

Michigan Curriculum Framework



III: Use Scientific Knowledge from the Life Sciences

Elementary

Reference	Content Standards	Wetlands (with teacher support)	Rainforest (with teacher support)
1. All students will apply an understanding of cells to the functioning of multicellular organisms; and explain how cells grow, develop and reproduce. (Cells)			
1.1	Describe cells as living systems	Use Organisms & Migration for examples	Use Organisms for examples
2. All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles; investigate and explain how living things obtain and use energy; analyze how parts of living things are adapted to carry out specific functions. (Organization of Living Things)			
2.1	Compare and classify familiar organisms on the bases of observable physical characteristics.	Use Organisms & Migration for examples	Use Organisms for examples
2.2	Describe vertebrates in terms of observable body parts and characteristics.	Use Organisms & Migration for examples	Use Organisms for examples
2.3	Describe life cycles of familiar organisms.	Organisms & Migration: life cycle	Organisms: Life cycle
2.4	Compare and contrast food, energy and environmental needs of selected organisms.	Organisms & Migration, Producers, Consumers, Decomposers, Food Chain, Web Energy, Food Web Game, Adaptations	Organisms, Dependency Web, Food, Habitat, Seed Dispersal, Pollination, Web Game
2.5	Describe functions of selected seed plant parts.	Use Organisms for examples	Organisms, Seed Dispersal, Botany: Seeds
3. All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes. (Heredity)			
3.1	Give evidence that characteristics are passed from parents to young.	Organisms & Migration for examples	Organisms for examples

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4. All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted to survive and reproduce in their environments; and analyze how species change through time. (Evolution)			
4.2	Explain how physical and/or behavioral characteristics of organisms help them to survive in their environments.	Plant & Animal Adaptations, Organisms, Migration	Organisms, Niches, Cryptic Coloration, Startle Display, Eyespots, Eyeshine, Warning & Mimicry
5. All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact. (Ecosystems)			
5.1	Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web.	Habitat, Food Chain, Food Web, Web Game, Producers, Consumers, Decomposers, Organisms, Migration,	Organisms, Dependency Web Game, Food
5.2	Explain common patterns of interdependence and interrelationships of living things.	Organisms, Migration, Habitat, Food Chain, Food Web, Web Game, Producers, Consumers, Decomposers	Organisms, Dependency Web Game, Food, Habitat, Seed Dispersal, Pollination, Niches
5.3	Describe the basic requirements for all living things to maintain their existence.	Organisms & Migration: Food Source	Organisms, Dependency Web Game, Food, Habitat, Seed Dispersal, Pollination
5.5	Describe positive and negative effects of humans on the environment.	Conservation, Pollution	Impact Screens, Rainforest Riches

Michigan Curriculum Framework



III: Use Scientific Knowledge from the Life Sciences

Middle School

Reference	Content Standards	Wetlands	Rainforest	The Digital Frog 2
1. All students will apply an understanding of cells to the functioning of multicellular organisms; and explain how cells grow, develop and reproduce. (Cells)				
1.1	Describe similarities/differences between single-celled and multicellular organisms.	Use Organisms & Migration for examples	Use Organisms for examples, Botany: Algae, Bacteria, Fungi	
1.2	Explain why specialized cells are needed by plants and animals.	Use Organisms & Migration for examples	Use Organisms for examples	Use Cardiac Muscle, Smooth Muscle, Skeletal Muscle for examples
1.3	Explain how cells use food as a source of energy.	Food Chains, Photosynthesis, Producers, Consumers, Decomposers		
2. All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles; investigate and explain how living things obtain and use energy; analyze how parts of living things are adapted to carry out specific functions. (Organization of Living Things)				
2.1	Compare and classify organisms into major groups on the basis of their structure.	Organisms & Migration include taxonomy for each organism	Organism Screens	
2.2	Describe the life cycle of a flowering plant.	Use Plant Organisms for examples	Use Plant Organisms for examples, Botany Screens (with teacher support)	
2.3	Describe evidence that plants make and store food.	Photosynthesis, Producers, Organisms: plants & algae	Botany Screens: Leaves	
2.4	Explain how selected systems and processes work together in plants and animals.	Food Chain, Producers, Consumers, Decomposers, Nutrient Cycles		Interacting Systems

