

Ontario Life Systems Strand - Grade 5

Human Organ Systems

Expectations	The Digital Frog (to be used as a comparison)
Students will:	
Demonstrate an understanding of the structure and function of the respiratory, circulatory, digestive, excretory and nervous systems and how they interact	Respiratory, Circulatory, Digestive, Excretory and Nervous systems are found in the Anatomy section
Investigate the structure and function of the major organs of the respiratory, circulatory, digestive, excretory and nervous system	Respiratory, Circulatory, Digestive, Excretory and Nervous systems are found in the Anatomy section
Describe the basic structure and function of the major organs in all systems	Dissection shows the organ structures; Anatomy section shows functions.
Describe, using models and simulations, ways in which the skeletal, muscular system and nervous systems work together to produce movement	Anatomy section: Musculoskeletal and Nervous systems, Systems Interactions: How Do Frogs Move?
Identify the skin as an organ and explain its purpose	Anatomy section: The Skin
Explain what happens to excess nutrients not immediately used by the body	Anatomy section: Excretory and Digestive systems
Describe the components of the body's system of defense against infection	Anatomy section: Immune System: Blood, Thymus, Spleen, Skin, Bone

Ontario Life Systems Strand - Grade 6

Diversity of Living Things

Expectations	The Digital Frog
Students will:	
Demonstrate an understanding of ways in which classification systems are used to understand the diversity of living things	Ecology Section: Biodiversity, Frogs vs. Toads
Investigate classification systems and some of the common life processes	Ecology Section: Biodiversity, Behavior: Mating, Vocalization, Hibernation, Feeding
Explain why formal classification systems are based on structural characteristics rather than physical or behavioral characteristics	Ecology Section: Biodiversity, Frogs vs. Toads
Recognize differences between cold- and warm-blooded animals in regulating body temperature	Ecology section: Behavior: Hibernation
Compare the characteristics of vertebrates and invertebrates	use Anatomy section: Musculoskeletal for vertebrate example
Identify classification systems and the specific criteria used to organize information	Ecology section: Frogs vs. Toads
Identify inherited characteristics and learned or behavioral characteristics	Ecology section: Behavior: Hibernation, Feeding, Mating
Describe specific characteristics or adaptations that enable each group of vertebrates to live in its particular habitat and explain the importance of maintaining that habit for the survival of the species	Ecology section: Adopt a Pond: Create a Pond

Ontario Life Systems Strand - Grade 7

Interactions with Ecosystems

Expectations	The Digital Frog
Students will:	
Demonstrate an understanding of the effects of human activities, technological innovations and naturally occurring changes on the sustainability of ecosystems	Ecology section: Environmental Concerns, Adopt-a-Pond
Identify living and non-living elements in an ecosystem	Ecology section: Create a Pond, Niches
Identify populations of organisms within an ecosystem and the factors that contribute to their survival	Ecology section: Biodiversity, Create a Pond
Explain the long term effects of the loss of natural habitats and the extinction of species	Ecology section: Adopt a Pond, Environmental Concerns
Identify and explain economic, environmental and social factors that should be considered in the management and preservation of habitats	Ecology section: Adopt a Pond, Environmental Concerns

Ontario Life Systems Strand - Grade 8

Cells, Tissues, Organs and Systems

Expectations	The Digital Frog
Students will:	
Describe, using their observations, differences in structure between plant and animal cells	Anatomy: section see Cellular Division, Cardiac Muscle Cells for animal cell example
Recognize that cells in multicellular organisms need to reproduce to make more cells to form and repair tissues	Anatomy section: Blood, Cellular Division
Describe, using observation, the movement of gases and water during diffusion and osmosis	Anatomy section : Skin, Respiration, Circulation (capillaries)
Describe the needs and functions of cells and organs in relationship to the needs of the human body as a whole	Anatomy section: Respiratory, Circulatory, Digestive, Excretory, Endocrine, Nervous systems
Describe the factors that contribute to the functioning of the five basic human systems	Anatomy section: Respiratory, Circulatory, Digestive, Excretory, Endocrine, Nervous systems
Describe some ways in which the various systems in the human body are interdependent	Anatomy sections: Interacting Systems, How Do Frogs Eat?, How Do Frogs Move?, How Do Frogs Mate?, Respiratory, Circulatory, Digestive, Excretory, Endocrine, Nervous systems
Describe similar and different functions of comparable structures in different groups of living things	see Human Comparison throughout Anatomy sections
Describe ways in which substances work by altering cellular functions	Anatomy section: Respiratory, Circulatory, Digestive, Excretory, Endocrine, Nervous systems
Describe ways in which various types of cells contribute to the healthy functioning of the human body	Anatomy section: Blood, Cellular Division, Skin, Cardiac Muscle, Smooth Muscle, Skeletal Muscle
Illustrate how blood is pushed by pressure throughout the body to carry oxygen and nutrients to the cells, tissues and organs	Anatomy section: Heart, Veins, Arteries

