Louisiana Believes

Distance Learning Support for OpenSciEd Grade 8
Unit 8.6 Natural Selection and Common Ancestry

This resource is designed to support teachers in implementing distance learning for OpenSciEd Grade 8 Unit 8.6, Unit 7 in 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 8.6 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 November 22, 2021

DEPARTMENT of EDUCATION
Louisiana Believes

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

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

Lesson Set 1: Lessons 1-4		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for each lesson: L1, L2, L3, L4 **Thinking Deeper Documents for each lesson:** Lesson 1 TDD, Lesson 2 TDD, Lesson 3 TDD, Lesson 4 TDD **Additional Documents:** Lesson 1 Modern & Pedro Penguin Data Cards Lesson 1 Student Jamboard Lesson 2 Student Jamboard Lesson 3 Student Jamboard Lesson 3 Ancient Penguin Data Cards Slideshow Lesson 4 Penguins Student Jamboard - *(optional)*	**After each lesson:** Penguins Teacher Jamboard with completed slides from student-facing Jamboards (view only access) **Other resources:** Lesson 3:Lesson 1 Modern & Pedro Penguin Data Cards from the previous Lessons Lesson 4: Ancient Penguin Cards Slides and Lesson 3 TDD, Driving Question Board (from Lesson 2 student Jamboard)	**Prior to Lesson**: Lesson 1: Penguins Detroit Zoo Recording, A Surprising Find Podcast, Transcript of Podcast, Lesson 2: External Trait Data Strips, External Trait Key, Penguin Stickers, Internal Trait Data Strips, Internal Trait Key Lesson 3: Internal Trait Key **After Lesson Completion:** Virtual Class recordings (Lessons 1, 2, 3, 4)
Students should ideally join VIRTUAL CLASS on the following days: Days 1 & 2 - Lesson 1 Day 5 - Lesson 2 Day 7 - Lesson 3 Day 9 - Lesson 5		
Formative and Summative Assessment Opportunities: Lesson 1: Initial Explanations (TDD on Day 3) Lesson 2: Progress Trackers (TDD, Days 1 & 2) Lesson 3: Progress Tracker (TDD, Day 2) Lesson 4: Revisions on Lesson 1 Initial Explanation (TDD)		

Lesson Set Overview: Lessons 5, 6, 7, 8

Lesson Set 1: Lessons 5-8		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for each lesson: L5, L6, L7, L8 **Thinking Deeper Documents for each lesson:** Lesson 5 TDD, Lesson 6 TDD, Lesson 7 TDD, Lesson 8 TDD **Additional Documents:** Lesson 7 Student Jamboard Analyzing Data for Your Case Spreadsheet	**After each lesson:** Penguins Teacher Jamboard with completed slides from student-facing Jamboards (view only access) • Lesson 6: Lesson 1 Student Jamboard with DQB - *completed view-only version* • Lesson 7: Lesson 1 Student Jamboard - *editable version or completed view-only version and a new editable frame* • Lesson 8: System Model Poster - *after completion*	**Prior to Lesson**: Lesson 5: Day 1 Organism Cards: Horseshoe Crabs, Whales, Horses; Day 2 Organism Cards: Horseshoe Crabs, Whales, Horses Lessons 7 & 8: One of these: Cliff Swallow Data Packet, Peppered Moth Data Packet, Mustard Plant Data Packet, Finch Data Packet **After Lesson Completion:** Virtual Class recordings (Lessons 5, 6, 7, 8)
Students should ideally join VIRTUAL CLASS on the following days: Day 2 - Lesson 5 Day 3 - Lesson 6 Days 5 & 6 - Lesson 7 Day 8 - Lesson 8		
Formative and Summative Assessment Opportunities: Lesson 5: Predicted Groupings *(end of Day 1, TDD)*, Navigation *(end of Day 2, TDD)* Lesson 6: Claim *(end of Day 1, TDD)* Lesson 7: Case Study Data Analysis *(Days 1 & 2 , TDD & Spreadsheet)*, Making a Preliminary Model & Creating a System Model Poster *(Day 3 Post-Work, TDD)* Lesson 8: Exit Ticket *(end of Day 1, TDD)*, Prepare to Develop Our General Model *(Day 2 Post-Work, TDD)*		

Lesson Set Overview: Lessons 9, 10, 11

Lesson Set 1: Lessons 9-11		
Provided Resources Students Will Need	**Additional Resources Students Will Need**	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for each lesson: L9, L10, L11 **Thinking Deeper Documents for each lesson:** Lesson 9 TDD, Lesson 10 TDD, Lesson 11 TDD **Additional Documents:** Lesson 11 Student Jamboard	**After each lesson:** Penguins Teacher Jamboard with completed slides (view only access) • Lessons 9, 10, 11: General Model for Natural Selection • Lesson 11: Driving Question Board **Other resources:** Lesson 11: Shared document for sharing group models, Padlet or other shared space for "tweets"	**Prior to Lesson**: Lesson 9: Printed images from neutrophil video; Screencast of Simulation Investigations *(teacher made);* Simulation Orientation Video Lesson 10: Simulation Orientation Video **After Lesson Completion:** Virtual Class recordings (Lessons 9, 10, 11)
Students should ideally join VIRTUAL CLASS on the following days: Day 1 - Lesson 9 Day 3 - Lesson 10 Days 6 & 7 - Lesson 11		
Formative and Summative Assessment Opportunities: Lesson 9: Progress Tracker *(end of Day 1, TDD)*, Refining and Applying our General Model for Natural Selection *(end of Day 2, TDD)* Lesson 10: Data Table *(end of Day 1, TDD),* My Model For Changes in Bacteria Populations *(end of Day 2, TDD)* Lesson 11: My Model for Changes in Horses Toes *(end of Day 1, TDD);* DQB question answers and Progress Tracker *(end of Day 2, TDD)*		