Michigan Curriculum Framework



III: Use Scientific Knowledge from the Life Sciences

Middle School

Reference	Content Standards	Wetlands	Rainforest	The Digital Frog 2
3. All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes. (Heredity)				
3.1	Describe how the characteristics of living things are passed on through generations.	Plant & Animal Adaptations, Organisms & Migration as examples	Organisms, New Species, How Species Change	
3.2	Describe how heredity and environment may influence/determine characteristics of an organism.	Plant & Animal Adaptations, Organisms & Migration as examples	Organisms, New Species, How Species Change	
5. All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact. (Ecosystems)				
5.1	Describe common patterns of relationships among populations.	Producers, Consumers, Decomposers, Organisms, Migration	Dependency Types, Dependency Web, Food, Habitat, Seed Dispersal, Pollination, Ant Symbiosis	
5.2	Predict the effects of changes in one population in a food web on other populations.	Organisms, Migration for examples, Web Game	Organisms for examples, Web Game	
5.3	Describe how all organisms in an ecosystem acquire energy directly or indirectly from sunlight.	Food Chain, Food Web, Producers, Consumers, Decomposers, Web Game		
5.4	Describe the likely succession of a given ecosystem over time.	Succession and Formation	Succession, Tree Fall Gaps, Soils & Decomposition, Seasonality, Productivity	
5.5	Identify some common materials that cycle through the environment.	Photosynthesis, Nutrient cycles: carbon, water, nitrogen, phosphorus	Water Cycle, Productivity, Soils & Decomposition	
5.6	Describe ways in which humans alter the environment	Conservation, Pollution	Human Impact, Impact Screens, Rainforest Riches, Global Benefits	Environmental Concerns
5.7	Explain how humans use and benefit from plant and animal materials.	Conservation for examples	Impact Screens, Rainforest Riches	

Michigan Curriculum Framework



III: Use Scientific Knowledge from the Life Sciences

High School

Reference	Content Standards	Wetlands	Rainforest	Digital Frog 2
1. All students will apply an understanding of cells to the functioning of multicellular organisms; and explain how cells grow, develop and reproduce. (Cells)				
1.1	Classify cells/organisms on the basis of organelle and/or cell types.	Organisms & Migration for examples	Organisms for examples	Smooth muscle, Cardiac Muscle, Skeletal Muscle
1.3	Explain why specialized cells are needed by plants and animals.	Organisms & Migration for examples	Organisms for examples	Smooth muscle, Cardiac Muscle, Skeletal Muscle
1.4	Compare and contrast the chemical composition of selected cell types.			Use Respiration, Neurotransmitter, Creating Impulses, Reflex Arc, Synapse for examples
1.5	Compare the transformations of matter and energy during photosynthesis and respiration.	Photosynthesis		Respiration
1.6	Explain how essential materials move into cells and how waste and other materials get out.			Respiration
2. All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles; investigate and explain how living things obtain and use energy; analyze how parts of living things are adapted to carry out specific functions. (Organization of Living Things)				
2.1	Classify major groups of organisms on the basis of the five-kingdom system.	Organisms and Migration include taxonomy	Use Organisms for examples	
2.2	Describe the life cycle of a flowering plant.	Use plant Organism Screens for examples	Use plant Organism Screens for examples, Botany Screens	
2.3	Describe evidence that plants make and store food.	Photosynthesis, Producers, Organisms: plants, algae	Botany Screens: leaves, algae	

Michigan Curriculum Framework



III: Use Scientific Knowledge from the Life Sciences

High School

Reference	Content Standards	Wetlands	Rainforest	The Digital Frog 2
3. All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes. (Heredity)				
3.1	Explain how characteristics of living things are passed on from generation to generation.	Adaptations, use Organisms & Migration for examples	Use Organisms for examples, Biodiversity, Biodiversity Screens	
3.2	Describe how genetic material is passed from parent to young during sexual and asexual reproduction	Use Organisms & Migration for examples	Use Organisms for examples	
3.3	Explain how new traits may be established in individuals/populations through changes in genetic material		Biodiversity Screens: Species, Species Change	
4. All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted to survive and reproduce in their environments; and analyze how species change through time. (Evolution)				
4.1	Describe what biologists consider to be evidence for human evolutionary relationships to selected animal groups			Human comparison screens can be found throughout the anatomy section
4.2	Explain how a new species or variety may originate through the evolutionary process of natural selection	Use Organisms & Migration for examples	Use Organisms for examples, Biodiversity Screens: Species, Species Change	
4.3	Explain how new traits might arise and become established in a population		Use Organisms for examples, Biodiversity Screens: Species, Species Change	

Michigan Curriculum Framework



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5. All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment; and analyze how humans and the environment interact. (Ecosystems)				
5.1	Describe common ecological relationships among species	Food Chain, Food Web, Web Game, Producers, Consumers, Decomposers	Dependency Web, Food, Habitat, Seed Dispersal, Pollination, Web Game	
5.2	Explain how energy flows through familiar ecosystems	Food Chain, Food Web, Web Game, Producers, Consumers, Decomposers		
5.3	Describe general factors regulating population size in ecosystems	Habitat, Organisms & Migration for examples	Organisms for examples, Food, Habitat	
5.4	Describe responses of an ecosystem to events that cause it to change	Wetlands Mechanisms	Rainforest Mechanisms	
5.5	Describe how water, carbon dioxide, and soil nutrients cycle through selected ecosystems	Nutrient Cycles	Soils & Decomposition, Water Cycle, Productivity	
5.6	Explain the effects of agriculture and other human activities on selected ecosystems	Conservation, Pollution	Human Impact, Impact Screens, Rainforest Riches	Environmental Concerns, Adopt-a-Pond