

Ohio ABLÉ Science Lessons

TEACHER GUIDE



Ohio ABLÉ Online Instruction
<http://www.ohioable.org/learn/>

RATIONALE

DISTANCE EDUCATION PILOT

The Ohio Literacy Resource Center (OLRC) Distance Education project began piloting several distance learning models based on existing gaps in viable distance education offerings available to Ohio ABLE classroom teachers in 2014. We found that teachers desired using a blended learning approach, but specifically lacked Science resources and time to develop lesson content themselves. The Learner Moodle <http://ohioable.org/learn> was established and the Science Learner Moodle Pilot began November 2015.

The pilot team would build four Science modules in the Learner Moodle that supported the Learner Mastery Model as described by the National Reporting System (NRS)

Learner Mastery Model, which assigns a fixed number of proxy hours of credit based on the learner mastery (passing a test) on the content of each lesson. Learners work with the curriculum and materials and when they feel they have mastered the material, take a test. A high percentage of correct answers (typically 70%-80%) earns the credit hours attached to the material.

Mastery learning provides instruction that clearly specifies what is to be learned and how it will be evaluated; allows students to learn at their own pace; and provides both formative and summative assessments. Student proxy hours are then allotted based on their mastery (80%) of the material. The Learner Moodle provided asynchronous learning activities that would meet these requirements.

This blended learning opportunity gives students access to Science content both inside and outside of the ABLE classroom. Research shows that using a blended approach benefits both students and teachers. Teachers can integrate online content directly into their classrooms, while students enjoy the benefit of accessing integrated, cohesive materials at their convenience.

This Teacher Guide will provide Ohio ABLE teacher's information on how to access these lessons and the instructional design process used throughout the pilot. For additional information or questions concerning the technology component, contact Matt Gambrill at mgambrill@literacy.kent.edu; and for additional information or questions concerning the instructional design component, contact Judy Franks at jfranks@literacy.kent.edu.

Special thanks to Donna Ferrell, a classroom teacher from Columbus City Schools who was instrumental in developing the Science lessons that were part of the piloting process. Her hard work and diligence provided Ohio ABLE programs this excellent example of a blended learning approach.

TABLE OF CONTENTS

Instructional Design	page 2
Technology Support	page 16

INSTRUCTIONAL DESIGN

OVERVIEW

In the Instructional Design section of this guide, you will find information and ideas to help get students started using the Science Lessons. Let's begin with thinking about assessment and placement.

PRE-ASSESSMENT

To place students in the Science modules after enrolling them in the Learner Moodle, a decision as to where to start is necessary. The *Introduction to Science and Moodle* module would be the logical starting point for students so they can orient themselves to the Science content and also to learn how the Moodle lessons are structured.

Based on current classroom instruction, teachers may also want to assign particular modules that would integrate with the content students are learning presently as a blended learning experience. Whether teachers and students choose to work through the modules in order or randomly, Science content will be presented and reinforced throughout.

Another approach would be for students to take a pre-assessment to determine gaps in their learning and to go directly to that particular module to begin their study. Readily available in ABLE classrooms are the *Common Core Basics: Science* (EFL 3-4) and *Common Core Achieve: Science* (EFL 5-6) textbooks. These textbooks have Pretests and Chapter Reviews that students can utilize as a placement tool.

Common Core Basics: Science¹

- Pretest and Check Your Understanding found on pages 1-12
 - Identify skill areas where students need to concentrate their study time. Use the evaluation chart at the end of the Pretest to see which questions they answered incorrectly. Students can then focus time in the Science modules on these specific areas. They can spend time learning content in the textbook and the modules, then return to take the Posttest (pages 436-454) or other standardized test.
- Chapter Reviews and Check Your Understanding

Chapters	Textbook	Review Pages	Moodle Module <i>*currently available</i>
1	Human Body and Health	46-49	Human Body and Health
2	Life Functions and Energy Intake	78-83	Relationship between Life Functions and Energy Intake
3	Ecosystems	126-129	<i>Energy Flows in Ecological Networks*</i>
4	Foundations of Life	166-171	Organization of Life
5	Heredity	194-195	<i>Molecular Basis for Heredity*</i>
6	Evolution	230-232	<i>Evolution*</i>
7	Energy	276-279	Conservation, Transformation and Flow of Energy
8	Work, Motion, and Forces	298-299	Work, Motion, and Forces

Chapters	Textbook	Review Pages	Moodle Module *currently available
9	Chemical Properties	348-352	Chemical Properties and Reactions Related to Living Systems
10	Earth and Living Things	376-377	Interactions between Earth's Systems and Living Things
11	Earth	402-405	Earth and its System Components and Interactions*
12	The Cosmos	430-433	Structures and Organization of the Cosmos

Common Core Achieve Science²

- Pretest and Check Your Understanding found on pages 1-11
 - Identify skill areas where students need to concentrate their study time. Use the evaluation chart at the end of the Pretest to see which questions they answered incorrectly. Students can then focus time in the Science modules on these specific areas. They can spend time learning content in the textbook and the modules, then return to take the Posttest (pages 358-372) or other standardized test.
- Chapter Reviews and Check Your Understanding

Chapters	Textbook	Review Pages	Moodle Module *currently available
1	Human Body and Health	54-57	Human Body and Health
2	Ecosystems	90-93	Energy Flows in Ecological Networks*
3	Structure and Functions of Life	134-137	Organization of Life Relationship between Life Functions and Energy Intake
4	Heredity and Evolution	176-177	Molecular Basis for Heredity* Evolution*
5	Work, Motion, and Forces	204-207	Work, Motion, and Forces
6	Energy	242-245	Conservation, Transformation and Flow of Energy
7	Matter	280-283	Chemical Properties and Reactions Related to Living Systems
8	The Earth	328-331	Interactions between Earth's Systems and Living Things Earth and its System Components and Interactions*
9	The Cosmos	353-355	Structures and Organization of the Cosmos

Ohio ABE Science Lessons

Home ▶ Science ▶ Ohio ABE Science Lessons

The screenshot shows the Moodle interface for Ohio ABE Science Lessons. On the left is a navigation menu with the following items: Home, Dashboard, Ohio ABE Online Instruction, Current course (expanded), Ohio ABE Science Lessons (expanded), Participants, Badges, Welcome, Life Science, Physical Science, and Earth and Space Science. The main content area is titled 'Welcome' and contains several links: 'Introduction to Science and Moodle' (highlighted with a red box), 'Introduction to Science and Moodle Assignment', '3-2-1 Exit Ticket for Introduction to Science and Moodle' (with a note: 'Not available unless: You achieve a required score in Introduction to Science and Moodle Assignment'), 'Time Tracking', and 'Report Technical Issues'.

After students log into the Science Lessons, they will find a page that looks like the above visual. Direct them to click on the title of the lesson. Time Tracking will be explained further in the **Technology Support** section of the Teacher Guide. Students or teachers can report any technical issues (dead links, wrong answers, etc.) by clicking on the Report Technical Issues link

Ohio ABE Science Lessons

Home ▶ Science ▶ Ohio ABE Science Lessons ▶ Welcome ▶ Introduction to Science and Moodle

LESSON MENU

Introduction to Science and Moodle
Vocabulary
Video
Video
Readings
Visuals
Inquiry Question Answer
Introduction to Science and Moodle Assignment

NAVIGATION

Home

- Dashboard
- ▶ Ohio ABE Online Instruction
- ▶ Current course
- ▶ My courses

Introduction to Science and Moodle

Introduction to Science and Moodle



Image Source: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQNTqmC8yGeZmlJ_UZqgEFXK6K0wMoK_D_1zu-nfepwMaXHutQpXA

The first content page of the *Introduction to Science and Moodle* module looks like this and will include an image, outcomes, and the inquiry question. The Lesson Menu on the left task bar gives students a glimpse of the components of this module.

By the end of this lesson, you will be able to

- explain each of the components of a Science lesson.
- navigate through a lesson module.
- begin using the Learner Moodle with confidence.

This lesson module serves as your introduction to learning online with the Ohio ABLE Learner Moodle. Each lesson begins with looking at the outcomes. **Outcomes** focus your attention on the most important skills and activities in each lesson. They specify what you will know and be able to do once you've completed each lesson. Outcomes allow you to demonstrate how knowledge has been mastered after completing the final assignment. You will find that you will be asked to explain, define, identify, summarize, list, read, describe, write, classify, use, research. All active verbs that will help you to better understand the Science content.

On each page, students will find information about the various components they will be completing throughout the lesson. These have been identified in red outlined boxes. Direct students to read each of these boxes before completing the page.

Vocabulary

On the bottom left of each page, students will find a navigational button with a preview of what they will be learning next. They should click this button to move on.


You have completed 20% of the lesson

20%



There will also be a progress bar on each page that indicates to students how much of the lesson they have completed.

Ohio ABLE Science Lessons

Home ▶ Science ▶ Ohio ABLE Science Lessons ▶ Welcome ▶ Introduction to Science and Moodle Assignment

NAVIGATION 

Home

- Dashboard
- Ohio ABLE Online Instruction
- Current course
 - Ohio ABLE Science Lessons
 - Participants
 - Badges
 - Welcome
 -  Introduction to Science and Moodle
 -  **Introduction to Science and Moodle Assignment**
 - Time Tracking

Introduction to Science and Moodle Assignment

Complete the Introduction to Science and Moodle Assignment by finding an article of interest and then listing three facts that you learned from reading an article or viewing a video. Write a summary using the three main ideas and c article.

Explore these websites to find a scientific concept you want to learn more about.