Lesson 1 (4 days) - Anchoring Phenomenon

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

- Lesson Slideshow - *This works best as a shared document to which students have view-only access so it can be updated in real-time if needed.*
- Thinking Deeper Document - *Each student will need an editable copy.*
- Lesson 1 Modern & Pedro Penguin Data Cards - 1 per group
- Lesson 1 Student Jamboard with selected frames of Penguins Teacher Jamboard - ***Important notes about Jamboard:*** *You should have a teacher Jamboard and student-facing Jamboard for EACH section (class). Students will need to have edit access to the student-facing Jamboard to contribute. As needed, you can copy and paste frames from the student-facing Jamboard into the Teacher one and either share with students as viewers or as a pdf.*

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
- Penguins Detroit Zoo Recording
- A Surprising Find Podcast
- Transcript of Podcast *(linked in TDD)*
- Lesson 1 Modern & Pedro Penguin Data Cards
- Lesson 1 Student Jamboard with selected frames of Penguins Teacher Jamboard - Alternative way of contributing notices, wonders, ideas for investigation etc to student Jamboard. (ex. text app and teacher or other students adds ideas to student-facing Jamboard). Completed teacher Jamboard pdf with copies of their class's student-facing frames for this lesson.
- Virtual Class recordings

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

- Day 2
- Day 3

Lesson 1 (4 days) - Anchoring Phenomenon

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (5 min) OBSERVE LIVE PENGUINS Slide A	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students.	VIRTUAL CLASS PRE-WORK: 1. Watch video and live feed from the Detroit Zoo. 2. Record notices and wonders.
Part 2 (12 min) MEET PEDRO, HUMAN-SIZED PENGUIN Slide B		VIRTUAL CLASS PRE-WORK: 1. Listen to podcast and read along on the transcript. 2. Record interesting ideas and questions.
Part 3 (8 min) BRAINSTORM TYPES OF EVIDENCE NEEDED Slide C		VIRTUAL CLASS PRE-WORK: 1. Consider ways that living things are connected to each other and how living penguins are connected to Pedro.
Part 4 (15 min) MEET THREE TYPES OF PENGUINS ALIVE TODAY Slides D-J		VIRTUAL CLASS PRE-WORK: 1. Watch the videos and read the infographic data cards for each of the three types of penguins. 2. Record notes on their physical appearances and behaviors.
Part 5 (15 min) CONSIDER CONNECTIONS BETWEEN PENGUINS Slide K		VIRTUAL CLASS PRE-WORK: 1. Make claims about connections between penguins. 2. Record ideas for how these living penguins could be connected to Pedro.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 6-8 (45 min) PREDICT PATTERNS IN PENGUINS LOOK FOR PATTERNS AMONG PENGUINS PREDICT WHERE OTHER PENGUIN FOSSILS COULD BE FOUND PREDICTING PENGUINS FROM LONG AGO COMPARE PENGUINS AND DEVELOP A TIMELINE MODEL TO REPRESENT OUR THINKING Slides L-S	Prior to the virtual class, the teacher should: 1. Prepare for students to work in break-outs groups - pairs for the "Turn and Talk" and comparing penguin drawings, and small groups for examining patterns in penguin data. *(If break-outs are not available, have students share in the chat and conduct discussions as a whole class.)* 2. Prepare to share Lesson 1 Modern & Pedro Penguin Data Cards (one per group or one per student depending on the voice above) and your copy of the Student Jamboard for their class. 3. Plan for how students will share their penguin drawings with one another - *copy and paste on a shared document, share their TDD with their partner, screenshare in break-outs, etc.* VIRTUAL CLASS: 1. Share what we observed about modern penguins and Pedro and record ideas on the student Jamboard. 2. Introduce 18 types of living penguins and work in pairs to predict connections they will find among the living penguins and between living penguins and Pedro. 3. Work in groups to organize penguins on the Lesson 1 Modern & Pedro Penguin Data Cards to in different ways according to patterns in the data and record groupings. 4. Groups share some of the categories they used to sort the penguins. 5. Consider the grouping of geographic location and record questions. 6. Consider where we would dig for more penguin fossils and what we would expect to find. 7. Record ideas. Create a drawing of an ancient penguin, explain reasoning, and consider whether there one or more types of penguins. 8. Compare the drawing with a partner and record similarities and differences between the predictions. 9. Co-create a timeline model as a class to represent its thinking about penguins.	

Day 3		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 11-15 (45 min) NAVIGATION WRITE AND COMPARE INITIAL EXPLANATIONS INITIAL CLASS CONSENSUS DISCUSSION BRAINSTORM AND SHARE RELATED PHENOMENA NAVIGATION Slides T-Y	Prior to the virtual class, the teacher should: 1. Prepare for students to work in break-outs groups - in pairs for the Navigation and small groups for comparing initial explanations. *(If this is not an option, make any necessary adjustments to the slideshow.)* VIRTUAL CLASS: 1. Recall that in the last class we wondered if there were other types of ancient penguins. 2. Discuss where ancient penguins went and where modern penguins came from with a partner. *(if breakout rooms are unavailable, this can also be discussed whole class or ideas shared using the chat feature)* 3. Individually construct an explanation for the two questions and then compare initial explanations in a small group. *(if breakout rooms are unavailable, teacher can share select student explanations with the whole class for comparison)* 4. Class discussion to determine what is agreed upon, areas of disagreement, and new ideas to consider. 5. Stop and jot where else they have seen other organisms that are similar to organisms that lived in the past then share ideas with the class. 6. Think about why organisms today look different from past organisms and what new questions they have. 7. Preview post-work and ensure that students still have access to the student-facing Jamboard because they will be returning to the DQB and adding Ideas for Investigation.	

