



General Biology - Part 2

Michigan State High School Science Content Expectations

Course Description

Biology 2 will begin by discussing the microscopic forms of life known as viruses, bacteria, and fungi. After gaining an understanding of the simpler forms of life, we will move on to discuss the higher forms of life represented by the plants and animals. We will begin with the simplest forms of each kingdom and move on to the more complex.

Text Book

Campbell, Neil L., Robin J. Heyden, and Brad Williamson.

Biology: Exploring Life. Upper Saddle River:

Pearson-Prentice Hall, 2004.

Unit 1 Description

This unit will deal with the invisible world of microbes. For the most part, these organisms are invisible to the naked eye. The prokaryotes that we will be studying include the bacteria viruses and the protists. These organisms can be considered to be the simplest of living things, yet they exhibit all the functions of far more complex organisms.

Essential Content and Skills

The learner will:

- Identify the two domains of prokaryotes.
- Describe the three physical features that are used to classify prokaryotes.
- Describe the four modes of nutrition and identify which one cyanobacteria use.
- Explain how prokaryotes recycle chemicals between organic matter and the nonliving environment.
- Describe the ways prokaryotes are helpful to humans.
- Describe the ways in which bacteria cause illness.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

- Identify the way humans defend against bacterial diseases.
- Describe the structure and reproduction of viruses.
- Explain how viruses cause diseases.
- Explain how humans defend against viral diseases.
- Describe the life cycle of a retrovirus.
- Describe the characteristics that all protists have in common.
- Explain why certain unicellular protists can be considered the most complex of all cells.
- Identify three types of nutrition among protists.
- Study the means of locomotion in common protists.
- Describe the life cycle of protists lacking the ability to move.
- Describe the general characteristics of plasmodial slime molds.
- Summarize the life cycle of a slime mold.
- Describe the characteristics of water molds and downy mildews.
- Describe the characteristics of euglenoids and dinoflagellates.
- Distinguish diatoms from other photosynthetic protists.
- Compare and contrast the three types of seaweed.
- Describe the basic structure of fungi.
- Explain the function of spores in fungal reproduction.
- Compare and contrast the zygote fungi, sac fungi, and club fungi.
- Distinguish the yeasts from other groups of fungi.
- Explain how molds differ in lifestyle from other fungi.
- Describe two examples of symbiotic fungi.
- Identify some fungal diseases of plants and of humans.
- Describe some human uses of fungi.

Unit 1 Michigan State Content Expectations

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Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 1 Lesson 1: Bacterial Classification

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
B2.4h	Describe the structures of viruses and bacteria.

Unit 1 Lesson 2: The Role of Prokaryotes - Good and Bad

State Standard	Description
B2.4g	Explain that some structures in the modern eukaryotic cell developed from early prokaryotes, such as mitochondria, and in plants, chloroplasts.

Unit 1 Lesson 3: Viruses

State Standard	Description
B2.4h	Describe the structures of viruses and bacteria.
B2.4i	Recognize that while viruses lack cellular structure, they have the genetic material to invade living cells.

Unit 1 Lesson 4: Characteristics of Protists

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)

Unit 1 Lesson 5: Molds and Mildews

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L3.p2C	Describe the role of decomposers in the transfer of energy in an ecosystem. (prerequisite)
B3.3A	Use a food web to identify and distinguish producers, consumers, and decomposers and explain the transfer of energy through trophic levels.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 1 Lesson 6: Photosynthetic Algae - Part 1

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
B3.1A	Describe how organisms acquire energy directly or indirectly from sunlight.

Unit 1 Lesson 7: Photosynthetic Algae - Part 2

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
B3.1A	Describe how organisms acquire energy directly or indirectly from sunlight.

Unit 1 Lesson 8: Structure, Function, and Reproduction of Algae

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)

Unit 1 Lesson 9: Diversity in the Fungi Kingdom

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
L3.p2C	Describe the role of decomposers in the transfer of energy in an ecosystem. (prerequisite)
L3.p2D	Explain how two organisms can be mutually beneficial and how that can lead to interdependency. (prerequisite)

Unit 1 Lesson 10: The Good and the Bad

State Standard	Description
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Course Name - Part

Michigan State Curriculum Content Standards (continued)

L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L3.p2C	Describe the role of decomposers in the transfer of energy in an ecosystem. (prerequisite)
B3.3A	Use a food web to identify and distinguish producers, consumers, and decomposers and explain the transfer of energy through trophic levels.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Description

This unit will deal with the plant kingdom. We will learn about the diversity of the members of this kingdom and then concentrate on the most successful members of this group, the flowering plants. We will study the adaptations that all plants have made to exist in the varying environments of our earth.

