

Louisiana Believes

Distance Learning Support for inquiryHub Biology Unit 1 Bend 1: Why don't antibiotics work like they used to?

This resource is designed to support teachers in implementing distance learning for iHub Biology Unit 1 Bend 1. It is intended as a supporting document and should be used in conjunction with the [Inquiry Hub High School Biology Curriculum Resources](#). The resources contained in this document have been adapted from [inquiryHub Biology](#) with permission under [Creative Commons 4.0 licensing](#).

The 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.

Updated August 18, 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. Sample Virtual Class Norms
Lesson Slideshows	Lesson progression specific to each lesson that can be shared with students in their entirety at the beginning of the lesson or broken into small portions and shared as needed. They will contain assignments for students to complete before, during, and after virtual classes, discussion boards, and home investigations. They are intended to replace the SAS documents from iHUB. These can be copied and delivered directly to students using google classroom or another platform, modified for use in your platform of choice, or printed and delivered to students without internet access.
Assignment	An assignment should be posted on a virtual platform (Google Classroom, Schoology) that can be accessed and edited by students. Assignments should have the option to “make a copy” for each student so that students can individually complete work and turn in that individual work to the teacher for review, feedback, and assessment.
Discussion Boards	Assignments designed for students to share ideas and engage in discussion with one another over time rather than a live environment. Students should use documents from individual work to plan their public discussion. Usually students will post some original comments into a group discussion and respond to a specified number of others. Ensure that norms are established for appropriate posting behavior, just like you would set norms for your classroom discussion. Teachers may choose to allow students without internet access 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

Unit 1 Bend 1	
Resources Students Will Need	Additional Materials for Students Without Internet Access
<p>Lesson Slideshows for each lesson:</p> <p>Lesson 1, Lesson 2, Lesson 3, Lessons 4 & 5, Lesson 6, Lesson 7, Lesson 8, Lesson 9, Lesson 10, Lesson 11, Lesson 12, Lesson 13, LA Lesson LSSS-HS-LS1-8</p> <p>Additional Materials Lesson 1:</p> <ul style="list-style-type: none"> • Incremental Modeling Tracker - used throughout Bend 1 • Video transcript <p>Additional Materials Lesson 3:</p> <ul style="list-style-type: none"> • Discussion assignment (teacher made - discussion board, Padlet, live Zoom, etc.) • Teacher video lecture (optional) • Lesson 3 Investigation Google Form (teacher make a copy of google form) • Lesson 3 Experimental Results 	<p>Prior to Lessons (videos and documents): *Print Copies of All Slideshows and SEETs*</p> <ul style="list-style-type: none"> • Lesson 1: Frontline Video: Hunting the Nightmare Bacteria • Lesson 2: Articles for Investigation (Slide 9 of Lesson Slideshow) <p>(A. What is MRSA?, B. About Resistant Bacteria in Public Transit System, C. Timeline Chart of MRSA Resistance, D. Antibiotic Resistant Threats in the US, 2013, E. About Resistant Bacteria in Public Transit System)</p> <ul style="list-style-type: none"> • Lessons 4&5: Bacterial Growth Time-Lapse Video & Optional Binary Fission video (suggestion - edit to 2:10) • Lesson 6: Student Investigation Data & Lesson 6 Simulation video Tutorial • Lesson 7: Virtual Lesson Video & SEET Exit ticket (teachers make a copy for yourself) • Lesson 8: Food Color Diffusion Video, Investigation 1 Experimental Results & Investigation 2 Experimental Result • Lesson 10: iHub Simulation Model Video (teacher/student made) & Lesson 10 Investigation #1 Student Data • Lesson 11: Generational Bacteria Graphs for analysis • Lesson 12: Darwin vs Lamarck Text • LSSS-HS-LS-1-8: Virus Video, Immunity Video, TEDEd Video & printed questions from this TED.Ed Lesson <p>After Lesson Completion: *Copy of DQB after every update* Virtual Class recordings (Teacher records Virtual Classes and shares videos with absent or un-connected students.)</p>
<p>Students should ideally join VIRTUAL CLASS on the following Lessons: 1, 2, 3, 4/5, 8, 9, 11, 12, 13 (pre-assessment) <i>*Could be altered for discussion board if virtual class time is limited: 2, 3, 9</i></p>	

Formative and Summative Assessment Opportunities:

All Slides where students fill in answers and notes can be used for formative assessment. These are to be turned in to the teacher. Feedback can be delivered through comments and work revised if needed.

