

TCSJ PBL Overview

Title:	Ecosystems	Est. Start Date:	Duration: 4 Weeks
Teacher:	Chock, Haley, Mesimer	Grade Level: 7th Grade	
Content Focus:	<ul style="list-style-type: none">- Life Science	Other subject areas to be included: <ul style="list-style-type: none">- Mathematics- Writing- Language Arts- Social Studies	
Overall Idea: Summary of the issue, challenge, investigation, scenario, or problem	<ul style="list-style-type: none">- Analyze specific ecosystems- Identify biotic/abiotic factors- Model matter and energy in an ecosystem- Differentiate between exponential and linear graphs- Identify limiting factors of ecosystems		
The Project: What will students design, build, and/or present at the end of the PBL to demonstrate their expertise and solution/answer to the Driving Question?	<ul style="list-style-type: none">- Present a model of your findings<ul style="list-style-type: none">- Include abiotic, biotic, geography, climate graphs, food web identifications, limiting factors, choice numeric data, predator vs. prey, and maintenance- Needs to have at least 5 visuals- Create a hands-on simulation/description of your ecosystem		
Essential Question:	<ul style="list-style-type: none">- What types of relationships exist in an ecosystem?	Driving Question:	<ul style="list-style-type: none">- What has prevented dinosaurs from taking over the earth?
Content and Skills Standards to be addressed: (CCCSS, NGSS, Calif.)	NGSS Science Standards: MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.] MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in		

	<p>terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]</p>
MS-LS2-3.	<p>Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]</p>
CCSS ELA/Literacy Standards:	
WHST.6–8.2.a–f	<p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (MS-LS2-2)</p>
RST.6–8.1	<p>Cite specific textual evidence to support analysis of science and technical texts. (MS-LS2-1),(MS-LS2-2),(MS-LS2-4)</p>
ELA-LITERACY.SL.7.1	<p>Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.</p>
ELA-LITERACY.SL.7.2	<p>Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.</p>
CCSS Mathematics Standards:	
6.RP.-3.a-d	<p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (MS-LS2-5)</p>
6.SP.5.a-d	<p>Summarize numerical data sets in relation to their context. (MS-LS2-2)</p>
7.SP.1-2.	<p>Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the</i></p>

	book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.					
		T+A	E		T+A	E
21 st Century Skills and MPS to be explicitly taught and assessed (T+A) or that will be encouraged (E) by Project work but not taught or assessed:	Analytical Thinking	X		Make sense of problems & persevere in solving them.		X
	Collaborating	X		Reason abstractly & quantitatively.	X	
	Communicating	X		Model with mathematics.	X	
	Creating & Innovating		X	Attend to precision.		X
	Finding & Evaluating Information	X		Look for and make sense of structure.		X
	Problem Solving			Look for and express regularity in repeated reasoning.		X
Presentation Audience						
Culminating Products and Performances	Group:	- Presentation of model and simulation		Class	X	
				School		
				Community		
	Individual:	- Learning Logs - Daily journal writes - Avatar simulation		Experts		
				Web		
				Other:		
Project Overview						
Entry event to launch inquiry, engage	Entry event: Student will complete a quickwrite describing what would happen if a particular organism took over the world. Students will then watch a “Jurassic Park” type of video. This will ultimately lead to a discussion of why this does not happen. https://www.youtube.com/watch?v=1koa2xAxCaw					