Day 4		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 16 (8 min) DEVELOP INITIAL QUESTIONS Slide Z		VIRTUAL CLASS POST-WORK: 1. Brainstorm questions related to what we have observed so far.
Parts 17-18 (8 min) REVISE QUESTIONS AND POST QUESTIONS TO DRIVING QUESTION BOARD Slide AA		VIRTUAL CLASS POST-WORK: 1. Review questions and use the sentence starters to revise or create two new questions. 2. Post the two questions to the Driving Question Board.
Part 19 (10 min) BRAINSTORM IDEAS FOR INVESTIGATION Slide BB		VIRTUAL CLASS POST-WORK: 1. Record a way that we could investigate the answer to one of the questions. 2. Share the idea to the Ideas for Investigations and/or Data We Need.

Return to Lesson Set Overview

Lesson 2 (2 days) - Investigation

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

- Lesson Slideshow
- Thinking Deeper Document
- Completed Lesson 1 Jamboard (Ideas for investigations, DQB)
- Lesson 2 Student Jamboard - You will need to duplicate the frame, one for each group in a class/section. You will need a copy of the Jamboard for each class/section and share edit access with students.

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
- Completed Lesson 1 Jamboard (Ideas for investigations, DQB)
- External Trait Data Strips
- External Trait Key
- Penguin Stickers
- Internal Trait Data Strips
- Internal Trait Key
- Teacher Jamboard pdf with completed copies of their class's student-facing frames for this lesson.
- Virtual Class recording

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

- Day 1

Lesson 2 (2 days) - Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-5 (44 min) BUILDING THE DRIVING QUESTION BOARD AND NAVIGATION EXPLORE A SET OF HERITABLE TRAITS FOR MODERN PENGUINS SHARE IDEAS ABOUT WHERE TRAIT VARIATION CAME FROM ORIENTING TO SKELETAL STRUCTURES RECORDING NEW QUESTIONS Slides A-Q	Prior to the virtual class, the teacher should: 1. Arrange for students to work in groups to analyze and sort data strips and for discussion about explaining trait variation. *(If break out rooms are not available, data strips can be viewed in Sheets and a copy can be made for each student and the discussion can be conducted whole-class.)* 2. Prepare to share the modified Lesson 2 Student Jamboard for that class or the slides version of the strips if not using break-outs. 3. Make any necessary modifications to the Lesson Slideshow and Thinking Deeper Document and share with students. 4. Ensure students have access to completed student Jamboard frames from the previous lesson. VIRTUAL CLASS: 1. Review questions posted to the Driving Question Board and organize questions into categories. 2. Revisit ideas for investigation, matching ideas to questions and adding new ideas. 3. Individually record what we have figured out so far in progress trackers. 4. Review trait variations from the Muscles unit and connect to heritable traits in penguins 5. Orient to the chart for heritable traits in penguins. 6. In groups, analyze and organize penguin data strips on the group's Jamboard frame. 7. Record the groupings by organizing pictures of penguins on the TDD. 8. Discuss, in groups, penguins that have common traits and where penguins get common sets of traits from. 9. Observe and discuss bone structures and internal heritable traits of penguins 10. Record new questions about heritable bone trait variations for penguins.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (5 min) REVIEWING NEW QUESTIONS Slide R		VIRTUAL CLASS POST-WORK: 1. Reflect on questions that came up and predict how examining bone structures will help answer.
Part 7 (15 min) EXPLORE HERITABLE BONE TRAITS Slides S, T	*Data strips are provided as a link to the slides in the TDD. The link will force students to make their own copy so they can edit.*	VIRTUAL CLASS POST-WORK: 1. Review the data strips for the internal heritable traits of penguins and look for patterns. 2. Record patterns by organizing penguins into groups.
Part 8 (10 min) MAKING PREDICTIONS Slide U		VIRTUAL CLASS POST-WORK: 1. Stop and Jot to capture thinking about very similar penguins and where they got these traits from.
Part 9 (5 min) UPDATING PROGRESS TRACKER Slide V		VIRTUAL CLASS POST-WORK: 1. Update the progress tracker providing evidence from the things we have figured out so far.
Part 10 (5 min) PREDICTING CHARACTERISTICS Slide W		VIRTUAL CLASS POST-WORK: 1. Create an argument for what we might see in the ancestors of a specific type of modern penguin.
Part 11 (4 min) RECORDING NEW QUESTIONS Slide X		VIRTUAL CLASS POST-WORK: 1. Record any new questions.

