Grade 6

Unit 3 & 4—Diversity of Life & Interdependence (FOSS® Populations and Ecosystems)

Essential Questions:
- **How does the transfer of matter and energy through biological communities support diversity of living things?**
- **How is interdependence essential in maintaining life on earth?**

Expanded Process Skills: *quoted from the NYS Core Curriculum (**Note:** Correlation is provided at the "Investigation" level.)*

Standard 6 – Interconnectedness: Common Themes

Key Idea 1 – Systems Thinking

ICT1.2 Describe the differences and similarities between dynamic systems and organizational systems.

ICT1.4 Describe how the output from one part of a system (which can include material, energy, or information) can become the input to the other parts.

Key Idea 2 – Models

ICT2.1 Select an appropriate model to begin the search for answers or solutions to a question or a problem.

ICT2.2 Use models to study processes that cannot be studied directly (e.g., when the real process is too slow, too fast, or too dangerous for direct observation).

ICT2.3 Demonstrate the effectiveness of different models to represent the same thing and the same model to represent different things.

Key Idea 4 – Equilibrium and Stability

ICT4.1 Describe how feedback mechanisms are used in both designed and natural systems to keep changes within desired limits.

Key Idea 5 – Patterns of Change

ICT5.1 Use simple linear equations to represent how a parameter changes with time.

ICT5.2 Observe patterns of change in trends or cycles and make predictions on what might happen in the future.

Key Idea 6 – Optimization

ICT6.1 Determine the criteria and constraints and make trade-offs to determine the best decision.

ICT6.2 Use graphs of information for a decision-making problem to determine the optimum solution.

Standard 7 – Interdisciplinary Problem Solving

Key Idea 1 – Connections

IPS1.3 Design solutions to real world problems of general social interest related to home, school, or community using scientific experimentation to inform the solution and applying mathematical concepts and reasoning to assist in developing a solution.

Grade 6

General Skills: *quoted from the NYS Core Curriculum (Note: Correlation is provided at the "Investigation" level.)*

1. Follow safety procedures in the classroom and laboratory.
2. Safely and accurately use the following measurement tools: metric ruler, balance, graduated cylinder, thermometer.
3. Use appropriate units for measured or calculated values.
4. Recognize and analyze patterns and trends.
6. Develop and use a dichotomous key.
7. Sequence events.
8. Identify cause-and-effect relationships.
9. Use indicators and interpret results.

Living Environment Skills: *quoted from the NYS Core Curriculum (Note: Correlation is provided at the "Investigation" level.)*

1. Manipulate a compound microscope to view microscopic objects.
2. Determine the size of a microscopic object using a compound microscope.
6. Classify living things according to a student-generated scheme and an established scheme.
7. Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.
9. Identify structure and function relationships in organisms.

Physical Setting Skills: *quoted from the NYS Core Curriculum (Note: Correlation is provided at the "Investigation" level.)*

1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.
5. Use a magnetic compass to find cardinal directions.
   (Kit Option: see FOSS® *Weather & Water*, Investigation 1, Part 2: Local Weather)
6. Measure the angular elevation of an object, using appropriate instruments.
7. Generate and interpret field maps including topographic and weather maps.
   (Kit Option: see FOSS® *Weather & Water*, Investigation 9, Part 2: Air Masses and Weather Maps)

Major Understandings: *quoted from NYS Performance Indicator (Note: Correlation is provided at the "Lesson" level, i.e., Investigation & Part.)*

LE 1.1 Compare and contrast the parts of plants, animals, and one-celled organisms.

1.1a Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size.

1.1b The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.

1.1c Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus.

1.1d Some organisms are single cells; others, including humans are multicellular.

1.1e Cells are organized for more effective functioning in multicellular organisms. Levels of organization for structure and function of a multicellular organism include cells, tissues, organs, and organ systems.

1.1f Many plants have roots, stems, leaves, and reproductive structures. These organized groups of tissues are responsible for a plant's life activities.

1.1g Multicellular animals often have similar organs and specialized systems for carrying out major life activities.

1.1h Living things are classified by shared characteristics on the cellular and organism level. In classifying organisms, biologists consider details of internal and external structures. Biological classification systems are arranged from general (kingdom) to specific (species).

Grade 6

LE1.2 Explain the functioning of major human organ systems and their interactions.

1.2e The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy.

LE 3.2 Describe factors responsible for competition within species and the significance of that competition.

3.2a In all environments, organisms with similar needs may compete with one another for resources.

LE 5.1 Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.

5.1a Animals and plants have a variety of body plans and internal structures that contribute to their ability to maintain a balanced condition.

5.1b An organism's overall body plan and its environment determine the way that the organism carries out the life processes.

5.1c All organisms require energy to survive. The amount of energy needed and the method of obtaining this energy vary among cells. Some cells use oxygen to release the energy stored in food.

5.1d The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.

5.1e Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy form both plants and animals. Decomposers such as bacteria and fungi, obtain energy by consuming wastes and / or dead organisms.

5.1f Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required for survival. Regulation includes a variety of nervous and hormonal feedback systems. (**Note:** Observed in Investigation 8: Adaptations, concept of 'regulation' not explained.)

5.1g The survival of an organism depends on its ability to sense and respond to its external environment.

LE 5.2 Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms.

5.2a Food provides molecules that serve as fuel and building materials for all organisms. All living things, including plants, must release energy from their food, using it to carry on their life process.

5.2b Foods contain a variety of substances, which include carbohydrates, fats, vitamins, proteins, minerals, and water. Each substance is vital to the survival of the organism.

5.2c Metabolism is the sum of all chemical reactions in an organism. Metabolism can be influenced by hormones, exercise, diet, and aging.

5.2d Energy in foods is measured in Calories. The total caloric value of each type of food varies. The number of Calories a person requires varies from person to person.

5.2e In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient based on species, size, age, sex, activity, etc. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state.

LE 6.1 Describe the flow of energy and matter through food chains and food webs.

6.1a Energy flows through ecosystems in one direction, usually from the Sun, through producers to consumers and then to decomposers. This process may be visualized with food chains or energy pyramids.

6.1b Food webs identify feeding relationships among producers, consumers, and decomposers in an ecosystem.

6.1c Matter is transformed from one organism to another and between organisms and their physical environment. Water, nitrogen, carbon dioxide, and oxygen are examples of substances cycled between the living and the nonliving environment.

Grade 6

LE 6.2 Provide evidence that green plants make food and explain the significance of this process to other organisms.

6.2a Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun's energy is converted into and stored as chemical energy in the form of sugar. The quantity of sugar molecules increases in green plants during photosynthesis in the presence of sunlight.

6.2b The major source of atmospheric oxygen is photosynthesis. Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis.

6.2c Green plants are the producers of food which is used directly or indirectly by consumers.

LE 7.1 Describe how living things, including humans, depend upon the living and nonliving environment for their survival.

7.1a A population consists of all individuals of a species that are found together at a given place and time. Populations living in one place form a community. The community and the physical factors with which it interacts compose an ecosystem.

Note: Standards met for 'living things' at Grade 6; expanded to 'humans' in Grade 7.

7.1b Given adequate resources and no disease or predators, populations (including humans) increase. Lack of resources, habitat destruction, and other factors such as predation and climate limit the growth of certain populations in the ecosystem.

Note: Standards met for 'living things' at Grade 6; expanded to 'humans' in Grade 7.

7.1c In all environments, organisms interact with one another in many ways. Relationships among organisms may be competitive, harmful, or beneficial. Some species have adapted to be dependent upon each other with the result that neither could survive without the other.

7.1d Some microorganisms are essential to the survival of other living things.

7.1e The environment may contain dangerous levels of substances (pollutants) that are harmful to organisms. Therefore, the good health of environments and individuals requires the monitoring of soil, air, and water, and taking steps to keep them safe.

LE 7.2 Describe the effects of environmental changes on humans and other populations.

7.2a In ecosystems, balance is the result of interactions between community members and their environment.

7.2b The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace others over time, resulting in long-term gradual changes (ecological succession).

7.2c Overpopulation by any species impacts the environment due to the increased use of resources. Human activities can bring about environmental degradation through resource acquisition, urban growth, land-use decisions, waste disposal, etc.

7.2d Since the Industrial Revolution, human activities have resulted in major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, or ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth's resources.

PS 1.1 Explain daily, monthly, and seasonal changes on Earth.

1.1i The tilt of the Earth's axis of rotation and the revolution of Earth around the Sun cause seasons on Earth. The length of daylight varies depending on latitude and season.
(Kit Option: see FOSS® Weather & Water Investigation 3, Part 2: Sun-Earth Systems)

PS 2.1 Explain how the atmosphere (air), hydrosphere (water), and lithosphere (land) interact, evolve, and change.

2.1b As altitude increases, air pressure decreases.
(Kit Option: see FOSS® Weather & Water Investigation 2, Part 2: Earth's Atmosphere)

Grade 6

PS 2.2 Describe volcano and earthquake patterns, the rock cycle, and weather and climate changes.

2.2j Climate is the characteristic weather that prevails from season to season and year to year.
(Kit & Blend Option: see FOSS® Populations & Ecosystems Investigation. 7: Ecoscenarios; Kit Option: see also FOSS® Weather & Water Investigation 9, Part 3: Climate)

2.2r Substances enter the atmosphere naturally and from human activity. Some of these substances include dust from volcanic eruptions and greenhouse gases such as carbon dioxide, methane, and water vapor. These substances can affect weather, climate, and living things.
(Kit Option: see FOSS® Weather & Water Investigation 1: What is Weather, Investigation 2: Where's the Air?, Investigation 7: The Water Planet)

PS 4.1 Describe the sources and identify the transformations of energy observed in everyday life.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.

PS 4.5 Describe situations that support the principle of conservation of energy.

4.5a Energy cannot be created or destroyed, but only changed from one form into another.

4.5b Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.

IMPORTANT NOTES

FOSS® Population and Ecosystems Multimedia:

The FOSS® CD-ROM based multimedia component is an integral part of the course. It may be accessed through your browser and Internet connection ***or*** using the CD-ROM installed on your computer. In either case you will need to use a large screen monitor or LCD projector when making presentations to the entire class.

It is essential that you review the installation requirements (Teacher Guide, CD-ROM User Guide pp. 475 – 506) check system requirements and necessary "plug-in" software, install the CD and review **ALL** interactive components **on the computer that you will be using in the classroom** (and have the installation completed on other computers (ex.: computer lab) PRIOR TO PRESENTING THE LESSON. Request local technical support to complete installation if you have problems. Emails for additional technical assistance requests should be sent through the link at the bottom of the FOSSweb Welcome Page (www.fossweb.com/index.php).

The Multimedia is used throughout the course and you will need to be able to switch between the variety of formats (VCR/computer) and decide how your students will best benefit from the different instructional formats (group instruction, computer lab, classroom computers, learning centers, reinforcement though home study).

In FOSS® Populations and Ecosystems the following types of multimedia will be used:

- Videos – showing population studies (Investigation 2: *Among the Wild Chimpanzees)* and providing virtual 'field trips' (Investigation 4: *Of Ice and Fire: A Portrait of Mono Basin,* Investigation 8: *Hawaii: Strangers in Paradise)* to enhance student awareness of the complex interaction between organisms and their environment.
- *A Multimedia video clip from the CD-ROM* (Investigation 8, Part 1) *(classroom projection suggested)*
- FOSS® CD-ROM / Multimedia Organism Database – used in Investigations 3, 4, 7 & 8
- FOSS® CD-ROM / Multimedia Ecoscenarios – used in Investigations 4 & 7 may be accessed from the CD, used online or printed for student use.

As an alternate or in addition to the CD-ROM, you may access the Multimedia via the Internet through the FOSS® website (www.fossweb.com/NYC/modules3-6/grade6.html). At the **Populations and Ecosystems** page click on the *Populations and Ecosystems Multimedia* link where you will register for a username and password that will be shared with your students and allow student access from any networked computer. Daily use of the Multimedia through the Internet is a great option if you have a reliable network connection. In other cases using the online Multimedia will be the preferred option for use in the computer lab.

