Louisiana Believes

Distance Learning Support for inquiryHub Biology
Unit 3 Bend 1: Ecosystems – Serengeti

This resource is designed to support teachers in implementing distance learning for iHub Biology Unit 3 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:

- 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.

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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. 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 2	
Provided Resources Students Will Need	**Additional Materials for Students Without Internet Access**
Lesson Slideshows for each lesson: Lesson 1, Lesson 2, Lesson 3, Lesson 4, Lesson 5, Lesson 6, Lesson 7, Lesson 8, Lesson 9, Lesson 10 **Additional Documents:** Lessons 1-8 & 10: Incremental Modeling Tracker (IMT) **Additional Materials (not already linked within slideshow):** Lesson 7: SEET Lesson 8: Small Group Notebooks (Teachers make a copy for each class) o Group A Notebook o Group B Notebook o Group C Notebook o Group D Notebook o Group E Notebook	**Prior to Lesson**: (videos and documents) ***Print Copies of All Slideshows and SEETs*** Lesson 1: Serengeti Video, Serengeti Photo Capture Data, "The Serengeti Plain" Lesson 2: Lesson 2 Student Reading Lesson 3: Video of Simulation Demonstration Lesson 5: Lesson 5 Reading, Buffalo Population Graph Lesson 6: Buffalo Population Graph, Wildebeest Population Graph, Buffalo Habitat and Wildebeest Migration Data Lesson 7: Serengeti Simulation (teacher made video), Video of Simulation Demonstration Lesson 8: Student Texts (Printed copy) Lesson 9: Wildebeest and Fire Data, Serengeti Tree Data **After Lesson Completion:** Virtual Class recordings: Lessons 1, 4, 5, 6, 7, 9 and Lessons 2, 3, 8, 10 if not done asynchronously
While all lessons contain materials to supplement virtual class, they could be modified for asynchronous delivery by requiring submission of work for feedback and converting any group discussion into discussion boards. **Some lessons, however, are BEST suited for live instruction and a VIRTUAL CLASS should be offered for the following lessons:** 1, 4, 5, 6, 7, 8 **Students COULD complete the following lessons asynchronously:** 2, 3, 8, 10	

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. Specific slide suggestions for formative assessment:
Lesson 1: Slide 19, Lesson 2: Slide 16, Lesson 3: Slide 20, Lesson 4: Slides 12 or 16, Lesson 6: Slide 12, Lesson 7: Slide 16, Lesson 8: Slide 11, Lesson 9: Slides 13 & 15

All discussions (whether live or on an asynchronous Discussion Board) can be used for formative assessment
IMTs updates for each lesson
SEETs - focus quiz type assessments (Lesson 7)
Transfer Tasks (delivery via your assignment platform)

Lesson List

Lesson 1 - What explains why the populations of buffaloes in the Serengeti changes so much?

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

- Lesson Slideshow
- Driving Question Board Question 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
- IMT Assignment (teacher made) or IMT (by iHub)
- Serengeti Video
- Serengeti Photo Capture Data
- "The Serengeti Plain" text
- Virtual Class recording - *after completion of virtual class, or prepare a video to support students in completing the slides independently*

Lesson 1 - What explains why the populations of buffaloes in the Serengeti changes so much?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 4-10) Parts 1 - 3, 6 (25 min)	1. Share Lesson Slideshow. 2. Set up Google Jamboard, discussion board, or other virtual platform for DQB. 3. Share teacher-created IMT assignment with students.	1. Complete slides 4 - 10
VIRTUAL CLASS (Slides: 11-16) Parts 4, 5, 7, 8 (45 min)	1. Sharing ideas discussion - students share ideas based on the questions, initial models and video from the pre-work. Teacher guides using prompts from parts 2, 3, & 6. 2. Class builds Driving Questions Board (Part 4). 3. Analyze Google Map images and data to answer questions and discuss (Part 7). 4. Students read "The Serengeti Plain" (independently or with partners in breakout rooms). Students summarize each paragraph on the table provided in the slideshow. (Part 8)	
VIRTUAL CLASS POST-WORK (Slides: 17-20) Parts 9, 10, 11 (15 min)	1. Review student models. 2. Slide 19 opportunity for formative assessment.	1. Answer questions based on text and map. 2. Complete IMT.

Return to Lesson List

Lesson 2 - What do buffaloes eat and is there more of it for them to eat now?

NOTE: This lesson could be done completely asynchronously with a DISCUSSION BOARD taking place of VIRTUAL CLASS. Students would be required to read ALL 6 of the readings and discuss findings via a discussion board.

