

***Holyoke Public Schools
Middle School Science
Curriculum Map
Grade 7***

***Unit #3
Ecosystems***

revised
February 2010

Overview of Curriculum Maps

Goals:

1. To ensure that students are exposed to a rigorous curriculum in every school and every grade
2. To have consistent instruction and assessment district wide
3. To prepare students for the MCAS test
4. to explain what is expected to be covered in each Science unit of study

Expectations:

The district's expectation is for students to successfully meet the Massachusetts Science and Technology/Engineering Standards, and the English Language Proficiency Benchmarks and Outcomes (ELPBO). In order to help facilitate this teachers are required to follow curriculum maps.

Accountable Talk:

To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable - accountable to the learning community, to the science discipline, and to rigorous thinking.

Feedback to Students:

Feedback needs to happen daily in the classroom. There are many ways to give feedback. Conferencing, observations, questions asked during the workshop, and written responses to students' work and notebook entries.

Formative Assessments are embedded throughout the unit to provide diagnostic information, which teachers can use to inform their decisions about instruction for individual students and for the class. In general Formative Assessment should not be graded. They are intended to help teachers have greater insight into students' thinking.

Summative Assessments are used for evaluation purposes. Summative Assessments are graded. Assessments that are graded should occur at the end of an investigation.

NAEP Science Assessment sample questions

<http://nces.ed.gov/nationsreportcard/science/>

FIVE ESSENTIAL PRACTICES FOR TEACHING ENGLISH LANGUAGE LEARNERS

The five essential practices for teaching English language learners are practices developed by America's Choice to support the literacy needs of ELL students. These practices are a result of current second language acquisition research, literacy development, and effective classroom practices. (*America's Choice: Teaching English Language Learners: Literacy*)

Essential Practice 1	Classroom Applications
<p data-bbox="164 720 570 821">Develop Oral Language through Meaningful Conversation and Context.</p> <p data-bbox="164 867 610 1446">Oral language is the foundation of literacy and a main tool for learning and interacting in both academic and social settings. Natural exposure and planned experiences with oral language facilitates increases expression and understanding of the second language. Oral language also supports vocabulary development in context, paving the way for better comprehension and production. Exposure to rich oral and written language environments is vital for developing literacy and language skills.</p>	<ul data-bbox="691 720 1354 1549" style="list-style-type: none">• Develop oral language through meaningful conversation by planning language experiences and building consistent time to engage conversation.• Enunciate and rephrase difficult works allow extra time for practice and repetition.• Demonstrate and orally explain activities step-by step. Rephrase difficult instructions• Use think-alouds. Verbally share the comprehension thought process.• Provide opportunity for practice: allow extra time for practice and repetition in oral, reading, and writing activities with appropriate feedback.• Allow students to respond through Turn and Talk activities, oral, choral reading and re-reading.• Use audio recording of a text to provide extended to provide extended literacy opportunities where students listen to the reading of a text independently while developing fluency, accuracy, and language acquisition.• Plan daily read-alouds to model literacy strategies and to scaffold fluency, accuracy, and independent reading.

Essential Practice 2	Classroom Applications
<p>Teach Targeted Skills through Contextualized and Explicit Instruction</p> <p>Full literacy is a fluid combination of oral, reading, and writing skills. These skills must be taught through explicit and contextualized instruction that scaffolds learning. Contextualized instruction provides students with extra linguistic clues that support understanding not only of the content but also of the language being used in the lesson. Combining contextualized practices with the knowledge of phonemic awareness, phonics skills, language structures and functions, text patterns, and literary devices such as metaphors, analogies, figurative language, and unfamiliar cultural concepts, will aid students in achieving stronger literacy skills. Explicit skills give the students the tools they need to comprehend increasingly complex literacy demands.</p>	<ul style="list-style-type: none"> • Use clues of context to make instruction meaningful. Teach skills and strategies using materials, books or writing that students know and understand • Use Big Books or shared reading to teach phonics, vocabulary and language features. • Use student or teacher writing models to teach craft, spelling, and language use conventions. • Teach phonemic awareness within a context. ELL children must attach meaning and experience to phonemes they may never have heard before. Teach phonemic awareness while explicitly teaching vocabulary, meaning, or within-a-story context. • Understand the linguistic background native language and address these issues specifically. • Pay special attention to sounds of letters. Languages have different linguistic features. For example, while the vowel sounds in English vary, Spanish vowel sounds are consistent. Students will transfer what they know about one language and automatically, and sometimes incorrectly, apply it to English. • Use meaningful activities to teach phonemic awareness, such as language games, Word Walls, word banks, songs, poems, and rhymes that focus on particular sounds or letters.

Essential Practice 3	Classroom Applications
<p>Build Vocabulary through Authentic and Meaningful Experiences with Words</p> <p>Developing and deepening a student's understanding of new words is essential for English language learners. Building vocabulary in the context of literature, experiences, and modeled writing ensures that students will own the new words they encounter. Vocabulary building is a lifelong process and students must learn ways to integrate and approach new and challenging words. Discussing, playing with, and using new words allows students to gain new vocabulary through meaningful, and therefore memorable, experiences.</p>	<ul style="list-style-type: none"> • Vocabulary development must be taught intentionally. Since word knowledge correlates with reading comprehension and meaning-making strategies used in decoding, it must be a focus for instruction. • Vocabulary development must be taught in context. Connect word knowledge with background knowledge and instructional context. ELL students need both meaning and context to acquire new vocabulary. • Facilitate and plan activities that support the three main ways vocabulary is learned: <ol style="list-style-type: none"> 1. Through meaningful conversations with adults and other students. 2. Listening to adults read at slightly higher levels than the student's independent level. 3. Read extensively on their own at their reading level. • Pre-teach vocabulary words, prefixes/suffix, context clues, and cognates. Build students' skill box with vocabulary and give them tools to understand and connect new vocabulary. • Use content Word Walls or word webs. Support cognitive structuring for ELLs by connecting new vocabulary to themes, ideas, or generalizations. • Explicitly focus on and teach academic language. Students need to be consistently exposed to formal or content specific language and vocabulary. • Explicitly teach the building blocks of language. Students need to learn the connecting and transition words of the English language ("however," "in conclusion", etc.)Teach them in context and teach them explicitly. • Focus teaching Tier 2 words, as well as essential Tier 1 words. Although most explicit vocabulary instruction should focus on Tier 2 words (words with a high frequency in the written language, example: examine), ELLs need instruction around Tier 1, or basic spoken words as well.

Essential Practice 4	Classroom Applications
<p>Build and Activate Background Knowledge</p> <p>Learning is based on establishing neural connections in the brain, drawing on previous experience, background knowledge, and prior and current environments. It is both the teacher's and the student's job to facilitate these connections in order to construct meaning and understand new ideas and concepts while expanding on their own world knowledge. Actively fostering these connections will enable students to more easily interpret their surroundings and assign meaning to new concepts while expanding their own</p>	<ul style="list-style-type: none"> • Elicit student's experience and comments. Connect school, literary and personal events through talking, writing, and reading. • Consider the cultural background of students when selecting literacy materials such as books and poems. Support language development of Ell students by giving them new English words for experiences that are close to home. Using materials that represent their cultural background increases motivation and supports participation. • Discuss and build language around universal themes. Connect new language to universal experiences. • Build content-based word banks and webs. Connect new language to other known words, experiences, and ideas to support cognitive structuring. • Use native language and value home culture. View home cultures as a resource, rather than a liability. • Use hands-on experience based instruction in all academic areas. Language can be built upon common classroom experiences. • Encourage students to make connections before, during and after reading. • Find out what students know, and build on their experience.