You will need a **VCR and monitor** to view videos included in this kit (*Among the Wild Chimpanzees; Of Ice and Fire: A Portrait of Mono Basin; Hawaii: Strangers in Paradise.) (DVDs are not currently available for these titles.)*

IMPORTANT NOTES

Homework / Extra Practice for FOSS® Populations and Ecosystems:

Homework for the Middle School FOSS® modules can take a variety of forms. Throughout the unit specific homework is assigned as a step in "*Guiding the Investigation.*" The teacher may decide to assign readings for homework as prompted at the end of an investigation to support and extend experiment content. The readings and/or the questions posed after the readings, reflections in student notebooks and FOSS® Response Sheets can all be used as homework. Other suggestions for extra practice with challenging concepts are included in the "*Extending the Experience*" section of some investigations.

Extending the Experience: Consider these enrichment activities AT ANY TIME DURING THE MODULE. These experiences that follow many investigations may be suitable for enrichment, homework or for a lesson plan to be delivered by a substitute teacher when a hands-on investigation may not be appropriate.

Science Materials Supplied by the Teacher/School for FOSS® Weather & Water:

The FOSS® Middle School modules are designed to be used in classrooms where a teacher sees several sections of students working on the same unit of study each day. Typically this takes place in the "science lab" (See Materials section of the Teacher Guide, pp. 25-32.) The kit provides consumable equipment for five classes of 32 students. Teachers using this unit will have consumable materials for 160 student uses. Materials supplied by the teacher (listed on p. 28) include common classroom supplies, perishable materials and science equipment frequently found in the middle school setting. Review this list to determine if you need any additional materials.

The section of this Planning Guide called **"Science Materials Supplied by the Teacher"** details the equipment, tools, resources and other significant items needed for the daily lesson. It does not include common classroom supplies like paper, pencils, marking pens, staplers, etc.

Time on Task in FOSS® Populations and Ecosystems:

- For YEAR ONE of the new Science Curriculum adoption the 6th grade Planning Calendar has been designed to incorporate **all** parts of the curriculum into the classroom instruction time. Specific comments have been added to note portions of investigations that may be moved out of direct instruction time and used as reinforcement (as homework or at the teacher's discretion). It is recommended that teachers modulate the use of the variety of instructional experiences to address student learning styles, classroom management and student interest. *As noted on p. 24 of the Teacher Guide, the first time user of the FOSS® Populations and Ecosystems Course is encouraged to follow the path of the Teacher Guide. In future years, modifications that will enhance student understanding will be well grounded in curriculum objectives and teacher experiences.*
- Students new to the FOSS® Middle School modules benefit from the initial use of the Student Resource Book during class time. Spend some time with students examining the format of the Resource Book as it differs from the traditional textbook format with which they are familiar. As you proceed through the course, you will be reminded in the Teacher Guide that you will need to decide whether to assign the reading and questions as homework or devote class time to the reading.

Grade 6

IMPORTANT NOTES

Full Kit and Blend Option Schools using FOSS® Populations & Ecosystems:

- The anticipated 2008 calendar year benchmark for Blend Option Schools for the beginning of Unit 3 is January 29.
- Full Kit Option schools should continue with the Unit 2 FOSS® Weather and Water Planning Guide Lessons 38 through 52 (Investigations 8 & 9) to complete the course.
- The YEAR ONE ADOPTION benchmark for Full Kit Option Schools for the beginning of Unit 3 is February 25.
- **Note that preparation notes for Units 3 & 4: FOSS® Populations and Ecosystems are included in the "Advance Planning/Notes to Teachers" of the Full Kit Option Unit 2: FOSS® Weather & Water Planning Guide**

Consult FOSS® Populations and Ecosystems Teacher Guide – Materials, Living Organisms p. 31

- Locate Living Materials Cards, Part Nos. 270-4380 (Milkweed Bugs) and 270-4379 (Mini ecosystem organisms) shipped to your school with the kits.
- Plan to order Milkweed bugs so they arrive 7–10 days before you begin Populations and Ecosystems Investigation 1: Milkweed Bugs. Allow 4 weeks for delivery.
- Plan for arrival and care of milkweed bugs, see TG p. 39; or follow the link **http://www.fossweb.com/modulesMS/PopulationsandEcosystems/index.html**
- Plan to order Mini Ecosystem Organisms so they arrive a few days before you begin Populations and Ecosystems Investigation 3: Mini ecosystems. Allow 4 weeks for delivery.
- Plan for arrival and care of mini ecosystem terrestrial and aquatic organisms, see TG pp. 86-88; or follow the link **http://www.fossweb.com/modulesMS/PopulationsandEcosystems/index.html**

Grade 6

	Est. date Blend: Jan 29	Est. date Kit: Feb 25	
WEEK 1	**Lesson 1** (45 min) **Objective(s):** Pre-assessment	**Alignment with NYS Core Curriculum:** • Expanded Process Skills: ICT • Interdisciplinary Problem Solving • General Skills: • Living Environment Skills • Physical Setting Skills: • Living Environment: • Physical Science:	
	Advanced Planning/ Notes to Teacher – Teacher Guide, Assessment, pp. 403-407, 440-444 (omit pp. 445-446) – Teacher Guide Overview, pp. 1-24 taking note of p. 12 Reading & Writing in Science p. 14 Management Strategies p. 18 Using FOSS® Technology p. 19 Classroom Safety p. 20 Populations & Ecosystems Course Matrix – Teacher Guide Materials, pp. 25-32 taking note of p. 28 Materials Supplied by the Teacher p. 29 Preparation (omitting references to Inv. 9 & 10) p. 31 Living Organisms	**Investigation/Activity** Administer Pretest: Summative Assessment TG pp. 459-463 (omit pp. 464-465). **Omit Exam Questions # 3, 7, 21, 22, 23 pertaining to Investigations 9 & 10**	**Science Materials Supplied by the Teacher** **AV Equipment** Determine the Multimedia set-up that best fits your classroom setting. See FOSS® Populations & Ecosystems Teacher Guide, page 18.

WEEK 1 (continued)

Lesson 2 (45 min) Investigation 1: 1 of 3 sessions plus ongoing observations

Objective(s):

Content Support NOTE: Teachers may wish to add direct instruction on the definition and characteristics of "living things." (NYSCC Standard LE 1.1a)

Content

- An organism is any living thing.
- An organism's habitat is where it lives — the place where it can meet all of its requirements for life.

Process / Conducting Investigations

Observe adult milkweed bugs to determine gender differences.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT2.1, ICT2.2
- Interdisciplinary Problem Solving
- General Skills: 1
- Living Environment Skills: 9
- Physical Setting Skills:
- Living Environment: 1.1g, 1.1h
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 33-40 taking note of:
pp. 34-35 Inv. 1 "At A Glance"
p. 39 Milkweed Bugs in the Classroom
p.40 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 41-43 taking note of:
pp. 42 Step 1. Putting Milkweed Bugs in Holding Habitat
pp. 42 Step 2. Put Bugs in Petri Dishes

– Teacher Guide, Assessment, pp. 403-409

Investigation/Activity

Investigation 1: *Milkweed Bugs Part 1: Introducing Milkweed Bugs, Steps # 1-12*

– Teacher Guide pp. 44-46
– Student Lab Notebook, p. 1
Teacher Answer Master, p. 377
– Transparency No.1
– Assessment Chart for Investigation 1-4, p. 447

NOTE: Teachers of Special Needs students may wish to download the Investigation Duplication Masters from the FOSS® Grade 1-2 module "Insects" for a life cycle poster of the Milkweed Bugs. This poster may be used to create templates for students with limited motor skills. Follow the link: http://lhsfoss.org/fossweb/teachers/parents/dupmasters.php to register with the website and access Investigation Duplication and Assessment Master PDF files. (These files are not currently available via a direct link on the NYC FOSSweb.)

Science Materials Supplied by the Teacher

Milkweed Bugs (adult)
Cardboard, 15 x 30 cm
Transparent tape

AV Equipment

- Extension cord
- Overhead projector

Grade 6

WEEK 1 (continued)

Lesson 3 (45 min) Investigation 1: 2 of 3 sessions plus ongoing observations

Objective(s):

Content

An organism's habitat is where it lives — the place where it can meet all of its requirements for life.

Process

Construct a habitat suitable for raising milkweed bugs.

Building Explanations

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT2.1, ICT2.2, ICT6.1
- Interdisciplinary Problem Solving:
- General Skills: 1,
- Living Environment Skills
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 33-40 taking note of:
pp. 34-35 Inv. 1 "At A Glance"
p. 39 Milkweed Bugs in the Classroom

– Teacher Guide Materials & Getting Ready, pp. 47-50 taking note of
p. 50 Step 8. Think About Classroom Temperature

– Teacher Guide, Assessment, pp. 403-409

Investigation/Activity

Investigation 1: *Milkweed Bugs* Part 2: *Milkweed Bug Habitat, Steps # 1-6*

– Teacher Guide pp. 51-54
– Student Lab Notebook, p. 2-4
– Transparency No. 2-4 – A Habitat for Milkweed Bugs
– Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide. p. 408

Science Materials Supplied by the Teacher

Milkweed Bugs (adult)
Twigs (20-30 cm long)
Cardboard 15 x 30 cm
Sharpened Pencil
Water source
Permanent marking pens
String/clothesline (see p. 54)

If needed (see p. 50):
– Cardboard box
– 60 watt lamp

AV Equipment
- Extension cord
- Overhead projector

WEEK 1 (continued)

Lesson 4 (45 min) Investigation 1: 3 of 3 sessions plus ongoing observations

Objective(s):

Content

A kind of organism that is different from all other organisms is called a species.

Process/Conducting Investigations

Monitor events and changes that yield information about milkweed bug reproduction.

Building Explanations

Describe the sequence of changes that constitute the milkweed bug's life cycle.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, ICT2.1, 2.2, 2.3, ICT5.2
- Interdisciplinary Problem Solving
- General Skills: 1, 4, 7, 8,
- Living Environment Skills: 9
- Physical Setting Skills:
- Living Environment: LE 1.1g, 1.1h, 3.2a, 5.1a, 5.1c, 5.1d, 7.1b,
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 33-40 taking note of:
pp. 34-35 Inv. 1 "At A Glance"
p. 39 Milkweed Bugs in the Classroom

– Teacher Guide Materials & Getting Ready, pp. 55-56
taking note of
p. 56 Step 1. Plan Timing
Refer to p. 38 to plan approximate time intervals between development stages

– Teacher Guide, Assessment, pp. 403-409

Investigation/Activity

Investigation 1: *Milkweed Bugs* Part 3: *Observing Milkweed Bug Habitats, Steps # 1-11*

– Teacher Guide pp. 57-60
– Student Lab Notebook, pp. 6-7
– Transparency No.5 – Milkweed Bug Changes
– Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide. p. 408

– *FOSS® Populations and Ecosystems Resource Book: Milkweed Bugs*, pp. 3-5

Extending the Experience: Teacher Guide p. 60
Enrichment activities may be considered AT ANY TIME DURING THE MODULE. These experiences that follow many investigations may be suitable for inclass enrichment, homework or for a lesson plan to be delivered by a substitute teacher when a hands-on investigation may not be appropriate.

– Consider maintaining a Milkweed Bug colony.

Science Materials Supplied by the Teacher

Cardboard, 15 x 30 cm
Transparent tape

AV Equipment

- Extension cord
- Overhead projector

WEEK 1 (continued)

Planning Milkweed Bug Observations: (5-15 min)

Events including (but not limited to): onset of mating, egg laying, egg hatching, molting and instars, population changes, interactions, and maintenance activities should be recorded as accurately as possible.

Lesson 5 (45 min) Investigation 2: 1 of 4 sessions

Objective(s):

Content

- An individual is one single organism.
- A population is all of the individuals of one kind (one species) in a specified area at one time.
- A community is all the interacting populations in a specified area.
- An ecosystem is a system of interacting organisms and nonliving factors in a specified area.

