIRTUAL CLASS PRE-WORK:</p> <ol style="list-style-type: none"> 1. Reflect and jot down thoughts about reflection
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Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>Parts 5-7 (40 min)</p> <p>NAVIGATION</p> <p>EXAMINE CLOSE UP IMAGES OF EVERYDAY OBJECTS</p> <p>CONSENSUS DISCUSSION ABOUT THE SURFACE OF OBJECTS</p> <p>Slides K- N</p>	<p>VIRTUAL CLASS:</p> <ol style="list-style-type: none"> 1. Have students share their ideas from the previous class (case study, their related experiences, and teacher flashlight demo (pictures) 2. Give students 5 minutes to observe and make observations of close up images of paper, cardboard, and foil. 3. Discuss observations 4. Discussion for consensus on the question: Why does the surface of an object change how light reflects off of it? 5. After you hear agreement, using chart paper or virtual drawing board draw on a model to show how light reflects off those surfaces and have students draw in their Thinking Deeper Document. 	
<p>Part 8 (10 min)</p> <p>USE THE MODEL TO EXPLAIN RELATED PHENOMENA</p> <p>Slide O</p>	<ol style="list-style-type: none"> 1. Collect and review responses to C.E.R 	<p>VIRTUAL POST-WORK:</p> <ol style="list-style-type: none"> 1. Use C.E.R. format and evidence from investigations to explain why the images are different

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Lesson 6 (1 day) - Putting Pieces Together and Problematizing

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
- Virtual Class Recording - *after completion*
- Consensus Model Diagram - *after completion*
- Updated Driving Question Board - *after completion*

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

- Day 1

Lesson 6 (1 day) - Putting Pieces Together and Problematizing

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 1-3 (34 min) NAVIGATION REVISITING ROOM A REVISIT THE DRIVING QUESTION BOARD Slides A-D	Prior to class teacher should: <ol style="list-style-type: none"> 1. Share Lesson Slideshow with students_ 2. Share Thinking Deeper Document with students_ 3. Make sure students have updated DQB 4. Have students look through their thinking deeper documents to look for ideas that might be important to create a new model. VIRTUAL CLASS: <ol style="list-style-type: none"> 1. Discuss student ideas for creating a new model. 2. Go through each symbol on the key and discuss why you will need it to explain the model. 3. Have students annotate the key 4. After discussion is finished on the key, give students time to use the symbols from the key to represent what is happening with the light as it interacts in different parts of the room. 5. Have students share their models 6. Review the DQB and identify questions that we answered and what questions will still wonder about 7. Add any new questions 	
Part 4 (20 min) EXPLAIN ROOM A Slides E-F	<ol style="list-style-type: none"> 1. Collect and review explanations to check for understanding 	VIRTUAL CLASS POST-WORK: <ol style="list-style-type: none"> 1. Using revised models, explain why the material is like a mirror in room A. 2. Jot down thoughts of where to go next

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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](#)

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 clip 1](#)
- [Video clip 2](#)
- Discussion Boards- after completion

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

- None

Lesson 7 (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_	VIRTUAL CLASS PRE-WORK: 1. Reflect on what we have figured out so far
Part 2 (10 min) COMPARE THE ONE-WAY MIRROR AND PLEXIGLASS Slide B		VIRTUAL CLASS PRE-WORK: 1. Review data from lesson 4 and make observations to compare the one-way mirror and plexiglass.
Part 3 (12 min) INVESTIGATE AND DISCUSS TRANSMISSION FROM BOTH SIDES Slides C-H		VIRTUAL CLASS PRE-WORK: 1. Predict whether the amount of light that is transmitted changes with the side the light is coming from 2. Brainstorm ideas for investigating that relationship 3. Conduct Investigation: Look over data and record it in data chart 4. Draw conclusions from the data