Science Daily <https://www.sciencedaily.com/>



- Use the tabs Physical/Tech or Environment

Science News <https://www.sciencenews.org/>

Earth and Environment <https://www.sciencenews.org/topic/earth-environment>

You will receive 10 points for this assignment.

For each lesson, there will be three components students need to be aware of.

The lesson is identified with the  icon while the assignment is identified with the  icon. These components will be explained later in the guide under the **Lesson Plan Components** section. Above is the final assignment page for the Introduction. They will need to follow the directions at the end of the lesson and click on the assignment icon in the left navigation pane to complete the assignment. Once the assignment is completed and graded by the teacher, the student must complete with at least an 80% mastery level.






Until then, there will be a message: *Not available unless you achieve a required score in Introduction to Science and Moodle Assignment.* This grade will then allow the 3-2-1 Exit Ticket to become visible. Students should then complete and submit the informal evaluation to receive a Badge for lesson completion. This list of Badges can be printed and placed in the student portfolio. More about the Badges will be explained in the **xxx** section of the Teacher Guide.

FRAMEWORKS

The Ohio ABLE Science Lessons were developed based on the GED® Science Content Topics and Subtopics³ and Ohio ABLE ABE/ASE Content Standards⁴. Four modules or units are currently available (identified by red arrow) with additional modules planned for development during 2016-2017.

GED® Science Content Topics and Subtopics

Life Science	
	La Human Body and Health
	L.a.1 Body systems (e.g. muscular, endocrine, nervous systems) and how they work together to perform a function (e.g. muscular and skeletal work to move the body)
	L.a.2 Homeostasis, feedback methods that maintain homeostasis (e.g. sweating to maintain internal temperature), and effects of changes in the external environment on living things (e.g. hypothermia, injury)
	L.a.3 Sources of nutrients (e.g. foods, symbiotic organisms) and concepts in nutrition (e.g. calories, vitamins, minerals)
	L.a.4 Transmission of disease and pathogens (e.g. airborne, bloodborne), effects of disease or pathogens on populations (e.g. demographics change, extinction), and disease prevention methods (e.g. vaccination, sanitation)
	Lb Relationship Between Life Functions and Energy Intake
	L.b.1 Energy for life functions (e.g. photosynthesis, respiration, fermentation)
	Lc Energy Flows in Ecologic Networks (Ecosystems)
	L.c.1 Flow of energy in ecosystems (e.g. energy pyramids), conservation of energy in an ecosystem (e.g. energy lost as heat, energy passed on to other organisms) and sources of energy (e.g. sunlight, producers, lower level consumer)
	L.c.2 Flow of matter in ecosystems (e.g. food webs and chains, positions of organisms in the web or chain) and the effects of change in communities or environment on food webs
	L.c.3 Carrying capacity, changes in carrying capacity based on changes in populations and environmental effects and limiting resources to necessary for growth
	L.c.4 Symbiosis (e.g. mutualism, parasitism, commensalism) and predator/prey relationships (e.g. changes in one population affecting another population)
	L.c.5 Disruption of ecosystems (e.g. invasive species, flooding, habitat destruction, desertification) and extinction (e.g. causes [human and natural] and effects)
	Ld Organization of Life (Structure and Function of Life)
	L.d.1 Essential functions of life (e.g. chemical reactions, reproduction, metabolism) and cellular components that assist the functions of life (e.g. cell membranes, enzymes, energy)
	L.d.2 Cell theory (e.g. cells come from cells, cells are the smallest unit of living things), specialized cells and tissues (e.g. muscles, nerve, etc.) and cellular levels of organization (e.g. cells, tissues, organs, systems)
	Le Molecular Basis for Heredity
	L.e.1 Central dogma of molecular biology, the mechanism of inheritance (e.g. DNA) and chromosomes (e.g. description, chromosome splitting during Meiosis)
	L.e.2 Genotypes, phenotypes and the probability of traits in close relatives (e.g. Punnett squares, pedigree charts)
	L.e.3 New alleles, assortment of alleles (e.g. mutations, crossing over), environmental altering of traits, and expression of traits (e.g. epigenetics, color-points of Siamese cats)
	Lf Evolution
	L.f.1 Common ancestry (e.g. evidence) and cladograms (e.g. drawing, creating, interpreting)
	L.f.2 Selection (e.g. natural selection, artificial selection, evidence) and the requirements for selection (e.g. variation in traits, differential survivability)
	L.f.3 Adaptation, selection pressure, and speciation

Physical Science

Pa Conservation, Transformation, and Flow of Energy

- Pa.1 Heat, temperature, the flow of heat results in work and the transfer of heat (e.g. conduction, convection)
- Pa.2 Endothermic and exothermic reactions
- Pa.3 Types of energy (e.g. kinetic, chemical, mechanical) and transformations between types of energy (e.g. chemical energy [sugar] to kinetic energy [motion of a body])
- Pa.4 Sources of energy (e.g. sun, fossil fuels, nuclear) and the relationships between different sources (e.g. levels of pollutions, amount of energy produced)
- Pa.5 Types of waves, parts of waves (e.g. frequency, wavelength), types of electromagnetic radiation, transfer of energy by waves, and the uses and dangers of electromagnetic radiation (e.g. radio transmission, UV light and sunburns)

Pb Work, Motion, and Forces

- Pb.1 Speed, velocity, acceleration, momentum, and collisions (e.g. inertia in a car accident, momentum transfer between two objects)
- Pb.2 Force, Newton's Laws, gravity, acceleration due to Gravity (e.g. freefall, law of gravitational attraction), mass and weight
- Pb.3 Work, simple machines (types and functions), mechanical advantages (force, distance, and simple machines), and power

Pc Chemical Properties and Reactions Related to Living Systems

- Pc.1 Structure of matter
- Pc.2 Physical and chemical properties, changes of state, and density
- Pc.3 Balancing chemical equations and different types of chemical equations, conservation of mass in balanced chemical equations and limiting reactants
- Pc.4 Parts in solutions, general rules of solubility (e.g. hotter solvents allow more solute to dissolve), saturation and the differences between weak and strong solutions

Earth and Space Science

ES.a Interactions between Earth's Systems and Living Things

- ES.a.1 Interactions of matter between living and non-living things (e.g. cycles of matter) and the location, uses and dangers of fossil fuels
- ES.a.2 Natural Hazards (e.g. earthquakes, hurricanes, etc.) their effects (e.g. frequency, severity, and short- and long-term effects), and mitigation thereof (e.g. dikes, storm shelters, building practices)
- ES.a.3 Extraction and use of natural resources, renewable vs. non-renewable resources and sustainability

ES.b Earth and its System Components and Interactions

- ES.b.1 Characteristics of the atmosphere, including its layers, gases and their effects on the Earth and its organisms, including climate change
- ES.b.2 Characteristics of the oceans (e.g. salt water, currents, coral reefs) and their effects on Earth and organisms
- ES.b.3 Interactions between Earth's systems (e.g. weathering caused by wind or water on rock, wind caused by high/low pressure and Earth rotation, etc.)
- ES.b.4 Interior structure of the Earth (e.g. core, mantle, crust, tectonic plates) and its effects (e.g. volcanoes, earth quakes, etc.) and major landforms of the Earth (e.g. mountains, ocean basins, continental shelves, etc.)

ES.c Structures and Organization of the Cosmos

- ES.c.1 Structures in the universe (e.g. galaxies, stars, constellations, solar systems), the age and development of the universe, and the age and development of Stars (e.g. main sequence, stellar development, deaths of stars [black hole, white dwarf])
- ES.c.2 Sun, planets, and moons (e.g. types of planets, comets, asteroids), the motion of the Earth's motion and the interactions within the Earth's solar system (e.g. tides, eclipses)
- ES.c.3 The age of the Earth, including radiometrics, fossils, and landforms

Ohio ABE/ASE Content Standards

The focus of these lessons is on Educational Functioning Levels (EFL) 3-6. Students must already be self-directed and ready for independent work as evidenced at the higher levels. Teachers will want to discuss this with students to determine readiness. The following standards were chosen as the main support for these online lessons, but additional standards can also be added. For a lesson where a student writes an argumentative essay, **W.4.1** could also be identified.

R.3.8. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a topic or subject area. (RI.5.4)

L.4.5. Acquire and use accurately level-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. (L.8.6)

R.4.10. Integrate information presented in different media or formats (e.g., in charts, graphs, photographs, videos, or maps) as well as in words to develop a coherent understanding of a topic or issue. (RI.6.7)

INSTRUCTIONAL BEST PRACTICES

Blended Learning

The Ohio ABLE Distance Education Policy states that students in ABLE programs will receive both distance and traditional classroom education during the program year. This is called a **blended** approach to instruction.

“Blended learning, sometimes known as **hybrid learning**, is a teaching and learning model that has a face-to-face *class* or tutorial component combined *with an online* learning component.”⁵

“Blended learning is not the same as technology-rich instruction. It goes beyond one-to-one computers and high-tech gadgets. Blended learning involves leveraging the Internet to afford each student a more personalized learning experience, including increased *student control* over the time, place, path, and/or pace of learning.”⁶

Both of these definitions represent important characteristics that have been included in the Science Lessons. Blended learning is sometimes referred to as “online + brick and mortar” learning where students can access at their convenience (asynchronous) or during classroom instruction (synchronously). A great example of this happens during the *Ecosystem Disruptions* lesson where the teacher is presenting a lesson on Scientific Method, while online students are applying what they are learning in class.

Inquiry

"Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world."⁷

Based on this definition from the National Science Education Standards, each lesson contains an inquiry question that focuses the students thinking throughout each activity. Students will continuously be gaining a better understanding of the science content for later assessments and life application.