Process / Conducting Investigations

Analyze and sort images on cards to determine which represent individuals, populations, communities, and ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE7.1a,
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 61-69 taking note of:
pp. 62-63 Inv. 2 "At A Glance"
p. 67 The Ecology Vocabulary

– p. 69 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 70-71
taking note of
p. 71 Step 1. Prepare Sorting Cards

– Teacher Guide, Assessment, pp. 410-412

Investigation/Activity

Investigation 2: *Sorting Out Life* Part 1: *Ecosystem Card Sort, Steps # 1-7*

– Teacher Guide pp. 72-75
– Student Lab Notebook, pp. 8, 11
Teacher Answer Master p. 378-379, 380
– Transparency No.6 – Ecosystem Definitions
– Assessment Chart for Investigation 1-4, p. 447

Science Materials Supplied by the Teacher

Chart Paper
Marking pens
Tape

AV Equipment

- Extension cord
- Overhead projector

NOTE: Read ahead through Lesson 12 and prepare for care of organisms during Winter Break.

Note for 2007-2008 Pilot Year:

Opportunities to meet and extend the Living Environment Skills Standards for use of the compound microscope, and the Living Environment Standards LE 1.1a through 1.1h are found throughout the FOSS® Populations and Ecosystems course, particularly in Investigations 1, 2, 3 and 4. Reference should be made to the standards cited in the introductory pages of the Planning Guide.

Student prior knowledge may lead teachers to address these content standards using direct instruction. Additional lessons to support direct instruction will be available for 2008-2009.

WEEK 2

Lesson 6 (45 min) Investigation 2: 2 of 4 sessions

Objective(s):

Content

- An individual is one single organism.
- A population is all of the individuals of one kind (one species) in a specified area at one time.
- A community is all the interacting populations in a specified area.
- An ecosystem is a system of interacting organisms and nonliving factors in a specified area.
- Biotic factors are living elements in an ecosystem; abiotic factors are nonliving elements.

Process / Conducting Investigations

Analyze and sort images on cards to determine which represent individuals, populations, communities, and ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE7.1a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 61-69 taking note of:
pp. 62-63 Inv. 2 "At A Glance"
p. 67 The Ecology Vocabulary

– p. 69 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 70-71
taking note of
p. 71 Step 1. Prepare Sorting Cards

– Teacher Guide, Assessment, pp. 410-412

Investigation/Activity

Investigation 2: *Sorting Out Life Part 1: Ecosystem Card Sort, Steps # 8-15*

- Teacher Guide pp. 73-75
- Student Lab Notebook, p. 8, 11
  Teacher Answer Master p. 378-379, 380
- Transparency No.6 – Ecosystem Definitions
- Assessment Chart for Investigation 1-4, p. 447

- *FOSS® Populations and Ecosystems Resource Book: Life in a Community* pp. 6-7

Science Materials Supplied by the Teacher

Chart Paper
Marking pens
Tape

AV Equipment

- Extension cord
- Overhead projector

WEEK 2 (continued)

Lesson 7 (45 min) Investigation 2: 3 of 4 sessions

Objective(s):

Content

- An individual is one single organism.
- A population is all of the individuals of one kind (one species) in a specified area at one time.
- A community is all the interacting populations in a specified area.
- An ecosystem is a system of interacting organisms and nonliving factors in a specified area.
- Biotic factors are living elements in an ecosystem; abiotic factors are nonliving elements.

Process / Conducting Investigations

Identify biotic and abiotic elements in an ecosystem.

Building Explanations

Explain the defining characteristics of and individual, population, community, and ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 2.1, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1.4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1d, 5.1e, 5.1g, 7.1a, 7.1b, 7.1c, 7.2a, 7.2b
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 61-69
taking note of:
pp. 62-63 Inv. 2 "At A Glance"
p. 67 The Ecology Vocabulary

– p. 69 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 76-77
taking note of
p. 77 Step 1. Arrange for Video Viewing

– Teacher Guide, Assessment, pp. 410-412

Investigation/Activity

Investigation 2: *Sorting Out Life Part 2: Video Population Study, Steps # 1-5*

– Teacher Guide pp. 78-79

– Student Lab Notebook, p. 13
Teacher Answer Master, p. 381

– Video: *Among the Wild Chimpanzees*

– Assessment Chart for Investigation 1-4, p. 447
Assessment Master, Mid-Summative Exam 1-2, pp. 450-451
Assessment Scoring Guide. p. 412

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- VCR with monitor

WEEK 2 (continued)

Lesson 8 (45 min) Investigation 2: 4 of 4 sessions

Objective(s):

Content

- An individual is one single organism.
- A population is all of the individuals of one kind (one species) in a specified area at one time.
- A community is all the interacting populations in a specified area.
- An ecosystem is a system of interacting organisms and nonliving factors in a specified area.
- Biotic factors are living elements in an ecosystem; abiotic factors are nonliving elements.

Process

Identify biotic and abiotic elements in an ecosystem.

Building Explanations

Explain the defining characteristics of an individual, population, community, and ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 2.1, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1d, 5.1e, 5.1g, 7.1a, 7.1b, 7.1c, 7.2a, 7.2b
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 61-69
taking note of:
pp. 62-63 Inv. 2 "At A Glance"
p. 67 The Ecology Vocabulary

– p. 69 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 76-77
taking note of
p. 77 Step 1. Arrange for Video Viewing

– Teacher Guide, Assessment, pp. 410-412

Investigation/Activity

Investigation 2: *Sorting Out Life* Part 2: *Video Population Study, Steps # 6-9*

– Teacher Guide pp. 78-79

– Student Lab Notebook, p. 13
Teacher Answer Master p. 381

– Video: *Among the Wild Chimpanzees*

– Assessment Chart for Investigation 1-4, p. 447
Assessment Master, Mid-Summative Exam 1-2, pp. 450-451
Assessment Scoring Guide. p. 412

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- VCR with monitor

WEEK 2 (continued)

Lesson 9 (45 min) Investigation 3: 1 of 4 sessions plus ongoing observations

Objective(s):

Content Support NOTE: Teachers may wish to use the organisms from Investigation 3 and the Populations and Ecosystems Organism Database to:

- acquire microscope skills using Daphnia (before Inv. 3, Part 2, Step 8) and/or Elodea (at any time during Investigation 3)(Living Environment Skills 1 and 2)
- expand instruction on the definition and characteristics of "living things" (NYSCC Standard LE 1.1a-c)
- identify unicellular and multicellular organisms and the levels of structure and functional organization of cells (as part of Lesson 10) (NYSCC Standards LE 1.1d-g)
- explore biological classification systems (NYSCC Standard LE 1.1h and Living Environment Skills 6) including the use of a dichotomous key; see also Lesson 34 for additional resources

Content

- An aquatic ecosystem functions in water
- A terrestrial ecosystem functions on land.

Process / Conducting Investigations

Assemble the abiotic elements of an aquatic and terrestrial mini ecosystem

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 2.1, 2.2, 2.3, 6.1
- Interdisciplinary Problem Solving:
- General Skills: 1, 7
- Living Environment Skills: 6, 9
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–e, 7.1c, 7.2a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 81-89 taking note of:
pp. 82-83 Inv. 3 "At A Glance"
p. 86 Overall Planning Ahead
p. 87 Care for Aquatic Organisms
p. 87 Care for Terrestrial Organisms

– Teacher Guide Materials & Getting Ready, pp. 90-93 taking note of pp. 91 Step 4. Prepare Soil
reserve some sand for aquariums
p. 92 Step 7. Consider Legume Allergies
Radish seeds may be substituted for alfalfa (a legume).
p. 92 Step 8. Plant Seeds in Cups as **reference specimens to identify germinating seeds**
p. 93 Step 10 Plan Assessment

Investigation/Activity

Investigation 3: *Mini Ecosystems* Part 1: *The Physical Environment, Steps # 1-11*

– Teacher Guide pp. 94-95
– Student Lab Notebook, p. 15
Teacher Answer Master, p. 382
– Assessment Chart for Investigation 1-4, p. 447

– *FOSS® Populations and Ecosystems Resource Book: Mini Ecosystem Organisms,* pp. 64-68

Science Materials Supplied by the Teacher

Newspaper
Self-stick notes
Bus tray or box for soil
Rocks (small)*
Dead leaves*
Twigs*
Containers for Terrarium materials distribution
Clean pitchers / gallon jugs for treated water distribution

WEEK 3

Lesson 10 (45 min) Investigation 3: 2 of 4 sessions plus ongoing observations

Objective(s):

Content

- An aquatic ecosystem functions in water
- A terrestrial ecosystem functions on land.

Building Explanations

Describe how organisms depend on the abiotic elements in their ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 2.1, 2.2, 2.3, 6.1
- Interdisciplinary Problem Solving:
- General Skills: 1, 7
- Living Environment Skills: 6, 9
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–e, 7.1c, 7.2a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 81-89 taking note of:
p. 82-83 Inv. 3 "At A Glance"
p. 86 Overall Planning Ahead
p. 87 Care for Aquatic Organisms
p. 87 Care for Terrestrial Organisms

– Teacher Guide Materials & Getting Ready, pp. 96-98 taking note of
p. 97 Step 1. Plan TWO Sessions
p. 97 Step 2. Treat Tap Water
p. 97 Step 4. Place Aquatic Organisms in Cups Use pushpin to make air holes in lids.
p. 98 Step 9. Plan Assessment: Teacher Observation

Investigation/Activity

Investigation 3: *Mini Ecosystems* Part 2: *Introducing Life, Steps # 1-10*

– Teacher Guide pp. 99-100
– Student Lab Notebook, p. 16
– Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide. p. 413

– *FOSS Populations and Ecosystems Resource Book: Mini Ecosystem Organisms,* pp. 64-68

Science Materials Supplied by the Teacher

Newspaper
Clean pitchers / bottles for treated water distribution
Aquarium (large "holding tank" for guppies)
Trays (optional)

AV Equipment

WEEK 3 (continued)

Lesson 11 (45 min) Investigation 3: 3 of 4 sessions plus ongoing observations

Objective(s):

Content

- An aquatic ecosystem functions in water
- A terrestrial ecosystem functions on land.

Building Explanations

Describe how organisms depend on the abiotic elements in their ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 2.1, 2.2, 2.3, 6.1
- Interdisciplinary Problem Solving:
- General Skills: 1, 7
- Living Environment Skills: 6, 9
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–e, 7.1c, 7.2a.
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 81-89 taking note of:
pp. 82-83 Inv. 3 "At A Glance"
p. 86 Overall Planning Ahead
p. 87 Care for Aquatic Organisms
p. 87 Care for Terrestrial Organisms

– Teacher Guide Materials & Getting Ready, pp. 96-98 taking note of
p. 97 Step 1. Plan **TWO** Sessions
p. 97 Step 6. Place Terrestrial Organisms in Cups **Use pushpin to make air holes in lids.**
p. 98 Step 8. Plan for Reading
p. 98 Step 9. Plan Assessment: Teacher Observation

Investigation/Activity

Investigation 3: *Mini Ecosystems Part 2: Introducing Life, Steps # 11-18*

– Teacher Guide pp. 101-102
– Student Lab Notebook, p. 17
– Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide. p. 413

– *FOSS® Populations and Ecosystems Resource Book: Mini ecosystem Organisms,* pp. 64-68

– *FOSS® Populations and Ecosystems Resource Book: Biosphere 2: An Experiment in Isolation,* pp. 8-13

Science Materials Supplied by the Teacher

Newspaper
Trays (optional)

AV Equipment

WEEK 3 (continued)

Lesson 12 (45 min) Investigation 3: 4 of 4 sessions plus ongoing observations

Objective(s):

Content

An ecosystem is a web of interactions and relationships among the organisms and abiotic factors in an area.