Grade 9 Academic Biology: Reproduction

Expectations	The Digital Frog
Students will:	
describe cell theory, and apply it to processes of cell division, including mitosis, and the function of sexual (including human) and asexual reproductive systems	Anatomy section: Urogenital System: Cellular Division: Mitosis, Meiosis
investigate and analyse cell division and factors affecting cell reproduction;	Anatomy section: Urogenital System: Cellular Division: Mitosis, Meiosis
describe cell division, including mitosis, as part of the cell cycle, including the roles of the nucleus, cell membrane, and organelles (e.g., stages of mitosis – prophase, metaphase, anaphase, and telophase);	Anatomy section: Urogenital System: Cellular Division: Mitosis, Meiosis
describe and give examples of types of sexual reproduction that occur in plants and in animals, including hermaphrodites (e.g., conjugation, cross-fertilization, internal and external fertilization);	Ecology: Behavior: Mating (as an example), Anatomy: Urogenital System: Cellular Division: Meiosis
demonstrate an understanding of the process of cell division, including mitosis, and the function of sexual (including human) and asexual reproductive systems.	Anatomy section: Urogenital System: Cellular Division: Mitosis, Meiosis
describe the basic process of cell division, including what happens to the cell membrane and the contents of the nucleus (e.g., stages of mitosis – prophase, metaphase, anaphase, and telophase)	Anatomy section: Urogenital System: Cellular Division: Mitosis, Meiosis
demonstrate an understanding of the importance of cell division to the growth and reproduction of an organism (e.g., describe changes in cell division in an organism during its lifespan)	Anatomy: Urogenital System: Cellular Division: Mitosis, Meiosis
describe the various types of sexual reproduction that occur in plants and in animals, and identify some plants and animals, including hermaphrodites, that exhibit this type of reproduction (e.g., conjugation, cross-fertilization, internal and external fertilization)	Ecology: Behavior: Mating (as an example)
compare sexual and asexual reproduction (e.g., asexual reproduction does not require a partner and can take place whenever environmental conditions such as food, warmth, and moisture are suitable)	Ecology: Behavior: Mating (as an example of sexual reproduction).

Grade 10 Academic Biology: The Sustainability of Ecosystems

Expectations	The Digital Frog 2
By the end of this course, students will:	
describe the processes of photosynthesis and cellular respiration as they relate to the cycling of energy, carbon, and oxygen through abiotic and biotic components of an ecosystem	Anatomy section: Respiration
examine the factors (natural & external) that affect the survival and equilibrium of populations in an ecosystem (e.g., resource limits of an ecosystem, competing populations, bioaccumulation, selective decline)	Ecology: Environmental Concerns
explain why different ecosystems respond differently to short-term stresses and long-term changes	Ecology: Environmental Concerns

Grade 10 Applied Biology: Ecosystems and Human Activity

Expectations	The Digital Frog 2
By the end of this course, students will:	
analyse natural and human threats to a local ecosystem and propose viable solutions to restore ecological balance	Ecology: Environmental Concerns
relate issues to environmental sustainability with a particular focus on issues in Ontario and Canada .	Ecology: Environmental Concerns, Adopt-A-Pond
describe the processes of photosynthesis and cellular respiration as they relate to the cycling of energy, carbon, and oxygen through abiotic and biotic components of an ecosystem	Anatomy section: Respiration
describe how different ecosystems respond differently to short-term stresses and long-term changes	Ecology: Environmental Concerns

Grade 11 University Preparation (Biology)