<p>students:</p> <p>Outline or Conceptual Flow</p> <p>Include assessment points and <i>clearly identify</i> opportunity(s) for students to inquire, research, and share their new knowledge with their peers.</p> <p><i>Note: Details of lesson plans do not belong in the outline.</i></p>	<p>Week 1:</p> <p>1) What are the components of an ecosystem? Students will begin work on their summative project by researching basic ecological components. Students will be able to identify the components and terminology associated with ecology in ecosystems: (NGSS:MS-LS2-3 ELA WHST.6–8.2.a–f and SL.7.1-2)</p> <ul style="list-style-type: none"> a) Abiotic b) Biotic <ul style="list-style-type: none"> i) Community ii) Population <p><u>Assessment:</u> Students will describe their chosen ecosystem with biotic and abiotic contributing factors in a presentation to the class. (Example: Desert ecosystem: Biotic-scorpions, abiotic:sand)</p> <p>Week 2:</p> <p>2) How does matter and energy flow through an ecosystem? Students are able to identify various relationships within an ecosystem and explain how those relationships reflect the flow of energy and matter. Students can briefly describe the steps of both the water and carbon cycle. (NGSSMS-LS2-3 and MS-LS2-2, Mathematics:6.SP.5.a-d, ELA SL.7.1-2)</p> <ul style="list-style-type: none"> a) Cycles of Nature <ul style="list-style-type: none"> i) Water ii) Carbon b) Energy Flow <ul style="list-style-type: none"> i) Pyramids ii) Food chains (producers, consumers, decomposers) iii) Food webs (herbivore, carnivore, omnivore, predator, prey) <p><u>Assessment:</u> Students will model the elements of energy flow through a method of their choosing (ie. song, dance, video, acting, etc.)</p> <p>Week 3:</p> <p>3) Students should be able to describe population growth and the role of limiting factors in terms of deaths, emigration, births, and immigration. Students can differentiate between linear, logistic, and exponential growth. Students can successfully graph on two axes: population number and time. (NGSS: MS-LS2-1, Reading ELA:RST.6–8.1, SL.7.1-2 Mathematics:7.SP.1-2., 6.RP.-3.a-d)</p> <ul style="list-style-type: none"> a) Types of population growth <ul style="list-style-type: none"> i) Exponential ii) Logistic iii) Linear b) Types of limiting factors <ul style="list-style-type: none"> i) Density dependent (disease, predation, competition) ii) Density independent (natural disaster, human activity) <p><u>Assessment:</u> Students will research and describe the limiting factors of population growth within their ecosystem.</p>
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	Week 4: 4) Students should effectively collaborate with other students to create a project demonstrating their knowledge on their ecosystem. (Listening/Speaking ELA-LITERACY.SL.7.1-2.				
Assessments	Formative Assessments (During Project)	Quizzes/Tests	X		
		Journaling/Learning Log	X		
		Preliminary Plans/Outlines	X		
		Rough Drafts	X		
		Other			
	Summative Assessments (End of Project, identify content areas to be covered) NOTE: The end of PBL Summative Assessments do NOT replace The Project.	Written Product(s), with rubric	X	Other Products	
		Oral Presentation, with rubric	X	Peer Evaluation	
		Multiple Choice/Short Answer Test		Self-Evaluation	X
		Essay Test		Other	
Resources Needed	On-site people, facilities	<ul style="list-style-type: none">- Classroom Teacher- School Site			
	Equipment	<ul style="list-style-type: none">- Computers/Internet- Microsoft Office (Excel)			
	Materials	<ul style="list-style-type: none">- Current newspapers- Markers/Colored pencils- Yarn			

	Community resources	<ul style="list-style-type: none">- http://www.biologyjunction.com/unit9_ecology.htm- http://www.biologycorner.com/lesson-plans/ecology/			
Reflection Methods	(Individual, Group, and/or Whole Class)	Journal/Learning Log	X	Focus Group	
		Whole-class Discussion	X	Fishbowl Discussion	
		Survey		Other	
Project Teaching and Learning Guide					
Knowledge and Skills Needed by Students (to successfully complete culminating projects and to do well on summative assessments)					
Student needs to be able to: <ul style="list-style-type: none">- Define an ecosystem and its components: biotic and abiotic factors, communities, and populations.			Student needs to be able to: <ul style="list-style-type: none">- Graph and analyze population data such as growth, decline, and identifying predator/prey relationships.		
Student needs to be able to: <ul style="list-style-type: none">- Define and identify limiting factors within an ecosystem.			Student needs to be able to: <ul style="list-style-type: none">- Create and interpret food chains and food webs.		
Student needs to be able to: <ul style="list-style-type: none">- Summarize both the water and nitrogen cycle within a given ecosystem.			Student needs to be able to:		
Questions to be Provided by the Project Teacher (to successfully complete culminating products and to do well on summative assessments)					
Teacher asks questions to recall facts, make observations, or demonstrate understanding: <ul style="list-style-type: none">- How can you define an ecosystem?- What is a community?- What is a population?- What are the biotic factors in an ecosystem?			Teacher asks questions to summarize, analyze, organize, or evaluate: <ul style="list-style-type: none">- At what point does a population stop growing?- What is the difference between density-dependent and density-independent limiting factors?- How much energy is lost between the levels of an		

<ul style="list-style-type: none"> - What are the abiotic factors in an ecosystem? - What is a limiting factor? - What are examples of density dependent limiting factors? - What are examples of density-independent limiting factors? - What are producers? - What are consumers? - What are the types of consumers? - What are decomposers? 	<p>energy pyramid?</p> <ul style="list-style-type: none"> - What effect do limiting factors have on an ecosystem? - What signs might indicate a healthy or unhealthy ecosystem?
<p>Teacher asks questions to apply or relate:</p> <ul style="list-style-type: none"> - Can you identify the abiotic and biotic factors in an ecosystem? - Why are producers critical to an ecosystem? - Why are decomposers critical to an ecosystem? - Why is the carbon cycle essential to life? - Why is the water cycle essential to life? - Why do populations grow exponentially? - Why do populations grow linearly? - Why do populations grow logistically? - How does climate affect an ecosystem? - How does the amount of sunlight affect climate and therefore ecosystems? 	<p>Teacher asks questions to predict, design, or create:</p> <ul style="list-style-type: none"> - Can you design an ecosystem? - What will happen to an ecosystem during drought? - Why might organisms immigrate? - How does drought affect the water cycle? - How is population growth affected over time in an ecosystem? - When will the human population stop growing?
<p style="text-align: center;">Teacher Reflection:</p> <p>How did the unit flow? What worked well? What needs to be changed for next time? What did the students learn? What evidence do you have to support student's learning?</p>	

