

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

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
Biology B: Ecology						
<p>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.</p>						
Ecological Levels of Organization in the Biosphere						
<p>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.</p>						
Levels of Ecological Organization						
<p>Students will describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere).</p>						
		<p>READ the text on Ecology CH 11 SEC 1.</p>		<p><a href="https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13">https:// itunes.apple.com/ us/book/ck-12- biology-interactive/ id574071922? mt=13</a></p>		
		<p>WATCH the video introducing ecology and providing a crash course in ecology concepts.</p>		<p><a href="https://www.youtube.com/watch?v=izRvPaAWgyw">https:// www.youtube.com/ watch? v=izRvPaAWgyw</a></p>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		REVIEW the presentation on Hierarchy of Living Things.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGSjJ6ZEdQd2RIVkU">https://drive.google.com/open?id=0B99Um_mvTWdGSjJ6ZEdQd2RIVkU</a>		
		ILLUSTRATE the levels of the biosphere.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGWUR4VXdU0VhNUE">https://drive.google.com/open?id=0B99Um_mvTWdGWUR4VXdU0VhNUE</a>		
		CREATE a biome concept map.		<a href="http://www.biologycorner.com/worksheets/biomes_conceptmap.html#.UEvMVaBn4">http://www.biologycorner.com/worksheets/biomes_conceptmap.html#.UEvMVaBn4</a>		
		RESEARCH a biome and DESIGN a website to showcase it.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGQ3h3OGMtMXZ5VIU">https://drive.google.com/open?id=0B99Um_mvTWdGQ3h3OGMtMXZ5VIU</a>		
		MATCH the levels of organization terms with their corresponding images.		<a href="http://www.adaptivepractice.com/lesson/hierarchy-of-life">http://www.adaptivepractice.com/lesson/hierarchy-of-life</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		DEFINE the levels of organization and PROVIDE examples for each.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGbmRUZ1NyM2tVdnM">https://drive.google.com/open?id=0B99Um_mvTWdGbmRUZ1NyM2tVdnM</a>		
		QUIZ yourself on the ecological levels of organization.		<a href="https://www.quia.com/quiz/1039453.html">https://www.quia.com/quiz/1039453.html</a>		
		BUILD a prairie.		<a href="http://www.bellmuseum.umn.edu/games/prairie/build">http://www.bellmuseum.umn.edu/games/prairie/build</a>		
		COMPARE ecosystems in this virtual lab.		<a href="http://fergusonfoundation.org/hbf-kids-zone/lets-take-a-dip/">http://fergusonfoundation.org/hbf-kids-zone/lets-take-a-dip/</a>		
		COLLECT and ANALYZE data on virtual lab activity.		<a href="http://www.nclark.net/lets_dip_lesson_plan.pdf">http://www.nclark.net/lets_dip_lesson_plan.pdf</a>		
		IDENTIFY fish in the virtual habitat.		<a href="http://fergusonfoundation.org/btw-students/fish-identification/">http://fergusonfoundation.org/btw-students/fish-identification/</a>		
<b>Biotic and Abiotic Components of Ecosystems</b>						
	Students will describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.					

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		WATCH the video on ecosystem ecology and its factors.		<a href="https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-07">https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-07</a>		
		WATCH the video on differentiating between biotic and abiotic factors.		<a href="https://www.youtube.com/watch?v=nQO5x8Q3e8g">https://www.youtube.com/watch?v=nQO5x8Q3e8g</a>		
		DEFINE and CATEGORIZE biotic and abiotic factors.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGc2RneXVyOUYxczA">https://drive.google.com/open?id=0B99Um_mvTWdGc2RneXVyOUYxczA</a>		
		TEST your knowledge after watching Finding Nemo.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGaGU5UExNM0dCVmM">https://drive.google.com/open?id=0B99Um_mvTWdGaGU5UExNM0dCVmM</a>		
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						