Essential Practice 5	Classroom Applications
<p data-bbox="164 254 581 321">Teach and Use Meaning-Making Strategies</p> <p data-bbox="164 365 638 873">Intentionally teaching meaning-making strategies provides students with a toolbox to approach future learning challenges. Meaning-making strategies vary from helping students comprehend text to various strategies students can use to understand English-dependent lessons. Modeling appropriate behaviors to students gives them the tools to be autonomous learners and supplies them with options they can use to interpret environmental input, both academically and socially.</p>	<ul data-bbox="716 254 1357 1201" style="list-style-type: none"> • Explicitly teach student meaning-making strategies. Model for students how to visualize, make connections, monitor for meaning, determine importance, etc. • Provide opportunities for practice. Sustain daily work periods in reading and writing for students to practice these strategies. • Systematically assess students and adjust instruction. Monitor progress and use data to adjust the focus of mini-lessons, conferences and small-group instruction. • Model activities and thinking for certain skills. Students need to see and experience what is expected of them before they perform a task. • Beginning ELLs need more than just phonics and English Language Development instruction. EXPOSE STUDENTS RIGHT AWAY TO COMPREHENSION STRATEGIES. Waiting to address skills in chronological order hinders academic growth and English proficiency. • Teach students how to help themselves in English-dependent lessons. Model your thinking and how you approach problems. Build students cognitive toolbox by explicitly teaching the ways to help themselves during difficult language situations.

Resources: *Diversity of Life* FOSS kit

Prentice Hall Science Explorer, *From Bacteria to Plants & Environmental Science*
Student Text, Student Edition on Audio CD, Teacher's Edition, & Color Transparencies
All-in-One Teaching Resources

- Blackline masters, teaching support, and answer keys are organized by chapter.

TeacherEXPRESS

- (4 CD-ROM Set) contains lesson management software, an Interactive Teacher's Edition, correlates to state and local standards, and instructional tools.

Differentiated Instruction

- Guided Reading and Study Workbook, Adapted Reading Study Workbook, & Adapted Tests

Ecosystem Project

Students design, and build an ecosystem (aquarium, terrarium, or eco-bottle). Students construct a table of the organisms in their ecosystem and identify the organisms as producers, consumers (herbivore, carnivore, omnivore, or scavenger), or decomposers (bacteria). ** Teachers should have available for students a model of one of the ecosystems a student could create in a bottle: terrestrial habitat, compost habitat, aquatic habitat, or a combination of all three: terr-aqua (eco) column. See project description at end of unit for more information.

Students observe, collect data, take notes and make drawings of their habitats on a weekly basis.

Big Idea: All Living Things can be classified into Five Kingdoms/ Todos Seres vivos pueden ser clasificados en Cinco Reinos

Massachusetts Science and Technology/Engineering Standards

LSS # 1. Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom.

MCAS item analysis (what do students need to be able to do)

- ✓ Know or describe the characteristics used to classify organisms into each Kingdom
- ✓ Know the 5 Kingdoms: Animalia, Plantae, Fungi, Protista, and Monera (bacteria)
- ✓ Differentiate between nucleated (eukaryote) and non-nucleated (prokaryote) cells
- ✓ Know or give examples of organisms that belong to each kingdom
- ✓ Visually identify common examples of each Kingdom

Vocabulary: Students should make notebook entries (words, definitions, and illustrations) as words are introduced lesson by lesson. In addition, a word wall should be created in the classroom for students to refer to when needed as they speak, read, and write.

Guiding Question: What is a living thing?/ ¿Qué es un ser vivo?

Engage:

- Ask students to write down everything they can about what defines a living thing. They should include examples to distinguish living from nonliving. (*elicit prior knowledge*)
 - *Write directions, instructions, or explanations with multiple sentences that provide information in logical order (W.2.2; link to ELA 19.7)
 - *From the Massachusetts English Language Proficiency and Outcomes for English Language learners (ELPBO)

Explore:

- Investigation 1, Part 1: Living or Nonliving? Diversity of Life FOSS kit, page 43-51. Students observe the mysterious substance (camphor) when placed in water.

Students record their observations and share their ideas with others. Next, students sort a set of 24 cards with pictures of objects and organisms into **living/vida** and **nonliving/vivientes** groups, defining the **characteristics/ características** that qualify objects as living. Discuss the results.

* Demonstrate comprehension of explanations or instructions, when clarification is given (S.2.21)

*Participate orally in class activities, using appropriate words, phrases, and expressions (S.3.46)

- Students prepare the mini-ponds, see pages 50 to 51 in the FOSS Diversity of Life Teacher Guide.
 - * Demonstrate comprehension of explanations or instructions, when clarification is given (S.2.21)
- Students add the following vocabulary terms to their glossaries: **living, nonliving, characteristics**
 - *S.1.5. Employ vocabulary essential for grade-level content learning.
 - *S.12.a. Identify cognates in printed, grade-level, academic content vocabulary terms.

Explain:

- Students use a T-chart to list characteristics of living and non-living things. Students complete the T-chart in their science journal.
 - *Write lists of words and phrases needed to accomplish an assigned writing task. (W.1.2)
- Make a class chart about the "Characteristics of Life", based on students thinking at this time. Tell them that these characteristics can be modified as they acquire additional information.
 - *Express basic personal needs and information and school-related information (S.1.4)

Explore:

- Investigation 1: Part 2, Is Anything Alive in Here? *FOSS Diversity of Life Teacher Guide*, pages 54 to 63. Students place five unidentified materials (sand, yeast, polyacrylate crystals, radish seeds, and brine shrimp eggs) in different **environments/ entornos** and observe what happens after a day. They determine if each material is living and record **evidence/ pruebas** that supports their determinations.
 - *Demonstrate comprehension of oral directions that include visual cues (S.3.1)
 - *Ask and respond to questions to clarify information (S.3.14)
- Students add the following vocabulary terms to their glossaries: **environments, evidence**

*S.1.5. Employ vocabulary essential for grade-level content learning.

*S.12.a. Identify cognates in printed, grade-level, academic content vocabulary terms.

- Read Aloud and discuss the article called "Life on Earth", page 21 to 23 in the *FOSS Diversity of Life Resources* book. Students record in their notebooks the seven characteristics of all living things (gas exchange, water, use energy, eliminate waste, respond to the environment, grow, and reproduce).

*Read and understand previously learned essential vocabulary words. (R.1.1; link to ELA 7.4)

*Use knowledge of text features to determine purpose and meaning of text. (R.5.9; link to ELA 13.18)

Extend:

- **MULTIMEDIA:** Students work in groups or individually to play the **Living/Nonliving Game** on the FOSS website. The game requires students to apply the criteria of life. Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing. <http://www.fossweb.com/>

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

Evaluate: (NAEP released question)

*Organize information to be expressed in writing in a way that makes sense for the purpose and audience (W.1.3; link to ELA23.2)

Q. Classify each of the eight living things listed below into one of two groups according to an important physical characteristic.

Gorilla
Parrot
Snake
Earthworm
Jellyfish
Sponge
Fish
Fly

Group 1

Group 2

a) What physical characteristic did you use in your classification?

b) Name a different physical characteristic that you could have used.

Guiding Questions: What characteristics are used to sort living organisms into the Kingdoms of Living Things?/ ¿Qué características se utilizan para clasificar los organismos vivos en los reinos de los seres vivos? /

Engage:

- Classifying Activity: Creepy Critters. What if you discovered a completely new life form? Would you be able to determine what existing organisms it might be related to? What would you look for? How would you organize your research? (See appendix and/or the following website)

http://www.microbeworld.org/images/stories/resources/PDFs/Experiments/creepy_critters.pdf

*Use appropriate words, phrases, and expressions to interact with peers and adults.(S.3.24)

Explore:

- Read Aloud and discuss the article "Kingdoms of Life", page 65-70 in the *Diversity of Life Resources* (FOSS kit) book. Students read about how scientists have created 5 large categories called kingdoms, to classify all living things. The **Kingdoms of Life/ Reinos de la vida** are **Monera (bacteria), Protista, Fungi, Animalia, and Plantae/ Monera (bacterias), Protista, Fungi, Animalia, y Plantae**. Students make a table listing the 5 kingdoms in the first column, characteristics for each kingdom in the second column, and examples of organism for each kingdom in the third column.

*Summarize information from a literary or an informational text that is read. (R.3.3; link to ELA 8.18)

Explain:

- Students turn and talk (about the article "Kingdoms of Life") with a partner. Tell each other what you have learned.