Process

Use a scientific log to record interactions and changes in a mini ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 1.4, 2.1, 2.2, 2.3, 4.1, 5.2,
- Interdisciplinary Problem Solving
- General Skills: 1, 2, 3, 4, 7, 8
- Living Environment Skills: 9
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–e, 6.2c, 7.1 a–e, 7.2a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 81-89 taking note of:
p. 82-83 Inv. 3 "At A Glance"
p. 86 Overall Planning Ahead
p. 87 Care for Aquatic Organisms
p. 87 Care for Terrestrial Organisms

– Teacher Guide Materials & Getting Ready, pp. 103-104 taking note of
p. 104 Step 1. Think About Recording Schedule
p. 104 Step 3. Prepare Additional Materials
p. 104 Step 5. Make Multimedia Available
p. 104 Step 5. Plan Assessment: Teacher Observation

Investigation/Activity

Investigation 3: *Mini Ecosystems* Part 3: *Observing Mini ecosystems, Steps # 1-11*

– Teacher Guide pp. 105-108
– Student Lab Notebook, p. 16-17
– Transparency No. 7, Mini Ecosystem Log Sheet
– Special Teacher Master p. 363, Mini Ecosystem Log Sheet
– Assessment Chart for Investigation 1-4, p. 447 Assessment Scoring Guide. p. 414

– *FOSS® Populations and Ecosystems Resource Book: Miniecosystem Organisms, pp. 64-68*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia: Organism Database*

Extending the Experience: Teacher Guide p. 108
Localize Your Mini Ecosystems
– Observe the Effects of a Decomposer
– Consider a Watershed

Science Materials Supplied by the Teacher

Lettuce or Carrot
[land snail (optional organism) & isopod food]
Transparency markers

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

Planning Aquarium and Terrarium Observations: (5-15 min per observation)

Events including (but not limited to), population changes, interactions, maintenance activities, and temperature should be recorded as accurately as possible on the Mini Ecosystem Log Sheet.

WEEK 3 (continued)

Lesson 13 (45 min) Investigation 4: 1 of 3 sessions

Objective(s):

Content

- Mono Lake is an example of an alkaline lake ecosystem.
- The Mono Lake ecosystem is defined by the interactions among the organisms and physical factors that exist in the Mono Lake Basin.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 1.4, 2.1, 2.2, 2.3, 4.1, 5.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7, 8
- Living Environment Skills:
- Physical Setting Skills: 1
- Living Environment: LE3.2a, 5.1a–g, 5.2e, 7.1a–e, 7.2a–d
- Physical Science: PS 2.2j, 2.2r

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 109-118 taking note of:
pp. 110-111 Inv. 4 "At A Glance"
pp. 112-117 Scientific and Historical Background
p. 118 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 119-120
taking note of
p. 120 Step 1. Obtain a Map of the U.S.
see Extending the Experience
p. 120 Step 2. Prepare to Show a Video
p. 120 Step 3. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 4: *Mono Lake* Part 1: *A Visit to Mono Lake, Steps # 1-7*

– Teacher Guide pp. 121
– Student Lab Notebook, p. 19
Teacher Answer Master, p. 383
– Video: *Of Ice and Fire: A Portrait of the Mono Basin*
– Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide, Student Sheet p. 415

Extending the Experience:

Have students locate Mono Lake on the map using map coordinates to meet NYS Core Curriculum *Physical Settings Skills 1*

"Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map."

Science Materials Supplied by the Teacher

Map of U.S.A.

AV Equipment

- Extension cord
- VCR with monitor

WEEK 3 (continued)

Lesson 14 (45 min) Investigation 4: 2 of 3 sessions

Objective(s):

Content

- The sequence of organisms that eat one another is a food chain.
- All of the feeding relationships in an ecosystem define the food web for that ecosystem.
- The Mono Lake ecosystem is defined by the interactions among the organisms and physical factors that exist in the Mono Lake Basin.

Process / Conducting Investigations

- Research the functional roles of 12 organisms in the Mono Lake ecosystem in order to construct a food web.
- Diagram a food web, using arrows to indicate what eats what.

Building Explanations

Explain the functional roles and feeding relationships that constitute a food web.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 1.4, 2.1, 2.2, 2.3
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7, 8
- Living Environment Skills: 7
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–g, 5.2e, 6.1a–b, 7.1a, c–e, 7.2a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 109-118
taking note of:
pp. 110-111 Inv. 4 “At A Glance”
pp. 112-117 Scientific and Historical Background
p. 118 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 122-123
taking note of
p. 123 Step 2. Plan for Multimedia
p. 123 Step 3. Plan Assessment: Response Sheet
p. 123 Step 4. Plan Assessment: Mid-Summative Exam

Investigation/Activity

Investigation 4: *Mono Lake* Part 2: *Mono Lake Food Web, Steps # 1-16*

– Teacher Guide pp. 124-128
– Student Lab Notebook, Response Sheet, p. 21
Teacher Answer Master, p. 384
– Transparency No. 8, Mono Lake Food Web
– Assessment Master, Mid-Summative Exam 3-4, p. 352
Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide, Response Sheet, p. 416
Assessment Scoring Guide, Mid-Summative Exam 3-4, p. 417

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia: Mono Lake Food-Web simulation.*

Science Materials Supplied by the Teacher

Paper cutter (optional)

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 3 (continued)

Lesson 15 (45 min) Investigation 4: 3 of 3 sessions

Objective(s):

Content

- The sequence of organisms that eat one another is a food chain.
- All of the feeding relationships in an ecosystem define the food web for that ecosystem.
- The Mono Lake ecosystem is defined by the interactions among the organisms and physical factors that exist in the Mono Lake Basin.

Process / Conducting Investigations

- Research the functional roles of 12 organisms in the Mono Lake ecosystem in order to construct a food web.
- Diagram a food web, using arrows to indicate what eats what.

Building Explanations

Explain the functional roles and feeding relationships that constitute a food web.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.2, 1.4, 2.1, 2.2, 2.3
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7, 8
- Living Environment Skills: 7
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1a–g, 5.2e, 6.1a–b, 7.1a, c–e, 7.2a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 109-118 taking note of:
pp. 110-111 Inv. 4 “At A Glance”
pp. 112-117 Scientific and Historical Background
p. 118 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 122-123
taking note of
p. 123 Step 2. Plan for Multimedia
p. 123 Step 3. Plan Assessment: Response Sheet
p. 123 Step 4. Plan Assessment: Mid-Summative Exam

Investigation/Activity

Investigation 4: *Mono Lake* Part 2: *Mono Lake Food Web, Steps # 17-19*

– Teacher Guide pp. 128-129
– Student Lab Notebook, Response Sheet, p. 21
Teacher Answer Master, p. 384
– Transparency No. 8, Mono Lake Food Web
– Assessment Master, Mid-Summative Exam 3-4, p. 352
Assessment Chart for Investigation 1-4, p. 447
Assessment Scoring Guide, Response Sheet, p. 416
Assessment Scoring Guide, Mid-Summative Exam 3-4, p. 417

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia: Mono Lake Food-Web simulation.*

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

	2008 Anticipated Winter Break for Blend Option	
	Est. date Blend: February 25	Est. date Kit: March 17
WEEK 4	**Lesson 16** (45 min) **Investigation 5: 1 of 7 sessions** **Objective(s):** **Content** • Food is energy-rich organic matter that organisms need to conduct their life processes. • Energy in food is measured in kilocalories. **Process / Conducting Investigation** Burn food to confirm that it contains energy and that energy in food can be measured.	**Alignment with NYS Core Curriculum:** • Expanded Process Skills: ICT1.4, 2.2 • Interdisciplinary Problem Solving: • General Skills: 1, 2, 3, 4, • Living Environment Skills: • Physical Setting Skills: • Living Environment: LE5.2a, 5.2d • Physical Science:

Advanced Planning/ Notes to Teachers	Investigation/Activity	Science Materials Supplied by the Teacher
– Teacher Guide Overview, pp. 131-141 taking note of: pp. 132-133 Inv. 5 "At A Glance" pp. 134-140 Scientific and Historical Background p. 141 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 142-145 taking note of p. 145 Step 1. Consider Burning p. 145 Step 2. Obtain Snacks p. 145 Step 4. Think About Timing pp. 145-147 Steps 5-7. ** **Practice the Activity Before Doing it in the Classroom** p. 145 Steps 8-9. Plan Assessments: Quick Write & Student Sheet **Read ahead to lesson 21 to prepare materials for part 4: trophic levels**	Investigation 5: *Finding the Energy* Part 1: *Energy in Food, Steps # 1-11* – Teacher Guide pp. 146-148 – Student Lab Notebook, Water Heating Set-up, p. 22 Measuring Food Energy, p. 23 Teacher Answer Master, p. 385 – Transparency No. 9, Cheese-Ball Nutrition Label – Assessment Chart for Investigation 5-7, p. 448 Assessment Scoring Guide, Quick Write on Energy, p. 418-419 Assessment Scoring Guide, Student Sheet, Measuring Food Energy, p. 420	Cardboard Square (7x7 cm) Graduated cylinder (25 or 50 ml) Safety Matches (wood are preferred) Cheese balls Other snacks Water Pitcher Utility Knife **AV Equipment** • Extension cord • Overhead projector

WEEK 4 (continued)

Lesson 17 (45 min) Investigation 5: 2 of 7 sessions

Objective(s):

Content

- Food is energy-rich organic matter that organisms need to conduct their life processes.
- Energy in food is measured in kilocalories.

Process / Conducting Investigation

Burn food to confirm that it contains energy and that energy in food can be measured.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 2, 3, 4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE5.2a, 5.2d
- Physical Science: PS4.5a–b

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview,
pp. 131-141 taking note of:
pp. 132-133 Inv. 5 "At A Glance"
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 142-145
taking note of
p. 145 Step 1. Consider Burning
p. 145 Step 2. Obtain Snacks
p. 145 Step 4. Think About Timing
pp. 145-147 Steps 5-7. **
Practice the Activity Before Doing it in the Classroom
p. 145 Steps 8-9. Plan Assessments: Quick Write & Student Sheet

Investigation/Activity

Investigation 5: *Finding the Energy* Part 1: *Energy in Food, Steps # 12-19*

– Teacher Guide pp. 146-148
– Student Lab Notebook, Water Heating Set-up, p. 22
Measuring Food Energy, p. 23
Teacher Answer Master, p. 385
– Transparency No. 9, Cheese-Ball Nutrition Label
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Quick Write on Energy, p. 418-419
Assessment Scoring Guide, Student Sheet, Measuring Food Energy, p. 420

Science Materials Supplied by the Teacher

Cardboard Square (7x7 cm)
Graduated cylinder (25 or 50 ml)
Safety Matches (wood are preferred)
Cheese balls
Other snacks
Water
Pitcher
Utility Knife

AV Equipment

- Extension cord
- Overhead projector

WEEK 4 (continued)

Lesson 18 (45 min) Investigation 5: 3 of 7 sessions

Objective(s):

Content

- Food is energy-rich organic matter that organisms need to conduct their life processes.
- Energy in food is measured in kilocalories.

Process / Conducting Investigation

Burn food to confirm that it contains energy and that energy in food can be measured.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 2, 3, 4
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE5.2a, 5.2d
- Physical Science: PS4.5a–b

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 131-141
taking note of:
pp. 132-133 Inv. 5 "At A Glance"
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 142-145
taking note of
p. 145 Step 1. Consider Burning
p. 145 Step 2. Obtain Snacks
p. 145 Step 4. Think About Timing
pp. 145-147. Steps 5-7. **
Practice the Activity Before Doing it in the Classroom
p. 145 Steps 8-9. Plan Assessments: Quick Write & Student Sheet

Investigation/Activity

Investigation 5: *Finding the Energy* Part 1: *Energy in Food, Steps # 20-24*

– Teacher Guide pp. 146-148
– Student Lab Notebook, Water Heating Set-up, p. 22
Measuring Food Energy, p. 23
Teacher Answer Master, p. 385
– Transparency No. 9, Cheese-Ball Nutrition Label
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Quick Write on Energy, p. 418-419
Assessment Scoring Guide, Student Sheet, Measuring Food Energy, p. 420

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*

Extending the Experience:

Have students meet NYS Core Curriculum Standard LE 5.2e at Step 22 by including the direct question:
"What would happen if you only ate cheese balls?"
as a follow up question to "Does that make sense?"