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
	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.		<a href="https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13">https:// itunes.apple.com/ us/book/ck-12- biology-interactive/ id574071922? mt=13</a>		
		LABEL the food web and CREATE your own.		<a href="http://www.biologycorner.com/worksheets/food_web_label.html#.UzMby_IdWSo">http:// www.biologycorner. com/worksheets/ food_web_label.htm l#.UzMby_IdWSo</a>		
		COMPLETE crossword puzzle on food webs		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGaHIZeGhiaDhXV28">https:// drive.google.com/ open? id=0B99Um_mvTW dGaHIZeGhiaDhXV 28</a>		
		READ and ASSESS your understanding of food webs and pyramids.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGa2ZvdDhldDdnMkk">https:// drive.google.com/ open? id=0B99Um_mvTW dGa2ZvdDhldDdnM kk</a>		
		WATCH this video to identify and define ecological pyramids.		<a href="https://www.youtube.com/watch?v=wGfOoRrICto">https:// www.youtube.com/ watch? v=wGfOoRrICto</a>		
Interactions in an Ecosystem						

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
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.		<a href="https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13">https:// itunes.apple.com/ us/book/ck-12- biology-interactive/ id574071922? mt=13</a>		
		WATCH the video on the reintroduction of wolves into Yellowstone Park.		<a href="https://www.youtube.com/watch?v=dMGJ9oThHbc">https:// www.youtube.com/ watch? v=dMGJ9oThHbc</a>		
		INTERPRET and GRAPH data on deer predation and starvation.		<a href="http://www.biologycorner.com/worksheets/predator_preyn_graphing.html#.UzMau_l dWSo">http:// www.biologycorner. com/worksheets/ predator_preyn graphing.html#.UzMau_l dWSo</a>		
		INTERPRET ecological data.		<a href="http://www.biologycorner.com/worksheets/interpreting_data.html#.UzMeM_l dWSo">http:// www.biologycorner. com/worksheets/ interpreting_data.ht ml#.UzMeM_l dWSo</a>		
		SIMULATE predator/prey interactions.		<a href="http://biologycorner.com/worksheets/predatorsim.html#.UzMi81d8rKd">http:// biologycorner.com/ worksheets/ predatorsim.html#.UzMi81d8rKd</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		WATCH this video to differentiate between types of symbiotic relationships.		<a href="https://www.youtube.com/watch?v=zSmL2F1t81Q">https://www.youtube.com/watch?v=zSmL2F1t81Q</a>		
		DESIGN a pic collage to depict symbiotic relationships.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGUiJiUWl2ZzfWnc">https://drive.google.com/open?id=0B99Um_mvTWdGUiJiUWl2ZzfWnc</a>		
		EXPLORE anadromous fish survival rates in this virtual ecosystem simulation.		<a href="http://fergusonfoundation.org/btw-students/swim-for-your-life-fish-game/">http://fergusonfoundation.org/btw-students/swim-for-your-life-fish-game/</a>		
		CREATE biodiversity.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGSEFybHd4RU5mQ28">https://drive.google.com/open?id=0B99Um_mvTWdGSEFybHd4RU5mQ28</a>		
		DETERMINE the impact of light and color in the sea through a series of hands-on activities.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGYkcya1IEeUk5WXc">https://drive.google.com/open?id=0B99Um_mvTWdGYkcya1IEeUk5WXc</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		WATCH the webisode on Symbiosis in the Sea.				
		COMPLETE this study guide for the Symbiosis in the Sea webisode.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGc1FFZXhIZzFKYVk">https://drive.google.com/open?id=0B99Um_mvTWdGc1FFZXhIZzFKYVk</a>		
		QUIZ yourself on symbiotic relationships.		<a href="http://www.proprofs.com/quiz-school/story.php?title=symbiotic-relationship-quiz">http://www.proprofs.com/quiz-school/story.php?title=symbiotic-relationship-quiz</a>		
<b>Recycling Matter through an Ecosystem</b>						
	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.		<a href="https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13">https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13</a>		
		WATCH the video on global carbon flow.		<a href="https://www.youtube.com/watch?v=1o4ODWMZq5U">https://www.youtube.com/watch?v=1o4ODWMZq5U</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		WATCH the video describing the hydrologic and carbon cycles.		<a href="https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-08">https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-course-ecology-2/v/crash-course-ecology-08</a>		