All Discussions (whether live or on a board) can be used for formative assessment

IMTs updates - check for understanding

SEETs - focus quiz type assessments

Lesson 13 is the Summative Assessment for Bend 1 ([Rubric](#))

Lesson List

[Lesson 1](#)

[Lesson 2](#)

[Lesson 3](#)

[Lesson 4 & 5](#)

[Lesson 6](#)

[Lesson 7](#)

[Lesson 8](#)

[Lesson 9](#)

[Lesson 10](#)

[Lesson 11](#)

[Lesson 12](#)

[Lesson 13](#)

[Virus Lesson \(added for LA specific standard HS LS 1-8\)](#)

Lesson 1 - How did this little girl (Addie) get so sick?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)

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

- Anchor Phenomenon Videos: [Frontline Video: Hunting the Nightmare Bacteria](#)
- [Video transcript](#)
- [Lesson Slideshow](#)
- Virtual Class recording - *after completion*
- [Incremental Modeling Tracker](#)

Lesson 1 - How did this little girl (Addie) get so sick?

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PRE-WORK (Slides: 3-7) Parts 1 - 2	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review Notice/Wonder responses from students in preparation to facilitate VIRTUAL CLASS discussions 	<ol style="list-style-type: none"> 1. Watch Frontline Bacteria video 2. Complete Notice/Wonder chart using video and transcript (embedded in Google Slide)
VIRTUAL CLASS (Slides: 8 - 22) Parts 3 - 7, 8	<ol style="list-style-type: none"> 1. Discuss and share out timelines to create class consensus. 2. Complete "Kinds of Bacteria" Chart 3. Engage students in discussion with prompts from the Lesson Slideshow 4. Students create initial models. 5. Students share and compare initial models. 6. Introduce IMT and collaborate to fill out the first row 	
VIRTUAL CLASS POST-WORK (Slides: 23 - 24) Part 9	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). Refer to notes on slide 18. 2. Review students' initial questions (this can be done directly on Google slideshow, Padlet, or a discussion board) 3. Review students' initial models 	<ol style="list-style-type: none"> 1. Review IMT 2. Complete initial questions 3. Turn in slideshow

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Lesson 2 - How common is this problem? Can it happen to me?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- EXIT Ticket (teacher made - optional)

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

- [CDC Summary AR Threats](#)
- [Lesson Slideshow](#)
- Virtual Class recording - *after completion*
- [Incremental Modeling Tracker](#)
- Articles for Investigation (Slide 9 of Lesson Slideshow)
 - A. [What is MRSA?](#)
 - B. [About Resistant Bacteria in Public Transit System](#)
 - C. [Timeline Chart of MRSA Resistance](#)
 - D. [Antibiotic Resistant Threats in the US, 2013](#)
 - E. [About Resistant Bacteria in Public Transit System](#)
- EXIT Ticket (teacher made - optional)