*Restate a main event from a story that is heard. (S.3.17; link to ELA 8.7)

Extend: Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing.

- Today the classification includes six Kingdoms: Plants, Animals, Protists, Fungi, Archaeobacteria, and Eubacteria.

http://www.ric.edu/faculty/ptiskus/Six_Kingdoms/Index.htm

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

Evaluate: (MCAS released question)

*Use context to determine the meanings of words (R.1.3; link to ELA 4.13)

Q. If a new organism were discovered, which of the following would **most likely** be used

to classify it into the appropriate kingdom? (LS #1)

- A. the color of the organism
- B. the organism's natural habitat
- C. the structure of the organism's anatomy
- D. the location where the organism was found

Guiding Question: What organisms belong to the Protist Kingdom?/ ¿Qué organismos pertenecen al reino Protista?

Engage:

- Ask students, "How can we observe tiny **organisms/ organismos** to gather evidence that they are alive?"
 - *Demonstrate understanding when simple information is given (S.3.3)

Explore:

- Students work with a partner to use **microscopes/ microscopios** to view life in the mini-ponds or **pond water/ agua del estanque** and/or prepared slides of **micro-organisms/ microorganismos**. See Diversity of Life Resource Book pages 4 to 7 for microorganism guide. All grade 7 science teachers were given a class set (5 sets of 5) of slides of protists in Sept 2009. The set includes five microscope slides of paramecium, amoeba, spirogyra, mixed protists, and euglena. Students draw and label organisms observed in their science notebooks.
 - *Participate in classroom discussions and activities, when frequent clarification is given. (S.3.43)
- Students add the following vocabulary terms to their glossaries: **organisms, micro-organisms**
 - *S.1.5. Employ vocabulary essential for grade-level content learning.
 - *S.12.a. Identify cognates in printed, grade-level, academic content vocabulary terms.
- Students can view short movies of many different examples of **organisms** that belong to the **Protista Kingdom** on the FOSS website. Go to the Diversity of Life Multimedia. Students should make a list of different types of organisms that belong to the Protista Kingdom in their notebooks. <http://www.fossweb.com/>
 - *Comprehend and answer questions following a presentation (S.4.13)
- Read Aloud and discuss the article called "The Lowly Paramecium", pages 24 to 26, in the *FOSS Diversity of Life Resources* book.

Explain:

- Students are asked to write down 3 important details, 2 connections, and 1 question they may have after reading "The Lowly Paramecium". The 3-2-1 strategy is used to help students' self-monitor comprehension; identify important details in the text;

make connections to text or learning; or identify areas in the text or lesson where understanding is uncertain.

Extend: Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing.

- This virtual pond dip introduces some of the commoner types and hopefully encourages an exploration of the incredible 'world within a world' of a real pond. <http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/ponddip/index.html>
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
- Pond Life Video Gallery: Freshwater ponds provide a home for a wide variety of aquatic and semi-aquatic plants, insects, and animals. The vast majority of pond inhabitants, however, are invisible until viewed under the microscope. Beneath the placid surface of any pond is a microscopic metropolis bustling with activity as tiny bizarre organisms pursue their lives; locomoting, eating, trying not to be eaten, excreting, and reproducing. In this collection of digital movies, observe the activities of microscopic organisms taken from a typical North Florida pond. <http://www.microscopyu.com/moviegallery/pondscum/>
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
- A simple guide to small and microscopic pond life. <http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/pond/index.html>
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
- The Five Kingdoms of Living Things (with lists of the characteristics of each). Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing. <http://teachers.oregon.k12.wi.us/hanson/index2.htm>
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

Guiding Questions: What organisms belong to the Fungi Kingdom? What are the characteristics of organisms that belong to the Fungi Kingdom? / ¿Qué organismos pertenecen al reino Fungi? ¿Cuáles son las características de los organismos que pertenecen al Reino Fungi?

Engage:

- Students observe samples of **mushrooms/ setas** (dried and/or fresh), **lichen/ liquen**, and/or bread **mold/ molde** (several different examples of fungi). Ask students if these are living things? Have them refer to the characteristics of living

things to help them make their decision.

*Express one's own opinions, preferences, and wishes related to familiar topics (S.2.24)

- Students can view many different examples of **organisms** that belong to the **Fungi Kingdom** on the FOSS website. Go to the Diversity of Life Multimedia. Students should make a list of different types of organisms that belong to the Fungi Kingdom in their notebooks. <http://www.fossweb.com/>
*Participate in classroom discussions and activities, when frequent clarification is given. (S.3.43)

Explore:

- Students read in small groups: "What is **mold**, anyway?" (See appendix and/or the following website). After reading students answer questions.
<http://www.shellyssciencepot.com/Worksheets/Fungi/WhatIsMold.pdf>
*Analyze main ideas and supporting details and evidence in texts. (R.3.7; link to ELA 8.22)
- Students write a short research report (using library books, textbooks, and/or the internet) about one type of fungi (mushrooms, mold, puffballs, shelf/bracket fungus, yeast, etc.). Students must include detailed descriptions of the fungi's physical characteristics, what it needs to grow, where it grows, how it reproduces, and any other interesting details.
*Summarize data gathered through research. (R.6.2)
*Obtain information from a variety of print and non-print sources (R.6.4; link to ELA 24.3)
- Students work with a partner to interpret a graph: "Effect of Root-Associated Fungi on Tree Growth", page 94 in Prentice Hall Science Explorer, *From Bacteria to Plants* textbook. Students learn that root-associated fungi improve or enhance tree growth. Students answer questions in their science notebooks.
*Write a brief response to a literary text or an explanation of an informational text, citing evidence from the text as support. (W.2.3; link to ELA 19.12)
*Summarize important ideas from a text and represent the relationships between or among them. (R.3.8; link to ELA 8.22)

Evaluate:

- Formative Assessment:
*Ask and answer questions (S.2.23)

Q. While hiking through Granville State Forest, a student finds an unusual plant-like organism that appears to lack chlorophyll. When the student examines a sample using a microscope, he sees many cells with cell walls and no chloroplasts. This organism is **most likely** a member of what Kingdom?

- A. Animalia
- B. Eubacteria
- C. Fungi
- D. Protista

Extend: Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing.

- Fun Facts about Fungi <http://herbarium.usu.edu/fungi/FunFacts/factindx.htm>
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
 - *Participate in limited discussions using appropriate and adequate words and phrases (S.1.18)

- The yeasts are one very important group of fungi. The common yeast used in baking bread grows very fast. You can complete an experiment in two days! The basic idea method is to measure the amount of carbon dioxide (CO₂) released during the growth of yeast. The growth of the yeast stops when one of the nutrients required by the yeast is gone, or when the liquid gets too acid (low pH) and kills the yeast. (See the appendix and/or the following website)

http://herbarium.usu.edu/fungi/FunFacts/Yeast_exp.htm
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

- The simplest method of growing molds is to put a substrate like bread in a moist chamber. The substrate provides nutrients, and the chamber maintains the high humidity that favors the growth of fungi. Placing a slice of bread, fruit or vegetable, or a leaf in a plastic sandwich bag is a simple way to use this method. The small plastic bag must have a tie, a fold-over top or another way of sealing it. Mold growth should be visible after 3 to 5 days. (See the appendix and/or the following website)

http://herbarium.usu.edu/fungi/FunFacts/moist_chamber.htm
 - *Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

Guiding Question: How are organisms in the Fungi Kingdom similar and different than organisms in the Plant Kingdom?/ ¿Cómo son los organismos del Reino Fungi similares y diferentes de los organismos en el reino vegetal?

- Fungi discussion question - For a long time, fungi (mushrooms, etc.) were classified in the plant kingdom. Eventually, they were placed into their own kingdom (Kingdom Fungi). List some reasons that they are similar to plants. Then list some reasons that they are different from plants. [Possible Answers:*Similarities - both fungi and plants are multi-cellular and have cell walls; neither move from place to place.