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)

Teacher Key to IMT

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

- Lesson Slideshow
- Lesson 2 Student Reading (linked within slideshow)
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion if lesson is completed in a live session*

Lesson 2 - What is happening to the muscles of the kids in the video?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 4 - 7) Parts 1 - 3 (30 minutes)	1. Create a discussion board for student reading groups and insert a link into Slide 6. 2. Assign student reading groups. 3. Share Lesson Slideshow with students.	1. Complete slides 4 -7. 2. Engage in questions on the discussion board.
VIRTUAL CLASS (Slides: 8 - 16) Parts 4 - 5 (30 minutes)	1. Students share out what they learned in a Sharing Ideas discussion (using prompts from Parts 1 - 3) 2. Students share out what they learned in the group reading and in the discussion board while other students take notes in the appropriate area on slides 9 - 12. 3. Students complete Making Sense questions (whole group, with reading group in breakout rooms, or independently). 4. Teacher leads Building Understanding discussion using prompts in Part 5. 5. Students answer the Conclusion question.	
VIRTUAL CLASS POST-WORK (Slides: 17 - 19) Parts 6-7 (5 minutes)	1. Conclusion Question (slide 16) possible formative check.	1. Add to IMT. 2. Answer Next Steps questions.

Return to Lesson List

Lesson 3 - Are population changes in buffalo related to changes in climate?

NOTE: this lesson could be done completely asynchronously with a DISCUSSION BOARD taking place of VIRTUAL CLASS.

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)

Teacher Key to IMT

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

- Lesson Slideshow
- Video of Simulation Demonstration
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion*

Lesson 3 - Are population changes in buffalo related to changes in climate?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 4-9) Parts 1, 3 (15 min)	1. Share Lesson Slideshow with students.	1. Complete questions on slides 4 - 9
VIRTUAL CLASS (Slides: 10 -21) Parts 2, 4 - 8 (55 min)	1. Engage students in discussion of pre-work. 2. Teacher will model the simulation (or show iHub video). 3. Students complete Simulation Investigation #1 (slides 11 - 16). *optional - this can be completed in partners or small groups in breakout rooms 4. Teacher engages students in Making Sense discussion (slide 16). 5. Students complete Simulation Investigation #2 (slides 17 - 20). *optional - this can be completed in partners or small groups in breakout rooms 6. Teacher engages students in Making Sense discussion (slide 20).	
VIRTUAL CLASS POST-WORK (Slides: 22 - 24) Parts 8 - 9 (10 min)	1. Possible Formative check - Making Sense question on slide 20	1. Complete Next Steps Questions. 2. Complete IMT.

Return to Lesson List

Lesson 4 - Is the changing buffalo population size caused by a changing predator population size?

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)

Teacher Key to IMT

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion*

Lesson 4 - Is the changing buffalo population size caused by a changing predator population size?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 3 – 9) Parts 1, 3, 4, 5 (17 min)	1. Share Lesson Slideshow with students.	1. Complete slides 3 - 9.
VIRTUAL CLASS (Slides: 10 – 17) Parts 6 - 11 (26 min)	1. Engage students in sharing ideas discussion. 2. Students read a short text (on slide). *option to put students in breakout rooms with partner or small group to read and answer question on slides 11 & 12 3. Students revise prediction, analyze data, and answer questions. (slides 13 - 16) 4. Teacher facilitates discussion around answering the main question with students using prompts from part 11.	
VIRTUAL CLASS POSTWORK (Slides 18 – 20) Parts 12-13 (10 min)	1. Formative check options - slide 12 or slide 16	1. Complete next steps questions. 2. Complete IMT.

Return to Lesson List

Lesson 5 - Is there a disease that affected the buffalo population?

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)

Teacher Key to IMT

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)
- Lesson 5 Reading
- Buffalo Population Graph
- Virtual Class Recording – *after completion*

Lesson 5 - Is there a disease that affected the buffalo population?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 4 - 9) Parts: 1 - 3 (30 min)	1. Share lesson slideshow with students. 2. If opting to use discussion board for pre-work discussion of lesson reading, set up the discussion board.	1. Complete slides 3 – 9. 2. Participate in discussion board (if used).
VIRTUAL CLASS (Slides: 10 - 14) Parts: 4, 5, 7, 8 (50 min)	1. Sharing ideas discussion; Students can share timelines from pre-work in breakout rooms (part 4). 2. Students brainstorm and discuss next steps (Part 5). 3. Students generate an independent model and share with partners in breakout rooms (Part 7). 4. Use prompts in Part 8 to build a class consensus model.	
VIRTUAL CLASS POST-WORK (Slides: 15 – 17) Parts: 9, 10 (10 min)	1. IMT can be used as a formative check	1. Complete next steps. 2. Complete IMT.