The National Science Education Standards state that "inquiry is central to science learning."⁷ These standards point out that students engaging in science inquiry will demonstrate the following behaviors:

- Describe objects and events.
- Ask questions.
- Construct explanations.
- Test explanations against current scientific knowledge.
- Communicate their ideas to others.
- Identify their assumptions.
- Use critical and logical thinking.
- Consider alternative explanations.⁷

Science Vocabulary

One of the key indicators of students' success in the academic areas is their vocabulary. Vocabulary is crucial for gaining meaning from their reading. Because of this, one of the key components of the Science modules incorporates science vocabulary into each lesson.

Teachers are often eager to teach content and by providing science terms, students gain valuable scientific knowledge they can apply in other learning situations. “When students interact with science words in multiple ways, they are able to approach words and their meanings more fully. Graphic organizers can help to present words with a range of contextual information.”⁸ Each lesson contains a vocabulary graphic organizer students can print or save to collect terms as they work through the videos and readings.

Differentiation

Since many ABE classrooms contain multi-level students, it was essential that the Science Lessons contain instructional approaches that differentiate for our learners. Differentiation is the process of accommodating the different ways that students learn in the areas of *process* (teaching strategies and learning activities), *materials* (resources), and *assessments*

Students are provided a differentiated approach to their learning, especially in the **Readings** component of each lesson. The readability of articles has been determined using the Readability Test Tool <http://www.webpagefx.com/tools/read-able/> where students can choose to read at an intermediate (EFL 3-4) or advanced (EFL 5-6) level.

For accessibility, students can also use the following tools.

- Rewordify <http://rewordify.com/> offers students the ability to take difficult text and plug it into this free software to receive a simplified version of the text.
- Readability Everywhere <https://www.readability.com/apps> allows the student to download a free app they can use on their Android, iPhone or iPad device.

Research has shown that almost all students and teachers can gain great benefit from a multisensory approach to learning. Each lesson uses two or more modalities of learning. **Video** and **Visuals** components have been included for visual learners and to add interest. Graphic organizers are provided for vocabulary and note taking to increase retention of content.

LESSON PLAN COMPONENTS

The instructional design process for the Science Lessons called for a lesson plan template to be developed; containing many of the same components as the ABE/ASE Lesson Plan Template teachers use for classroom instruction. These components are driven by best practice for instruction and follow the same format throughout:




Student Outcomes	Student-focused and represented with consistent phrasing <i>By the end of the lesson, you will be able to</i>
Guided Inquiry Question	Guides student learning throughout lesson with possible answer provided at the end of the lesson
Academic Vocabulary	Science knowledge improves with consistent use of vocabulary strategy graphic organizer throughout module (term, definition, example or picture). Application of science vocabulary used in formative and summative assessments
Video	Multiple ways to present content based on multiple learning modalities. Note taking graphic organizer provided for use throughout lesson
Video Check	Formative assessments as checks for understanding provided throughout the lesson in the form of multiple choice, short answer, matching, essay, and true/false questions
Readings	Multiple ways to present content based on multiple learning modalities. Note taking graphic organizer provided for use throughout lesson. Readings are also differentiated by applying a readability scale and placing them into EFLs 3-4 and EFLs 5-6
Reading Check	Formative assessments as checks for understanding provided throughout the lesson in the form of multiple choice, short answer, matching, essay, and true/false questions
Visuals	Multiple ways to present content based on multiple learning modalities with graphs, illustrations pictures, charts, diagrams, images, and maps
Visuals Check	Formative assessments as checks for understanding provided throughout the lesson in the form of multiple choice, short answer, matching, essay, and true/false questions
Inquiry Question Answer	Possible answer given for students to evaluate their understanding of the content
Final Assignment	Writing used as a means of evaluation in the final summative assignment
Parallel Classroom Instructional Activity*	Parallel classroom instruction teachers can use as student's progress through the modules *See Resources section for links to these lessons

Lesson Plan Template










+		
Title	Science Content	Teacher
Science Topic	Science Subtopic	Program
Previous Module (Unit)	Next Module (Unit)	Proxy Hours
Parallel Classroom Instructional Activity		
Outcomes		Summative Assessment (Mastery)
Standards R.3.8. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a topic or subject area. (RI.5.4) L.4.5. Acquire and use accurately level-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. (L.8.6)		
Inquiry Question		Vocabulary
Standards R.4.10. Integrate information presented in different media or formats (e.g., in charts, graphs, photographs, videos, or maps) as well as in words to develop a coherent understanding of a topic or issue. (RI.6.7) (additional standards)		
Video	Reading	Visuals (graphs, illustrations, pictures, charts, diagrams, images, maps)
Video Check for Understanding	Reading Check for Understanding	Visuals Check for Understanding

Moodle Design

Students will experience two icons when they begin using the Science lessons and should become familiar with their navigational purpose.

	<p>The lesson⁹ module consists of content and question pages. Content pages contain information about the particular topic or provide resources for students to use to gain additional information. They simply advance to the next page by selecting a continue button at the bottom of the page. Question pages can be used to present information, but also include formative assessment questions or checks for understanding. Students will see essay, matching, multiple choice, short answer and true/false questions presented after each piece of content has been presented in the Video, Readings, and Visuals Checks. Students receive points for correct answers and can go back and review as often as needed to make sure they have acquired mastery of the content.</p>
	<p>The assignment¹⁰ activity provides a page where students can submit work for teachers to grade and give feedback on the summative assessment. Teachers can find these submissions together on one screen of your course under Grades.</p>
	<p>The feedback activity is a quick informal evaluation of each lesson designed as an exit slip. The purpose is to assess student understanding of key concepts and allow students time to reflect on their learning; giving teachers' insights into how to support them throughout the process.</p>

Molecular Basis for Heredity

 Molecular Biology	<input type="checkbox"/>
 Molecular Biology Assignment	<input type="checkbox"/>
 3-2-1 Exit Ticket for Molecular Biology	
Not available unless: You achieve a required score in Molecular Biology Assignment	
 Genetic Probability	<input type="checkbox"/>
 Genetic Probability Assignment	<input type="checkbox"/>
 3-2-1 Exit Ticket for Genetic Probability	
Not available unless: You achieve a required score in Genetic Probability Assignment	
 Genetic Variations	<input type="checkbox"/>
 Genetic Variations Assignment	<input type="checkbox"/>
 3-2-1 Exit Ticket for Genetic Variations	
Not available unless: You achieve a required score in Genetic Variations Assignment	

Above is an example of how lessons will appear on the student's screen for each module or unit. They should become comfortable navigating through each lesson and assignment as they build their technology skills.

INSTRUCTIONAL DESIGN SOURCES

¹*Common core basics Science*. (2015). Columbus, OH: McGraw Hill.

²*Common core achieve Science*. (2015). Columbus, OH: McGraw Hill.

³GED® Science Test Content Topics. (2016, June). Retrieved June 23, 2016, from <http://www.gedtestingservice.com/uploads/files/ffa754ca18bc9a572e96f0d1ab75c61c.pdf>

⁴Ohio Board of Regents ABE/ASE Standards for English Language Arts and Literacy and Mathematics. (2014, July). Retrieved June 23, 2016, from <http://www.ohioable.org/files/Standards/FY15%20CCRs-Ohio%20ABE%20ASE%20Standards.pdf>

⁵Blended Learning for the AE Classroom. (n.d.). Retrieved June 23, 2016, from <http://app.essentialed.com/resources/blended-learning-teachers-guide-web.pdf>

⁶What is Blended Learning? (2015). Retrieved June 23, 2016, from <http://www.christenseninstitute.org/blended-learning/>

⁷National Science Education Standards. (1996). Retrieved June 23, 2016, from <http://www.csun.edu/science/ref/curriculum/reforms/nses/nses-complete.pdf>

⁸Effective Strategies for Teaching Science Vocabulary. (n.d.). Retrieved June 23, 2016, from <http://www.learnnc.org/lp/pages/7079>

⁹Lesson Activity. (2015, November). Retrieved June 23, 2016, from https://docs.moodle.org/31/en/Lesson_activity

¹⁰Assignment Activity. (2016, June). Retrieved June 23, 2016, from https://docs.moodle.org/31/en/Assignment_activity

TECHNOLOGY SUPPORT

TECHNICAL REQUIREMENTS

The basic technical requirements are the same for teachers and students.