*Differences - cells walls in each are made from different materials; plants make their own food (autotrophic), while fungi can't (heterotrophic)]

*Participate in limited discussions using appropriate and adequate words and phrases (S.1.18)

*Select and use words to increase detail in writing. (W.3.3; link to ELA 21.2)

Guiding Questions: What organisms belong to the Monera Kingdom? What are the characteristics of organisms that belong to the Monera Kingdom?/ ¿Qué organismos pertenecen al reino Monera? ¿Cuáles son las características de los organismos que pertenecen al reino Monera?

- Students can view many different examples of **organisms** that belong to the **Monera Kingdom** on the FOSS website. Go to the Diversity of Life Multimedia. Students should make a list of different types of organisms that belong to the Monera Kingdom in their notebooks. <http://www.fossweb.com/>

*Participate in limited discussions using appropriate and adequate words and phrases (S.1.18)

- **Bacteria** may eventually be divided into more than just the one kingdom **Monera** because there are some very different groups of bacteria. Algae pose an entirely different problem. Earlier classification schemes classified algae as plants. However, current schemes include the unicellular algae within the kingdom Protista, while keeping the multi-cellular algae within the plant kingdom. Classification is a constantly changing, dynamic science! This means that you can still learn by discovery, not just memorization!

Guiding Question: What Kingdom do organisms belong to?/ ¿Qué hacen los organismos Reino pertenece?

- Students identify the **kingdom** that 20 **organisms** belong to. They write at least one **characteristic** that places the organism into its kingdom (**Monera, Protista, Fungi, Plantae, or Animalia**). See the appendix and/or the following website.

<http://www.schools.utah.gov/curr/science/sciber00/7th/classify/sciber/kinglab.htm>

*Work collaboratively with peers when using technology in the classroom. (W.5.3)

- **Five Kingdom Card Game**

1. Have students go through old magazines, and/or use the internet to print some pictures to make a collection of pictures of living things from the five Kingdoms. Encourage students to look for microscopic living things as well as large, easily recognizable living things.
2. Each student makes 5 cards. Have students glue their pictures onto index cards, one image per card. Have students write the name of the organism on the card. *Laminate the pictures so that you can reuse them next year.*

3. Pass out 5 to 10 cards to each team, leaving a small class pile in the center. Explain the object of the game is for each team to get rid of all its cards by correctly classifying the item pictures.
4. The teacher calls out a Kingdom. Each team must select a card that fits that Kingdom and hold it up. If their classification is correct, they discard the card to the central pile. If their classification is wrong, they have to draw another card from the pile and they can't discard. Allow the teams time to come to a decision among themselves about which card to hold up.
5. The first team to discard all their cards wins.
 - *Read and understand high-frequency and familiar words and phrases. (R.2.2)
 - *Ask and answer concrete questions about familiar content. (S.2.5)

Explain:

- o Students make a table listing the 5 kingdoms in the first column, characteristics of each kingdom in the second column, and examples of organisms for each kingdom in the third column.
 - *Write lists of words and phrases needed to accomplish an assigned writing task. (W.1.2)

Evaluate:(MCAS released questions)

- *Organize information to be expressed in writing in a way that makes sense for the purpose and audience (W.1.3; link to ELA23.2)

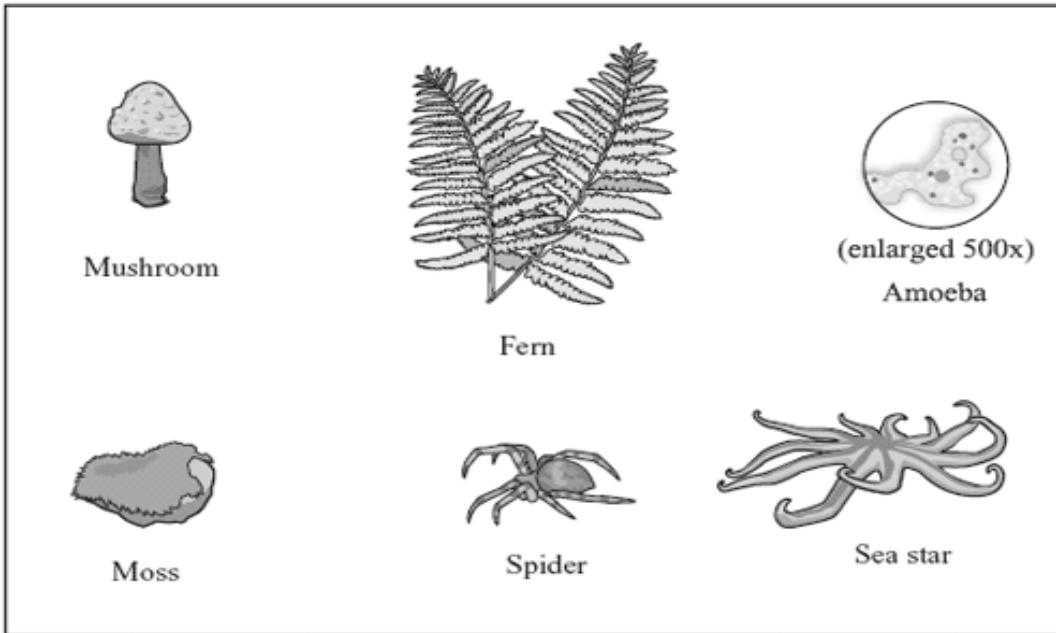
Q. A mushroom is a member of the Kingdom Fungi. Members of Kingdom Fungi are unique because they digest their food outside their bodies and then absorb the nutrients.

You may organize your answer for parts a, b, and c in a chart. (LS #1)

- a) Name **two** other Kingdoms of living organisms.
- b) Give **one** example of an organism that is classified into each Kingdom you described in part a.
- c) For each Kingdom that you selected, describe **two** characteristics that are used to classify organisms into that Kingdom.

****For this question, show students samples of released student work (remove the scores before giving students the sample work) and have them score the samples using the rubric provided. This will help students understand how open-ended questions on the MCAS test are scored. (see the next couple of pages)**

****Q. Individual organisms can be sorted into different kingdoms based on their characteristics. Pictures of six organisms and a table listing four kingdoms are shown below. (LS #1)**



Four Kingdoms of Living Organisms

Animalia	Plantae	Fungi	Protista
SAMPLE ONLY			

- Copy the table above into your Student Answer Booklet.
- Write the name of each pictured organism under the correct kingdom in your copy of the table.
- For each kingdom listed in the table, describe one characteristic that all organisms in that kingdom have in common.

Scoring Guide and Sample Student Work

Select a score point in the table below to view the sample student response.

Score	Description
4	The response demonstrates a thorough understanding of how to classify organisms into kingdoms according to characteristics that they share. The response correctly places the names of the six organisms in the correct kingdoms and correctly describes one characteristic that all the organisms in each kingdom have in common.
4	
3	The response demonstrates a general understanding of how to classify organisms into kingdoms according to characteristics that they share.
2	The response demonstrates a limited understanding of how to classify organisms into kingdoms according to characteristics that they share.
1	The response demonstrates a minimal understanding of how to classify organisms into kingdoms according to characteristics that they share.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Note: There are 2 sample student responses for Score Point 4.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 4

a)

Animalia	Plantae	Fungi	Protista
spider	Fern	mushroom	amoeba

b)

sea star	moss		
----------	------	--	--

c) All organisms in Kingdom Animalia are consumers. They cannot create their own food, so they eat other organisms. All members of Kingdom Plantae are producers. Using photosynthesis, plants use light energy, carbon dioxide, and water to make glucose (their food.) Organisms in the Fungi Kingdom break down decomposing matter. They break down matter and absorb it for energy, recycling the matter. In the Protist Kingdom, all of the organisms have eukaryotic cells. Whether they are one-celled or many, resembling animals, plants, or fungi, the protists^{all} have cells with nuclei in them.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 4

Animalia	Plantae	Fungi	Protista
Spider Sea star	Fern Moss	Mushroom	Amoeba
They get their food from somewhere else	They make their own food from CO ₂ , water, and light.	They absorb energy from other, dead organisms.	Made out of one cell

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 3

a.

	Animalia	Plantae	Fungi	Protista
B→	spider	fern	mushroom moss	Amoeba

© In the Animalia kingdom, all those organisms have to catch or eat other organisms for their food. All those organisms also have multicellular bodies.