Expectations	The Digital Frog 2
By the end of this course, students will:	
illustrate and explain important cellular processes (e.g., protein synthesis, respiration, lysosomal digestion), including their function in the cell, the ways in which they are interrelated, and the fact that they occur in all living cells	Anatomy section:: Respiration
demonstrate an understanding of the process and importance of mitosis (e.g., cell division and the phases of mitosis)	Anatomy section:: Urogenital System: Cellular Division -Mitosis
explain the process of meiosis in terms of the replication and movement of chromosomes	Anatomy section:: Urogenital System: Cellular Division –Meiosis
describe and explain the major processes, mechanisms, and systems, including the respiratory, circulatory, and digestive systems, by which plants and animals maintain their internal environment	see Anatomy section: for animal examples: Respiratory System, Digestive System, Control System, Nervous System, Urogenital System, Immune System, Systems Interactions, Endocrine System, Musculoskeletal System, Circulatory System
describe the process of ventilation and gas exchange from the environment to the cell (e.g., describe the pathway of oxygen from the atmosphere to the cell, and the roles of ventilation, haemoglobin, and diffusion in this process)	Anatomy section: Respiratory System screens
explain the role of transport or circulatory systems in the transport of substances in an organism (e.g., explain how nutrients, respiratory gases, end products of metabolism, and hormones or regulatory chemicals are transported from one area in an organism to another)	Anatomy section: Circulatory System, Respiratory System, Control System, Systems Interactions
describe the importance of nutrients and digestion in providing substances needed for energy and growth	Anatomy section: Digestive System screens
compare the anatomy of different organisms– vertebrate and/or invertebrate (e.g., carry out a dissection, or use a computer-simulated dissection, of a mammal or a fish to examine the heart, the pulmonary circulation system, the aorta, and other main arteries and veins, and compare the functions of the arteries and veins to those of xylem and phloem in plants)	entire Dissection section of CD, entire Anatomy section of CD *note: a comparison to human anatomy is found throughout the Anatomy section on the CD

Grade 11 College Preparation (Biology)

Expectations	The Digital Frog 2
By the end of this course, students will:	
demonstrate an understanding of the structure, function, and interactions of the main internal systems of humans and other animals;	entire Anatomy section offers a comparison to Human systems
investigate, with the aid of laboratory procedures, the physiological mechanisms of animal systems that are responsible for the physical health of the individual;	various animation / videos are offered throughout the CD to demonstrate laboratory mechanisms
describe the anatomy and physiology of the digestive, circulatory, excretory, respiratory, reproductive, and locomotion systems of humans and one other animal	Anatomy section: Respiratory System, Digestive System, Control System, Nervous System, Urogenital System, Immune System, Systems Interactions, Endocrine System, Musculoskeletal System, Circulatory System (with human comparisons)
explain mechanisms of interaction between animal systems (e.g., describe the exchanges between capillaries and tissues; explain the emulsification of lipids by bile)	Systems Interactions screens - How Do Frogs Eat?, How Do Frogs Move?, How Do Frogs Mate?
explain how the endocrine system and central nervous system help maintain homeostasis (e.g., describe how blood sugar levels are maintained by the liver and the pancreas)	Endocrine System screens, Nervous System : Central Nervous System screens
carry out a dissection, or use a computer-simulated dissection, of a vertebrate to identify organs and establish relationships among structure, function, and health (e.g., dissect a mammal to identify and examine the components of the digestive system)	entire Dissection section of CD, entire Anatomy section of CD
analyse how various factors influence the relationships between organisms and the natural environment	entire Ecology section, Behavior – Mating, Vocalization, Hibernation, Feeding, Niches, Life Cycle, Adopt-a-Pond, Environmental Concerns
explain why it is important to be aware of the impact of human activities on the natural environment.	Ecology section: Adopt-a-Pond, Environmental Concerns
demonstrate an understanding of the fundamental principles of taxonomy by classifying organisms from a local ecosystem;	Ecology section: Biodiversity
assess the impact of agriculture on the natural environment	Ecology section: Adopt-a-Pond, Environmental Concerns
investigate, independently or collaboratively, the effect that human population growth has on the environment and the quality of life (e.g., examine effects, such as the movement or elimination of wildlife and plants, that are caused by the encroachment of human populations on ecosystems)	Ecology section: Adopt-a-Pond, Environmental Concerns

Grade 12 University Preparation (Biology)

Expectations	The Digital Frog 2
By the end of this course, students will:	
describe the anatomy and physiology of the endocrine and nervous systems, and explain their roles in homeostasis	Anatomy section: Endocrine System screens, Nervous System screens
explain the action of hormones in the female and male reproductive systems, including the feedback mechanisms involved	Anatomy section: Endocrine System screens
explain the role of the kidney in maintaining water and ion balance	Anatomy section: Excretory System, Kidneys