- Hardware
 - Computer
 - Windows 7 and up
 - Mac OSX
 - Chromebooks
 - Mobile Device (optional)
 - Mobile devices like tablets and smartphones can be used for viewing lessons, but not all devices are able to upload files to complete assignments.
- Internet Access
 - A high speed connection is required to access the videos included in the lesson modules
 - Avoid using mobile devices with limited data plans when accessing videos
- Software
 - Productivity Software
 - MS Office 2007 and up, Open Office, or Google Docs
 - Internet Browser compatibility
 - Firefox, most recent version
 - Chrome, most recent version
 - Safari 6 for OS X 10.7 or later
 - Internet Explorer 10 or later
- Plugins
 - Adobe Flash

TEACHER SKILLS SET

- Teachers meeting the Level 1 & 2 Ohio ABLE Technology Standards have the prerequisite knowledge necessary to implement the resources available on the Learner Moodle.
 - Teachers Technology Standards Level 1 & 2 <https://www.ohiohighered.org/able>
 - Basic computer concepts,
 - productivity software,
 - information & communication,
 - technology-enhanced programs/classroom,
 - PD
- Internet and Computer Skills
 - Computer concepts (turn on, exit program, shutdown, navigation, print, etc.)
 - Internet (browser, navigation, URLs, search, download files, etc.)
 - MS Word or Google Docs (formatting, spelling, bullets, margins, copy/paste)
 - File management (create/open/save files, create/open/save folders)
 - LMS navigation and management (create student accounts, access reports)
 - Email (password, compose/send messages, etiquette, attachment)

STUDENT SKILLS SET

- Student should be screened to help determine readiness. Some students will need additional help with basic computer operations before they will be able to successfully navigate the content.
 - Student Computer Skills Screenings and Assessments
 - Northstar Digital Literacy
 - <https://www.digitalliteracyassessment.org/>
 - Recommended modules
 - Basic computer
 - WWW
 - MS Word
 - Email
 - Student Internet and Computer Skills Survey
 - Tinyurl.com/ovntxsv
 - Basic Computer Skills MOOC
 - <https://www.wisc-online.com/courses/computerskills>
 - Basic Internet and Computer Skills
 - Computer concepts (turn on, exit program, shutdown, navigation, print, etc.)
 - Internet (browser, navigation, URLs, search, download files)
 - Word processing (formatting, spelling, insert image)
 - File management (create/open/save files, create/open/save folders)
 - Email (password, compose/send messages, etiquette,)

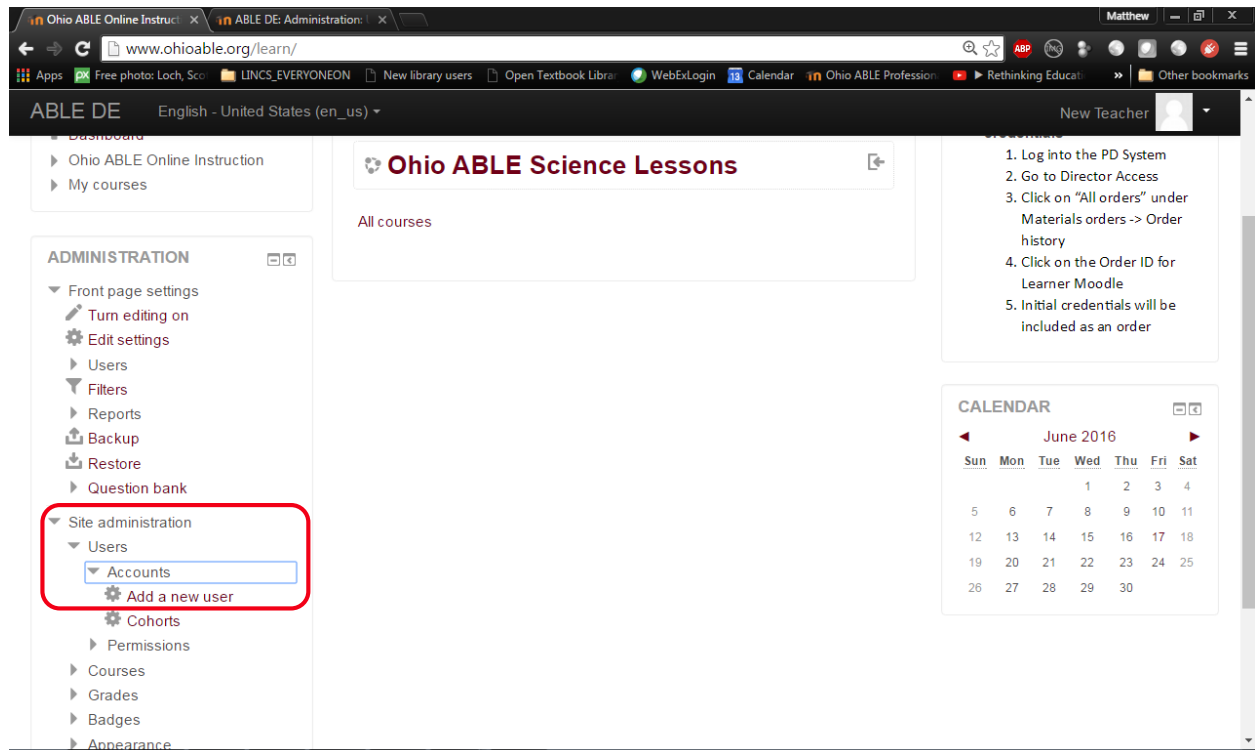
COURSE MANAGEMENT AND REPORTING

The following sections will cover the main course administration functions. The necessary functions instructors will need to be familiar with include the following:

- Creating student accounts
- Enrolling students
- Lesson reports and grading
- Grading assignment submissions
- Course grade reports
- Time tracking

CREATE STUDENT ACCOUNT

The first step is creating a student account. Sign in to the Learner Moodle and go to the **Site administration** functions found in the side menu on the left. Click the arrow to expand the menu options and select **Add a new user**.



The screenshot shows the Moodle administration interface for Ohio ABE. The browser address bar displays www.ohioable.org/learn/. The page title is "ABLE DE Administration". The left sidebar contains a menu with the following items:

- Dashboard
- Ohio ABE Online Instruction
- My courses
- ADMINISTRATION
 - Front page settings
 - Turn editing on
 - Edit settings
 - Users
 - Filters
 - Reports
 - Backup
 - Restore
 - Question bank
 - Site administration
 - Users
 - Accounts
 - Add a new user
 - Cohorts
 - Permissions
 - Courses
 - Grades
 - Badges
 - Appearance

The "Add a new user" option is highlighted with a red box. The main content area displays "Ohio ABE Science Lessons" and "All courses". A right sidebar contains a list of instructions and a calendar for June 2016.

CALENDAR

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

You will need the following information to create a student account

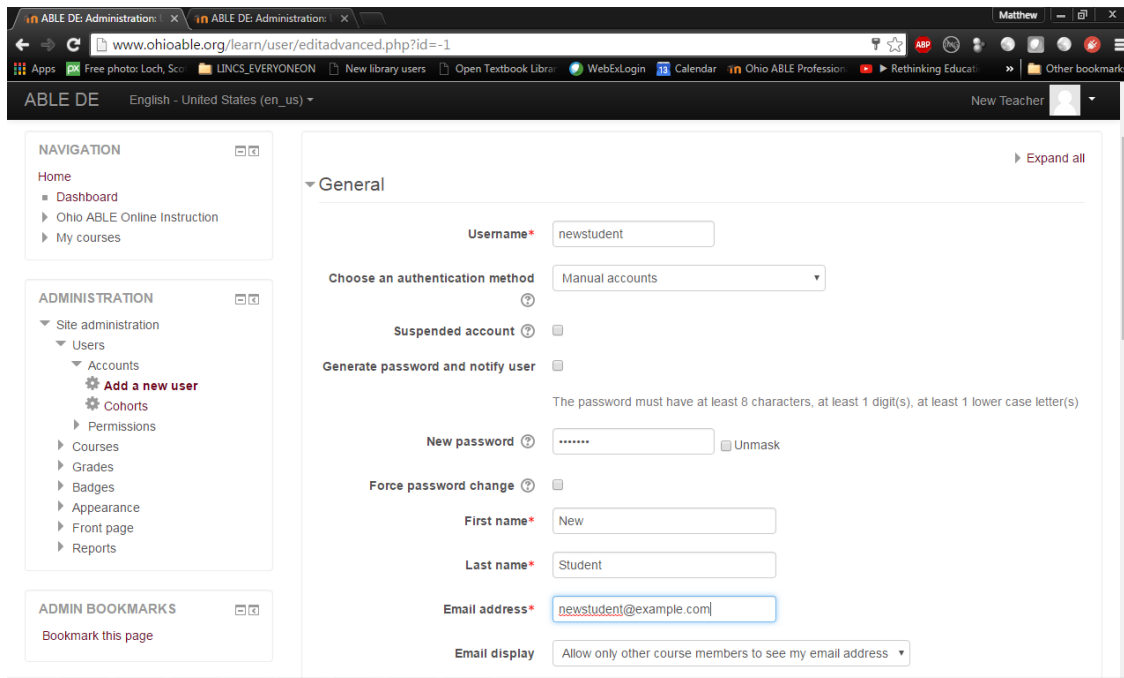
Username To create a username, use the student's first initial and last name (e.g. John Smith = jsmith). If the username already exists, add a number to the end starting with 1 (e.g. jsmith1).

Password Must be at least 8 characters with at least 1 digit

First Name/Last Name

Email address An email address is required by Moodle for each student account.

Record the information to distribute to students, scroll to the bottom of the page, and click **Create user**

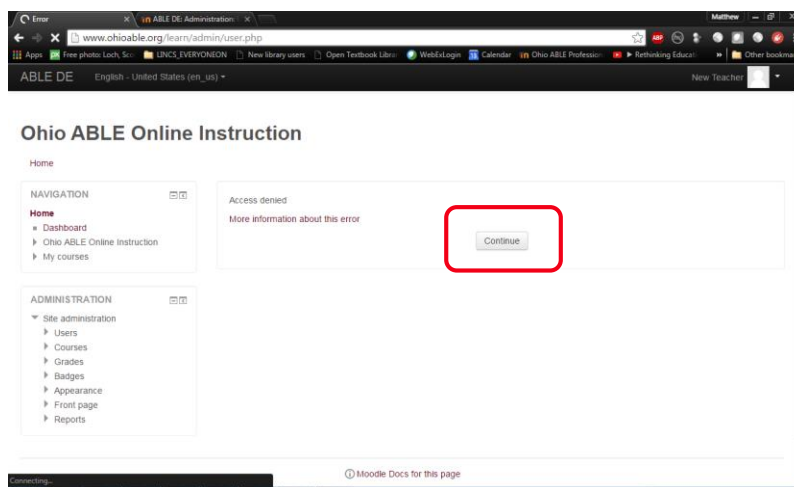


The screenshot shows the 'Edit advanced user' form in the Moodle administration interface. The form is titled 'General' and contains the following fields and options:

- Username:** newstudent
- Choose an authentication method:** Manual accounts
- Suspended account:**
- Generate password and notify user:**
- New password:** [masked with dots] Unmask
- Force password change:**
- First name:** New
- Last name:** Student
- Email address:** newstudent@example.com
- Email display:** Allow only other course members to see my email address

On the left side, there is a navigation menu with 'ADMINISTRATION' > 'Users' > 'Accounts' > 'Add a new user' highlighted. Below the form, there is a 'Bookmark this page' button.