Monday	Tuesday	Wednesday	Thursday	Friday
<p>Entry Event:</p> <ul style="list-style-type: none"> - Quickwrite: What would happen if an organism were to take over the world? - Discussion: Why doesn't this happen. - Jurassic Park clip: https://www.youtube.com/watch?v=1koa2xAXCAw <p>Assess:</p> <ul style="list-style-type: none"> - Think-Pair- Share - KWL chart to record student responses <p>Application:</p> <ul style="list-style-type: none"> - What is the difference between population, community and ecosystem? <p>Video: https://www.youtube.com/watch?v=TDBBUAIDQeo</p> <p>EL Strategies:</p> <ul style="list-style-type: none"> - Strategic grouping, - Think-pair-share (small group) - Audio/visual - informal writing. <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Reteaching population, species, and organism definitions and examples. 	<p>Front Load:</p> <ul style="list-style-type: none"> - Direct instruction on ecosystems <p>Video: https://www.youtube.com/watch?v=Elpp_7-yTN4</p> <p>Application:</p> <ul style="list-style-type: none"> - Show pictures of random places- have students describe the ecosystem <p>Lab:</p> <ul style="list-style-type: none"> - School site scavenger hunt- identify biotic and abiotic components of the school's ecosystem. <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, grouping - Hands-on activity <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - One on one/small group review of biological principles of life, how to differentiate between living and non-living entities. 	<p>Research:</p> <ul style="list-style-type: none"> - Students choose an ecosystem to learn more about. (In groups of 3) - Identify the biotic and abiotic components of that ecosystem. - Students will use laptops to go online and research different types of ecosystems - Students will begin creating a presentation on their ecosystem <p>EL Strategies:</p> <ul style="list-style-type: none"> - Strategic grouping - Technology <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Review basic components of ecological terms from Monday. (small group) 	<p>Application:</p> <ul style="list-style-type: none"> - Students share progress of their research <p>Research:</p> <ul style="list-style-type: none"> - Students will continue their research and finalize presentations. <p>EL Strategies:</p> <ul style="list-style-type: none"> - Informal presentation - Strategic grouping - Small group discussion - Technology <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Small group-reinforcement of biotic and abiotic factors. 	<p>Application:</p> <ul style="list-style-type: none"> - Raccoon activity simulation <p>Assessment:</p> <ul style="list-style-type: none"> - Students will describe their chosen ecosystem with all contributing factors in a presentation to the class. <p>EL Strategies:</p> <ul style="list-style-type: none"> - Strategic grouping - Hands-on activity - Technology - Whole class activity <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - N/A

Daily PBL Plans

Week #2

Dates _____

Monday	Tuesday	Wednesday	Thursday	Friday
<p>Front Load:</p> <ul style="list-style-type: none"> - Energy Flow: Introduce Energy Pyramid and producers/consumers <p>Application:</p> <p>Who's Eating Who? Activity</p> <p>http://www.antarctica.gov.au/about-antarctica/education-resources/whos-eating-who</p> <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, grouping - Research activity <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Small group reinforcement of photosynthesis and cellular respiration. 	<p>Entry Event:</p> <p>https://www.youtube.com/watch?v=o_RBHfjZsUQ</p> <p>Front Load:</p> <ul style="list-style-type: none"> - Carnivores, herbivores, omnivores <p>Application:</p> <p>Finish Who's Eating Who?</p> <p>Research:</p> <ul style="list-style-type: none"> - Students will continue researching detailed pictures of their ecosystem <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, grouping - Research activity - Technology <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Reinforcement of prior day: energy flow. 	<p>Assessment:</p> <ul style="list-style-type: none"> - Have pictures of your ecosystem- Identify: carnivores, herbivores, omnivores, producers, consumers, decomposers, predator, prey <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, grouping. <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Further differentiation between trophic level identification (e.g. producers, consumers, decomposers, etc) 	<p>Front Load:</p> <ul style="list-style-type: none"> - Water and Carbon cycle <p>Assessment:</p> <ul style="list-style-type: none"> - Model elements of the cycles (Student choice of drawing, song/dance, or poetry/creative narrative) <p>EL Strategies:</p> <ul style="list-style-type: none"> - Strategic grouping <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Recall and interpretive tasks for water and carbon cycle. Reinforcement of photosynthesis and cellular respiration. 	<p>Application:</p> <ul style="list-style-type: none"> - Food web activity <p>EL Strategies:</p> <ul style="list-style-type: none"> - Strategic grouping <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - N/A