Lesson 2 - How common is this problem? Can it happen to me?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>VIRTUAL CLASS PRE-WORK</p> <p>(Slides 3 - 11)</p> <p>Parts 1, 3-5</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Assign each student one of the articles (embedded in slideshow) to read as pre-work. (slide 9) 3. Review student pre-work before coming to virtual class 4. Set up DQB assignment (refer to slide 18) 	<ol style="list-style-type: none"> 1. Share experience in relation to antibiotics and infection 2. Analyze CDC infographic and answer questions 3. Read assigned article and take notes on Connect Extend Question document (slide 10)
<p>VIRTUAL CLASS</p> <p>(Slides 12 - 19)</p> <p>Parts 2, 6 - 8 - 10</p>	<ol style="list-style-type: none"> 1. Sharing ideas discussion 2. Teacher facilitated discussion and sharing of notes from each assigned article. Use questions on slides 15 - 16 to guide discussion. 3. Teacher facilitates creation of Driving Questions Board (via discussion, breakout rooms on Zoom, padlet, etc.) 	
<p>VIRTUAL CLASS POST-WORK</p> <p>(Slides 20 - 24)</p> <p>Part 11</p>	<ol style="list-style-type: none"> 1. Review student slideshow 2. Create DQB using all student questions to post on preferred platform for students to access 	<ol style="list-style-type: none"> 1. Complete IMT for Lesson 2 2. Write ideas for future investigations 3. EXIT ticket (teacher made) 4. Turn in slideshow

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Lesson 3 - Where are the bacteria around us?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- Discussion assignment (teacher made - discussion board, Padlet, live Zoom, etc.)
- Teacher video lecture (optional)
- [Lesson 3 Investigation Google Form](#) (teacher make a copy of google form)
- [Lesson 3 Experimental Results](#)

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

- [Lesson Slideshow](#)
- Copy of discussion assignment (when complete)
- Teacher video lecture (optional)
- [Incremental Modeling Tracker](#)
- Printed copy of [Lesson 3 Investigation Google Form](#)
- [Lesson 3 Experimental Results](#)
- Virtual Class recording - *after completion*

Lesson 3 (alternate) - Where are the bacteria around us?

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PRE-WORK (Slides: 3-6) Part 1	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow 2. Review student prework responses 3. Create discussion assignment (slide 8) via application appropriate to teacher’s preferred platform (padlet, jamboard, etc.) 4. Record video to accompany slides 9/10 (if using) 	<ol style="list-style-type: none"> 1. Answer prework thinking questions.
VIRTUAL CLASS <i>(option to substitute DISCUSSION BOARD)</i> (Slides: 7-12) Part 2 - 4	<ol style="list-style-type: none"> 1. Students participate in teacher created discussion assignment (live Zoom, Padlet, discussion board). Teacher may want to participate in discussion board by adding to the conversation in order to lead or focus the discussion (Refer to Alt Lesson 3A Part 1 and 2 to guide discussion) 2. Read through (or watch a teacher made video) explaining petri dish, agar, and procedure. 3. Complete Lesson 3 Investigation google form. 	
VIRTUAL CLASS POST-WORK (Slides: 13 - 21) 3A Part 5 - 6 3B (alt directions) Parts 2-6	<ol style="list-style-type: none"> 1. Make a copy of Lesson 3 Investigation Google form to post on slide 11. 2. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 3. Review Lesson 3 investigation google form and Post work prediction comparison 4. Opportunity for assessment - CER - give feedback to students via “comments” on Google Slides 	<ol style="list-style-type: none"> 1. Compare predictions to results 2. Write CER 3. Complete IMT for Lesson 3 4. Review discussion board question and add questions 5. Turn in slideshow

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Lesson 4 & 5 - How are we using our antibiotics? How do bacteria grow?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- Optional [SEET Exit Ticket](#) (Google Form)
- Optional [Binary Fission](#) video (suggestion - edit to 2:10 using Edpuzzle or another video app)

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

- [Lesson Slideshow](#)
- [Incremental Modeling Tracker](#)
- Bacterial Growth [Time-Lapse Video](#)
- Printed version of Optional [SEET Exit Ticket](#) (Google Form)
- Optional [Binary Fission](#) video (suggestion - edit to 2:10 using Edpuzzle or another video app)
- Virtual Class recording - *after completion*