You will receive an access denied message, but the account has been created. Click **Continue** to proceed to the next step, enrolling a student.



ENROLL STUDENT IN COURSE

From the home page, click on the **Ohio ABE Science Lessons** link to enter the course. From the course page, select **Enrolled users** found under the **Course Administration** side menu

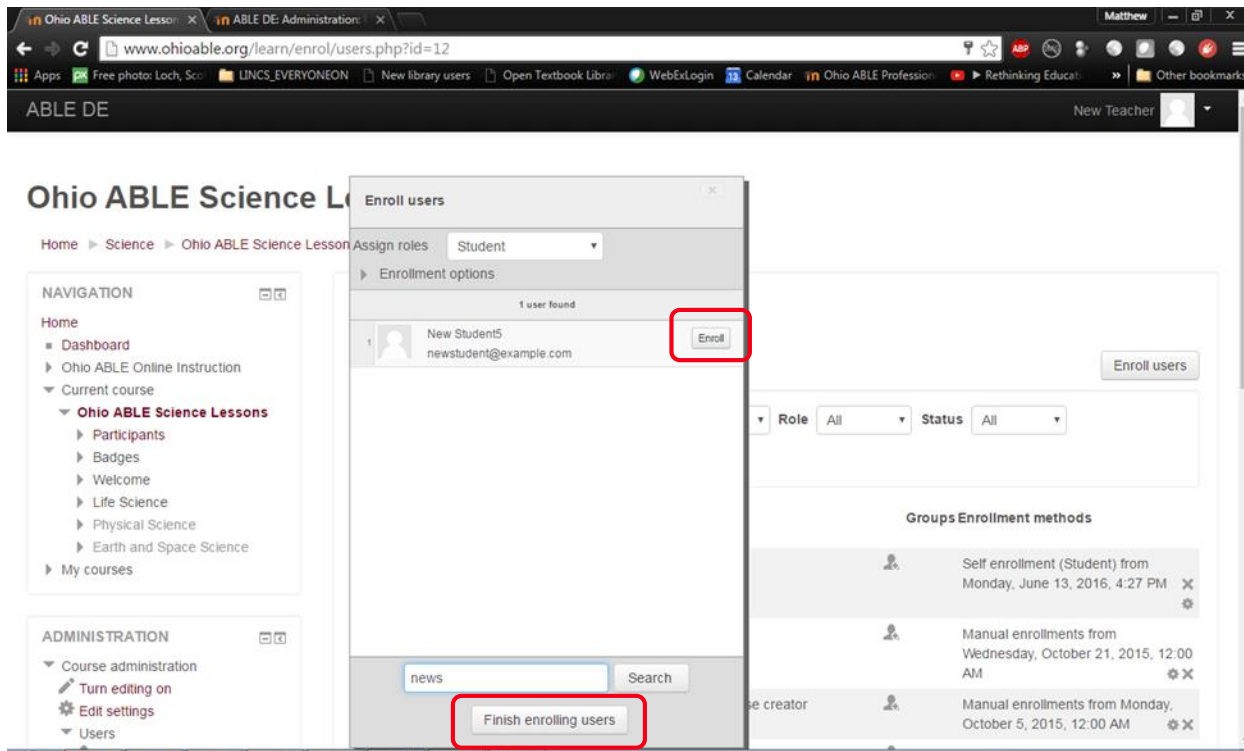
The screenshot shows the course administration interface. The left sidebar contains a navigation menu with 'ADMINISTRATION' expanded to show 'Users'. A red arrow points to the 'Enrolled users' link. The main content area displays a 'Welcome' message and a 'Life Science' word cloud. Below the word cloud, there are links for 'Human Body and Health', 'Relationship between Life Functions and Energy Intake', and 'Energy Flows in Ecological Networks'.

On the Enrolled users page, click on the **Enroll users** button on the right side.

The screenshot shows the 'Enrolled users' page. The title is 'Ohio ABE Science Lessons: 15 enrolled users'. The breadcrumb trail is 'Home > Science > Ohio ABE Science Lessons > Users > Enrolled users'. The left sidebar is identical to the previous screenshot. The main content area has a search bar and filters for 'Enrollment methods', 'Role', and 'Status'. Below the filters is a table of enrolled users. A red box highlights the 'Enroll users' button in the top right corner.

First name / Last name	Last access to course	Roles	Groups	Enrollment methods
	3 days 22 hours	Student		Self enrollment (Student) from Monday, June 13, 2016, 4:27 PM
	21 hours 32 mins	Teacher		Manual enrollments from Wednesday, October 21, 2015, 12:00 AM
	4 hours 36 mins	Teacher Course creator		Manual enrollments from Monday, October 5, 2015, 12:00 AM

At the pop-up, type in part of a student name and click **Search** to find the user you want to enroll. Leave the role assignment dropdown on **Student**. Click **Enroll** next to the users name and then click **Finish enrolling user**. After the account is created, teachers need to notify students of their login credentials.

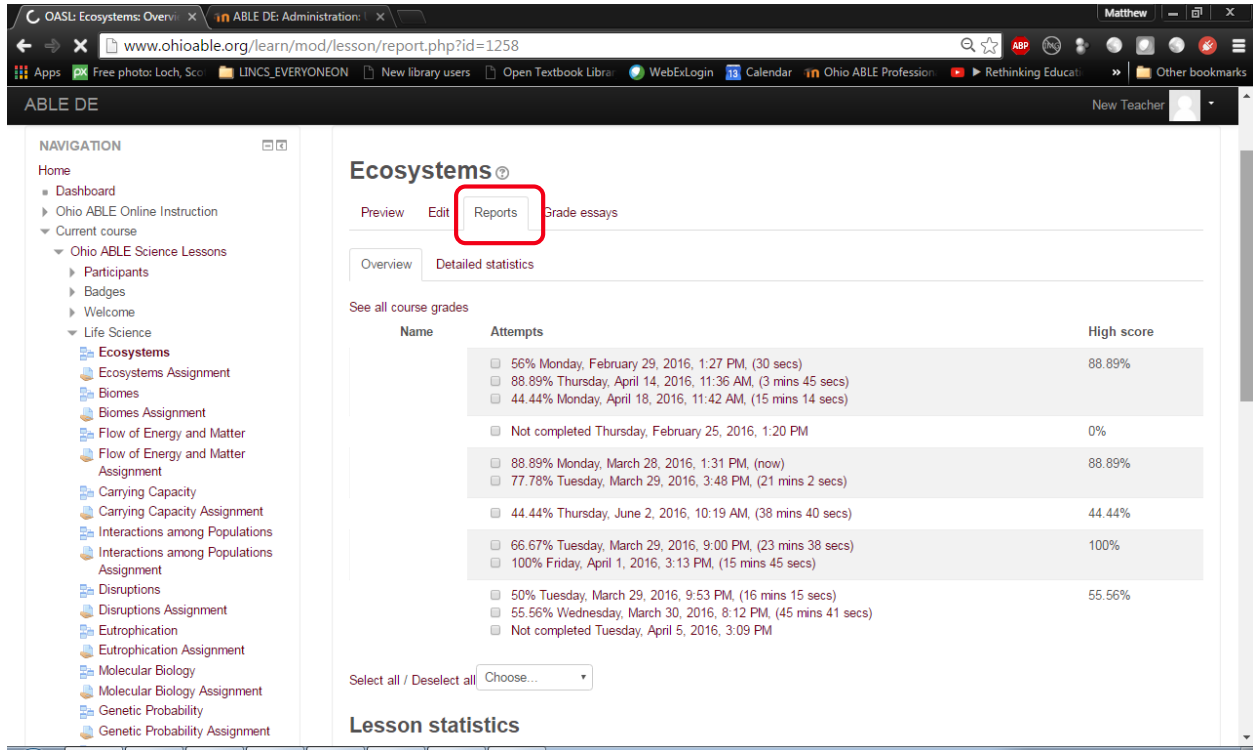


Please Note After the account is created, teachers need to notify students of their login credentials.

LESSON MODULE REPORTS

When signed in as a teacher, you will have access to the lesson reports and essay question submissions. Most questions are automatically scored by Moodle, but essay question types are graded manually.

To access a lesson report and essay submissions, click on the lesson you would like to view and click the **Reports** tab under the lesson name. Multiple attempts are allowed for each lesson, so you may see multiple scores. In the Moodle gradebook, the attempt with the highest score will be recorded.



The screenshot shows the Moodle interface for the 'Ecosystems' lesson. The 'Reports' tab is highlighted with a red box. The page displays a table of student attempts with columns for Name, Attempts, and High score.