Daily PBL Plans

Week #3

Dates _____

Monday	Tuesday	Wednesday	Thursday	Friday
<p>Quick-Write:</p> <ul style="list-style-type: none"> - Brainstorm ideas on how populations can grow or change <p>Entry Event:</p> <p>https://www.youtube.com/watch?v=OMtw0MpuoMU</p> <p>Front Load:</p> <ul style="list-style-type: none"> - Direct instruction on exponential vs. logistic graphs <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, informal writing - Hands-on activity <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - One on one practice with Dependent and Independent variable identification. 	<p>Application:</p> <ul style="list-style-type: none"> - Provide students with examples of graphs (human population data, industrial revolution)- students will interpret, analyze, and communicate their conclusions from the given data <p>EL Strategies:</p> <ul style="list-style-type: none"> - Hands-on activity - Student pairs if needed - Teacher monitoring <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Show students many examples of interpreting linear, exponential, and logistic graphs, and how it relates it to current assignment - Exit Ticket 	<p>Entry Event:</p> <p>https://www.youtube.com/watch?v=RBOsqmBQBQk</p> <p>Front Load:</p> <ul style="list-style-type: none"> - Limiting factors <p>Application:</p> <ul style="list-style-type: none"> - Provide scenarios- have students identify limiting factors (Present to class) <p>EL Strategies:</p> <ul style="list-style-type: none"> - Audio/visual, think-pair-share. <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - N/A 	<p>Research:</p> <ul style="list-style-type: none"> - Research limiting factors of their ecosystem <p>EL Strategies:</p> <ul style="list-style-type: none"> - Collaborate with people from different groups <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Teacher will provide one on one support for struggling students. - Provide a list of websites (1-3) where student(s) could find background information 	<p>Lab:</p> <ul style="list-style-type: none"> - Survivorship Lab- (Will include math concepts from monday) <p>EL Strategies:</p> <ul style="list-style-type: none"> - Break down vocabulary - Technology - Strategic grouping <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Strategic partnering - Teacher to circulate, provide one on one support for struggling students.

Daily PBL Plans

Week #4

Dates _____

Monday	Tuesday	Wednesday	Thursday	Friday
<p><u>Entry Event:</u></p> <ul style="list-style-type: none"> - Avatar simulation <p><u>Front Load:</u></p> <ul style="list-style-type: none"> - Presentation Rubric <p>EL Strategies:</p> <ul style="list-style-type: none"> - Practice speech/presentation with teacher before the actual presentation <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Teacher will be monitoring groups to make sure students are on track to finish 	<p><u>Create:</u></p> <ul style="list-style-type: none"> - Work on final project (poster board, power point etc.) - include: Data, graph, research on abiotic and biotic organisms, geography, climate graphs, food web identification, limiting factors, 3 predator/prey relationships <p><u>Application:</u></p> <ul style="list-style-type: none"> - Groups will organize their presentation - Groups able to practice in class- teacher feedback available <p>EL Strategies:</p> <ul style="list-style-type: none"> - Practice speech/presentation with teacher before the actual presentation <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Teacher will be monitoring groups to make sure students are on track to finish 	<p><u>Create:</u></p> <ul style="list-style-type: none"> - Work on final project (poster board, power point etc.) - include: Data, graph, research on abiotic and biotic organisms, geography, climate graphs, food web identification, limiting factors, 3 predator/prey relationships <p><u>Application:</u></p> <ul style="list-style-type: none"> - Groups will organize their presentation - Groups able to practice in class- teacher feedback available <p>EL Strategies:</p> <ul style="list-style-type: none"> - Practice speech/presentation with teacher before the actual presentation <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Teacher will be monitoring groups to make sure students are on track to finish 	<p><u>Final Presentations:</u></p> <p><u>Assess/Present</u></p> <ul style="list-style-type: none"> - Students self assess their recycling portfolio - Present their research/data collection <p><u>Assess/Write:</u></p> <ul style="list-style-type: none"> - Students write similarities and differences groups - What did they like/didn't like about each group's presentation <p>EL Strategies:</p> <ul style="list-style-type: none"> - N/A <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Write to the best of their ability. No minimum amount. 	<p><u>Final Presentations:</u></p> <p><u>Assess/Present</u></p> <ul style="list-style-type: none"> - Students self assess their recycling portfolio - Present their research/data collection <p><u>Assess/Write:</u></p> <ul style="list-style-type: none"> - Students write similarities and differences groups - What did they like/didn't like about each group's presentation <p>EL Strategies:</p> <ul style="list-style-type: none"> - N/A <p>Intervention Lesson:</p> <ul style="list-style-type: none"> - Write to the best of their ability. No minimum amount.