Return to Lesson Set Overview

Lesson 3 (2 days) - Investigation

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 3 Student Jamboard - You will need to duplicate the frame, one for each group in a class/section. You will need a copy of the Jamboard for each class/section and share edit access with students.
- Lesson 3 Ancient Penguin Data Cards Slideshow - One per student. *(they may use in groups during the virtual class but will need their own editable copy for post-work)*
- Lesson 1 Modern & Pedro Penguin Data Cards from the previous Lessons

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 3 Student Jamboard *(after completion)*
- Lesson 3 Ancient Penguin Data Cards Slideshow
- Internal Trait Variations Key *(linked in TDD)*
- Lesson 1 Modern & Pedro Penguin Data Cards from the previous Lessons
- Virtual Class recording

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

- Day 1

Lesson 3 (2 days) – Investigation

<table>
<tr><th colspan="3">Day 1</th></tr>
<tr><th rowspan="2">Lesson Components</th><th colspan="2">Distance Learning Plan</th></tr>
<tr><th>Teacher</th><th>Student</th></tr>
<tr><td>Parts 1-5 (45 min)

NAVIGATION

EXPLORE BONE DATA FOR ANCIENT AND MODERN PENGUINS AND WHOLE GROUP DISCUSSION

MAKING PREDICTIONS

ORGANIZE THE DATA BY TIME PERIOD AND LOOK FOR CONNECTIONS

Slides A-G</td><td colspan="2">Prior to the virtual class, the teacher should:
1. Arrange for students to work in groups to explore ancient penguin data strips then organize them on a timeline and with a partner for making predictions. (If breakouts are not available, students can work independently on the data strips/timeline and predictions. These activities can then be followed up as a whole class.)
2. Make any necessary modifications to the Lesson Slideshow and Thinking Deeper Document and share with students.
3. Prepare to share Lesson 3 Ancient Penguin Data Cards Slideshow with students.

VIRTUAL CLASS:
1. Discuss patterns found in heritable traits of modern penguins, traits expected of ancestors of penguins chosen for arguments, and questions that came up in the Pre-Work.
2. Stop and jot how data from fossils of other ancient penguins will help us make progress on some of our questions.
3. In groups, explore and organize ancient penguin data strips on their Jamboard page then discuss some of the patterns identified as a class.
4. With a partner, make predictions about a penguin that is older than Pedro and a penguin that is less ancient and explain their choices.
5. In groups, color code the data strips and organize them on a timeline on their Jamboard pages.
6. Preview post-work and ensure that students have access to the completed frames of the Jamboard from class for the Gallery Walk in Part 6 and the Data Card Slideshows. (If students created timelines individually, provide examples for students to compare)</td></tr>
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Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (8 min) GALLERY WALK Slide H		VIRTUAL CLASS POST-WORK: 1. Reflect on ways other groups/students organized their ancient penguins. 2. Describe how the traits of ancient penguins compare to modern penguins in Progress Tracker.
Part 7 (7 min) PREPARE TO ANALYZE FOSSIL DATA CARDS Slides I, J	1. Ensure that students have access to the Lesson 1 Modern & Pedro Penguin Data Cards from the previous Lessons.	VIRTUAL CLASS POST-WORK: 1. Record the differences in the maps of Earth from two different time periods. 2. Record how the ancient penguin data card is different from the modern penguin data cards.
Part 8 (5 min) EXPLORE THE FOSSIL DATA CARDS INDIVIDUALLY Slide K	1. Ensure that students have access to the Lesson 3 Ancient Penguin Data Cards Slideshow from the virtual class. *(they will each need their own copy)*	VIRTUAL CLASS POST-WORK: 1. Review slides of ancient penguin data cards. 2. Try organizing the slides in 3 different ways and record them.
Parts 9 & 10 (10 min) PROGRESS TRACKER UPDATE INTERPRETING THE DATA Slides L, M		VIRTUAL CLASS POST-WORK: 1. Add new patterns to the Progress Tracker. 2. Reflect on how scientists could estimate the size and weight of a penguin from just a few bones.
Part 11 (10 min) READING: HOW SCIENTISTS USE FOSSILS Slide N		VIRTUAL CLASS POST-WORK: 1. Read the article about how scientists use fossils and reflect.

Return to Lesson Set Overview

Lesson 4 (1 day) - Putting Pieces Together, Problematizing

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 4 Penguins Student Jamboard - *(optional)* utilize during class discussion as needed
- Ancient Penguin Cards Slides and Lesson 3 TDD
- Driving Question Board (from Lesson 2 student 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
- Ancient Penguin Cards Slides and Lesson 3 TDD
- Driving Question Board (from Lesson 2 student Jamboard)
- Teacher Jamboard pdf with completed copies of their class's frames for this lesson.
- Virtual Class recording

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

- Day 1

Lesson 4 (1 day) - Putting Pieces Together, Problematizing

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-7 (45 min) NAVIGATION TAKE STOCK OF PREVIOUS GROUPINGS DEVELOP CONSENSUS PENGUIN GROUPINGS ANALYZE CONSENSUS REPRESENTATION OF PENGUIN GROUPINGS DEVELOP AN EXPLANATION BASED ON EVIDENCE ANALYZE EXPLANATIONS NAVIGATION Slides A-K	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in pairs for "Turn and Talk" activities. *(If breakouts are not available, students can share ideas in the chat or in a whole-class discussion.)* 2. Arrange to use the Lesson 4 frame for consensus on your copy of the Teacher Jamboard and to share the Lesson 4 Penguins Student Jamboard with students if utilizing during the class discussions. 3. Make any necessary modifications to the Lesson Slideshow and Thinking Deeper Document and share with students. VIRTUAL CLASS: 1. Recall looking at patterns of ancient and modern penguins; turn and talk to discuss one way they organized the ancient penguin cards and what patterns they noticed. 2. Discuss where ancient penguins went, where modern penguins came from and identify one new thing that has been figured out and other questions that arose. 3. Independently take stock of the groupings created for both ancient and modern penguins and jot some notes about which penguins should be grouped together and where they should go on the timeline. 4. Develop consensus groupings. 5. Analyzes how many penguins a grouping actually represents. Reference population card if needed. 6. Reflect on and edit the initial explanation from Lesson 1 of where ancient penguins went and where modern penguins came from as well as why there are similarities and differences in the traits. 7. Create a consensus explanation based on evidence that answers these questions. 8. Analyze the consensus and identify what evidence is still needed to make the explanation stronger. 9. Turn and talk about what should be investigated next. 10. Take inventory of the questions on the DQB that we think have been answered and record one question with its answer.	