Name	Attempts	High score
	<input type="checkbox"/> 56% Monday, February 29, 2016, 1:27 PM, (30 secs)	
	<input type="checkbox"/> 88.89% Thursday, April 14, 2016, 11:36 AM, (3 mins 45 secs)	88.89%
	<input type="checkbox"/> 44.44% Monday, April 18, 2016, 11:42 AM, (15 mins 14 secs)	
	<input type="checkbox"/> Not completed Thursday, February 25, 2016, 1:20 PM	0%
	<input type="checkbox"/> 88.89% Monday, March 28, 2016, 1:31 PM, (now)	88.89%
	<input type="checkbox"/> 77.78% Tuesday, March 29, 2016, 3:48 PM, (21 mins 2 secs)	
	<input type="checkbox"/> 44.44% Thursday, June 2, 2016, 10:19 AM, (38 mins 40 secs)	44.44%
	<input type="checkbox"/> 66.67% Tuesday, March 29, 2016, 9:00 PM, (23 mins 38 secs)	100%
	<input type="checkbox"/> 100% Friday, April 1, 2016, 3:13 PM, (15 mins 45 secs)	
	<input type="checkbox"/> 50% Tuesday, March 29, 2016, 9:53 PM, (16 mins 15 secs)	55.56%
	<input type="checkbox"/> 55.56% Wednesday, March 30, 2016, 8:12 PM, (45 mins 41 secs)	
	<input type="checkbox"/> Not completed Tuesday, April 5, 2016, 3:09 PM	

GRADING ESSAY QUESTION TYPES IN LESSON MODULE

In addition to the lesson grade report, there is a tab for **Grade essays**. This report shows you the time and date of student submissions. Submissions highlighted in red have not been graded yet. Click on the link next to the students name to grade a submission.

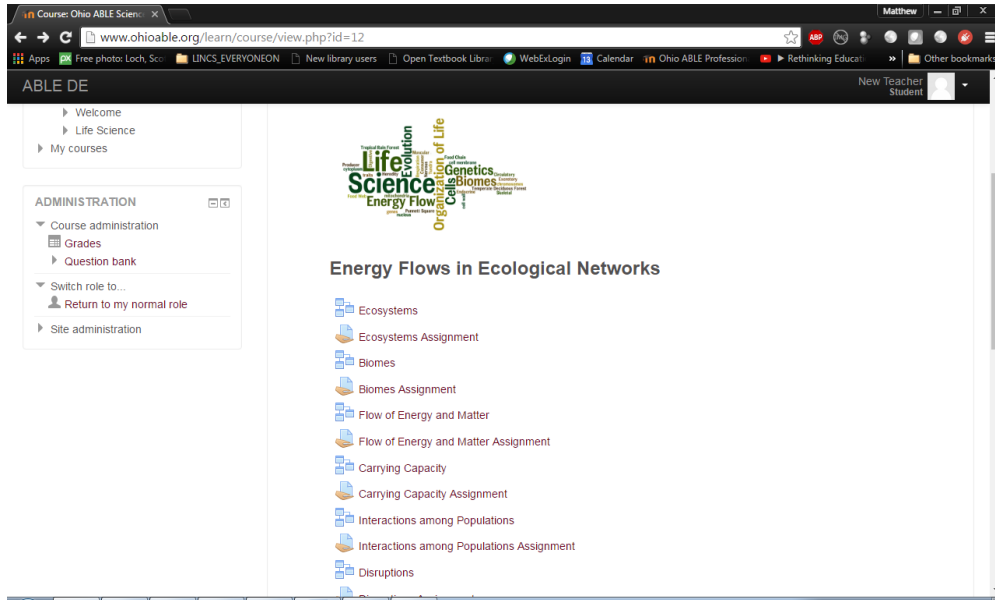
The screenshot shows the 'Ohio ABE Science Lessons' interface. The navigation menu on the left includes 'Home', 'Dashboard', 'Ohio ABE Online Instruction', and 'Current course'. The 'Current course' section is expanded to show 'Ohio ABE Science Lessons', which includes 'Participants', 'Badges', 'Welcome', 'Life Science', and 'Ecosystems'. The 'Ecosystems' section is further expanded to show various assignments. The main content area displays the 'Grade essays' tab for the 'Ecosystems' lesson. The page shows a table of student submissions with columns for 'Essays' and 'Email'. The submission for 'April 18 2016, 11:52 AM Video Check' is highlighted in red, indicating it has not been graded yet.

On the **Grade essays** page, there is a text box for comments and a drop down menu to grade the submission. Add a comment and use the dropdown to assign a grade, then click the **Save changes** button at the bottom of the page.

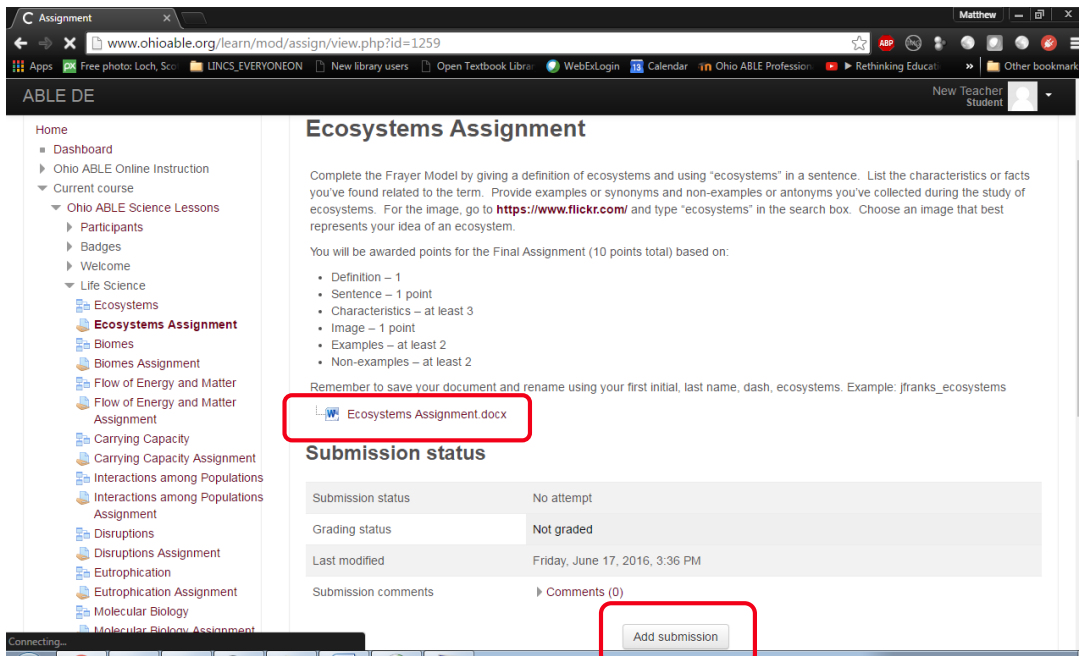
The screenshot shows the 'Grade essays' page for a specific submission. The page displays the question 'What is a niche and how does it fit into an ecosystem?' and the student's response 'Niche is an organism within its environment and community, affecting it's survival as a species.' The 'Your comments' text box is highlighted with a red arrow, and the 'Essay score' dropdown menu is highlighted with a red box. The 'Save changes' button is also highlighted with a red box.

ASSIGNMENT SUBMISSIONS

Each lesson module is followed by a writing assignment. **Please Note** Students will be able to view the assignment on a mobile device, but they will need access to a laptop or desktop with word processing software like Microsoft Word or Google Docs to submit their completed assignment.



Students will be prompted with directions and instructed to download the assignment file. Once students download and complete the assignment, they need to return to the assignment page to upload their work by clicking on the **Add submission** button found at the bottom.



Students can drag and drop their assignment file or click on the box to open up the file navigator. One the file is selected, click **Save changes** to submit the assignment. Once the assignment is submitted, the course teacher will receive an email notification.

The screenshot shows a web browser window with the URL www.ohioable.org/learn/mod/assign/view.php?id=1259&action=editsubmission. The page is titled "ABLE DE" and shows a user profile for "New Teacher Student".

Navigation Menu (Left Sidebar):

- Ohio ABLE Online Instruction
- Current course
- Ohio ABLE Science Lessons
 - Participants
 - Badges
 - Welcome
 - Life Science
 - Ecosystems
 - Ecosystems Assignment**
 - Biomes
 - Biomes Assignment
 - Flow of Energy and Matter
 - Flow of Energy and Matter Assignment
 - Carrying Capacity
 - Carrying Capacity Assignment
 - Interactions among Populations
 - Interactions among Populations Assignment
 - Disruptions
 - Disruptions Assignment
 - Eutrophication
 - Eutrophication Assignment
 - Molecular Biology
 - Molecular Biology Assignment
 - Genetic Probability
 - Genetic Probability Assignment
 - Genetic Variations

Main Content Area:

Complete the Frayer Model by giving a definition of ecosystems and using "ecosystems" in a sentence. List the characteristics or facts you've found related to the term. Provide examples or synonyms and non-examples or antonyms you've collected during the study of ecosystems. For the image, go to <https://www.flickr.com/> and type "ecosystems" in the search box. Choose an image that best represents your idea of an ecosystem.

You will be awarded points for the Final Assignment (10 points total) based on:

- Definition – 1
- Sentence – 1 point
- Characteristics – at least 3
- Image – 1 point
- Examples – at least 2
- Non-examples – at least 2

Remember to save your document and rename using your first initial, last name, dash, ecosystems. Example: jfranks_ecosystems

File Submissions: Maximum size for new files: 1MB, maximum attachments: 1

The file submission area contains a dashed box with a blue arrow pointing down and the text "You can drag and drop files here to add them." Below this area are two buttons: "Save changes" (highlighted with a red box) and "Cancel".