Return to Lesson List

Lesson 6 - What happened to other herbivores on the Serengeti after the big change created by disease?

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

- Lesson Slideshow
- Individual Incremental Modeling Tracker (IMT)

Teacher Key to IMT

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

- Lesson Slideshow
- Buffalo Population Graph
- Wildebeest Population Graph
- Buffalo Habitat and Wildebeest Migration Data
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion*

Lesson 6 -What happened to other herbivores on the Serengeti after the big change created by disease?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides: 4-6) Part: 2 (20 min)	1. Share Lesson Slideshow with students.	1. Complete slides 4 – 6.
VIRTUAL CLASS (Slides: 7 - 11) Parts 1 & 3 (20 min)	1. Teacher facilitate Consensus building discussion. 2. Students analyze the buffalo habitat and wildebeest migration data and record observations in table.	
VIRTUAL CLASS POST WORK (Slides: 12-14) Parts 4-5 (10 min)	1. Conclusion question on slide 12 can be used as a formative check.	1. Answer conclusion question and next steps question. 2. Add to IMT.

Return to Lesson List

Lesson 7 - How do we know whether or not a population will continue to grow, stay stable, or decline?

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

- Lesson Slideshow
- SEET (teachers make a copy)
- Individual Incremental Modeling Tracker (IMT)

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

- Lesson Slideshow
- Printed copy of the SEET
- Serengeti Simulation – teachers choose to screencast the use of the simulation and provide a video on a flash drive
- Video of Simulation Demonstration
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion*

Lesson 7 - How do we know whether or not a population will continue to grow, stay stable, or decline?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides 2 -6) Parts: 3-4 (10 min)	1. Share Lesson Slideshow with students. 2. Make copy of SEET and insert into slide 11	1. Complete prework slides.
VIRTUAL CLASS (Slides 7 - 14) Parts: 1, 2, & 5 - 11 (75 min)	1. Teachers facilitate consensus building and sharing ideas discussion 2. Students use the Serengeti Simulation to test predictions made in prework. 3. Students answer Making Sense Questions and teachers facilitate group discussion. 4. Teacher facilitates drawing conclusions discussion (option to make this post work and create a discussion board). 5. Teacher directs students to work on adding major discoveries to IMT and prompt reflection about the lesson. 6. Administer SEET.	
VIRTUAL CLASS POST WORK (Slides 15 - 18) Parts 12 & 13 (15 min)	1. Review SEET and student model for formative assessment.	1. Develop a model. 2. Complete Next Steps questions.

Return to Lesson List

Lesson 8 - Can a systems comparison help us understand what happened to the buffalo and wildebeest between 1975 and 2000?

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

- Lesson Slideshow
- Small Group Notebooks (Teachers make a copy for each class)
    - Group A Notebook
    - Group B Notebook
    - Group C Notebook
    - Group D Notebook
    - Group E Notebook
- Individual Incremental Modeling Tracker (IMT)

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

- Lesson Slideshow
- Printed copy and/or alternate way of contributing to Small Group Notebooks (Teachers make a copy for each class)
    - Group A Notebook
    - Group B Notebook
    - Group C Notebook
    - Group D Notebook
    - Group E Notebook
- Student Texts (Printed copy)
- Individual Incremental Modeling Tracker (IMT)
- Virtual Class recording - *after completion*

Lesson 8 - Can a systems comparison help us understand what happened to the buffalo and wildebeest between 1975 and 2000?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slides 4 - 5) Parts: 3 (4 min)	1. Make copies of each Small Group Notebook and drop link into slide 7 2. Share Lesson Slideshow with students. *alternatively, drop links into Google Classroom or other platform before class starts	1. Complete prework.
VIRTUAL CLASS (Slides 6 - 9) Parts: 5 - 9 (65 min)	1. Teacher facilitates consensus building discussion. 2. Teacher assigns one question to each small group and directs students to open appropriate small group notebook; students will enter breakout rooms to discuss the assigned question and complete the Systems Comparison Chart for their assigned question. 3. Teacher facilitates a whole group consensus discussion. Student groups share out the key details discussed in small group and other students add those notes to their Small Group Notebook. 4. Teacher assigns one text (A, B, or C) to each small group. Students then go back into the same breakout rooms and complete the reading and evidence chart in small group notebook. (text is linked in small group notebook). Once students have recorded evidence, they can go back and add to the Systems Comparison Chart. 5. Teacher leads a whole group consensus discussion. Each group will share out what they added to their Systems Comparison Chart. Other students can add notes during the discussion. **Note - the small group notebooks are designed to be used by the students in the small group at the same time. They can take notes in the notebook at the same time in real time. If this is not desired, these can be assigned to students individually on Google Classroom or other platform.	