Lesson 4 & 5 - How are we using our antibiotics? How do bacteria grow?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>VIRTUAL CLASS PRE-WORK</p> <p>(Slides: 3 - 9)</p> <p>Lesson 4 Parts 1 - 3</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses 3. Optional suggestion - Give feedback to students on slides 5 & 6 4. Make a copy of SEET exit ticket (if using) and change the link on slide 21 	<ol style="list-style-type: none"> 1. Answer prework thinking questions. 2. Read article and summarize in table on slideshow 3. Watch Lysol commercial and answer 2 more thinking questions <p>(Prework comes from Lesson 4)</p>
<p>VIRTUAL CLASS</p> <p>(Slides: 10 - 15)</p> <p>Lesson 5 Part 2 - 3A</p>	<ol style="list-style-type: none"> 1. Sharing ideas discussion 2. Watch time-lapse video and record observations; discuss. 3. Complete data set with teacher guidance. 4. Watch teacher modeling creation of a mathematical model of bacterial reproduction. <p>(optional breakout session for special education students or students with accommodations for deficiencies in math to work in small group with teacher or special ed teacher to complete the graph after other students sign out of zoom)</p>	
<p>VIRTUAL CLASS POST-WORK</p> <p>(Slides: 16 - 23)</p> <p>Lesson 5 Part 3B - 6</p>	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Review student graphs, SEET, and postwork thinking questions. Give feedback using “comments” as necessary 	<ol style="list-style-type: none"> 1. Complete graph and insert into slide 16 2. Complete IMT for Lesson 4 & 5 3. Answer thinking questions 4. Watch Binary Fission video 5. Complete SEET exit ticket 6. Turn in slideshow

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Lesson 6 - How do bacteria grow in a simulated environment?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Student Investigation Data](#)

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

- [Lesson Slideshow](#)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Student Investigation Data](#)
- [Lesson 6 Simulation video Tutorial](#)
- Students will need to visit a library to perform the simulation or the teacher may choose to make a screen recording of the simulation and provide it to them.

NOTE: This lesson is designed to be delivered as an “assignment” and can be done asynchronously as post work for the previous lesson.

Lesson 6 - How do bacteria grow in a simulated environment?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>ASSIGNMENT PRE-WORK</p> <p>(Slides: 2 - 7)</p> <p>Lesson 5 Home Learning Lesson 6 Part 1</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses 3. Preview video of teacher modeling how to use iHub online simulation OR upload teacher-made video 	<ol style="list-style-type: none"> 1. Complete thinking questions
<p>ASSIGNMENT</p> <p>(Slides: 8 - 21)</p> <p>Parts 2 - 6</p>		<ol style="list-style-type: none"> 1. Complete investigation #1 and #2 using iHub simulation (video included to model how to use simulation) 2. Record data, create a graph, and answer Making Sense questions for Investigation #1 3. Record data for Investigation #2 and create a graph
<p>ASSIGNMENT POST-WORK</p> <p>(Slides: 22 - 32)</p> <p>Parts 7 - 8 & Home Learning Optional Discussion Board - Parts 9 - 11</p>	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Review student virtual work (Making sense questions, conclusion, graphs) 3. Post and participate in discussion board (optional) 	<ol style="list-style-type: none"> 1. Students compare their graph to other graphed data 2. Answer Making Sense Questions, Conclusion, and Next Steps 3. Participate in Discussion Board (optional per teacher) 4. Complete Lesson 6 IMT 5. Complete Exit Ticket & Turn in slide show

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Lesson 7 - How are bacteria killed?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Virtual Lesson Video](#)
- [SEET Exit ticket](#) (teachers make a copy for yourself)

NOTE: This lesson does not require a virtual class, but is intended as pre-work for Lesson 8.