GRADING ASSIGNMENT SUBMISSIONS

After receiving a notification of a submitted assignment, teachers will need to log in to the course and navigate to the assignment page. On the assignment page, click on the **View/grade all submissions** link.

The screenshot shows the 'Ecosystems Assignment' page. The left sidebar contains a navigation menu with 'Ecosystems Assignment' highlighted. The main content area includes instructions for the assignment and a 'Grading summary' table.

Grading summary	
Participants	11
Submitted	0
Needs grading	0

A red-bordered button labeled 'View/grade all submissions' is located at the bottom of the grading summary section.

On the assignment submission report, students will be listed with their submitted file in the **Status** column. Download the assignment for review and then click on the small icon under **Grade** to comment and give a grade.

The screenshot shows the 'Ecosystems Assignment' submission report. The page includes a 'Grading action' dropdown menu and a table listing student submissions.

User	First name / Last name	Email address	Status	Grade	Last modified (submission)	File submissions
			No submission	-	-	
			No submission	-	Tuesday, March 29, 2016, 4:10 PM	Co (0)
			No submission	-	Tuesday, March 29, 2016, 10:20 PM	Co (0)
			No submission	-	Wednesday, March 30, 2016, 5:50 PM	Co (0)

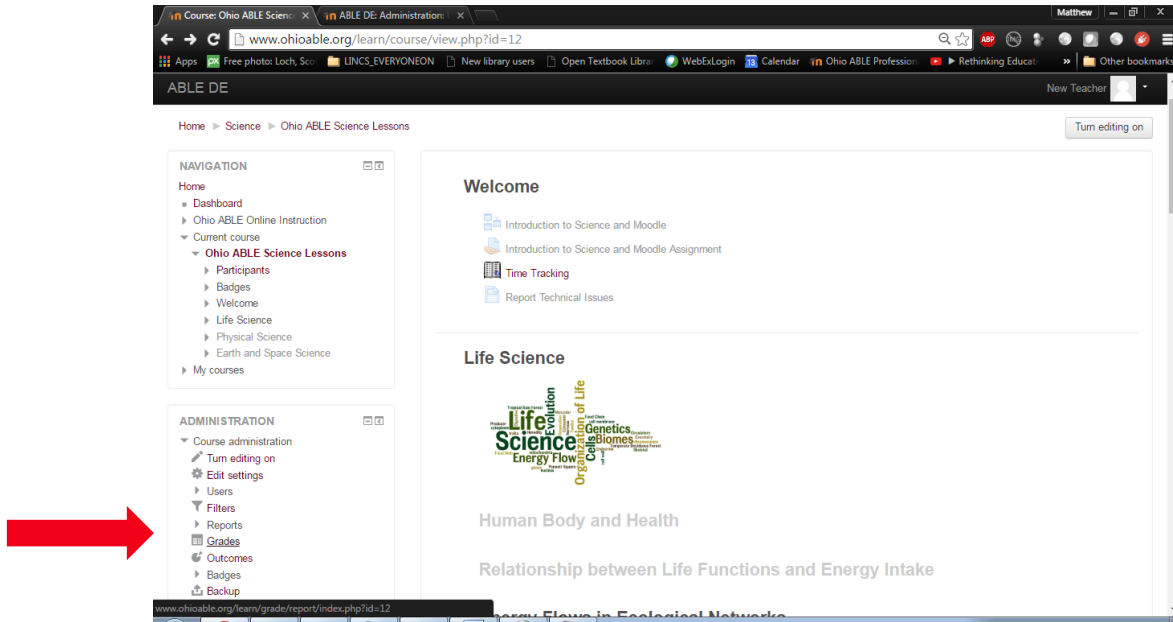
A red-bordered box highlights the 'Status' and 'Grade' columns for the first submission row.

Enter the grade and any feedback on the assignment and click **Save changes**.

The screenshot shows a web browser window with the URL www.ohioable.org/learn/mod/assign/view.php?id=1259&rownum=10&action=grade. The page is titled "Grade" and is part of the "ABLE DE" system. On the left, there is a navigation menu with categories like "Interactions among Populations", "Disruptions", "Eutrophication", "Molecular Biology", "Genetic Probability", "Genetic Variations", "Common Ancestry", "Selection", and "Physical Science". Below the menu is an "ADMINISTRATION" section with options like "Assignment administration", "Edit settings", "Locally assigned roles", "Permissions", "Check permissions", and "Filters". The main content area contains a "Grade" section with a red box around the "Grade out of 10" input field. Below this, it shows "Current grade in gradebook" as "-", "Grading student" as "11 out of 11", and a "Feedback comments" text area with a rich text editor toolbar. At the bottom, there is a "Notify students" dropdown set to "Yes" and a "Save changes" button, which is also highlighted with a red box.

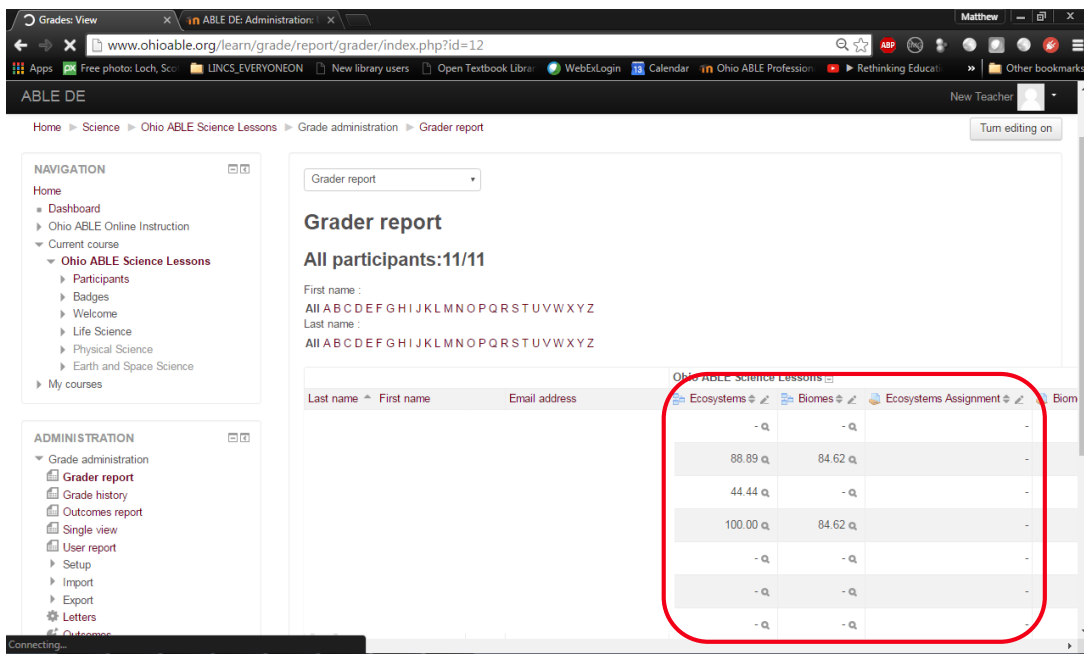
GRADE REPORTS

The grade report is a comprehensive overview of all completed lesson modules and assignments. To access the grade report, click on the **Grades** link found under **Course administration**.



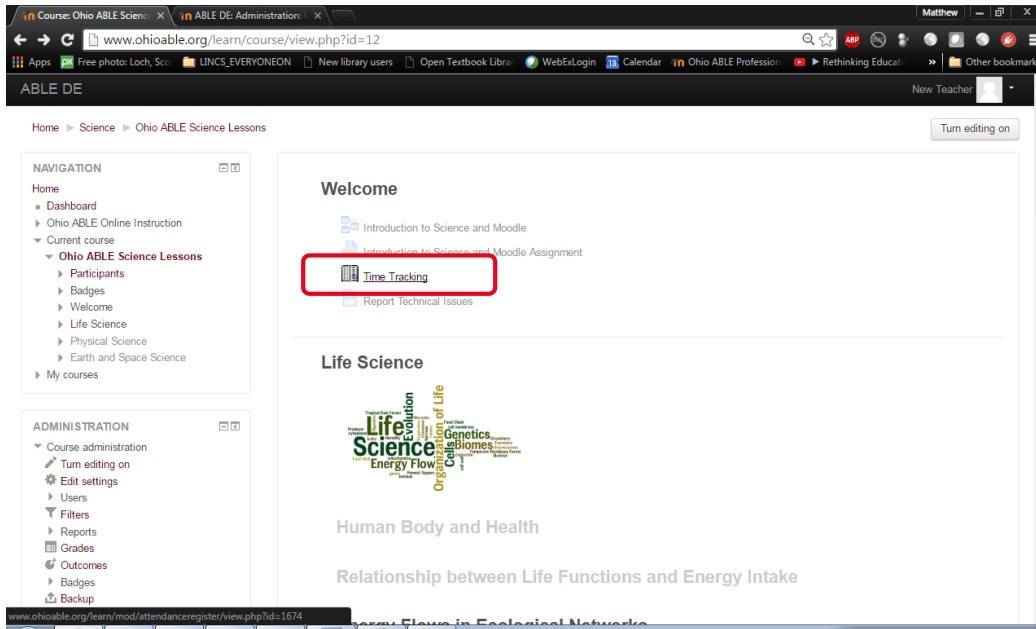
Students enrolled in the course will appear in the **Grader report**. Lesson modules and assignment grades will be listed in a table.

Please Note The lessons allow multiple attempts by students, but only the highest score will be reported.