VIRTUAL CLASS POST WORK (Slides 10-13) Parts: 10 (5 min)	1. Slide 11 (conclusion question) can be used as a formative check.	1. Complete Making Sense & Conclusion questions 2. Add to IMT

Return to Lesson List

Lesson 9 - Is there something special about wildebeest on the Serengeti?

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

- Lesson Slideshow

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

- Lesson Slideshow
- Wildebeest and Fire Data
- Serengeti Tree Data
- Virtual Class recording - *after completion*

Lesson 9 - Is there something special about wildebeest on the Serengeti?

Lesson Components	Distance Learning Plan	
	Teacher	Student
VIRTUAL CLASS PREWORK (Slides 4-5) Part: 2 (7 min)	1. Share Lesson Slideshow with students. *if presenting as asynchronous, build and share discussion board with students	1. Complete Slides 4 & 5.
VIRTUAL CLASS (Slides 6 - 11) Parts: 1, 3 - 5, 9 (45 min)	1. Teacher engages students in Consensus Building discussion using prompts from Part 1 and Part 2. 2. Students work in small group breakout rooms to examine Serengeti Tree Data and answer questions. *option to change slide 7 to prework and have students examine data independently Teacher engages students in Building Understandings discussion using prompts given in Part 3 3. Students examine Wildebeest and Fire Data and answer questions (small group or independently) 4. Students examine Wildebeest and Fire Data and answer questions (small group or independently) 5. Teacher engages students in Sharing Ideas discussion using prompts in Part 4 6. Students answer Making Sense questions independently. 7. Teacher engages students in Sharing Initial Ideas discussion using prompts in Part 5 8. Teacher shares website for monitoring health of Serengeti (Part 9)	

VIRTUAL CLASS POST WORK (Slides 12 - 19) Parts: 6 - 8 (40 min)	1. Model (slide 13) can be used as a formative check. 2. Evaluate the claim (slide 15) can be used as a formative check 3. *Option to prepare discussion board for students to share ideas about Looking to the Future questions. Alternatively, those answers can be shared at the beginning of Lesson 10 Virtual Class.	1. Construct a model of wildebeests effects on the Serengeti. 2. Complete Evaluate the Claim questions 3. Complete Looking to the Future questions 4. Update IMT

Return to Lesson List

Lesson 10 - How can we apply the rules of our model to explain population changes in other ecosystems?

**This lesson could be delivered Asynchronously by changing the lesson to a graded assessment “Project.” Students can choose a keystone species to research. Teacher can give students a rubric and guiding questions, requiring students to submit a slideshow, prezi, or other type of presentation, including a model of how the keystone species affects the ecosystem. The next virtual class could focus on student presentations or a sharing ideas discussion of the similarities and differences between the keystone species they researched and the wildebeest.

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

- Lesson Slideshow

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

- Lesson Slideshow
- Virtual Class recording - *after completion*

Lesson 10 - How can we apply the rules of our model to explain population changes in other ecosystems?

Lesson Components	Distance Learning Plan	
	Teacher	**Student**
VIRTUAL CLASS PREWORK (Slide 4 -5) Parts: 1 (5 min)	1. Share Lesson Slideshow with students.	1. Students complete prework.
VIRTUAL CLASS (Slide 6 - 12) Parts: 2 - 4 (40 min)	1. Teacher engages students in Consensus Building discussion using prompts in Part 1. *during this discussion, students can also share answers from Lesson 9, Looking to the Future 2. Give students list of keystone species. Move small groups to breakout rooms to choose a species to research. 3. Whole group discussion to develop a list of criteria to guide research of keystone species. 4. Students work in small group breakout rooms to research and record that research on slideshow. Students also develop a model of the keystone species and its effects on the ecosystem. 5. Teacher engages students in Sharing Initial Ideas discussion to compare their keystone species to the wildebeest.	
VIRTUAL CLASS POST WORK	1. Model can be used as formative assessment	2. Complete slides and submit. 3. Update IMT

Return to Lesson List