Return to Lesson Set Overview

Lesson 5 (1 day) – Putting Pieces Together, Problematizing

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
- Day 1 Organism Cards: Horseshoe Crabs, Whales, Horses
- Day 2 Organism Cards: Horseshoe Crabs, Whales, Horses
- Virtual Class recording

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. Stop and Jot what we learned in the last class and how looking at data from other ancient and modern organisms will help with our questions.
Part 2 (20 min) SORT ORGANISMS BY CHARACTER Slides B, C	*Organism cards are linked into TDDs as pdf files. Note: Teacher may also assign individual students copies of organism slides: Horseshoe crabs, Whales, Horses*	VIRTUAL CLASS PRE-WORK: 1. Choose one of the three organisms to explore and look for patterns in the characters of the organisms. 2. Record the groupings and identify information needed to understand the patterns you.
Part 3 (5 min) MAKE A PREDICTION Slide D	*Note: To save time in the Virtual Class, the teacher may have students copy and paste their groupings onto a shared document that can be utilized at the beginning of class.*	VIRTUAL CLASS PRE-WORK: 1. Make a prediction about whether similarities among organisms are related to where they lived and/or when they lived.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 4-10 (60 min) GROUP SHARE SHARING PREDICTIONS SORT ORGANISMS BASED ON WHEN THEY LIVED OR WHERE THEY LIVED SHARE PATTERNS CREATE A CONSENSUS MODEL EXPLAIN YOUR ORGANIZATION IN JIGSAW GROUPS NAVIGATION Slides E-Q	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in groups to share their groupings, sorting by when/where the organisms lived, and creating and sharing consensus models. *(If breakouts are not available, the teacher can share student examples, students can do some portions independently and/or collaborate via shared documents and whole-class discussions.)* 2. Make any necessary modifications to the Lesson Slideshow and Thinking Deeper Document based on decisions around methods of collaboration. VIRTUAL CLASS: 1. Share in groups how they organized their organism cards with those who chose the same organism cards noting similarities and differences in their groupings. 2. Shares predictions for whether similarities are related to where or when the organisms lived. 3. Sort organisms based on when or where they lived. 4. In groups, students either sort organisms by when they lived or where they lived (6 groups minimum). 5. Work in groups to look at and organize data cards of their organisms, recording their groupings on their TDDs. *(data cards have been linked to TDDs as pdf files; teacher can also choose to assign these as slides - horseshoe crabs, whales, horses)* 6. Groups with the same organism cards combine to discuss their groupings and create a consensus model using the images to show how they think the organisms are related. 7. Work in groups of three where one person represents each type of organism, share models, record notes on the models of others, and discuss the questions. 8. Independently answer the last two discussion questions. *Note: Since some of the Day 1 activities have been moved to the virtual class, there may not be time to complete 7 & 8 above. The teacher may choose to have the students complete them asynchronously for post-work by utilizing shared documents for viewing models and discussion.*	

Return to Lesson Set Overview

Lesson 6 (2 days) - Putting Pieces Together, Problematizing

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 1 Student Jamboard with DQB - *supply view-only version once complete*

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 1 Student Jamboard with DQB - *supply view-only version once complete*
- Virtual Class recording

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

- Day 1

Lesson 6 (2 days) - Putting Pieces Together, Problematizing

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-5 (45 min) NAVIGATION ANALYZE DATA BUILDING UNDERSTANDING DISCUSSION CONSTRUCT AN ARGUMENT ABOUT ANCIENT AND MODERN PENGUINS CONSENSUS DISCUSSION ABOUT PENGUIN DESCENT Slides A-L	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in break-out rooms with a partner for Turn and Talk and sharing claims. *(If breakout rooms are not available, this can be done by utilizing the chat, whole-class discussion and/or shared documents as needed.)* 2. Make necessary adjustments to Lesson Slideshow and Thinking Deeper Document and share with students. VIRTUAL CLASS: 1. Discuss the patterns observed over the different modern and ancient organisms. 2. Turn and talk about the individual organism versus its population and whether the traits they observed were typical for the population or unique to the individual. 3. Analyze fossil data independently then as a class. 4. Discuss trait variation among populations to surface the idea that individuals that belong to the same populations share a set of common characters, but there is still variation in traits between individuals of a population. 5. Write a new claim about how modern penguins are connected to penguins from long ago and share that claim with a partner. 6. Class discussion to come to consensus about whether a line of descendants exists between modern and ancient penguins.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (8 min) NAVIGATION Slide M		VIRTUAL CLASS POST-WORK: 1. Reflect on our argument for why there must be a line of descendants connecting ancient penguins to modern ones.
Part 7 (10 min) CONSTRUCT EXPLANATIONS Slide N		VIRTUAL CLASS POST-WORK: 1. Propose an explanation for what could be causing changes in an entire population of descendants.
Part 8 and 9 (6 min) DEVELOP NEW QUESTIONS AND POST THEM TO THE DRIVING QUESTION BOARD Slide O	1. Ensure that students can access and edit the Lesson 1 Student Jamboard for their class.	VIRTUAL CLASS POST-WORK: 1. Record any new questions and add them to the Driving Question Board.