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 4 (continued)

Lesson 19 (45 min) Investigation 5: 4 of 7 sessions

Objective(s):

Content

Photosynthesis is the process by which energy-rich molecules (food) are made from water, carbon dioxide, and light.

Process / Conducting Investigations

Analyze experimental data to confirm that plants require water, carbon dioxide, and light to increase in biomass (food).

Building Explanations

Discuss how photosynthesis makes energy available to organisms.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, 2.1, 2.2, 5.1,
- Interdisciplinary Problem Solving:
- General Skills: 3, 4, 7, 8
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE 5.1d, 6.1c, 6.2a–c
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 131-141 taking note of:
pp. 132-133 Inv. 5 “At A Glance”
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 151-152
taking note of
p. 152 Step 1. Consider the Content
p. 152 Step 2. Plan for Reading
p. 152 Step 3. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 5: *Finding the Energy Part 2: Energy and Producers, Steps # 1-8*

– Teacher Guide pp. 153-155
– Student Lab Notebook, Food-Producers Experiment, p. 25
Teacher Answer Master, p. 386
– Transparency No. 10, Food-Producers Experiment
– Transparency No. 11, Photosynthesis
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Student Sheet, Food-Producers Experiment Report, p. 421

– *FOSS® Populations and Ecosystems Resource Book: Where Does Food Come From?, pp. 14-16*

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector

Grade 6

WEEK 4 (continued)

Lesson 20 (45 min) Investigation 5: 5 of 7 sessions

Objective(s):

Building Explanations

- Explain how organisms get the energy they need for life.
- Describe how every activity undertaken by living organisms involves expenditure of energy.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment: LE 5.2a
- Physical Science: PS 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 131-141
taking note of:
pp. 132-133 Inv. 5 "At A Glance"
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 156-157
taking note of
p. 157 Step 1. Copy and Cut Energy Use Strips
p. 157 Step 2. Plan Assessment: Self-Assessment

Investigation/Activity

Investigation 5: *Finding the Energy* Part 3: *Using Energy, Steps # 1-10*

– Teacher Guide pp. 158-160

– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Student Sheet, Food-Producers Experiment Report, p. 421

Science Materials Supplied by the Teacher

Masking tape

AV Equipment

WEEK 5

Lesson 21 (45 min) Investigation 5: 6 of 7 sessions

Objective(s):

Content

Feeding relationships define trophic levels: producers, consumers, and decomposers.

Process

Use a simulation to reinforce the 10% rule of energy transfer across trophic levels.

Building Explanations

Describe how energy moves from one trophic level to another in an ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, 2.1, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7,
- Living Environment Skills: 7
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1c, 5.1d, 5.1e, 5.2a–e, 6.1a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 131-141
taking note of:
pp. 132-133 Inv. 5 "At A Glance"
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 161-163
taking note of
p. 162 Step 1. Prepare Bead Sets
p. 163 Step 2. Cut Chenille Stems
p. 163 Step 3. Plan Bead Management
p. 163 Step 4. Plan Assessment: Mid-Summative Exam 5

Investigation/Activity

Investigation 5: *Finding the Energy* Part 4: *Trophic Levels, Steps # 1-8*

– Teacher Guide pp. 164-166
– Transparency No. 12, Trophic Level Kg Beads
– Assessment Master, Mid-Summative Exam 5, p. 453
Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Mid-Summative Exam 5, p. 422

– *FOSS® Populations and Ecosystems Resource Book: Trophic Levels. p. 17-21*

Extending the Experience: Teacher Guide p. 170
Consider these enrichment activities AT ANY TIME DURING THE MODULE. These experiences that follow many investigations may be suitable for enrichment, homework or for a lesson plan to be delivered by a substitute teacher when a hands-on investigation may not be appropriate.

Science Materials Supplied by the Teacher

Coat Hanger (optional)
Old Scissors
or
Wire cutter

AV Equipment

- Extension cord
- Overhead projector

WEEK 5 (continued)

Lesson 22 (45 min) Investigation 5: 7 of 7 sessions

Objective(s):

Content

Feeding relationships define trophic levels: producers, consumers, and decomposers.

Process / Conducting Investigations

Use a simulation to reinforce the 10% rule of energy transfer across trophic levels.

Building Explanations

Describe how energy moves from one trophic level to another in an ecosystem.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT1.4, 2.1, 2.2
- Interdisciplinary Problem Solving:
- General Skills: 1, 4, 7
- Living Environment Skills: 7
- Physical Setting Skills:
- Living Environment: LE3.2a, 5.1c, 5.1d, 5.1e, 5.2a–e, 6.1a
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 131-141
taking note of:
pp. 132-133 Inv. 5 "At A Glance"
pp. 134-140 Scientific and Historical Background
p. 141 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 161-163
taking note of
p. 162 Step 1. Prepare Bead Sets
p. 163 Step 2. Cut Chenille Stems
p. 163 Step 3. Plan Bead Management
p. 163 Step 4. Plan Assessment: Mid-Summative Exam 5

Investigation/Activity

Investigation 5: *Finding the Energy* Part 4: *Trophic Levels, Steps # 9-17*

– Teacher Guide pp. 166-169
– Transparency No. 12, Trophic Level Kg Beads
– Assessment Master, Mid-Summative Exam 5, p. 453
Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Mid-Summative Exam 5, p. 422

– *FOSS® Populations and Ecosystems Resource Book: Trophic Levels. p. 17-21*

Extending the Experience: Teacher Guide p. 170
– Diagram Humans in Food Web
– Describe Human Trophic Levels

Science Materials Supplied by the Teacher

AV Equipment
- Extension cord
- Overhead projector

WEEK 5 (continued)

Lesson 23 (45 min) Investigation 6: 1 of 6 sessions

Objective(s):

Content

- Reproductive potential is the theoretical unlimited growth of a population over time.
- A limiting factor is any biotic or abiotic component of the ecosystem that controls the size of a population.

Process / Conducting Investigations

- Calculate the theoretical growth of a population of milkweed bugs, assuming no limiting factors.
- Use computer simulations to find out how reproductive strategies and limiting factors affect population growth.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving
- General Skills:
- Living Environment Skills
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 171-178
taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 179-180
taking note of
p. 180 Step 1. Provide Calculators
p. 180 Step 2. Preview the Milkweed Bug Experiments
p. 180 Step 3. Preview Multimedia
p. 180 Step 4. Plan Assessment: Student Sheet

Read ahead to Lesson 29 to plan class management strategies for Investigation 7: Ecoscenarios.

Investigation/Activity

Investigation 6: *Population Size Part 1: Reproductive Potential, Steps # 1-12*

– Teacher Guide pp. 181-183
– Student Lab Notebook:
Milkweed-Bug Changes, p. 6,
Milkweed-Bug Reproductive Potential, p.27
-Teacher Answer Master, p.387
Milkweed-Bugs, Limited, p.29
-Teacher Answer Master, p.388
Milkweed-Bug Hatching Investigation, pp. 31-32
Milkweed-Bug Hatching Analysis, p. 33
-Teacher Answer Master, p. 389
– Transparency No. 13, Milkweed-Bug Reproductive Potential
– Transparency No. 14, Unlimited Milkweed-Bug Population
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Milkweed-Bug Hatching Analysis, p. 423

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*

Science Materials Supplied by the Teacher

Calculators

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 5 (continued)

Lesson 24 (45 min) Investigation 6: 2 of 6 sessions

Objective(s):

Content

- Reproductive potential is the theoretical unlimited growth of a population over time.
- A limiting factor is any biotic or abiotic component of the ecosystem that controls the size of a population.

Process / Conducting Investigations

- Calculate the theoretical growth of a population of milkweed bugs, assuming no limiting factors.
- Use computer simulations to find out how reproductive strategies and limiting factors affect population growth.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview,
pp. 171-178 taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 179-180
taking note of
p. 180 Step 1. Provide Calculators
p. 180 Step 2. Preview the Milkweed Bug Experiments
p. 180 Step 3. Preview Multimedia
p. 180 Step 4. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 6: *Population Size* Part 1: *Reproductive Potential, Steps # 13-18*

– Teacher Guide pp. 181-183

– Student Lab Notebook:
Milkweed-Bug Changes, p. 6,
Milkweed-Bug Reproductive Potential, p. 27
-Teacher Answer Master, p. 387
Milkweed-Bugs, Limited, p. 29
-Teacher Answer Master, p. 388
Milkweed-Bug Hatching Investigation, pp. 31-32
Milkweed-Bug Hatching Analysis, p. 33
-Teacher Answer Master, p. 389

– Transparency No. 13, Milkweed-Bug Reproductive Potential

– Transparency No. 14, Unlimited Milkweed-Bug Population

– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Milkweed-Bug Hatching Analysis, p. 423

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia: Milkweed Bugs Unlimited* and *Milkweed Bugs Limited* Simulations

Note: Step 18. It may require 2 days of work with the simulations for students to acquire enough data to answer the questions thoroughly.

Science Materials Supplied by the Teacher

Calculators

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 5 (continued)

Lesson 25 (45 min) Investigation 6: 3 of 6 sessions

Objective(s):

Content

- Reproductive potential is the theoretical unlimited growth of a population over time.
- A limiting factor is any biotic or abiotic component of the ecosystem that controls the size of a population.

Process / Conducting Investigations

- Calculate the theoretical growth of a population of milkweed bugs, assuming no limiting factors.
- Use computer simulations to find out how reproductive strategies and limiting factors affect population growth.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 171-178
taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 179-180
taking note of
p. 180 Step 1. Provide Calculators
p. 180 Step 2. Preview the Milkweed Bug Experiments
p. 180 Step 3. Preview Multimedia
p. 180 Step 4. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 6: *Population Size* Part 1: *Reproductive Potential, Steps # 19-22*

– Teacher Guide pp. 181-183
– Student Lab Notebook:
Milkweed-Bug Changes, p. 6,
Milkweed-Bug Reproductive Potential, p. 27
-Teacher Answer Master, p. 387
Milkweed-Bugs, Limited, p. 29
-Teacher Answer Master, p. 388
Milkweed-Bug Hatching Investigation, pp. 31-32
Milkweed-Bug Hatching Analysis, p. 33
-Teacher Answer Master, p. 389
– Transparency No. 13, Milkweed-Bug Reproductive Potential
– Transparency No. 14, Unlimited Milkweed-Bug Population
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Milkweed-Bug Hatching Analysis, p. 423

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia: Milkweed Bugs Unlimited* and *Milkweed Bugs Limited* Simulations

Science Materials Supplied by the Teacher

Calculators

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 6

Lesson 26 (45 min) Investigation 6: 4 of 6 sessions

Objective(s):

Content

- Reproductive potential is the theoretical unlimited growth of a population over time.
- A limiting factor is any biotic or abiotic component of the ecosystem that controls the size of a population.

Process / Conducting Investigations

Analyze laboratory experiments to determine the effects of abiotic factors on population size.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 171-178 taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 187-188
taking note of
p. 188 Step 1. Review the Algae and Brine Shrimp Experiments
p. 188 Step 2. Plan for Reading
p. 188 Step 3. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 6: *Population Size* Part 2: *Algae and Brine Shrimp Populations, Steps # 1-6*

– Teacher Guide pp. 189-190
– Student Lab Notebook:
Algae and Brine Shrimp Experiments, pp. 34-36,
Algae and Brine Shrimp Experiments Analysis, p. 37
-Teacher Answer Master, p. 390
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Algae and Brine Shrimp Experiment Analysis, p. 424

– *FOSS® Populations and Ecosystems Resource Book: Limiting Factors, p. 22-24*

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord

WEEK 6 (continued)

Lesson 27 (45 min) Investigation 6: 5 of 6 sessions

Objective(s):

Process / Conducting Investigations

Analyze field observations to determine the effects of biotic factors on population size.