In the Plantae kingdom those organisms use photosynthesis to make their own food.

In the fungi kingdom these organisms decay other organisms like trees or dead organisms.

In the protista kingdom these organisms only have one cell. They live off of just one cell in their whole bodies.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 2

a+b	Animalia	Plants	Fungi	Protista
	Spider sea star	fern moss	mushroom	Amoeba

C = All animalia organisms are living animals. All plants organisms are plants, so they use photosynthesis. All fungi organisms are fungus and grow on living things. All protista organisms are ^{tiny} protists.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 1

A.	Animalia	Plante	Fungi	Protista
B.	Spider SeaStar	fern	mush- room MOSS	Amoeba

C. Animalia- they both are living creatures.

Plante - it is a plant that needs water and sunlight

Fungi - both dont need water or sunlight and have bacteria.

Protista - this is a kind of cell and you need a microscope to see it.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 0

Four Kingdoms of Living organisms

Animalia	Plantae	Fungi	Protista
	Moss Mushroom Spider	Sea star	enlarged

Moss - a short, soft plant that grows on the ground and on trees
adjective mossy.

Big Idea: Organisms interact within an ecosystem/ Los organismos interactúan dentro de un ecosistema

Massachusetts Science and Technology/Engineering Standard

LSS # 13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.

MCAS item analysis (What do students need to be able to do?)

- ✓ Identify characteristics of an ecosystem based on graphical data (read and interpret a graph)
- ✓ Recognize symbiotic and parasitic relationships
- ✓ Describe ways that organisms help other organisms survive and grow

Massachusetts Science and Technology/Engineering Standards

LSS # 14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.

MCAS item analysis (What do students need to be able to do?)

- ✓ Explain the role of each organism in an ecosystem
- ✓ Identify producers, consumers, and decomposers and explain why they would be classified that way
- ✓ Read and interpret a food web diagram for the following: producer, consumer, decomposer, effects of elimination of an organism
- ✓ Understand and /or explain how elimination of one organism affects the population of other organisms in a food web
- ✓ Draw a food chain or food web from a list of organisms in an environment
- ✓ Identify which organisms have the greatest or least impact on ecosystems
- ✓ Understand and draw "arrows" in a food web as the direction of energy flow
- ✓ Identify organisms that produce energy from sunlight

Guiding Question: What is an ecosystem?/ ¿Qué es un ecosistema?

Engage:

- Ask students how living and nonliving things interact in a particular area (such as a forest)? (*elicit prior knowledge*)

*Respond briefly to questions on academic content. (S.3.18)

Explore:

- Read aloud and discuss "Energy Flow in Ecosystems", pages 42-47, Prentice Hall Science Explorer: *Environmental Science* textbook. Students learn about **ecosystems, producers, consumers, decomposers, energy transfer and food webs/ los ecosistemas, los productores, consumidores, descomponedores, la transferencia de energía y las redes alimentarias.**

*Identify details that support main idea in a literary or an informational text (R.3.2; link to ELA 18.18)

*Ask and respond to questions based on a text that is heard (S.3.15; link to ELA 8.15)

- Students make a diagram with labels of a food web using the picture on p 45, Prentice Hall Science Explorer: *Environmental Science*.
 - *Apply knowledge of word analysis to expand comprehension of vocabulary found in text (R.1.8)
- Students complete the Food Web activity, "Weaving a Food Web" on p 44, Prentice Hall Science Explorer: *Environmental Science*. This activity demonstrates how the organisms in a food web are interconnected.
 - *Demonstrate comprehension of oral, multiple-step directions. (S.3.29)
- Students work with a partner to complete the Activity: "Analyzing Interaction Among Organisms", page 69, in the Prentice Hall Science Explorer: *All-in-One Teaching Resources Environmental Science*. Students interpret a graph about the populations of rodents, birds and rattlesnakes in an area. Students answer questions in their notebooks.
 - *Ask and answer questions (S.2.23)
- Students complete the Math Activity: Predator-Prey Interactions, page 27, *Environmental Science*. Students interpret a graph about the wolf and moose populations on Isle Royale, an island in Lake Superior, from 1965 to 2005.
 - *Summarize important ideas from a text and represent the relationships between or among them. (R.3.8; link to ELA 8.22)
- ******Students design, and build an ecosystem (aquarium, terrarium, or eco-bottle). Students observe, collect data, take notes and make drawings of their habitats on a weekly basis.**
- Students add the following vocabulary terms to their glossaries: **ecosystems, producers, consumers, decomposers, energy transfer and food webs**.
 - *S.1.5. Employ vocabulary essential for grade-level content learning.
 - *S.12.a. Identify cognates in printed, grade-level, academic content vocabulary terms.
- Read about and discuss **Symbiosis/ Simbiosis**, page 30 to 31, Prentice Hall Science Explorer: *Environmental Science*. Students use a graphic organizer to compare and contrast mutualism, commensalism, and **parasitism/ parasitismo**, and give examples of each type of symbiosis.
 - *Summarize main ideas and supporting details. (R.5.5; link to ELA 13.12)
 - *Respond to factual and inferential questions that are based on academic content (S.3.39)
- Students add the following vocabulary terms to their glossaries: **symbiosis**, and

parasitism.

*Apply knowledge of word analysis to expand comprehension of vocabulary found in text (R.1.8)

*Read and understand previously learned essential vocabulary words. (R.1.1; link to ELA 7.4)

Explain:

- Formative Assessment: Students draw a food web using the following organisms (grass, mushroom, mouse, hawk, snake, fox, rabbit, and corn). Label each organism as producer, consumer, or decomposer. Use arrows to represent the flow of energy.
*Write lists of words and phrases needed to accomplish an assigned writing task. (W.1.2)

Extend: Teachers need access to either a computer lab, some computers in the classroom, or a projection system for large group viewing.

- Students graph and interpret real life data about the predator-prey relationship between snowshoe hare and Canadian lynx. (see appendix and/or the following website) <http://www.biotopics.co.uk/newgcse/predatorprey.html>
*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
*Work collaboratively with peers when using technology in the classroom. (W.5.3)
- Students do a Predator-Prey Simulation. The student simulates the interactions between a predator population of lynx and a prey population of rabbits in a meadow. After collecting the data, the student graphs the data and then extends the graph to predict the populations for several more generations. (see appendix and/or the following website) <http://www.accessexcellence.org/AE/AEPC/WWC/1991/predator.php>
*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
*Gather and analyze information, using multiple media. (W.5.5)
- On-line Activity: Students create a meadow, pond and arctic food webs http://www.harcourtschool.com/activity/food/arctic_activity.html
*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)
*Gather and analyze information, using multiple media. (W.5.5)
- Students label the organisms (producers, consumers, herbivores, carnivores, omnivores) that are part of a food web (see appendix and/or the following website) <http://www.biologycorner.com/worksheets/foodweb.htm>
*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

*Gather and analyze information, using multiple media. (W.5.5)

- Students play the producers, consumer, decomposer game

<http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.htm>

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

*Gather and analyze information, using multiple media. (W.5.5)

Evaluate: (MCAS released questions)

*Organize information to be expressed in writing in a way that makes sense for the purpose and audience (W.1.3; link to ELA23.2)

Q. Which of the following organisms produces energy from sunlight? (LS #14)

- A. worm
- B. rabbit
- C. hawk
- D. grass

Q. The population of which of the following organisms would **most likely** decline if small animals like rats, rabbits, and snakes were eliminated from an ecosystem? (LS #14)

- A. earthworms
- B. grasses
- C. hawks
- D. mushrooms

Q. Most of the bacteria in a forest ecosystem are **best** classified as which of the following types of organisms? (LS #14)

- A. consumers
- B. decomposers
- C. predators
- D. Producers

Q. Lichens are symbiotic organisms made of green algae and fungi. What do the green algae supply to the fungi in this symbiotic relationship? (LS #13)

- A. carbon dioxide
- B. food
- C. protection
- D. water

****For this question, show students samples of released student work (remove the scores before giving students the sample work) and have them score the samples using the rubric provided. This will help students understand how open-ended questions on the MCAS test are scored. (see the next couple of pages)**

****Q.** A forest ecosystem in New Hampshire contains a large area where berry plants grow naturally. The berry plants help some organisms in the forest survive and grow. Other organisms in the forest help the berry plants survive and grow.
(LS #13)

- a. Describe **two** different ways that the berry plants help some organisms in the forest survive and grow.
- b. Describe two different ways that other organisms in the forest help the berry plants survive and grow.