<p>Part 4 (5 min)</p> <p>GENERATE NEW IDEAS FOR INVESTIGATION</p> <p>Slide I</p>		<p>VIRTUAL CLASS PRE-WORK:</p> <ol style="list-style-type: none"> 1. Generate ways to investigate to explain why the one-way mirror transmits less and reflects more light than plexiglass
<p>Part 5 (10 min)</p> <p>INVESTIGATE HOW MIRRORS ARE MADE</p> <p>Slide J & K</p>		<p>VIRTUAL CLASS PRE-WORK:</p> <ol style="list-style-type: none"> 1. Watch two videos about how regular mirrors are made (Video clip 1, Video clip 2) and make observations 2. Summarize how mirrors are made
<p>Part 6 (2min)</p> <p>NAVIGATION</p> <p>Slide L</p>		<p>HOME INVESTIGATION:</p> <ol style="list-style-type: none"> 1. Look around your house for a mirror and look at it closely for the structural features and how it is made and record the findings

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 7 (2 min) NAVIGATION Slide M	1. Create and assign DISCUSSION BOARD Assignment (examples include a question thread on google stream or a shared google document)	DISCUSSION BOARD: 1. Share observations on the discussion board about the mirrors that was observed
Part 8 (15 min) OBTAIN INFORMATION ABOUT ONE-WAY MIRRORS Slides N & O		VIRTUAL CLASS PRE-WORK: 1. Use close-reading strategy to read and annotate article about regular and one way mirrors are made 2. Summarize the key ideas from the reading.
Part 9 (7min) USE THE DECAL TO MODEL THE STRUCTURE OF ONE-WAY MIRRORS Slide P		VIRTUAL CLASS PRE-WORK: 1. Look at decal that on which the flashlight is being shined 2. Make observations and explain what is happening
Part 10 (18 min) MODEL THE STRUCTURE OF THE ONE-WAY MIRROR, MIRROR, AND WINDOW Slide Q	1. Create and assign DISCUSSION BOARD Assignment (examples include a question thread on google stream or a google document that all students in the class can edit)	DISCUSSION BOARD: 1. Discuss what we have figured out about the question: How a one-way mirror is made and why it transmits less and reflects more light than a window. 2. Explain how you model light interacting with glass, one-way mirror, and mirror
Part 11 (5 min) NAVIGATION Slide R		VIRTUAL CLASS PRE-WORK: 1. Jot down your thoughts about the one-way mirror

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Lesson 8 (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](#)
- Driving Question Board
- Virtual Class Recording - *after completion*

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

- Day 2

Lesson 8 (2 day) - 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. Make sure students have updated copy of Driving Question Board	VIRTUAL CLASS PRE-WORK: 1. Reflect on what we know about one-way mirror and glass
Part 2 (7 min) SELECT QUESTIONS FROM DQB TO INVESTIGATE Slide B		VIRTUAL CLASS PRE-WORK: 1. Look at DQB board and choose what question we should investigate and why
Part 3 (10 min) PLAN AN INVESTIGATION Slide C		VIRTUAL CLASS PRE-WORK: 1. Brainstorm different lighting setups we could test 2. Predict what would happen in each setup
Part 4 (15 min) CONDUCT THE DIFFERENT LIGHTING INVESTIGATION Slides D-G		VIRTUAL CLASS PRE-WORK: 1. Look at lighting set-ups & make predictions 2. Make observations for each setup (pictures of investigation are included) 3. Answer questions about your observations
Part 5 (7 min) NAVIGATION Slide H		Virtual CLASS PRE-WORK: 1. Jot down ideas about why the differences in the brightness of lights in Room A and Room B affects what we see