Building Explanations

- Discuss how biotic and abiotic factors in an environment can limit a population.
- Explain the roles of both lab experimentation and field observation in the study of populations.
- Describe the population fluctuations in Mono Lake in terms of limiting factors and feeding relationships.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 171-178
taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 191-192
taking note of
p. 192 Step 1. Review Abiotic Factors at Mono Lake
p. 192 Step 2. Plan for Reading
p. 192 Step 3. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 6: *Population Size Part 3: Population Dynamics, Steps # 1-10*

– Teacher Guide pp. 193-198

– Student Lab Notebook:
Mono Lake Data, pp. 38-40,
Analysis of Mono Lake Data, p. 41
-Teacher Answer Master, p. 391

– Transparency No. 15, Abiotic Factors at Mono Lake

– Assessment Master, Mid-Summative
Exam 6, p. 454
Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Mid-Summative
Exam 6, p. 425

– *FOSS® Populations and Ecosystems Resource Book: Mono Lake in the Spotlight, p. 25-29*

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector

WEEK 6 (continued)

Lesson 28 (45 min) Investigation 6: 6 of 6 sessions

Objective(s):

Process / Conducting Investigations

Analyze field observations to determine the effects of biotic factors on population size.

Building Explanations

- Discuss how biotic and abiotic factors in an environment can limit a population.
- Explain the roles of both lab experimentation and field observation in the study of populations.
- Describe the population fluctuations in Mono Lake in terms of limiting factors and feeding relationships.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 171-178
taking note of:
pp. 172-173 Inv. 6 "At A Glance"
pp. 174-177 Scientific and Historical Background
p. 178 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 191-192
taking note of
p. 192 Step 1. Review Abiotic Factors at Mono Lake
p. 192 Step 2. Plan for Reading
p. 192 Step 3. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 6: *Population Size Part 3: Population Dynamics, Steps # 11-14*

– Teacher Guide pp. 193-198

– Student Lab Notebook:
Mono Lake Data, pp. 38-40,
Analysis of Mono Lake Data, p. 41
-Teacher Answer Master, p. 391

– Transparency No. 15, Abiotic Factors at Mono Lake

– Assessment Master, Mid-Summative Exam 6, p. 454
Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Mid-Summative Exam 6, p. 425

– *FOSS® Populations and Ecosystems Resource Book: Mono Lake in the Spotlight, p. 25-29*

Extending the Experience: Teacher Guide p. 198

– Discuss Other Population Limitations

Explore / discuss population limitations that DO NOT involve feeding relationships (to meet Standard).

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector

WEEK 6 (continued)

Lesson 29 (45 min) Investigation 7: 1 of 5 sessions

Objective(s):

Content Support NOTE: Teachers may wish to use Investigation 7: Ecoscenarios and the Populations and Ecosystems Organism Database to:

- formulate questions to add to the Ecoscenario Project Guidelines to directly address the Expanded Process Skills Standard 6 – Interconnectedness : Common Themes including but not limited to:
  Key Idea 1 – Systems Thinking
  Key Idea 4 – Equilibrium and Stability
  Key Idea 5 – Patterns of Change
  Key Idea 6 – Optimization
- explore biological classification systems (NYSCC Standard LE 1.1h and Living Environment Skills 6) including the use of a dichotomous key for the chosen Ecoscenario. (See Lesson 34 for weblinks to develop appropriate lessons for your class.)

Content

- Similar ecosystems occur in areas of similar abiotic conditions on Earth.
- An ecosystem is a group of interacting organisms and nonliving factors in a specified area.
- All ecosystems have characteristics in common, such as trophic levels — producers, consumers, and decomposers.

Process / Conducting Investigations

- Use print and electronic resources to acquire information about the populations, abiotic conditions, interactions, and human issues in an ecosystem.
- Use written reports, visual aids (posters), and oral presentations to share information.

Building Explanations

- Describe ways all ecosystems are alike.
- Describe factors that make ecosystems different from each other.
- Discuss ways that activities of humans affect natural ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 199-209 taking note of:
pp. 200-201 Inv. 7 "At A Glance"
pp. 202-208 Scientific and Historical Background
pp. 209 Why Do I Have to Learn This?

Continued

Investigation/Activity

Investigation 7: *Ecoscenarios* (Focus: Project Introduction)

– Teacher Guide pp. 214-218
– Student Lab Notebook:
Ecoscenario Project Guidelines, pp. 42-44,
Ecoscenario Presentation Notes, pp. 46-47

Continued

Science Materials Supplied by the Teacher

Poster Board
Colored marking pens

Continued

	– Teacher Guide Materials & Getting Ready, pp. 210-213 taking note of p. 211 Step 1. Plan Computer Use p. 211 Step 2. Decide How to Assign Groups p. 211 Step 3. Decide How to Assign Ecoscenarios p. 211 Step 4. Plan to Read the Ecoscenario Introductions p. 212 Step 5. Gather Additional Resources p. 212 Step 6. Plan a Time Line p. 213 Step 7. Review the Project Guidelines p. 213 Step 8. Obtain Materials for Posters p. 213 Step 9. Plan Assessment: Reports	– Assessment Chart for Investigation 5-7, p. 448 Assessment Scoring Guide, Ecoscenarios: Poster Presentation, p. 426-427 – *FOSS® Populations and Ecosystems Resource Book: Ecoscenario Introductions, p. 30-41* – *FOSS® Populations and Ecosystems CD-ROM / Multimedia:* **Extending the Experience:** Teacher Guide p. 218 – Investigate Local Ecosystem Issues	Craft materials (optional): – String – Construction paper – Tape / Glue – Scissors – Marking Pens Books on ecosystems Field guides **AV Equipment** • Extension cord • Multimedia set-up for CD-ROM • Computers with Internet access

WEEK 6 (continued)

Lesson 30 (45 min) Investigation 7: 2 of 5 sessions

Objective(s):

Content

- Similar ecosystems occur in areas of similar abiotic conditions on Earth.
- An ecosystem is a group of interacting organisms and nonliving factors in a specified area.
- All ecosystems have characteristics in common, such as trophic levels — producers, consumers, and decomposers.

Process / Conducting Investigations

- Use print and electronic resources to acquire information about the populations, abiotic conditions, interactions, and human issues in an ecosystem.
- Use written reports, visual aids (posters), and oral presentations to share information.

Building Explanations

- Describe ways all ecosystems are alike.
- Describe factors that make ecosystems different from each other.
- Discuss ways that activities of humans affect natural ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 199-209
taking note of:
pp. 200-201 Inv. 7 "At A Glance"
pp. 202-208 Scientific and Historical Background
p. 209 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 210-213
taking note of
p. 211 Step 1. Plan Computer Use
p. 211 Step 2. Decide How to Assign Groups
p. 211 Step 3. Decide How to Assign Ecoscenarios
p. 211 Step 4. Plan to Read the Ecoscenario Introductions
p. 212 Step 5. Gather Additional Resources
p. 212 Step 6. Plan a Time Line
p. 213 Step 7. Review the Project Guidelines
p. 213 Step 8. Obtain Materials for Posters
p. 213 Step 9. Plan Assessment: Reports

Investigation/Activity

Investigation 7: *Ecoscenarios* (Focus: Project Research)

– Teacher Guide pp. 214-218
– Student Lab Notebook:
Ecoscenario Project Guidelines, pp. 42-44,
Ecoscenario Presentation Notes, pp. 46-47
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Ecoscenarios: Poster Presentation, p. 426-427

– *FOSS® Populations and Ecosystems Resource Book: Ecoscenario Introductions, p. 30-41*

– *FOSS®*
Populations and Ecosystems CD-ROM / Multimedia:

Extending the Experience: Teacher Guide p. 218
– Investigate Local Ecosystem Issues

Science Materials Supplied by the Teacher

Poster Board
Colored marking pens
Craft materials (optional):
String
Construction paper
Tape / Glue
Scissors
Marking Pens
Books on ecosystems
Field guides

AV Equipment

- Extension cord
- Multimedia set-up for CD-ROM
- Computers with Internet access

WEEK 7

Lesson 31 (45 min) Investigation 7: 3 of 5 sessions

Objective(s):

Content

- Similar ecosystems occur in areas of similar abiotic conditions on Earth.
- An ecosystem is a group of interacting organisms and nonliving factors in a specified area.
- All ecosystems have characteristics in common, such as trophic levels — producers, consumers, and decomposers.

Process / Conducting Investigations

- Use print and electronic resources to acquire information about the populations, abiotic conditions, interactions, and human issues in an ecosystem.
- Use written reports, visual aids (posters), and oral presentations to share information.

Building Explanations

- Describe ways all ecosystems are alike.
- Describe factors that make ecosystems different from each other.
- Discuss ways that activities of humans affect natural ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 199-209 taking note of:
pp. 200-201 Inv. 7 "At A Glance"
pp. 202-208 Scientific and Historical Background
p. 209 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 210-213 taking note of
p. 211 Step 1. Plan Computer Use
p. 211 Step 2. Decide How to Assign Groups
p. 211 Step 3. Decide How to Assign Ecoscenarios
p. 211 Step 4. Plan to Read the Ecoscenario Introductions
p. 212 Step 5. Gather Additional Resources
p. 212 Step 6. Plan a Time Line
p. 213 Step 7. Review the Project Guidelines
p. 213 Step 8. Obtain Materials for Posters
p. 213 Step 9. Plan Assessment: Reports

Investigation/Activity

Investigation 7: *Ecoscenarios* (Focus: Project Research / Poster Preparation)

– Teacher Guide pp. 214-218
– Student Lab Notebook:
Ecoscenario Project Guidelines, pp. 42-44,
Ecoscenario Presentation Notes, pp. 46-47
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Ecoscenarios:
Poster Presentation, p. 426-427

– *FOSS® Populations and Ecosystems Resource Book: Ecoscenario Introductions, p. 30-41*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*

Extending the Experience: Teacher Guide p. 218
– Investigate Local Ecosystem Issues

Science Materials Supplied by the Teacher

Poster Board
Colored marking pens
Craft materials (optional):
– String
– Construction paper
– Tape / Glue
– Scissors
– Marking Pens
Books on ecosystems
Field guides

AV Equipment

- Extension cord
- Multimedia set-up for CD-ROM
- Computers with Internet access

WEEK 7 (continued)

Lesson 32 (45 min) Investigation 7: 4 of 5 sessions

Objective(s):

Content

- Similar ecosystems occur in areas of similar abiotic conditions on Earth.
- An ecosystem is a group of interacting organisms and nonliving factors in a specified area.
- All ecosystems have characteristics in common, such as trophic levels — producers, consumers, and decomposers.

Process / Conducting Investigations

- Use print and electronic resources to acquire information about the populations, abiotic conditions, interactions, and human issues in an ecosystem.
- Use written reports, visual aids (posters), and oral presentations to share information.