Essential Content and Skills

The learner will:

- Describe four challenges to plants living on land.
- Identify the four major groups of plants.
- Explain the phrase "alternation of generations."
- Contrast the two generations of a bryophyte.
- Describe three groups of bryophytes.
- Describe the characteristics of a pteridophyte.
- Name the three groups of pteridophytes.
- Describe three plant adaptations that evolved in gymnosperms.
- List the four major groups of gymnosperms.
- Describe three plant adaptations that evolved in gymnosperms.
- List the four major groups of gymnosperms.
- Describe two unique features of angiosperms.
- Describe ways that humans depend on angiosperms.
- Relate the structures of a flower to their reproductive functions.
- Describe various means of seed dispersal.
- Contrast mechanisms of seed germination.
- List three types of life expectancies for plants.
- Describe root and shoot structures and functions.
- Describe three main plant tissue systems.
- Identify the locations of meristematic tissue in a plant.
- Compare primary growth in a root and a shoot.
- Identify the two meristematic tissues.
- Describe how tree rings form.
- List the three sources of a plant's mass.
- List some mineral nutrients important to plants.
- Trace the path of nitrogen from the atmosphere to a plant's roots.
- List the typical contents of fertilizers.
- Explain how water and minerals from the soil reach the xylem of a root.
- Describe how water moves through the xylem to leaves.
- Explain how water loss from a plant is regulated.
- Trace the path of sugar movement in phloem.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Michigan State Content Expectations

Unit 2 Lesson 1: Introduction to Plants

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 2: Mosses and Ferns

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 3: Gymnosperms

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 4: Angiosperms - The Flowering Plants

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 5: Structural Adaptations of Angiosperms

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Lesson 6: Primary Plant Growth

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 7: Secondary Plant Growth

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 8: Plant's Nutritional Needs

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 9: Movement of Plant Nutrients

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Unit 2 Lesson 10: Weird Plants

State Standard	Description
L2.p3B	Explain the origins of plant mass. (prerequisite)
L2.p3C	Predict what would happen to plants growing in low carbon dioxide atmospheres. (prerequisite)
L2.p3D	Explain how the roots of specific plants grow. (prerequisite)

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Description

This unit will explore the animal kingdom. Starting with the simplest of invertebrates, the sponges, and ending with the most complex vertebrates, the mammals, we will investigate the grand diversity that exists in the animal kingdom. You will understand how all animals can be so different but yet so closely dependent upon each other for their very existence.

Essential Content and Skills

The learner will:

- List four general characteristics of animals.
- Compare and contrast vertebrates and invertebrates.
- Describe the general characteristics of sponges.
- Identify characteristics that vary among diverse sponges.
- Describe the general characteristics of cnidarians.
- Compare and contrast the body structure of a hydra with that of a marine jelly.
- Describe the general characteristics of flatworms.
- Describe three classes of flatworms.
- Describe the digestive system of a roundworm.
- List the diverse habitats of roundworms.
- Compare roundworms and rotifers.
- Describe body segmentation in annelids.
- Identify three classes of annelids.
- Describe the characteristics common to mollusks.
- Describe the characteristics of echinoderms.
- Compare and contrast three different classes of echinoderms.
- Describe the geologic time scale.
- Explain the meaning of the phrase "Cambrian explosion."
- List the general characteristics of arthropods.
- Name the main groups of arthropods, both living and extinct.
- List the general characteristics of arachnids.
- Compare and contrast the three main groups of arachnids.
- List the characteristics of decapods.
- Contrast the habitats of barnacles, copepods, and isopods.
- Summarize the general characteristics of insects.
- List eight major insect orders.
- Explain some positive and negative impacts of insects on human populations.
- Describe four unique characteristics of chordates.
- Distinguish invertebrate chordates from other invertebrates.
- Describe the general characteristics of vertebrates.
- Identify the main groups of vertebrates.
- Compare and contrast cartilaginous and bony fishes.
- Describe some adaptations of sharks and rays.
- Describe the general characteristics of bony fishes.
- Compare and contrast three groups of bony fishes.
- Describe the "double life" of frogs.
- Describe the diet and habitat of salamanders.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Michigan State Content Expectations

Unit 3 Lesson 1: Sponges, Jellyfish, Hydras, Anemones, and Coral

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 3 Lesson 2: Worms-Flat, Round, and Segmented

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences..