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 6-9 (40 min) NAVIGATION DEVELOP A MODEL TO EXPLAIN SETUP 1 DEVELOP CONSENSUS MODEL TO EXPLAIN BOX SYSTEM SETUP 1 AND 2 FLASHLIGHT DEMONSTATION Slides I-O	VIRTUAL CLASS: 1. Share thoughts and discuss the different lighting investigations 2. Reflect and answer questions about how we see and share out the answers 3. Individually, develop a model to explain why we see a weak one-way mirror effect when there is a bright light in both Room A and B 4. Share and discuss models 5. Teacher draws the box system Setup 1 with a viewing hole for Room A on pieces of chart paper or virtual drawing board 6. Facilitate a consensus discussion about how they represent the path of light travels to the eye in Room A viewing hole for set-up 7. Teacher draws the box system Setup 2 and repeats the process. 8. If possible, conduct the flashlight demonstration (pictures are included if not) that shows how our eyes will sense the stronger light signal using a flashlight in a well-lit and dark room. 9. Individually answer questions about what they observed and share/discuss their answers	
Part 10 (5 min) EXPLAIN WHAT WE SEE IN SETUP 1 AND 2 Slide P		VIRTUAL CLASS POST-WORK: 1. Using the class model and new understanding about how are eyes sense strong and weak light and explain what we observed through Room A viewing hole in setups 1 &2
Part 11 (5 min) NAVIGATION Slide Q		HOME INVESTIGATION: 1. Look around the house and make observations and take pictures if able to of related light phenomena of seeing different things when looking at glass windows.

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Lesson 9 (2 days) - 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
- [A Window From Day to Night 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](#)
- Driving Question Board
- Final Consensus Model-after completion
- [A Window From Day to Night Assignment](#)
- Updated Driving Question Board - *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 9 (2 days) - Putting Pieces Together

Day 1		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Part 1 (5 min) NAVIGATION	1. Share Lesson Slideshow with students_ 2. Share Thinking Deeper Document with students_	<i>Addressed during virtual class</i>
Part 2 (12 min) REVISIT ALL MODEL IDEAS Slides A & B		VIRTUAL CLASS PRE-WORK 1.Look over model key and clarify what each symbol means 2.Create a model to show new ideas how light transmits, through different materials based on signal strength
Part 3 (20 min) DEVELOP A FINAL CONSENSUS	<i>Addressed during virtual class</i>	
Part 4 (8 min) CONSTRUCT AN EXPLANATION OF THE TWO ROOMS Slide C		VIRTUAL CLASS PRE-WORK: 1. Construct an explanation of the two room system to show understanding of how light is reflected and transmitted through different materials

Day 2		
Lesson Components	Distance Learning Plan	
	Teacher	Student
Parts 5-7 (35 min) NAVIGATION EXPLAINING OBSERVATIONS FROM HOME REVISIT THE DRIVING QUESTION BOARD Slides D- F	VIRTUAL CLASS: 1. Before talking about observations from home, students share their models from the previous day. 2. Develop a Consensus Model: Using chart paper or a virtual drawing board with points, A, B,C,D, and E on it, as a class discuss and draw what is happening at each point with light, in terms of reflection and transmission. Make sure you account for materials, type of surface, type of material, and strength of signal. 3. Share and discuss what they found during their home investigation looking for light phenomena 4. Revisit the DQB and check off the questions that we can answer now 5. Discuss the unanswered questions and what could be done to investigate those	
WINDOW ASSIGNMENT Slide G	VIRTUAL CLASS POST-WORK: 1. Assign A Window From Day to Night (Could be used as an assessment) 2. Review work to check for understanding	VIRTUAL CLASS POST-WORK: 1. Complete assignment, A Window From Day to Night , to explain why we see different images at different times a day after virtual class and submit.
Part 8 (5 min) UNIT CLOSING Slide H & I	1. Create and assign DISCUSSION BOARD Assignment (examples include a question thread on google stream or a google document that all students in the class can edit) 2. Collect and review student C.E.R. responses	DISCUSSION BOARD: 1. Share thoughts on their experiences of completing the light unit. VIRTUAL CLASS POST-WORK: 2. Use C.E.R. format and evidence from investigations to explain why some people may put one-way reflective film on their homes to keep them cooler.

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