Return to Lesson Set Overview

Lesson 7 (3 days) - Investigation

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 1 Student Jamboard - *editable class version or new DQB frame + access to completed DQB from previous lessons*
- Lesson 7 Student Jamboard - *one per class/section*
- Analyzing Data for Your Case Spreadsheet - *one copy for each class/section*

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 1 Student Jamboard - *alternate way of sharing questions and updated DQB when complete*
- Lesson 7 Student Jamboard - *alternate way of collaborating with their group/sharing ideas and copy after completion*
- One of the following:
    - Cliff Swallow Data Packet
    - Peppered Moth Data Packet
    - Mustard Plant Data Packet
    - Finch Data Packet
- Analyzing Data for Your Case Spreadsheet - *alternate way of contributing information and copy after completion*

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

- Day 1
- Day 2

Lesson 7 (3 days) – Investigation

<table>
<tr><th colspan="3">Day 1</th></tr>
<tr><th rowspan="2">Lesson Components</th><th colspan="2">Distance Learning Plan</th></tr>
<tr><th>Teacher</th><th>Student</th></tr>
<tr><td>Parts 1-3 (60 min)

NAVIGATION

INTRODUCE THE CASES

ANALYZE ASSIGNED CASE

Slides A-G</td><td colspan="2">Prior to the Virtual Class, the teacher should:
1. Arrange for students to work in break-out rooms with a partner for Turn and Talk and case studies. (If breakout rooms are not available, utilize chat, whole-class discussion, independent work and/or shared documents.)
2. Ensure students have access to the editable Lesson 1 Student Jamboard for their class or make arrangements to have students add questions using a different method.
3. Prepare to assign data packets (pdf linked on TDD) to groups for the case studies. Documents will need to be downloaded and edited by each student.
4. Make necessary adjustments to Lesson Slideshow and Thinking Deeper Document and share with students.

VIRTUAL CLASS:
1. Reflect on the questions we posed at the end of Lesson 6 and add new questions to the DQB.
2. Share thoughts about how looking at changes happening over a shorter time scale could help with our questions.
3. Explore a new phenomenon for investigation.
4. Group students for the 4 case studies and acclimate to the task.
5. Work in groups to notice similarities and differences among the cases described on Slide D and make predictions about why changes occurred.
6. Discuss similarities and differences as a class and then pair-share predictions.
7. Groups reconvene with specific roles assigned to each member in order to analyze the case study.</td></tr>
<tr><td>HOME LEARNING
Slide H</td><td></td><td>VIRTUAL CLASS POST-WORK:
1. Complete the data analysis for assigned role.</td></tr>
</table>

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 4-8 (45 min) NAVIGATION SHARE ANALYSIS CREATE PRELIMINARY MODEL REFINE YOUR THINKING NAVIGATION Slides H-M	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in break-out rooms for case studies. *(If breakout rooms are not available, this can be done by utilizing the chat, whole-class discussion, independent work and/or shared documents as needed.)* 2. Make copies of the Lesson 7 Student Jamboard for each class and ensure students have edit access. VIRTUAL CLASS 1. Orient to goals for completing case investigations and creating a preliminary model. 2. In case study groups, individual students will share information about their data subsets. 3. Create a preliminary model as a group to describe the change that occurred in the case study. 4. Class discussion to think about more general ways to understand each case first using a structure and function lens and then a cause and effect lens. 5. Record the class' thinking. 6. Share their experience using the CCC lens.	
HOME LEARNING Slide N		VIRTUAL CLASS POST-WORK: 1. Complete work on Using the CCC Lens.

Day 3		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 9 (10 min) NAVIGATION - INDIVIDUAL SYSTEM MODELS Slide O		VIRTUAL CLASS POST-WORK: 1. Complete the CCC: Systems and System Model sections.
Part 10 (15 min) CREATE A REVISED SYSTEM MODEL POSTER Slides P, Q, R, S	1. Ensure students have access to the completed Lesson 7 Student Jamboard for their class.	VIRTUAL CLASS POST-WORK: 1. Think about the story of the population in the assigned case study. 2. Use the resources listed in the slideshow to revise preliminary model on the Systems Model Poster template.

Return to Lesson Set Overview

Lesson 8 (2 days) - Putting Pieces Together

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

- Lesson Slideshow
- Thinking Deeper Document
- System Model Poster - *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
- One of the following (not previously reviewed):
    - Cliff Swallow Data Packet
    - Peppered Moth Data Packet
    - Mustard Plant Data Packet
    - Finch Data Packet
- System Model Poster - *after completion*

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

- Day 1

Lesson 8 (2 days) - Putting Pieces Together

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-5 (45 min) NAVIGATION POSTER WALK AND TALK CO-CONSTRUCT SOME GENERALIZED STATEMENTS DEVELOP OTHER GENERAL MODEL IDEAS REFLECTING ON OUR DISCOURSE CONTRIBUTIONS Slides A-F	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in break-out rooms with a partner for sharing case studies and Discussion Protocol 2. *(If breakout rooms are not available, this can be done by utilizing the chat, whole-class discussion, independent work and/or shared documents as needed.)* 2. Make necessary adjustments to Lesson Slideshow and Thinking Deeper Document and share with students. VIRTUAL CLASS: 1. Reorient to the case studies and recall why we are investigating them. 2. Discuss how creating a general model for all four cases might help with our questions about ancient and modern penguins. 3. Share case system models in pairs. 4. Creates a general system model poster identifying what is causing changes in all four cases. 5. Share ideas in the same pairs for statements about “Survival and Reproduction” and “Offspring and Inheritance”. 6. Individually reflect on discourse contributions by highlighting answers to prompts.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (10 min) EVALUATE OUR GENERALIZED STATEMENTS Slide G		VIRTUAL CLASS POST-WORK: 1. Choose one other case study to review. 2. Figure out if the general model works for this case study as well or how it should be revised in order to apply.
Part 7 (12 min) PREPARE TO CO-CONSTRUCT GENERALIZED DESCRIPTIONS AND CLARIFY THE REMAINING PARTS OF THE MODEL Slide H		VIRTUAL CLASS POST-WORK: 1. Consider what we will need to add to our general model for each of the 3 categories on Slide H