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 3: Snails, Clams, and Octopi

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 3 Lesson 4: Starfish and Their Spiny Relatives

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 5: Animal Diversity and the Cambrian Period

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 3 Lesson 6: Spiders, Lobsters, and Other Arthropods

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 7: Insects

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 3 Lesson 8: Chordate Characteristics

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 9: The Bony Fishes

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 3 Lesson 10: Frogs and Other Amphibians

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Description

Unit 4 Description

This unit will discuss the reptiles, birds, and mammals. The course will conclude with the study of ecology and the intertwining relationship of all life.

Essential Content and Skills

The learner will:

- Identify three main characteristics of amniotes.
- Describe the general characteristics of reptiles.
- Describe the reptiles that dominated the Mesozoic Era.
- Name and describe three groups of modern reptiles.
- List some general characteristics of birds.
- Describe the most widely accepted hypothesis of the origin of birds.
- Describe various bird adaptations.
- Describe the general characteristics of mammals.
- Explain the most widely accepted hypothesis for the origin of mammals.
- Describe the key characteristics of the three main groups of mammals.
- Describe some general characteristics of primates.
- Describe the five levels of ecological study.
- Explain how the patchiness of the biosphere creates different habitats.
- Identify key abiotic factors.
- Explain how the sun heats Earth's surface unevenly.
- Describe global patterns of wind, precipitation, and ocean currents.
- Distinguish between local climates and microclimates.
- Describe what defines a biome.
- List and describe eight major terrestrial biomes.
- Compare and contrast ponds, streams, and estuaries.
- Compare conditions and typical organisms in the intertidal, neritic, and oceanic zones.
- Describe the abiotic and biotic factors that characterize coral reefs and hydrothermal vent communities.

Unit 4 Michigan State Content Expectations

Unit 4 Lesson 1: Reptiles

State Standard	Description

Course Name - Part

Michigan State Curriculum Content Standards (continued)

L2.p4A	<p>Classify different organisms based on how they obtain energy for growth and development. (prerequisite)</p> <p>Explain how an organism obtains energy from the food it consumes. (prerequisite)</p> <p>Define a species and give examples. (prerequisite)</p> <p>Define a population and identify local populations. (prerequisite)</p> <p>Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.</p> <p>Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.</p> <p>Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)</p> <p>Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)</p> <p>Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.</p> <p>Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.</p>
L2.p4B	
L5.p1A	
L5.p1B	
B2.2g	
B2.3B	
L3.p2A	
L3.p2B	
B5.2a	
B5.2b	

Unit 4 Lesson 2: Birds

State Standard	Description
L2.p4A	<p>Classify different organisms based on how they obtain energy for growth and development. (prerequisite)</p> <p>Explain how an organism obtains energy from the food it consumes. (prerequisite)</p> <p>Define a species and give examples. (prerequisite)</p> <p>Define a population and identify local populations. (prerequisite)</p> <p>Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.</p> <p>Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.</p> <p>Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)</p> <p>Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)</p> <p>Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.</p> <p>Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.</p>
L2.p4B	
L5.p1A	
L5.p1B	
B2.2g	
B2.3B	
L3.p2A	
L3.p2B	
B5.2a	
B5.2b	

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Lesson 3: Mammals

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 4 Lesson 4: Primates-1

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Lesson 5: Primates-2

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 4 Lesson 6: Biosphere

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Lesson 7: Global Ecosystem

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 4 Lesson 8: Climates

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Lesson 9: Terrestrial Ecosystems

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Unit 4 Lesson 10: Aquatic Ecosystems

State Standard	Description
L2.p4A	Classify different organisms based on how they obtain energy for growth and development. (prerequisite)
L2.p4B	Explain how an organism obtains energy from the food it consumes. (prerequisite)
L5.p1A	Define a species and give examples. (prerequisite)
L5.p1B	Define a population and identify local populations. (prerequisite)
B2.2g	Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.
B2.3B	Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.
L3.p2A	Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. (prerequisite)
L3.p2B	Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). (prerequisite)
B5.2a	Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.
B5.2b	Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.

Course Name - Part

Michigan State Curriculum Content Standards (continued)