Building Explanations

- Describe ways all ecosystems are alike.
- Describe factors that make ecosystems different from each other.
- Discuss ways that activities of humans affect natural ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 199-209
taking note of:
pp. 200-201 Inv. 7 "At A Glance"
pp. 202-208 Scientific and Historical Background
p. 209 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 210-213
taking note of
p. 211 Step 1. Plan Computer Use
p. 211 Step 2. Decide How to Assign Groups
p. 211 Step 3. Decide How to Assign Ecoscenarios
p. 211 Step 4. Plan to Read the Ecoscenario Introductions
p. 212 Step 5. Gather Additional Resources
p. 212 Step 6. Plan a Time Line
p. 213 Step 7. Review the Project Guidelines
p. 213 Step 8. Obtain Materials for Posters
p. 213 Step 9. Plan Assessment: Reports

Investigation/Activity

Investigation 7: *Ecoscenarios* (Focus: Poster Preparation / Individual Reports)

– Teacher Guide pp. 214-218
– Student Lab Notebook:
Ecoscenario Project Guidelines, pp. 42-44,
Ecoscenario Presentation Notes, pp. 46-47
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide, Ecoscenarios: Poster Presentation, p. 426-427

– *FOSS® Populations and Ecosystems Resource Book: Ecoscenario Introductions, p. 30-41*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*

Extending the Experience: Teacher Guide p. 218
– Investigate Local Ecosystem Issues

Science Materials Supplied by the Teacher

Poster Board
Colored marking pens
Craft materials (optional):
– String
– Construction paper
– Tape / Glue
– Scissors
– Marking Pens
Books on ecosystems
Field guides

AV Equipment

- Extension cord
- Multimedia set-up for CD-ROM
- Computers with Internet access

WEEK 7 (continued)

Lesson 33 (45 min) Investigation 7: 5 of 5 sessions

Objective(s):

Content

- Similar ecosystems occur in areas of similar abiotic conditions on Earth.
- An ecosystem is a group of interacting organisms and nonliving factors in a specified area.
- All ecosystems have characteristics in common, such as trophic levels — producers, consumers, and decomposers.

Process / Conducting Investigations

- Use print and electronic resources to acquire information about the populations, abiotic conditions, interactions, and human issues in an ecosystem.
- Use written reports, visual aids (posters), and oral presentations to share information.

Building Explanations

- Describe ways all ecosystems are alike.
- Describe factors that make ecosystems different from each other.
- Discuss ways that activities of humans affect natural ecosystems.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 199-209
taking note of:
pp. 200-201 Inv. 7 "At A Glance"
pp. 202-208 Scientific and Historical Background
p. 209 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 210-213
taking note of
p. 211 Step 1. Plan Computer Use
p. 211 Step 2. Decide How to Assign Groups
p. 211 Step 3. Decide How to Assign Ecoscenarios
p. 211 Step 4. Plan to Read the Ecoscenario Introductions
p. 212 Step 5. Gather Additional Resources
p. 212 Step 6. Plan a Time Line
p. 213 Step 7. Review the Project Guidelines
p. 213 Step 8. Obtain Materials for Posters
p. 213 Step 9. Plan Assessment: Reports

Investigation/Activity

Investigation 7: *Ecoscenarios* (Focus: Poster Presentations / Assessment)

– Teacher Guide pp. 214-218
– Student Lab Notebook:
Ecoscenario Project Guidelines, pp. 42-44,
Ecoscenario Presentation Notes, pp. 46-47
– Assessment Chart for Investigation 5-7, p. 448
Assessment Scoring Guide:
-Ecoscenarios: Poster Presentation, p. 426-427
-Ecoscenarios: Individual Presentation, p. 428-429

– *FOSS® Populations and Ecosystems Resource Book: Ecoscenario Introductions, p. 30-41*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*

Extending the Experience: Teacher Guide p. 218
– Investigate Local Ecosystem Issues

Science Materials Supplied by the Teacher

Poster Board
Colored marking pens
Craft materials (optional):
– String
– Construction paper
– Tape / Glue
– Scissors
– Marking Pens
Books on ecosystems
Field guides

AV Equipment

- Extension cord
- Multimedia set-up for CD-ROM
- Computers with Internet access

WEEK 7 (continued)	**Lesson 34** (45 min) **Using Dichotomous Keys** **Objective(s):** **Resources:** **The Educator's Desk Reference, Lesson Plan #:AELP-SPS0002 – Jan Devore, Westside School Payette, ID** http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Science/Process_Skills/SPS0002.html Note: Basic concept of dichotomous keys using paper clips or other familiar objects. **Mr. Hahurst's Sci-Page, Lancaster High School, Lancaster CA** http://www.lnhs.org/hayhurst/ips/dichot/index.htm Note: Activity using imaginary cartoon 'creatures.' Adapted from a workshop presented by Michael Kobe, Hammond City School District. **Constructing a Dichotomous Key – Margaret Bankhead, Robert A. Black Magnet School, Chicago IL 60649, developed in conjunction with the Science and Mathematics Initiative for Learning Enhancement, Illinois Institute of Technology, Chicago IL, 60616** http://www.iit.edu/~smile/bi8611.html Note: Activity using student shoes. **Dichotomous Keys - prepared by Laurie Kleager, University of Nebraska, Lincoln, NERDS (Nebraska Educators Really Doing Science) Project** http://nerds.unl.edu/Pages/preser/sec/skills/dkeys.html Note: Prepared for use with secondary students, this activity uses four insects. Includes good directions that will be helpful in developing your own dichotomous key. **Dichotomous Key, Queensland University of Technology, Brisbane, Australia** http://students.ed.qut.edu.au/n2364379/MDB377/DichotomousKey.html Note: This key from 'down under' uses organisms unique to Australia. Developed by a student (Cathy), it is meant to be used in the secondary classroom. Additional notes from the author are found at: http://students.ed.qut.edu.au/n2364379/MDB377/MDB377index.html.

WEEK 7 (continued)

Lesson 35 (45 min) Investigation 8: 1 of 8 sessions

Objective(s):

Content

An adaptation is any trait of an organism that enhances its chances of surviving and reproducing in its environment.

Building Explanations

Explain how adaptations help organisms survive in an environment.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
p. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 228-229
taking note of
p. 229 Step 1. Prepare Fish on a Stick
p. 229 Step 2. Preview Multimedia
p. 229 Step 3. Plan Reading
p. 229 Step 4. Plan Two Video Sessions
p. 229 Step 5. Plan Assessment: Quick Write
p. 229 Step 6. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 8: *Adaptations*, Part 1: *Identifying Adaptations, Steps # 1-4*

– Teacher Guide pp. 230-233
– Student Lab Notebook: Strangers in Paradise, p. 49
  -Teacher Answer Master, p. 392
– Special Teacher Master:
  -Kelp Fish, p. 368
  -Kelp Environment, p. 369
  -Rocky Environment, p. 370
– Video: *Hawaii: Strangers in Paradise*
– Assessment Chart for Investigation 8-10, p. 449
– Assessment Scoring Guide:
  -Self Assessment: Quick Write on Adaptations, p. 430
  -Student Sheet: Strangers in Paradise, p. 431

– *FOSS® Populations and Ecosystems Resource Book: Adaptations, p. 42-45*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*
  -Organism Database
  -Octopus Color Change

Science Materials Supplied by the Teacher

White paper
Masking tape
Paper clip

AV Equipment

- Extension cord
- VCR with monitor
- Multimedia set-up for CD-ROM

	Unit 4 – Benchmark Date: April 10		
	2008 Est. date Blend: March 3		2008 Est. date Kit: April 28
WEEK 8	**Lesson 36** (45 min) **Investigation 8: 2 of 8 sessions** **Objective(s):** **Content** An adaptation is any trait of an organism that enhances its chances of surviving and reproducing in its environment. **Process** Explain how adaptations help organisms survive in an environment.		**Alignment with NYS Core Curriculum:** • Expanded Process Skills: ICT • Interdisciplinary Problem Solving: • General Skills: • Living Environment Skill: • Physical Setting Skills: • Living Environment: • Physical Science:
	Advanced Planning/ Notes to Teachers – Teacher Guide Overview, pp. 219-227 taking note of: pp. 220-221 Inv. 8 "At A Glance" pp. 222-226 Scientific and Historical Background p. 227 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 228-229 taking note of p. 229 Step 1. Prepare Fish on a Stick p. 229 Step 2. Preview Multimedia p. 229 Step 3. Plan Reading p. 229 Step 4. Plan Two Video Sessions p. 229 Step 5. Plan Assessment: Quick Write p. 229 Step 6. Plan Assessment: Student Sheet	**Investigation/Activity** Investigation 8: *Adaptations*, Part 1: *Identifying Adaptations, Steps # 5-8* – Teacher Guide pp. 230-233 – Student Lab Notebook: Strangers in Paradise, p. 49 -Teacher Answer Master, p. 392 – Special Teacher Master: -Kelp Fish, p. 368 -Kelp Environment, p. 369 -Rocky Environment, p. 370 – Video: *Hawaii: Strangers in Paradise* – Assessment Chart for Investigation 8-10, p. 449 Assessment Scoring Guide: -Self Assessment: Quick Write on Adaptations, p. 430 -Student Sheet: Strangers in Paradise, p. 431 – *FOSS® Populations and Ecosystems Resource Book: Adaptations, p. 42-45* – *FOSS® Populations and Ecosystems CD-ROM / Multimedia:* -Organism Database -Octopus Color Change	**Science Materials Supplied by the Teacher** White paper Masking tape Paper clip **AV Equipment** • Extension cord • VCR with monitor • Multimedia set-up for CD-ROM

WEEK 8 (continued)

Lesson 37 (45 min) Investigation 8: 3 of 8 sessions

Objective(s):

Content

An adaptation is any trait of an organism that enhances its chances of surviving and reproducing in its environment.

Building Explanations

Explain how adaptations help organisms survive in an environment.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
p. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 228-229
taking note of
p. 229 Step 1. Prepare Fish on a Stick
p. 229 Step 2. Preview Multimedia
p. 229 Step 3. Plan Reading
p. 229 Step 4. Plan Two Video Sessions
p. 229 Step 5. Plan Assessment: Quick Write
p. 229 Step 6. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 8: *Adaptations*, Part 1: *Identifying Adaptations, Steps # 9-10*

– Teacher Guide pp. 230-233
– Student Lab Notebook: Strangers in Paradise, p. 49
-Teacher Answer Master, p. 392
– Special Teacher Master:
-Kelp Fish, p. 368
-Kelp Environment, p. 369
-Rocky Environment, p. 370
– Video: *Hawaii: Strangers in Paradise*
– Assessment Chart for Investigation 8-10, p. 449
Assessment Scoring Guide:
-Self Assessment: Quick Write on Adaptations, p. 430
-Student Sheet: Strangers in Paradise, p. 431

– *FOSS® Populations and Ecosystems Resource Book: Adaptations, p. 42-45*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*
-Organism Database
-Octopus Color Change

Science Materials Supplied by the Teacher

White paper
Masking tape
Paper clip

AV Equipment

- Extension cord
- VCR with monitor
- Multimedia set-up for CD-ROM

WEEK 8 (continued)

Lesson 38 (45 min) Investigation 8: 4 of 8 sessions

Objective(s):

Content

An adaptation is any trait of an organism that enhances its chances of surviving and reproducing in its environment.

Building Explanations

Explain how adaptations help organisms survive in an environment.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
p. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 228-229
taking note of
p. 229 Step 1. Prepare Fish on a Stick
p. 229 Step 2. Preview Multimedia
p. 229 Step 3. Plan Reading
p. 229 Step 4. Plan Two Video Sessions
p. 229 Step 5. Plan Assessment: Quick Write
p. 229 Step 6. Plan Assessment: Student Sheet

Investigation/Activity

Investigation 8: *Adaptations*, Part 1: *Identifying Adaptations, Step # 11*

– Teacher Guide pp. 230-233
– Student Lab Notebook: Strangers in Paradise, p. 49
-Teacher Answer Master, p. 392
– Special Teacher Master:
-Kelp Fish, p. 368
-Kelp Environment, p. 369
-Rocky Environment, p. 370
– Video: *Hawaii: Strangers in Paradise*
– Assessment Chart for Investigation 8-10, p. 449
Assessment Scoring Guide:
-Self Assessment: Quick Write on Adaptations, p. 430
-Student Sheet: Strangers in Paradise, p. 431

– *FOSS® Populations and Ecosystems Resource Book: Adaptations, p. 42-45*

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*
-Organism Database
-Octopus Color Change

Science Materials Supplied by the Teacher

White paper
Masking tape
Paper clip

AV Equipment

- Extension cord
- VCR with monitor
- Multimedia set-up for CD-ROM

WEEK 8 (continued)

Lesson 39 (45 min) Investigation 8: 5 of 8 sessions

Objective(s):

Content

- A feature is a structure, characteristic, or behavior of an organism, such as eye color, fur pattern, or timing of migration.
- A trait is the way a feature is expressed in an individual organism, such as brown eyes, small spots, or early migration.
- Variation is the range of expression of a feature within a population, such as the different eye colors, all the different fur patterns, and all of the dates on which migration starts.