Lesson 7 - How are bacteria killed?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>ASSIGNMENT PRE-WORK</p> <p>(Slides 4 - 5)</p> <p>Parts 2</p>	<p>1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.)</p> <p>2. Make a copy of the SEET exit ticket and change the link to insert in the slideshow.</p>	<p>1. Answer brainstorm question based on lysol commercial.</p>
<p>ASSIGNMENT</p> <p>(Slides 6 - 17)</p> <p>Parts 3 - 6</p>		<p>1. Watch a video to complete Investigation 1 and fill out a table of bacteria killed with an antibiotic, then graph it and insert graph into slide 9.</p> <p>2. While watching the video, complete Investigation 2 and fill in the first few rows of the table on slide 11. Then complete the table on their own.</p> <p>**optional differentiation - high-level students can graph Investigation 2</p> <p>3. Answer Making Sense Questions.</p>
<p>ASSIGNMENT POST-WORK</p> <p>(Slides 18-22)</p> <p>Parts 7-9</p>	<p>1. Share IMT with students as an assignment (on Google classroom, schoology, etc.).</p> <p>2. Review student virtual work (Making sense questions, graphs) and give feedback as needed.</p> <p>3. Assess Exit ticket</p>	<p>1. Answer Next Steps question</p> <p>2. Complete Lesson 7 IMT</p> <p>3. Complete Exit Ticket</p> <p>4. Turn in slide show</p>

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Lesson 8 - How do antibiotics affect bacteria when they are put together?

In a traditional classroom setting, Lesson 8 is completed over several days in which students engage in plating a known bacteria such as e.coli, add antibiotics (8a), analyze how the bacteria responded to a round of antibiotics (8b), and analyze how the bacteria responded to a second round of antibiotics (8c). Because students will not plate e. Coli at home, this lesson has been revised into one virtual Lesson 8 with no lessons in between.

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Investigation 1 Experimental Results](#)
- [Investigation 2 Experimental Result](#)

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Food Color Diffusion Video](#)
- [Investigation 1 Experimental Results](#)
- [Investigation 2 Experimental Result](#)
- Virtual Class recording - *after completion*

Lesson 8 - How do antibiotics affect bacteria when they are put together?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>VIRTUAL CLASS PRE-WORK</p> <p>(Slides 3 - 4)</p> <p>culminating ideas - no parts</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses. 	<ol style="list-style-type: none"> 1. Complete Connecting Ideas questions on slideshow
<p>VIRTUAL CLASS</p> <p>(Slides 6 - 19)</p> <p>Parts 8A Parts 1a, 2b, 5 8B Part 1, 2, 5 8C Part 2,3</p>	<ol style="list-style-type: none"> 1. Sharing ideas discussion based on Lessons 6 and 7. 2. Teacher shares video demo of food coloring spread on agar in petri dish 3. Teacher shows a picture and explains the setup of the investigation (optional for students to plan/design investigation) 4. Students make predictions, then analyze results using Investigation 1 Experimental Results linked in the slideshow and answer Making Sense Questions. 5. Teacher leads discussion to introduce Investigation 2 6. Students analyze results using Investigation 2 Experimental Results linked in the slideshow and complete observation chart. 	
<p>VIRTUAL CLASS POST-WORK</p> <p>(Slides 18 - 24)</p> <p>Part 8C Part 4</p>	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Review student virtual work (Making sense questions, next steps) and give feedback as needed (Slide 4 & 17) 3. Assess Exit ticket 	<ol style="list-style-type: none"> 1. Students complete Next Steps questions. 2. Complete Lesson 8 IMT 3. Complete Exit Ticket 4. Turn in slide show

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Lesson 9 - What's happening inside Addie?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- Virtual Class recording - *after completion*

Lesson 9 - What's happening inside Addie?

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PRE-WORK (Slides 3 - 9) Parts 1 - 2	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Plan and share IMT discussion board activity (slide 5) via application appropriate to teacher's preferred platform (padlet, jamboard, etc.) 	<ol style="list-style-type: none"> 1. Answer reflection questions. 2. Participate in IMT discussion. 3. Complete Connecting Ideas chart
VIRTUAL CLASS (Slides 10 - 13) Parts 4-5	<ol style="list-style-type: none"> 1. Teacher-led Consensus Building discussion to review Connecting Ideas Chart. 2. Add to DQB. 	
VIRTUAL CLASS POST-WORK (Slides 14 - 17) Part 6	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Review student virtual work (Connecting Ideas Chart, IMT) 	<ol style="list-style-type: none"> 1. Complete Lesson 9 IMT 2. Turn in slide show

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Lesson 10 - How does a bacterial population change in a simulated infection?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Lesson 10 Investigation #1 Student Data](#)

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Lesson 10 Investigation #1 Student Data](#)
- Students will need to visit a library to perform the [antibiotics simulation](#) or the teacher may choose to make a screen recording of the simulation and provide it to them.