Scoring Guide and Sample Student Work

Select a score point in the table below to view the sample student response.

Score	Description
<u>4</u>	The response demonstrates a thorough understanding of how organisms interact in an ecosystem. The response clearly describes two different ways that the berry plants help some organisms in the forest survive and grow. The response clearly describes two different ways that other organisms in the forest help the berry plants survive and grow.
<u>4</u>	
<u>3</u>	The response demonstrates a general understanding of how organisms interact in an ecosystem.
<u>2</u>	The response demonstrates a limited understanding of how organisms interact in an ecosystem.
<u>1</u>	The response demonstrates a minimal understanding of how organisms interact in an ecosystem.
<u>0</u>	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Note: There are 2 sample student responses for Score Point 4.

**2008 MCAS
Grade 8 Science and Technology/Engineering
Question 39 - Score Point 4**

Ⓐ Berry plants help some organisms in the forest survive and grow because first of all they are a ^{good} food for bees and many other wild life. They give them energy or stored up food for hibernation. Also a berry plant would help small bugs and caterpillars have a shelter, they might make a nest on the bush or live on the leaves.

Ⓑ Other organisms in the forest help berry plants survive and grow. First of all earth worms in the soil help ^{decompose and} create nutrients and rich soil beneficial to the berry plant which needs nutrients to grow. Also animals in the forest give off carbon dioxide (CO_2) which the berry plant needs ^{in order} to do photosynthesis. Without photosynthesis the plant would have no glucose sugar for energy. There for living things in the forest are needed to help plants, and plants are needed to help animals in the forest!

2008 MCAS

Grade 8 Science and Technology/Engineering

Question 39 - Score Point 4

(A) One way berry plants help other organisms is food for animals. also berry plants give nutrients to other plants from the berries that dissolved into the ground.

(B) Other organisms in the forest help the berry plant spread the seeds by eating them and dropping them far away to make new berry plants. Also other organisms help the plant get food by dying next to the plant or leaving behind droppings that the plant could use as nutrients.

2008 MCAS

Grade 8 Science and Technology/Engineering

Question 39 - Score Point 3

Ⓐ Berry plants help organisms in the forest survive and grow. One way it does this is by feeding organisms, so they don't die of hunger. Another way it helps organisms is by nourishing them, so they can survive and reproduce.

Ⓑ Although berry plants help organisms survive, organisms help the berry plants survive as well. One way decomposers help, is by making the soil fertile. Another organism might pick up a berry, and drop a seed somewhere else, creating a new plant.

2008 MCAS

Grade 8 Science and Technology/Engineering

Question 39 - Score Point 2

A. The berries are food to some organisms.
The berry plants are shelter to some organisms.

B. Some organisms protect the plant from threats or harm that could happen to it.
Other organisms are the reason it still exist, but keeping it growing.

**2008 MCAS
Grade 8 Science and Technology/Engineering
Question 39 - Score Point 1**

a. One is that the berry plant
is a source of food for animals

b.

2008 MCAS

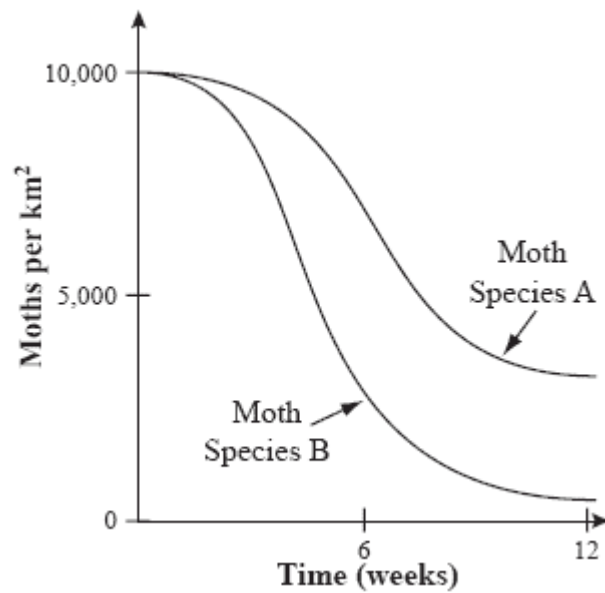
Grade 8 Science and Technology/Engineering

Question 39 - Score Point 0

A) The two different ways that the berry plants help some organisms in the forest survive and grow is if it rains and if the sun comes out. Those are two different ways.

B) The two different ways that other organisms in the forest help the berry plants survive and grow is if the soil is good and water every day that can help the berry plants survive and grow.

Q. The praying mantis is a predatory insect that often eats moths. The graph below shows the relative numbers of two species of moths over 12 weeks after the introduction of the predatory praying mantis. (LS #13)

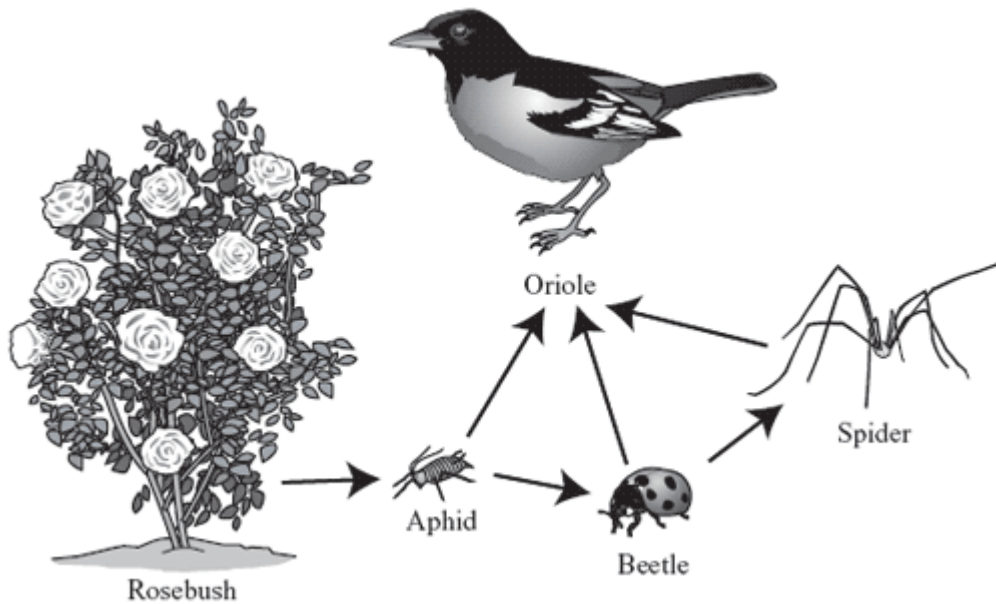


What characteristic of this ecosystem is **best** indicated from this graph?

- A. Species B was preferred as food over species A.
- B. Species B may replace species A in this environment.
- C. Species B will reproduce more rapidly than species A.
- D. Species B was more abundant at the beginning of this time period than species A.

**For this question, show students samples of released student work (remove the scores before giving students the sample work) and have them score the samples using the rubric provided. This will help students understand how open-ended questions on the MCAS test are scored. (see appendix)

**Q. The organisms in an ecosystem interact in many ways to survive. For example, a rosebush, aphids, beetles, spiders, and orioles all interact in a rosebush ecosystem. The diagram below shows how these organisms interact in a partial food web. (LS #14)



- Identify the producer organism in this food web. Explain the reasoning for your answer.
- Identify the primary consumer organism in this food web. Explain the reasoning for your answer.
- Describe what would **most likely** happen to each of the other organisms in the food web if the beetle population were suddenly destroyed. Explain the reasoning for your answer for each organism.