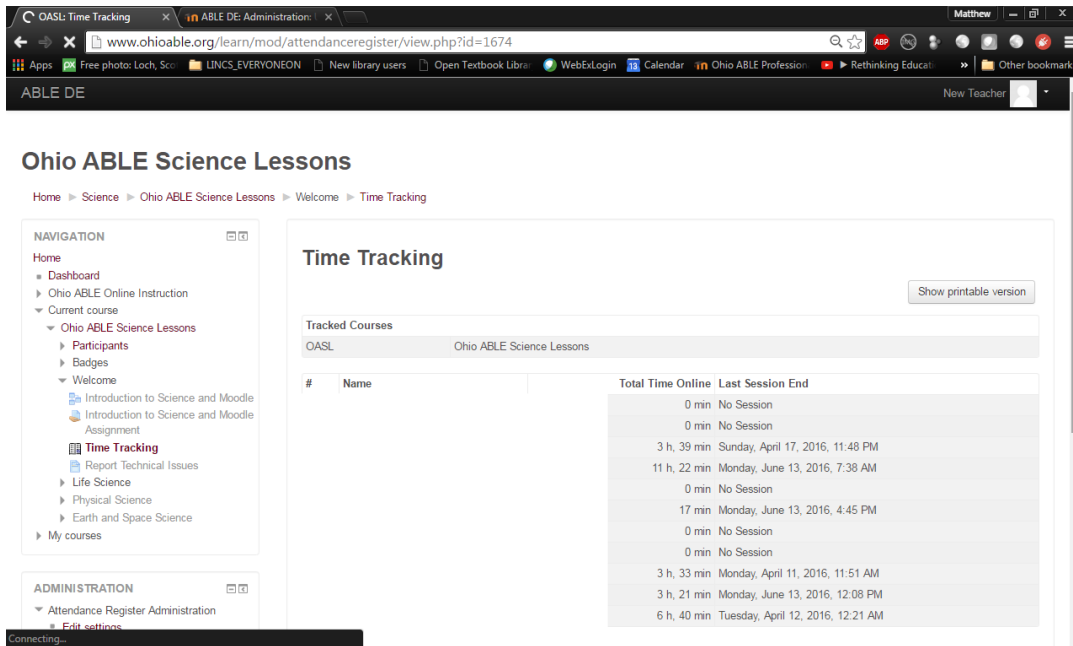


TIME TRACKING

A time tracking component is included and can be found at the top of the course page.



Total time spent is reported in the table, along with the date and time of last access.



RESOURCES

Open Educational Resources

Many of the resources used throughout the ABLE Science Lessons are called Open Educational Resources (OER). “OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits sharing, accessing, repurposing—including for commercial purposes—and collaborating with others.”¹¹ Below are a few Science favorites, but you will find additional sources in each module.





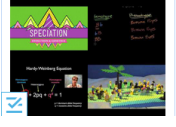
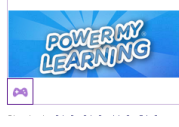
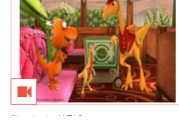
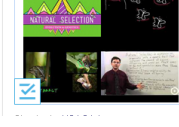
¹¹Open Educational Resources (OER): A Fact Sheet for Adult Education. (n.d.). Retrieved June 23, 2016, from https://lincs.ed.gov/sites/default/files/OER_Fact_Sheet_508.pdf

Life Science Formative Assessments, Homework, Videos, Lesson Plans

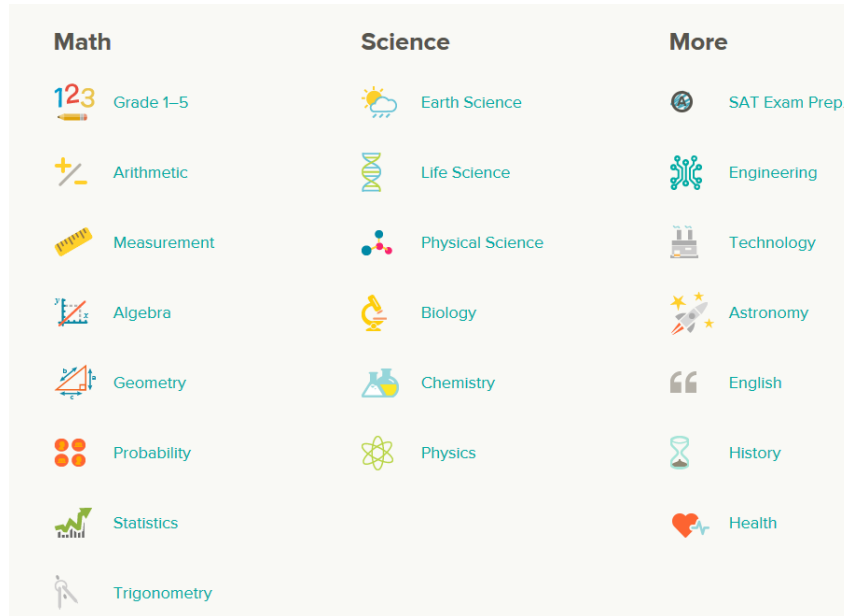
Search by subject (i.e. math), standard (G.SRT.1.1), keyword (ratio), etc.

Grade Resource Type Standard or Standard Area Or Life Science Publisher

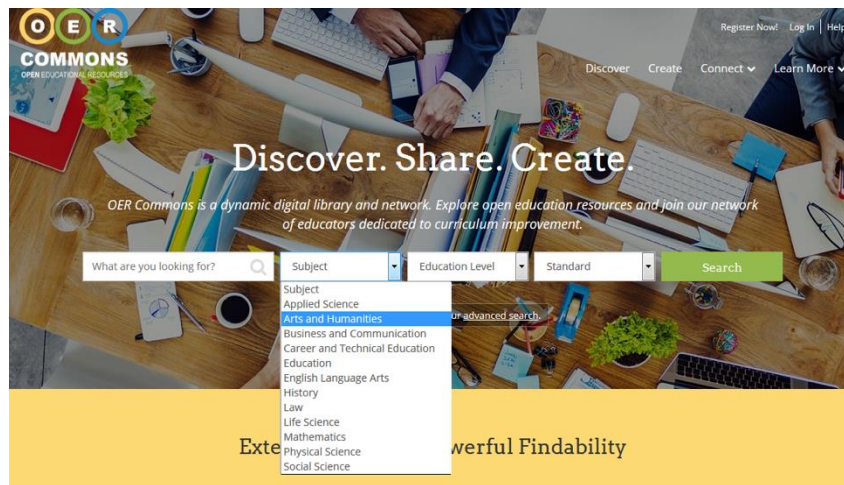
Show: All | Free | Premium | Paid 15653 Resources clear filters

VIDEO What is a Habitat? (One Minute Video Dictionary Series) 360degrees  Standards: 2.LS4.1 Grades: 1-3 Effectiveness: 100%	FEATURED ASSESSMENT How the Structure of DNA determines proteins Brandon Cormack/Gen  Standards: HS.LS1.1 Grades: 9-12	GAME Air Density and Baseball LearningRegistry_Old  Standards: G.MQ.2 Grades: 8-12 Effectiveness: 95%	VIDEO Energy and Food Chains- Revised - YouTube TroyGardner  Standards: 5.LS2.1 5.PS3.1 Grades: 4-6 Effectiveness: 100%
FEATURED ASSESSMENT Life Science - Biologic Evolution: Unity and Diversity Kellie Zimmer  Standards: HS.LS4.1 Grades: 9-12 Effectiveness: 100%	GAME Spellaroo (FunBrain) PowerMyLearning  Standards: HS.LS4.1 Grades: 9-12 Effectiveness: 100%	VIDEO A Colorful Hypothesis Pinky LearningMedia  Standards: HS.LS1.1 Grades: 9-12 Effectiveness: 100%	FEATURED ASSESSMENT Natural Selection Chris Jamieson  Standards: HS.LS4.1 Grades: 9-12 Effectiveness: 100%

OpenEd Resource Library <https://www.opened.com/search>



CK-12 <http://www.ck12.org/teacher>



OER Commons <https://www.oercommons.org/>

More Science OERs to use in your classroom:

- Curriki <http://www.curriki.org/>
- Wikimedia Commons https://commons.wikimedia.org/wiki/Main_Page
- Hippocampus <http://www.hippocampus.org/>
- Khan Academy Science <http://www.net-texts.com/Collection/28/Science-from-Khan-Academy>

Bank of Moodle Lesson Plans

The lesson plans contain several informational pieces that you might want to be aware of and incorporate into your classroom instruction. Make sure to check out the Parallel Classroom Instructional Activity; Science Content, Topic, and Subtopic; Teacher, Program, and Proxy Hours components. Below are links to currently completed lesson plans:

Life Science

Human Body and Health

Relationship between Life Functions and Energy Intake

[Energy Flows in Ecological Networks](#)

[Ecosystems](#)

[Biomes](#)

[Flow of Energy and Matter](#)

[Carrying Capacity](#)

[Interactions among Populations](#)

[Disruptions](#)

[Eutrophication](#)

Organization of Life

[Molecular Basis for Heredity](#)

[Molecular Biology](#)

[Genetic Probability](#)

[Genetic Variations](#)

[Evolution](#)

[Common Ancestry](#)

[Selection](#)

[Adaptation and Speciation](#)

Physical Science

Conservation, Transformation, and Flow of Energy

Work, Motion, and Forces

Chemical Properties and Reactions Related to Living Systems

Earth & Space Science

Interactions between Earth's Systems and Living Things

[Earth and its System Components and Interactions](#)

[Atmosphere and Climate](#)

[Oceanography](#)

[Weathering and Erosion](#)

[Structures of the Earth](#)

Structures and Organization of the Cosmos