Return to Lesson Set Overview

Lesson 9 (2 days) - Investigation

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

- Lesson Slideshow
- Thinking Deeper Document
- Lesson 8 Thinking Deeper Document
- General Model for Natural Selection (from Teacher Jamboard)- *before and after updates from virtual class*

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
- Printed images from neutrophil video
- Screencast of Simulation Investigations - *teacher made*
- Simulation Orientation Video - Lesson 9 Video at the bottom of the page
- General Model for Natural Selection (from Teacher Jamboard) - *before and after updates from virtual class*
- Virtual Class recording - *after completion*

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

- Day 1

Lesson 9 (2 days) – Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-7 (45 min) NAVIGATION INTRODUCE SOME MODEL ORGANISMS ANALYZE STRUCTURES IN SALMONELLA AND BRAINSTORM TYPES OF ENVIRONMENTAL INTERACTIONS ORIENT TO STRUCTURES THAT FIGHT OFF INFECTION ORIENT TO THE SIMULATION INVESTIGATE CHANGES IN TRAIT VARIATIONS IN A POPULATION: INVESTIGATION 1 INDIVIDUAL PROGRESS TRACKER UPDATE Slides A-K	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in pairs while completing Investigation 1 using the simulation. *(If breakout rooms are unavailable, each student can conduct the simulation individually and utilize the chat feature and whole class discussion to share data.)* 2. Prepare to share the most up-to-date General Model from the teacher Jamboard and to ensure students have view-only access to an updated version following the virtual class. 3. Make necessary adjustments to Lesson Slideshow and Thinking Deeper Document and share with students. VIRTUAL CLASS: 1. Class discussion to add ideas to the general model. 2. Consider how using a simulation to test our model under different conditions might be useful and list what needs to be part of the system in the simulation and what things need to be controlled or changed in order to gather data. 3. Reflect on organisms for comparison that are commonly used for studying traits in offspring over many generations, compare the reproductive rates of these organisms and consider the advantages of using one over another. 4. Analyze the structure variation among four salmonella bacteria and brainstorm specific risks and resources for bacteria. 5. Watch a video of a neutrophil fighting a bacterial infection and discuss it as a class. 6. Orient to the simulation and what variables can be adjusted in the model. 7. In pairs, students conduct investigation 1 and share their results with their partner for comparison. 8. Record thoughts for how and why this population of bacteria changed on progress trackers.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 8 (7 min) ANALYZE RESULTS Slide L		VIRTUAL CLASS POST-WORK: 1. Reflect on results of Investigation 1.
Part 9 (5 min) MAKE PREDICTIONS Slide M		VIRTUAL CLASS POST-WORK: 1. Make predictions for what will happen if certain variables were changed in the simulation.
Part 10 (13 min) INVESTIGATE CHANGES IN TRAIT VARIATIONS IN A POPULATION: INVESTIGATION 2 Slides N, O, P		VIRTUAL CLASS POST-WORK: 1. Carry out investigation 2 with the adjustments to the variables. 2. Compare the number of trait variations at the beginning and end of the model. 3. Carry out investigation 2 for a longer time period and reflect on the number of trait variations over time.
Part 11 (8 min) ANALYZE RESULTS Slide Q		VIRTUAL CLASS POST-WORK: 1. Reflect on and make sense of the results of Investigation 2.

Part 12 (10 min) PREPARE TO REVISE OUR GENERAL MODEL OF NATURAL SELECTION Slide R		VIRTUAL CLASS POST-WORK: 1. Record any new ideas that we should add to our General Model for Natural Selection to more fully explain our results.
Part 13 (2 min) PREPARE FOR OUR NEXT INVESTIGATION Slide S		VIRTUAL CLASS POST-WORK: 1. Brainstorm additional changes to our simulation, make predictions, and make connections to penguins to prepare for our next investigation.

Return to Lesson Set Overview

Lesson 10 (2 days) - Investigation

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

- Lesson Slideshow
- Thinking Deeper Document
- General Model for Natural Selection (from Teacher Jamboard) - *before and after updates from virtual class*

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

- Lesson Slideshow
- Thinking Deeper Document
- Simulation Orientation Video - Lesson 10 video at the bottom of the page
- General Model for Natural Selection (from Teacher Jamboard) - *before and after updates from virtual class*

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

- Day 1

Lesson 10 (2 days) – Investigation

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 1-5 (45 min) NAVIGATION ORIENT TO THE SIMULATION MAKE PREDICTIONS EXPLORE THE SIMULATION INVESTIGATE Slides A-H	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in pairs for Turn and Talk and when making predictions. *(If breakout rooms are unavailable, conduct a whole class discussion or utilize the chat feature to share ideas.)* 2. Prepare to share the most up-to-date General Model from the teacher Jamboard and to ensure students have view-only access to an updated version following the virtual class. 3. Make necessary adjustments to Lesson Slideshow and Thinking Deeper Document and share with students. VIRTUAL CLASS: 1. Class discussion to revise and add to the General Model for Natural Selection. 2. Turn and talk about resources brainstormed in the post-work from Lesson 9. 3. Orients to the bacteria in the simulation and the simulation itself by exploring what variables can be changed. 4. Make predictions about what will happen to the population of each bacteria over time then share their ideas with a partner. 5. Orient to what we should explore in the simulation in order to collect needed data. 6. Explore to determine two environmental conditions that result in very different trait distributions and run multiple trials to confirm the general trend. 7. Review how to collect data for the simulation. 8. Individually collect data using their two environmental conditions.	