Scoring Guide and Sample Student Work

Select a score point in the table below to view the sample student response.

Score	Description
4	The response demonstrates a thorough understanding of the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web. The response correctly identifies the producer and provides a clear explanation for the answer. The response correctly identifies the primary consumer and provides a clear explanation for the answer. The response also clearly describes what would most likely happen to each of the other organisms in the food web if the beetle population were suddenly destroyed.
4	
3	The response demonstrates a general understanding of the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
2	The response demonstrates a limited understanding of the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
1	The response demonstrates a minimal understanding of the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

Note: There are 2 sample student responses for Score Point 4.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 37 - Score Point 4

- a.) The producer organism in this food web is the rosebush. It is the base of the food web because ^{as a plant,} it produces its own food, and then serves as the primary source of energy for the other organisms.
- b.) The primary consumer in this food web is the Aphid. It is the consumer that feeds off the producer, the rosebush. Since it's the only herbivore, everything else would die if it wasn't there, because the other organisms are primarily ^{eating} carnivores, who wouldn't be able to obtain energy from the rosebush.
- c.) If the beetle population was destroyed, the spider population would soon follow, because in this food web, the only source of food for the spider is the beetle. The Oriole would have lost two of its three food sources, and would have to live off only the Aphids, which would decrease the population of orioles. The Aphids, having lost the beetle as one of their two predators, would have a(n) increase in population until the spider dies off, and the Orioles come looking for them as food. The rosebush would be devoured by the sudden increase of the Aphid population, then begin to grow back as the Aphid population becomes the primary food source of the Orioles.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 37 - Score Point 4

- A.) The producer in the food web is the rosebush. The rosebush is the producer because it makes its own food and is the basis of the entire food web.
- B.) The primary consumer in this food web is the aphid. It consumes producers and is an herbivore.
- C.) If the beetle population were suddenly destroyed it would affect the entire ecosystem. The most severe thing that would happen is the spider population would die off. This is because the spiders are secondary consumers and their only source of food are the beetles. It would affect the Oriole in the sense that 2 of its 3 sources of food would be gone. With both the beetles and spiders gone it could only eat aphids. There wouldn't be enough food so some Orioles would die of starvation. This would affect the aphids because they would be eaten more than before so their population would decrease. With less aphids there would be a surplus in rosebushes, but that's not good because no one else eats them. If the beetles suddenly were not there the entire ecosystem and food web would be changed for the worst.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 37 - Score Point 3

A. In this diagram, the Rosebush is the producer organism. It's at the bottom of this food chain, because it gets eaten; it doesn't eat another one. The rosebush, is really what starts the food web.

B. The primary consumer in this diagram is the Oriole. It's like the opposite of the rosebush. It eats almost everything there, except for the bush. All the arrows (almost all) point to it, and the oriole doesn't get eaten by any other organism in the food web. It's the predatory that gets the aphid, beetle, and spider. The Oriole is the last animal in this food web.

C. The whole food web would go completely wrong if you were to take the beetle out of it. The Aphids would overpopulate because the beetles used to eat them, but there not there now, the spiders wouldn't be seen around there that much either. The beetle is pretty-much the only thing that spiders eat in this chain. If you take away their primary food supply, then they'll starve, and eventually die off. All the aphids around, would destroy all the rose bushes, because now there would be more aphids to eat them. Last the Oriole would lose two of its prey, so orioles would die off just like the spiders. The web would be destroyed.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 37 - Score Point 2

(A) The producer in this system is the rose bush that feeds the aphids that feed the beetles that feed the spiders that all feed the orioles.

(B) The primary consumer is the orioles because they eat all three types of bugs.

(C) If the beetle population got destroyed then the aphid population would increase and the spider population would decrease. This would cause more rose bushes to be eaten and die. With two of the three insects the orioles eat gone, they would start dying too because they would only have one third of the food they had before.

2007 MCAS

Grade 8 Science and Technology/Engineering

Question 37 - Score Point 1

- a. The rose bush, they all eat it.
- b. the Oriole. it eats everything
- c. the spide would get hungry and die out. and the Aphid would become abundant

2007 MCAS

Grade 8 Science and Technology/Engineering

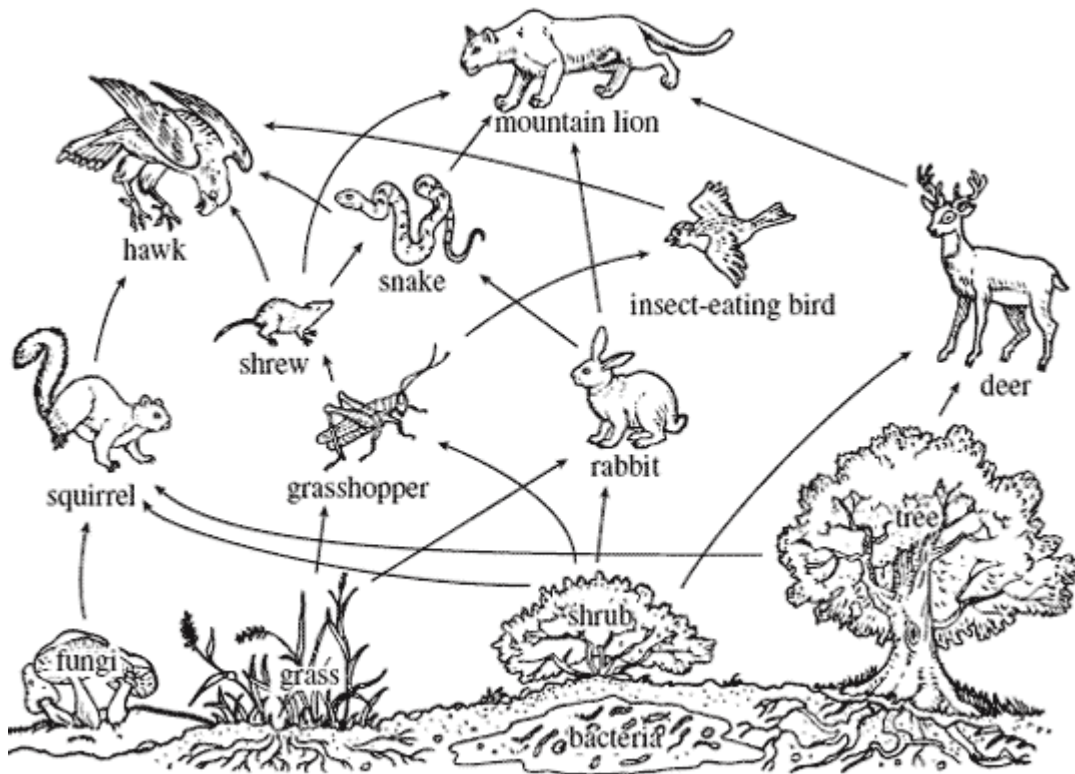
Question 37 - Score Point 0

a. The aphid, beetle, spider, and Oriole could eat the rose bush.

b. The Rose Bush might not be healthy for the creatures.

c. Most likely the other creatures would need help from beetles. It would be bad if beetles were destroyed.

Q. The diagram below shows a food web. (LS #14)



Members of this forest community get materials they need to survive from the ecosystem. These materials are constantly being recycled.

- Explain the role of grass in this food web, and include in your response why it is at the bottom of the web.
- What is the role of the grasshopper in this food web?
- Explain what would happen to the population of snakes if the rabbits were suddenly removed from this ecosystem.
- Explain what would happen to the grasshopper population if the insect-eating birds were suddenly removed from this ecosystem.

2005 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 4

A.) The role of the grass is the producer, and it's at the bottom of the web, because it's not consuming anything, only producing so that other animals can eat it.

B.) The role of the grasshopper is a first level consumer, because it's directly eating the producers, like the grass and shrubs, and not eating any other animal.

C.) If the rabbit were suddenly removed from the ecosystem, the snake's food source would decrease because the snakes feed directly off the rabbit in the food web. Even though the snakes could still feed off the shrew, there still wouldn't be enough food for all the snakes, so some could die.