Process / Conducting Investigations

- Use a multimedia simulation to investigate the adaptive value of protective coloration.
- Conduct simulated predator / prey interactions over multiple generations to investigate the effect of protective coloration on the color characteristics of a population of walking sticks.

Building Explanations

Describe how a population can change over time in response to environmental factors.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
pp. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 234-235
taking note of
p. 235 Step 1. Plan for Multimedia
p. 235 Step 2. Preview the Walking Stick Simulation
p. 235 Step 3. Plan Assessment: Self-Assessment
p. 235 Step 4. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 8: Adaptations, Part 2: Walking Sticks, Steps # 1-9

– Teacher Guide pp. 236-238

– Student Lab Notebook:
Walking Stick Predation: Bush Environment, p. 51
-Teacher Answer Master, p. 393
Five Generations of Walking Sticks, p. 52
Walking Sticks Population Graphs, p. 53

– Transparency No. 17 Walking Stick

– Transparency No. 18 Walking Stick Population Graph

– Transparency No. 19 Walking Sticks Populations after Five Generations

– Assessment Master, Mid-Summative Exam 8, p. 455-456
Assessment Chart for Investigation 8-10, p. 449
Assessment Scoring Guide:
-Self Assessment: Quick Write on Adaptations, p. 430
-Student Sheet: Strangers in Paradise, p. 431
-Mid-Summative Exam 8, p. 432-433

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*
-Walking Stick Predation

Science Materials Supplied by the Teacher

Colored pencils/pens

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 8 (continued)

Lesson 40 (45 min) Investigation 8: 6 of 8 sessions

Objective(s):

Content

- A feature is a structure, characteristic, or behavior of an organism, such as eye color, fur pattern, or timing of migration.
- A trait is the way a feature is expressed in an individual organism, such as brown eyes, small spots, or early migration.
- Variation is the range of expression of a feature within a population, such as the different eye colors, all the different fur patterns, and all of the dates on which migration starts.

Process / Conducting Investigations

- Use a multimedia simulation to investigate the adaptive value of protective coloration.
- Conduct simulated predator / prey interactions over multiple generations to investigate the effect of protective coloration on the color characteristics of a population of walkingsticks.

Building Explanations

Describe how a population can change over time in response to environmental factors.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving
- General Skills:
- Living Environment Skills
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
pp. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 234-235
taking note of
p. 235 Step 1. Plan for Multimedia
p. 235 Step 2. Preview the Walking Stick Simulation
p. 235 Step 3. Plan Assessment: Self-Assessment
p. 235 Step 4. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 8: *Adaptations*, Part 2: *Walking Sticks, Steps # 10-12*

– Teacher Guide pp. 236-238

– Student Lab Notebook:
Walkingstick Predation: Bush Environment, p. 51
-Teacher Answer Master, p. 393
Five Generations of Walking Sticks, p. 52
Walkingsticks Population Graphs, p.53

– Transparency No. 17 Walking Stick

– Transparency No. 18 Walking Stick Population Graph

– Transparency No. 19 Walking Sticks Populations after Five Generations

– Assessment Master, Mid-Summative Exam 8, p. 455-456
Assessment Chart for Investigation 8-10, p. 449
Assessment Scoring Guide:
-Self Assessment: Quick Write on Adaptations, p. 430
-Student Sheet: Strangers in Paradise, p. 431
-Mid-Summative Exam 8, p. 432-433

– *FOSS® Populations and Ecosystems CD-ROM / Multimedia:*
-Walking Stick Predation.

Science Materials Supplied by the Teacher

Colored pencils/pens

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

WEEK 9

Lesson 41 (45 min) Investigation 8: 7 of 8 sessions

Objective(s):

Content

- A feature is a structure, characteristic, or behavior of an organism, such as eye color, fur pattern, or timing of migration.
- A trait is the way a feature is expressed in an individual organism, such as brown eyes, small spots, or early migration.
- Variation is the range of expression of a feature within a population, such as the different eye colors, all the different fur patterns, and all of the dates on which migration starts.

Process / Conducting Investigations

- Use a multimedia simulation to investigate the adaptive value of protective coloration.
- Conduct simulated predator / prey interactions over multiple generations to investigate the effect of protective coloration on the color characteristics of a population of walking sticks.

Building Explanations

Describe how a population can change over time in response to environmental factors.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 "At A Glance"
pp. 222-226 Scientific and Historical Background
pp. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 234-235
taking note of
p. 235 Step 1. Plan for Multimedia
p. 235 Step 2. Preview the Walking Stick Simulation
p. 235 Step 3. Plan Assessment: Self-Assessment
p. 235 Step 4. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 8: *Adaptations*, Part 2: *Walking Sticks, Steps # 13-21*

– Teacher Guide pp. 236-238
– Student Lab Notebook:
Walking Stick Predation: Bush Environment, p. 51
-Teacher Answer Master, p. 393
– Five Generations of Walking Sticks, p. 52
Walking Sticks Population Graphs, p.53
– Transparency No. 17 Walking Stick
– Transparency No. 18 Walking Stick Population Graph
– Transparency No. 19 Walking Sticks Populations after Five Generations
– Assessment Master, Mid-Summative Exam 8, p. 455-456
Assessment Chart for Investigation 8-10, p. 449

Continued

Science Materials Supplied by the Teacher

Colored pencils/pens

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

		Assessment Scoring Guide: -Self Assessment: Quick Write on Adaptations, p. 430 -Student Sheet: Strangers in Paradise, p. 431 -Mid-Summative Exam 8, p. 432-433 – *FOSS® Populations and Ecosystems CD-ROM / Multimedia:* -Walking Stick Predation **Extending the Experience:** Teacher Guide p. Consider these enrichment activities AT ANY TIME DURING THE MODULE. These experiences that follow many investigations may be suitable for enrichment, homework or for a lesson plan to be delivered by a substitute teacher when a hands-on investigation may not be appropriate.	

WEEK 9 (continued)

Lesson 42 (45 min) Investigation 8: 8 of 8 sessions

Objective(s):

Content

- A feature is a structure, characteristic, or behavior of an organism, such as eye color, fur pattern, or timing of migration.
- A trait is the way a feature is expressed in an individual organism, such as brown eyes, small spots, or early migration.
- Variation is the range of expression of a feature within a population, such as the different eye colors, all the different fur patterns, and all of the dates on which migration starts.

Process / Conducting Investigations

- Use a multimedia simulation to investigate the adaptive value of protective coloration.
- Conduct simulated predator / prey interactions over multiple generations to investigate the effect of protective coloration on the color characteristics of a population of walking sticks.

Building Explanations

Describe how a population can change over time in response to environmental factors.

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Teacher Guide Overview, pp. 219-227
taking note of:
pp. 220-221 Inv. 8 “At A Glance”
pp. 222-226 Scientific and Historical Background
pp. 227 Why Do I Have to Learn This?

– Teacher Guide Materials & Getting Ready, pp. 234-235
taking note of
p. 235 Step 1. Plan for Multimedia
p. 235 Step 2. Preview the Walking Stick Simulation
p. 235 Step 3. Plan Assessment: Self-Assessment
p. 235 Step 4. Plan Mid-Summative Assessment

Investigation/Activity

Investigation 8: *Adaptations*, Part 2: *Walking Sticks, Steps # 22-23*

– Teacher Guide pp. 236-238

– Student Lab Notebook:
Walking Stick Predation: Bush Environment, p. 51
-Teacher Answer Master, p. 393

– Five Generations of Walking Sticks, p. 52
Walking Sticks Population Graphs, p.53

– Transparency No. 17 Walking Stick

– Transparency No. 18 Walking Stick Population Graph

– Transparency No. 19 Walking Stick Populations after Five Generations

Continued

Science Materials Supplied by the Teacher

Colored pencils/pens

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

		– Assessment Master, Mid-Summative Exam 8, p. 455-456 Assessment Chart for Investigation 8-10, p. 449 Assessment Scoring Guide: -Self Assessment: Quick Write on Adaptations, p. 430 -Student Sheet: Strangers in Paradise, p. 431 -Mid-Summative Exam 8, p. 432-433 – *FOSS® Populations and Ecosystems CD-ROM / Multimedia:* -Walking Stick Predation.	

Grade 6

Investigations 9 & 10 of the FOSS® Populations and Ecosystems course are not included in the NYC Grade 6 Scope & Sequence

WEEK 9 (continued)

Lesson 43 (45 min) Final Summative Assessment

Objective(s):

Post-Assessment

Alignment with NYS Core Curriculum:

- Expanded Process Skills: ICT
- Interdisciplinary Problem Solving:
- General Skills:
- Living Environment Skills:
- Physical Setting Skills:
- Living Environment:
- Physical Science:

Advanced Planning/ Notes to Teachers

– Consider a Review Session before giving the Final Summative Exam.

– Plan on a full session for the exam

– **Omit Exam Questions # 3, 7, 21, 22, 23 pertaining to Investigations 9 & 10**

Investigation/Activity

– Assessment Master, p. 459-463:

– Assessment Chart for Final Summative Assessment
Final Assessment, pp. 469-474
Assessment Scoring Guide, pp. 446-451

Science Materials Supplied by the Teacher

AV Equipment

- Extension cord
- Overhead projector

	2008 Est. date Blend: April 9 **26 remaining lessons available for Supplementary Lessons and Microscope Skills from Diversity of Life**	2008 Est. date Kit: May 6 **14 remaining lessons available for Supplementary Lessons and Microscope Skills from Diversity of Life**
WEEK 9 (continued)	**Lesson 44** (45 min) **Objective(s):** **Content** **Process / Conducting Investigations** **Building Explanations**	**Alignment with NYS Core Curriculum:** • Expanded Process Skills: ICT • Interdisciplinary Problem Solving: • General Skills: • Living Environment Skills: • Physical Setting Skills: • Living Environment: • Physical Science:

Advanced Planning/ Notes to Teachers	Investigation/Activity	Science Materials Supplied by the Teacher
– Teacher Guide Overview, pp. – Teacher Guide Materials & Getting Ready, pp.		**AV Equipment** • Extension cord • Overhead projector

Grade 6

WEEK 9 (continued)	**Lesson 45** (45 min)		**Alignment with NYS Core Curriculum:**
	Advanced Planning/ Notes to Teachers	**Investigation/Activity**	**Science Materials Supplied by the Teacher**
WEEK 10	**Lesson 46** (45 min)		
	Lesson 47 (45 min)		
	Lesson 48(45 min)		
	Lesson 49 (45 min)		
	Lesson 50 (45 min)		

Grade 6

WEEK 11	**Lesson 51** (45 min)		
	Lesson 52 (45 min)		
	Lesson 53 (45 min)		
	Lesson 54 (45 min)		
	Lesson 55 (45 min)		
WEEK 12	**Lesson 56** (45 min)		
	Lesson 57 (45 min)		

Grade 6

			2008 Kit Option — anticipated end of year benchmark
WEEK 12 (continued)	**Lesson 58** (45 min)		
	Lesson 59 (45 min)		
	Lesson 60 (45 min)		
WEEK 13	**Lesson 61** (45 min)		
	Lesson 62 (45 min)		
	Lesson 63 (45 min)		
	Lesson 64 (45 min)		

Grade 6

WEEK 13 (continued)	**Lesson 65** (45 min)		
WEEK 14	**Lesson 66** (45 min)		
	Lesson 67 (45 min)		
	Lesson 68 (45 min)		
	Lesson 69 (45 min)		
	Lesson 70 (45 min)		
	2008 Blend Option — anticipated end of year benchmark		
	Lesson xx (45 min)		