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 6 (5 min) NAVIGATION Slide I		VIRTUAL CLASS POST-WORK: 1. Record your investigation setup and findings by answering the questions for your investigation.
Part 7 (30 min) EXPLAIN THE DIFFERENCES IN THE TWO CASES Slides J, K	1. Ensure that students have view-only access to the most updated General Model from the Teacher Jamboard.	VIRTUAL CLASS POST-WORK: 1. Use the General Model and the template to model an explanation for both cases from the simulation.
Part 8 (5 min) MAKE PREDICTIONS ABOUT LONG PERIODS OF TIME Slide L		VIRTUAL CLASS POST-WORK: 1. Make a prediction for what would happen to the variations if the simulation were run for really long periods of time.
Part 9 (5 min) NAVIGATION Slide M		VIRTUAL CLASS POST-WORK: 1. Brainstorm about one of the three reflections on what our model can explain.

Return to Lesson Set Overview

Lesson 11 (3 days) - Putting Pieces Together

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

- Lesson Slideshow
- Thinking Deeper Document
- General Model for Natural Selection (from Teacher Jamboard)
- Shared document for sharing group models - *teacher made*
- Driving Question Board (from Teacher Jamboard)
- Padlet or other shared space for "tweets" - *teacher made*
- Lesson 11 Student Jamboard - one per class or section

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
- General Model for Natural Selection (from Teacher Jamboard)
- Shared document for sharing group models - *alternative way to contribute model and/or collaborate & document after completion*
- Driving Question Board (from Teacher Jamboard)
- Padlet or other shared space for "tweets" - *alternative way to contribute tweets & document after completion*
- Lesson 11 Student Jamboard - *alternative way to contribute questions & document after completion*
- Virtual Class recordings - *after completion*

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

- Day 2
- Day 3

Lesson 11 (3 days) - Putting Pieces Together

Day 1		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Part 1 (3 min) NAVIGATION Slide A	1. Share Lesson Slideshow with students. 2. Share Thinking Deeper Document with students.	VIRTUAL CLASS PRE-WORK: 1. Reflect on whether our natural selection model can explain differences in traits for the cases we have explored.
Part 2 (7 min) CHOOSE A TRAIT TO EXAMINE Slide B		VIRTUAL CLASS PRE-WORK: 1. Examine images of ancient and modern horses. 2. Recall differences over time in the toes of the horses. 3. Read the article about ancient and modern horses.
Part 3 (35 min) MODIFY THE GENERAL MODEL OF NATURAL SELECTION TO EXPLAIN A SPECIFIC CASE Slides C, D		VIRTUAL CLASS PRE-WORK: 1. Use the image and the reading to create a model for changes to horses toes. 2. Record how the general model might need to be revised to apply to this case.

Day 2		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 3-10 (45 min) NAVIGATION ORIENT TO TRAITS IN PENGUINS MODIFY THE GENERAL MODEL OF NATURAL SELECTION TO EXPLAIN PENGUINS GALLERY WALK Slides E-H	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in groups for revising the model *(If breakout rooms are unavailable, students can revise models independently then collaborate with a partner or group via shared document.)* 2. Prepare a shared document for students to upload group and/or individual models. (ex. Jamboard, google slideshow, etc.) VIRTUAL CLASS: 1. Class discussion about where we began and what our original question was. 2. Orients to the traits of modern and ancient penguins and identify major differences between them. 3. In groups, modify the general model to explain one of two major differences in penguins over time (beaks or body sizes). 4. Post group models into a shared document for a gallery walk. 5. Observe other group models and record noticings and wonderings.	

Day 3		
Lesson Components	**Distance Learning Plan**	
	Teacher	**Student**
Parts 8-11 (45 min) EVALUATE OUR DRIVING QUESTION BOARD (DQB) QUESTIONS REVISIT THE DQB ADD TO OUR PROGRESS TRACKERS (OPTIONAL) CELEBRATING OUR YEAR OF SCIENCE LEARNING Slides I-N	Prior to the Virtual Class, the teacher should: 1. Arrange for students to work in groups for revising the model *(If breakout rooms are unavailable, students can revise models independently then collaborate with a partner or group via shared document.)* 2. Ensure that students have access to the most up-to-date Driving Question Board from their class or teacher Jamboard. VIRTUAL CLASS: 1. Evaluate the extent to which questions on the DQB have been answered. 2. Answer three questions of their choice. 3. Consider the original question of how living things today are connected to things that lived long ago. 4. Add thoughts to their progress trackers. 5. Add “tweets” about a big idea they have learned, a challenge, or a rewarding experience from this year on a Padlet (or other shared space) shared by the teacher. 6. View, like, and comment on other “tweets”. 7. Create a new Driving Question Board to reflect the things they will want to figure out in high school.	

Return to Lesson Set Overview