D.) If the insect-eating bird were suddenly removed from the population, then the grasshopper population would be able to thrive more, since there wouldn't be as many animals consuming it. Even though the shrew would still be consuming it, the grasshoppers would still have a greater population.

2005 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 3

A= the role of grass in this food web is to be a producer and get eaten by the grasshopper and the rabbit so they can get eaten by other things. the reason it's at the bottom of the web is because it is a producer, not a consumer.

B= The role of the grasshopper is to eat the grass then get eaten by the insect eating bird and the shrew.

C= The snakes would die more often from hunger and fight over food in the form of the shrew.

D= The grasshoppers would thrive and have less worries about getting eaten.

2005 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 2

A, Grass is important because grasshoppers live in there and without grass there might not be grass hoppers and without grasshoppers there would be no shrew and without shrew there would not be that many hawks

B. The grasshopper eats grass so it can be eaten by the shrew.

C. The snake would have to eat just the shrew and then the hawk would just have to eat the squirrel. The snakes will also decrease.

D. If that happened the hawks would ~~decrease~~ decrease and the grasshopper would increase.

2005 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 1

A. The roll of the grass is that every live thing eats it for instant grasshopper rabbit.

B. The toll of the grasshopper is the insect-eating birds prey.

C. Some of the snakes would be extinct.

D. There would be more grasshopper around the world.

2005 MCAS

Grade 8 Science and Technology/Engineering

Question 19 - Score Point 0

If you pay close attention grass grows on it own, but not really it grows from the roots and the soil that why it at the bottom because it grows from the bottom grasshoppers wouldn't survive if there wasn't grass. I say this because there role is living on grass and eating it. just like if rabbits died or was removed snakes wouldn't live long because snakes eat rabbits. Also grasshopper eat insect-eating birds so if they were removed from the ecosystem they wouldn't be able to live either.

Big Idea: Dead plants and animals are broken down by other living organisms/ Plantas y animales muertos se descomponen por otros organismos vivos

Massachusetts Science and Technology/Engineering Standards

LSS #15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.

MCAS item analysis (what do students need to be able to do)

- ✓ Identify organism responsible for decomposition
- ✓ Identify and match a role to an organism
- ✓ Identify and match a description to a role
- ✓ Explain how removal of decomposers affect an ecosystem

Guiding Questions: What happens during decomposition? What organisms are responsible for decomposition?/ ¿Qué sucede durante la descomposición? ¿Qué organismos son responsables de la descomposición?

Engage:

- Classroom demonstration of decomposition. In a closed glass container add some food scraps to some soil, and allow students to observe the food scraps breaking down over time. http://www.bottlebiology.org/investigations/decomp_main.html
<http://aggie-horticulture.tamu.edu/extension/compostfacility/les14.htm>

*Work collaboratively with peers when using technology in the classroom.
(W.5.3)

- Students design an experiment of compare and contrast decomposition of food scraps with and without worms (some students may be doing this in their ecosystems).
*Participate in classroom discussions and other academic interactions, using basic and complex sentence structures and addressing abstract topics.
(S.3.65)

Explore:

- Read Aloud and discuss the role of bacteria in the environment, page 56, Prentice Hall Science Explorer: *From Bacteria to Plants*. Students record notes about the role of bacteria in their science notebooks.

*Use knowledge of text features to determine purpose and meaning of text.
(R.5.9; link to ELA 13.18)

- Classroom discussion: What would happen to all the trash people generate if there were no decomposing bacteria in the soil?
*Support a conclusion or finding by stating facts or logical reasons. (S.3.64)

Explain:

- Formative Assessment: Explain why it is important that dead animals and plants in an

ecosystem are broken down.

*Support a conclusion or finding by stating facts or logical reasons. (S.3.64)

Extend:

- Students read about the organisms (bacteria, fungi, and worms) that are responsible for decomposition (see appendix and/or the following website)

<http://www.nhptv.org/NatureWorks/nwep11b.htm>

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

*Work collaboratively with peers when using technology in the classroom. (W.5.3)

- This video segment from Interactive NOVA: "Earth" describes the role of decomposers in the living world.

<http://www.teachersdomain.org/resource/tdc02.sci.life.oate.decompose/>

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

- For a graphic display about the composition of American garbage go to

<http://www.gmushrooms.com/MushroomInformation/Composting.htm>

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

- Bacteria Lab Demonstration: Create a **Winogradsky Column**, to demonstrate the growth of microorganisms in a column of mud. The columns are complete, self-contained recycling systems, driven only by energy from light! The column is not a natural environment. All of the organisms are mixed during the preparation and it is merely to study environments that develop over time. When it is sealed and exposed to light, a succession of microbes will develop according to the concentrations of oxygen, nutrients and light available. Depending on the various concentrations of nutrients and the type of soils used, a variety of bacteria will appear over time. However, it is an excellent model of microbial ecology. Each organism is dependent on the other to set the conditions for development and the entire column is run on the energy of light. The Winogradsky Column is a classic demonstration of the metabolic diversity of prokaryotes. Examine the columns weekly for at least a month, recording changes in color and depth as they occur. (see appendix)

<http://www.biology.ed.ac.uk/research/groups/jdeacon/microbes/winograd.htm>

http://quest.arc.nasa.gov/projects/astrobiology/fieldwork/lessons/Winogradsky_5_8.pdf

*Identify important information about academic content, using prior knowledge and/or visual cues as needed (S.3.9; link to ELA 8.5)

Evaluate: (MCAS released questions)

Q. Lightning from a thunderstorm strikes a tree that falls to the forest floor and dies. During the next few years the dead tree undergoes many changes. (LS # 15)

What organisms are **most likely** responsible for the biological and chemical changes to the tree?

- A. consumers
- B. decomposers
- C. predators
- D. producers

Q. Which of the following **best** describes a role of mushrooms in ecosystems? (LS #15)

- A. capturing energy from sunlight
- B. consuming living plant material
- C. taking energy from animal hosts
- D. breaking down dead plant material

Q. The complete removal of decomposers from an ecosystem will have the **greatest** effect on which of the following?

- A. the spread of disease
- B. the availability of water
- C. the recycling of nutrients
- D. the distribution of organisms

Ecosystem Project

Lesson Content Goal: Study and analyze a specific ecosystem over time (aquarium, terrarium, eco-bottle, etc.)

Guiding Question: How do organisms interact in an ecosystem?/ ¿Cómo los organismos interactúan en un ecosistema?

Ecosystems

- a. Students plan how to construct their ecosystems
- b. Students note materials needed to build their ecosystems
- c. Students must obtain teacher approval, before building their ecosystems
- d. Students observe, collect data, take notes and make drawings of their habitats on a weekly basis
 - *Organize information to be expressed in writing in a way that makes sense for the purpose and audience (W.1.3; link to ELA23.2)
- e. At the end of this unit, students make an oral presentation about their ecosystems.
 - *Plan, rehearse, and orally present information in a brief report, using visual cues. (S.4.2)
 - *Create presentations using computer technology (W.5.7; link to ELA 27.2)
 - *Support a conclusion or finding by stating facts or logical reasons. (S.3.64)

Student Resources:

Bottle Biology: An idea book for exploring the world using soda bottles and other recyclable materials, Second Edition, Kendall/Hunt Publishing Company, 2003.

Website: <http://www.learner.org/channel/courses/essential/life/bottlebio/ecocol/>

Students use their notes and observations to:

Create a poster, Power Point presentation, or pamphlet that must include:

- What an ecosystem is
- Complete list of all the organisms in their ecosystem
- The name of the Kingdom of each organism in their ecosystem
- Students construct a table of the organisms in their ecosystem and identify the organisms as producers, consumers (herbivore, carnivore, omnivore, or scavenger), or decomposers (bacteria).
- A diagram of the food web between the organisms in their ecosystem (including energy flow with arrows)
- Students must present their findings to their classmates orally using some type of visuals.
- Students must write a reflection about their ecosystem. They must answer the following questions: What other things are you still wondering about? Are there any new questions you have about your ecosystem or next steps you would like to investigate? *(The purpose of the reflection is to get students to focus on what they learned, not what they liked or didn't like about the investigation or how they felt about working with other members of the group.)*