Lesson 10 - How does a bacterial population change in a simulated infection?

Lesson Components	Distance Learning Plan	
	Teacher	Student
ASSIGNMENT PRE-WORK (Slides 3 - 8) Parts 1 & 3	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Preview video of teacher modeling how to use iHub online simulation OR upload teacher-made video 3. Review student prework responses. 	<ol style="list-style-type: none"> 1. Answer brainstorm and predict questions.
ASSIGNMENT (Slides 8 - 28) Parts 4 - 7, 9-12		<ol style="list-style-type: none"> 1. Students complete Investigation 1, record data, compare results. 2. Students create a model of antibiotics interacting with different varieties of bacteria. 3. Students complete Investigation 2, record data, answer Making Sense, and Conclusion.
ASSIGNMENT (Slides 29 - 35) Part 13 - 14	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Review student virtual work (Making sense questions, next steps) and give feedback as needed (Slide 4 & 17) 3. Opportunity for assessment - slides 27, 29, 30 	<ol style="list-style-type: none"> 1. Complete Think about it Questions 2. Complete Lesson 10 IMT 3. Add to DQB 4. Turn in slide show

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Lesson 11 -How does moving bacteria that survive antibiotic doses from one environment to another affect the population over time?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Generational Bacteria Graphs for analysis](#)

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- Students will need to visit a library to perform the [antibiotics simulation](#) or the teacher may choose to make a screen recording of the simulation and provide it to them.

Lesson 11 -How does moving bacteria that survive antibiotic doses from one environment to another affect the population over time?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>VIRTUAL CLASS PRE-WORK</p> <p>(Slides 2 - 13)</p> <p>Parts 1, 2, 4</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses. 	<ol style="list-style-type: none"> 1. Students answer questions thinking back to Lesson 8. 2. Brainstorm about how the simulation will help answer questions. 3. Complete “Contagion” simulation investigation, record data, and graph. 4. Answer Conclusions question.
<p>VIRTUAL CLASS</p> <p>(Slides 14 - 19)</p> <p>Parts 1, 6A - D</p>	<ol style="list-style-type: none"> 1. Students discuss prework questions on slides 4 & 5. 2. Students share the graphs they created from prework. Options: students hold up hand drawn graph or share their screen; teachers compile a random selection of student graphs on a word document or slideshow and share the screen with students so they can view. Teacher leads a discussion comparing graphs. 3. Students access the Generational Bacteria graphs and analyze to answer questions. Options: students can analyze independently or teachers can create breakout rooms in the zoom session for students to analyze graphs in small groups. 4. Teacher models natural selection following guidelines in Learning Plan Part 6. 	
<p>STUDENT POST-WORK</p> <p>(Slides 20 - 26)</p> <p>Part 8</p>	<ol style="list-style-type: none"> 1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. Opportunity for assessment - slides 20 - 21 	<ol style="list-style-type: none"> 1. Complete Thinking Questions 2. Complete Lesson 11 IMT 3. Add to DQB 4. Turn in slide show

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Lesson 12 - How did the bacteria population become more resistant in Addie and in our community?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- [Darwin vs Lamarck Text](#)

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)
- Virtual Class recording - *after completion*

Lesson 12 -How did the bacteria population become more resistant in Addie and in our community?

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PRE-WORK (Slides 2 - 5) Parts 1	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses. 	<ol style="list-style-type: none"> 1. Answer reflection question.
VIRTUAL CLASS (Slides 6 - 14) Parts 1, 2A, 2B, 2C, 3, 4	<ol style="list-style-type: none"> 1. Teacher leads Sharing Ideas discussion. 2. Teacher leads students in the creation of the Natural Selection model. 3. Students work independently, with a small group, or whole class (teacher preference) to make Gotta Have It check list by referring to Lesson 9 slides 6, 7, 8. Review as a whole group. 	
VIRTUAL CLASS POST-WORK (Slides 15-22) Part 5	<ol style="list-style-type: none"> 1. Direct student to utilize gotta have it checklist when comparing Lamarck's and Darwin's ideas then fill in IMT 	<ol style="list-style-type: none"> 1. Complete Next Steps Questions. 2. Read Lamarck vs Darwin text and complete chart. 3. Complete Lesson 12 IMT. 4. Turn in slideshow.

