Biology Module B: Ecology, is one of four sections of Module B of the Biology Keystone Exam. The content and assignments are organized in a manner consistent with the Pennsylvania Keystone Biology blueprint. In Biology Module B, the theme of continuity and unity of life is explored through four big ideas. Students address the big ideas of cell growth and reproduction, genetics, the theory of evolution, and ecology through the exploration of the following essential questions:

- How do organisms live, grow, respond to their environment, and reproduce?
- How are the characteristics of one generation passed to the next?
- How can individuals of the same species and even siblings have different characteristics?
- How can there be so many similarities among organisms yet so many different kinds of plant, animals, and microorganisms?
- How and why do organisms interact with their environment and what are the effects of these interactions?

The resources in this Module will enable students to reinforce the concepts within Ecology as well as resources for teachers to utilize in the classroom. This section will focus on the question: How and why do organisms interact with their environment and what are the effects of these interactions?

Biology B: Ecology

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Biology B: Ecology						
	In Biology Module B, the theme of continuity and unity of life is explored through four big ideas. The big idea of this section, Ecology, focuses on concepts related to the ecological levels of organization in the biosphere and the interactions and relationships in an ecosystem. Students investigate and use data to build explanations of ecological interdependencies and cause-and-effect relationships within the biosphere and analyze interactions and relationships in an ecosystem as they relate to energy flow, biotic components, biogeochemical cycles, and limiting factors. Models are constructed and used to predict changes in an ecosystem in response to natural and human disturbances. Evidence is used to support their explanations and construct arguments and design solutions for problems that impact the environment.					
Ecological Levels of Organization in the Biosphere						
	In this session, students develop models that distinguish among levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere). Students will cite specific examples of biotic and abiotic components of aquatic and terrestrial ecosystems.					
Levels of Ecological Organization						
	Students will describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere).					
		READ the text on Ecology CH 11 SEC 1.		https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13		
		WATCH the video introducing ecology and providing a crash course in ecology concepts.		https://www.youtube.com/watch?v=izRvPaAWgyw		

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		REVIEW the presentation on Hierarchy of Living Things.		https://drive.google.com/open?id=0B99Um_mvTWdGSjJ6ZEdQd2RIVkU		
		ILLUSTRATE the levels of the biosphere.		https://drive.google.com/open?id=0B99Um_mvTWdGWUR4VXdxU0VhNUE		
		CREATE a biome concept map.		http://www.biologycorner.com/worksheets/biomes_conceptmap.html#.U_EvMVaBBn4		
		RESEARCH a biome and DESIGN a website to showcase it.		https://drive.google.com/open?id=0B99Um_mvTWdGQ3h3OGMtMXZ5VlU		
		MATCH the levels of organization terms with their corresponding images.		http://www.adaptivepractice.com/lesson/hierarchy-of-life		

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		DEFINE the levels of organization and PROVIDE examples for each.		https://drive.google.com/open?id=0B99Um_mvTWdGbmRUZ1NyM2tVdnM		
		QUIZ yourself on the ecological levels of organization.		https://www.quia.com/quiz/1039453.html		
		BUILD a prairie.		http://www.bellmuseum.umn.edu/games/prairie/build		
		COMPARE ecosystems in this virtual lab.		http://fergusonfoundation.org/hbf-kids-zone/lets-take-a-dip/		
		COLLECT and ANALYZE data on virtual lab activity.		http://www.nclark.net/lets_dip_lesson_plan.pdf		
		IDENTIFY fish in the virtual habitat.		http://fergusonfoundation.org/btw-students/fish-identification/		
Biotic and Abiotic Components of Ecosystems						
	Students will describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.					

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		WATCH the video on ecosystem ecology and its factors.		https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-07		
		WATCH the video on differentiating between biotic and abiotic factors.		https://www.youtube.com/watch?v=nQO5x8Q3e8g		
		DEFINE and CATEGORIZE biotic and abiotic factors.		https://drive.google.com/open?id=0B99Um_mvTWdGc2RneXVyOUYxczA		
		TEST your knowledge after watching Finding Nemo.		https://drive.google.com/open?id=0B99Um_mvTWdGaGU5UExNM0dCVmM		
Interactions and Relationships in an Ecosystem						
	In session, students will construct models of energy flow through an ecosystem and will describe biotic interactions in an ecosystem. In additions, students will describe how matter recycles through an ecosystem and how ecosystems change in response to natural and human disturbances, including limiting factors on population dynamics and potential species extinction.					
Energy Flow Through an Ecosystem						

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	Students will describe interactions and relationships in an ecosystem. This includes how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).					
		READ the text on Flow of Energy CH 11 SEC 1.		https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13		
		LABEL the food web and CREATE your own.		http://www.biologycorner.com/worksheets/food_web_label.html#.UzMby_ldWSo		
		COMPLETE crossword puzzle on food webs		https://drive.google.com/open?id=0B99Um_mvTWdGaHlZeGhiaDhXV28		
		READ and ASSESS your understanding of food webs and pyramids.		https://drive.google.com/open?id=0B99Um_mvTWdGa2ZvdDhIdDdnMkk		
		WATCH this video to identify and define ecological pyramids.		https://www.youtube.com/watch?v=wGfOoRrICto		
Interactions in an Ecosystem						