		WATCH the video about how nitrogen and phosphorous cycle through the system.		<a href="https://www.youtube.com/watch?v=leHy-Y_8nRs">https://www.youtube.com/watch?v=leHy-Y_8nRs</a>		
		IDENTIFY the water cycle.		<a href="http://www.brainrush.com/lesson/water-cycle">http://www.brainrush.com/lesson/water-cycle</a>		
		REVIEW the water cycle.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGVG15X2xsT0IYTkk">https://drive.google.com/open?id=0B99Um_mvTWdGVG15X2xsT0IYTkk</a>		
		QUIZ yourself on cycles of matter, niches, and symbiosis.		<a href="https://www.quia.com/quiz/4233200.html">https://www.quia.com/quiz/4233200.html</a>		
		INTERACT with the Water Cycle.		<a href="http://fergusonfoundation.org/hbf-kids-zone/the-water-cycle/">http://fergusonfoundation.org/hbf-kids-zone/the-water-cycle/</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
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.		<a href="http://www.nature.com/scitable/blog/green-science/global_warming_favors_lightcolored_insects">http://www.nature.com/scitable/blog/green-science/global_warming_favors_lightcolored_insects</a>		
		EXPLORE the Mount St. Helens Science and Learning Center.		<a href="http://www.mshslc.org/">http://www.mshslc.org/</a>		
		RECORD your thoughts and analysis on Mount St. Helens and ecological succession.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGZUICOTkzekxack">https://drive.google.com/open?id=0B99Um_mvTWdGZUICOTkzekxack</a>		
		EXPLORE changes in wetlands over time.		<a href="https://www.nps.gov/keaq/learn/education/changes-in-wetlands-over-time.htm">https://www.nps.gov/keaq/learn/education/changes-in-wetlands-over-time.htm</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		DEVELOP your scientific explanation of a change in wetlands from the prior activity.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGbIN1akttQlpKVVU">https://drive.google.com/open?id=0B99Um_mvTWdGbIN1akttQlpKVVU</a>		
		INVESTIGATE your biological footprint.		<a href="http://myfootprint.org/subscription.php">http://myfootprint.org/subscription.php</a>		
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.		<a href="https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13">https://itunes.apple.com/us/book/ck-12-biology-interactive/id574071922?mt=13</a>		
		READ the article on nutrient limitation and algal blooms.		<a href="http://www.nytimes.com/2013/07/06/world/asia/huge-algae-bloom-afflicts-qingdao-china.html?_r=1">http://www.nytimes.com/2013/07/06/world/asia/huge-algae-bloom-afflicts-qingdao-china.html?_r=1</a>		
		INVESTIGATE limiting factors affecting yellow perch.		<a href="http://www.gov.mb.ca/conservation/sustain/limfac.pdf">http://www.gov.mb.ca/conservation/sustain/limfac.pdf</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		READ the article on population limiting factors and EXAMINE data.		<a href="http://www.nature.com/scitable/knowledge/library/population-limiting-factors-17059572">http://www.nature.com/scitable/knowledge/library/population-limiting-factors-17059572</a>		
		WATCH this video on population growth patterns.		<a href="https://www.youtube.com/watch?v=OMtw0MpuoMU">https://www.youtube.com/watch?v=OMtw0MpuoMU</a>		
		ANALYZE and GRAPH population data.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGNGFGVDIIV09ycTA">https://drive.google.com/open?id=0B99Um_mvTWdGNGFGVDIIV09ycTA</a>		
		QUIZ yourself on ecological succession and populations.		<a href="https://www.quia.com/quiz/4233423.html">https://www.quia.com/quiz/4233423.html</a>		
Review Ecology						
Students will have the opportunity to review the section on ecology.						
		STUDY the Ecology Review Guide.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGQ3IKeTJxRzImSEk">https://drive.google.com/open?id=0B99Um_mvTWdGQ3IKeTJxRzImSEk</a>		

Module Title	Message	Assignment / Call to Action	Content Directions	Resource / URL	Info about the URL (published on the "i" button of a resource/url)	Notes
		WATCH the vodcast reviewing ecology.				
		COMPLETE the viewing guide for the vodcast on ecology.		<a href="https://drive.google.com/open?id=0B99Um_mvTWdGVEJOcWYyNzJnZTQ">https://drive.google.com/open?id=0B99Um_mvTWdGVEJOcWYyNzJnZTQ</a>		
		PRACTICE assessing your understanding of ecology.		<a href="http://www.proprofs.com/quiz-school/story.php?title=ecology-exam-review-practice-quiz">http://www.proprofs.com/quiz-school/story.php?title=ecology-exam-review-practice-quiz</a>		
		TEST your knowledge of ecology.		<a href="http://www.crsd.org/Page/33097">http://www.crsd.org/Page/33097</a>		