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Lesson 13 -What questions can we answer about bacteria and Addie’s situation?

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Rubric](#) for Aphid Assessment

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Rubric](#) for Aphid Assessment
- Virtual Class recording - *after completion*

Lesson 13 -What questions can we answer about bacteria and Addie’s situation?

Lesson Components	Distance Learning Plan	
	Teacher	Student
<p>VIRTUAL CLASS PRE-WORK</p> <p>(Slides 3 - 6)</p> <p>Parts 3, 4</p>	<ol style="list-style-type: none"> 1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) 2. Review student prework responses. 3. Link Class DQB to slide 4 	<ol style="list-style-type: none"> 1. Summarize important takeaways from IMT thus far. 2. Choose and answer 3 DQB questions.
<p>VIRTUAL CLASS</p> <p>(Slides 7 - 11)</p> <p>Parts 2, 4 - 6, 8</p>	<ol style="list-style-type: none"> 1. Students participate in Sharing Ideas discussion about Lesson 12 post work 2. Students share ideas from DQB pre-work 3. Teacher explains Aphid Model Assessment to students to prepare them to complete it for post work 	
<p>VIRTUAL CLASS POST-WORK</p> <p>(Slides 11 - 20)</p> <p>Part 8</p>	<ol style="list-style-type: none"> 1. Summative assessment opportunity - Aphid Model Assessment 2. Asses student IMT 	<ol style="list-style-type: none"> 1. Complete summative assessment - Aphid Model 2. Turn in IMT

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Louisiana Specific Virus Lesson -HS-LS1-8- What else causes disease besides bacteria? How is the reproduction different in viruses and bacteria? How do vaccines cause immunity? How does the immune system work?

**This lesson is not included in the iHub Curriculum resources, but in order to meet the requirements of the LSSS HS-LS1-8 Standard, this lesson may be included where it makes the most sense for your students. Suggestions: after Lesson 5; at the end of the Unit to transition to genetic diseases; Wherever your students naturally question about viruses or disease unrelated to bacteria.

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

- [Lesson Slideshow](#) (links to all videos and documents are embedded in the slideshow)
- [Incremental Modeling Tracker](#) (*to be used throughout Bend 1*)

Louisiana Specific Virus Lesson

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PRE-WORK (Slides 2 - 7)	1. Share Lesson Slideshow with students as assignment so that each student gets an individual copy of the slideshow (example - Google Classroom, Schoology, etc.) Optional: Share this link https://ed.ted.com/on/shzwXXEd as an assignment You can assign part or all of these questions. If you want student answers to go directly to you, copy and publish your own version	1. Students watch a video on viruses and complete a Notice/Wonder chart 2. Students complete a summary chart on viral reproduction 3. Students analyze a diagram and explain the differences between the lytic and lysogenic cycles 4. Students complete Ted.ed lesson https://ed.ted.com/on/shzwXXEd
VIRTUAL CLASS (Slides 8 - 14) <i>*Could be done asynchronously using discussion board</i>	1. Students participate in a Sharing Ideas discussion to share prework answers 2. Students answer thinking questions and participate in discussion 3. Students watch a video on vaccines as a whole class and discuss, or discuss Ted.ed lesson	
VIRTUAL CLASS POST-WORK (Slides 15 - 18)	1. Share IMT with students as an assignment (on Google classroom, schoology, etc.). 2. OPTION: if transitioning between Units 1 and 2, make a copy of this chart and assign each student to add a different disease to each column. Use this document to focus the class before delivering the DMD video in unit 2	1. Students update IMT

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