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	Students will describe interactions and relationships in an ecosystem. This includes how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).					
		READ the text on Communities and Interactions CH 12 SEC 1 & 2.		https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13		
		WATCH the video on the reintroduction of wolves into Yellowstone Park.		https://www.youtube.com/watch?v=dMGJ9oThHbc		
		INTERPRET and GRAPH data on deer predation and starvation.		http://www.biologycorner.com/worksheets/predator_prey_graphing.html#.UzMau_ldWSo		
		INTERPRET ecological data.		http://www.biologycorner.com/worksheets/interpreting_data.html#.UzMeM_ldWSo		
		SIMULATE predator/prey interactions.		http://biologycorner.com/worksheets/predatorsim.html#.UzMi81d8rKd		

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		WATCH this video to differentiate between types of symbiotic relationships.		https://www.youtube.com/watch?v=zSmL2F1t81Q		
		DESIGN a pic collage to depict symbiotic relationships.		https://drive.google.com/open?id=0B99Um_mvTWdGUlJiUWl2ZzlfWnc		
		EXPLORE anadromous fish survival rates in this virtual ecosystem simulation.		http://fergusonfoundation.org/btw-students/swim-for-your-life-fish-game/		
		CREATE biodiversity.		https://drive.google.com/open?id=0B99Um_mvTWdGSEFybHd4RU5mQ28		
		DETERMINE the impact of light and color in the sea through a series of hands-on activities.		https://drive.google.com/open?id=0B99Um_mvTWdGYkcya1lEeUk5WXc		

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		WATCH the webisode on Symbiosis in the Sea.				
		COMPLETE this study guide for the Symbiosis in the Sea webisode.		https://drive.google.com/open?id=0B99Um_mvTWdGc1FFZXhlZzFKYVk		
		QUIZ yourself on symbiotic relationships.		http://www.proprofs.com/quiz-school/story.php?title=symbiotic-relationship-quiz		
Recycling Matter through an Ecosystem						
	Students will describe how matter recycles through an ecosystem (e.e., water cycle, carbon cycle, oxygen cycle, and nitrogen cycle).					
		READ the text on Cycles CH 11 SEC 2.		https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13		
		WATCH the video on global carbon flow.		https://www.youtube.com/watch?v=1o4ODWMZq5U		

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		WATCH the video describing the hydrologic and carbon cycles.		https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-08		
		WATCH the video about how nitrogen and phosphorous cycle through the system.		https://www.youtube.com/watch?v=leHy-Y_8nRs		
		IDENTIFY the water cycle.		http://www.brainrush.com/lesson/water-cycle		
		REVIEW the water cycle.		https://drive.google.com/open?id=0B99Um_mvTWdGVG15X2xsT0lYTkk		
		QUIZ yourself on cycles of matter, niches, and symbiosis.		https://www.quia.com/quiz/4233200.html		
		INTERACT with the Water Cycle.		http://fergusonfoundation.org/hbf-kids-zone/the-water-cycle/		

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Ecosystems Change in Response to Natural and Human Disturbances						
	Students will examine how ecosystems change in response to natural and human disturbances e.g., climate changes, introduction of nonnative species, pollution, fires).					
		READ the article about the effects of global warming on insects.		http://www.nature.com/scitable/blog/green-science/global_warming_favors_lightcolored_insects		
		EXPLORE the Mount St. Helens Science and Learning Center.		http://www.mshslc.org/		
		RECORD your thoughts and analysis on Mount St. Helens and ecological succession.		https://drive.google.com/open?id=0B99Um_mvTWdGZUlCOTkzekxaclk		
		EXPLORE changes in wetlands over time.		https://www.nps.gov/keaq/learn/education/changes-in-wetlands-over-time.htm		

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		DEVELOP your scientific explanation of a change in wetlands from the prior activity.		https://drive.google.com/open?id=0B99Um_mvTWdGblN1akttQlpKVVU		
		INVESTIGATE your biological footprint.		http://myfootprint.org/subscription.php		
How Limiting Factors Affect Population Dynamics						
	Students will examine the effects of limiting factors on population dynamics and potential species extinction.					
		READ the text on Limiting Factors in an Ecosystem CH 12 SEC 4.		https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13		
		READ the article on nutrient limitation and algal blooms.		http://www.nytimes.com/2013/07/06/world/asia/huge-algae-bloom-afflicts-qingdao-china.html?_r=1		
		INVESTIGATE limiting factors affecting yellow perch.		http://www.gov.mb.ca/conservation/sustain/limfac.pdf		

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		READ the article on population limiting factors and EXAMINE data.		http://www.nature.com/scitable/knowledge/library/population-limiting-factors-17059572		
		WATCH this video on population growth patterns.		https://www.youtube.com/watch?v=OMtw0MpuoMU		
		ANALYZE and GRAPH population data.		https://drive.google.com/open?id=0B99Um_mvTWdGNGFGVDlIV09ycTA		
		QUIZ yourself on ecological succession and populations.		https://www.quia.com/quiz/4233423.html		
Review Ecology						
	Students will have the opportunity to review the section on ecology.					
		STUDY the Ecology Review Guide.		https://drive.google.com/open?id=0B99Um_mvTWdGQ3lKeTJxRzlmSEk		

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		WATCH the vodcast reviewing ecology.				
		COMPLETE the viewing guide for the vodcast on ecology.		https://drive.google.com/open?id=0B99Um_mvTWdGVEJOcWYyNzJnZTQ		
		PRACTICE assessing your understanding of ecology.		http://www.proprofs.com/quiz-school/story.php?title=ecology-exam-review-practice-quiz		
		TEST your knowledge of ecology.		http://www.crsd.org/Page/33097		