



Fish Ways

CURRICULUM FIT

Ontario



Canadian Wildlife Federation
350 Michael Cowpland Drive
Kanata, ON K2M 2W1
Tel: (800) 563-9453
(613)599-9594
Fax: (613)599-4428
www.cwf-fcf.org
www.wildeducation.org

*Comments should be directed to Joyce Sharp joyces@cwf-fcf.org

Compiled By: **Craig Armstrong**
Laurie Coombe
Alan Crook
Bob Moore (Project Co-ordinator)
Amy Wilson

Section A: Ontario Life Science Curriculum Cross-reference of Fishways Activities with Grade Levels K-8

Activity	Grades							
	1	2	3	4	5	6	7	8
A Breath of Fresh Water p. 93							X	X
A Community of Fish Helpers p. 283				X				
A Fish in Plaster p. 45						X		
A Puppet Out of Water p. 53				X				
Adopt a Fish p. 259	X	X				X		
Algonquin Adaptation p. 45							X	
An Angler's ... Eye View p. 89							X	
Back to School p. 91		X		X		X		
Bass To Basics p. 151				X		X		
Community Bingo p. 185				X		X		
Construct a Fish p. 51	X	X				X		
Designer Fishes p. 65								X
Dissect a River p. 37							X	
Featuring A Fish p. 61	X	X		X		X		
Fish Chameleon p. 77	X	X		X		X		
Fish Feelings p. 223		X						
Fish Print p. 43						X		
Fish Silhouettes p. 33	X	X		X				
Fish Stories p. 13	X	X						
Fishes on Drains p. 291	X	X						
Fishing for Facts p. 165							X	
Flying Fishes p. 69	X	X		X		X		
Going, Going... Gone p. 75							X	
Gone Fish'n p. 329	X							
Guess Who's Coming to Dinner p. 159	X			X		X		
Habitat Lost and Found p. 251				X		X		
Helping Habitat p. 277				X				
Home Sweet Habitat p. 145		X				X		
How Does Your Fish Measure Up p. 57				X				
I Wouldn't Wish to Be a Fish p. 137							X	
If I Were a Fish p. 179		X		X		X		
It's a Trout's Life p. 99				X		X		
It's in the Genes p. 75							X	
Kingfisher Shadows p. 95		X		X				

Activity	Grades							
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	1	2	3	4	5	6	7	8
Lethal Legacy p. 19							X	X
Lets Go Fishing p. 337		X						
Let's Migrate p. 203				X				
Lets Play Fish Cards p. 23		X		X				
Musical Mussels p. 307	X	X		X				
Name That Fish p. 19		X		X				
New Fishes on the Block p. 57							X	
Reel Estate For a Fish p. 137	X	X		X				
Scales For Life Underwater p. 81				X		X		
Scales Tell Tales p. 123				X		X		
Superior Sturgeon p. 13							X	
Survival in the Plant Patch p. 155	X	X		X		X		
Testing Waters p. 145							X	
The Acid Test p. 81							X	X
The Great Lakes: A Home for Fishes p. 357				X		X		
The Great Water Discovery Carnival p. 109				X		X		
The Ins and Outs of a Yellow Perch p. 227								X
The Invisible Fish p. 231	X	X		X				
The Spawning Adventure p. 197				X				
This Fish Has a Scale to Tell p. 85				X		X		
Trout Lake: A Fish Community Assessment p. 287								X
Trout Lake: Considering the Options p. 301								X
Trout Lake: The Root of the Problem p. 297								X
Trout Trails p. 31							X	
Using Senses to Classify Fishes p. 29	X			X		X		
Water Webs p. 105							X	
What a Way to Travel p. 65	X	X		X		X		
What Does a Body Tell Us? p. 71		X		X		X		
What Fishes Need p. 121	X	X						
What Should I Do? P. 99							X	
World Without Fishes p. 227				X				
Yummy Fishes p. 377	X							

Section B: Fishways Cross-Reference with the “Ontario Curriculum Strands and Topics: Science and Technology, Grades 1-8”

1.0 Life Systems: Grade 1 – Characteristics and Needs of Living Things Life

1.1 Overview

The study of Life Systems in Grade 1 focuses on an investigation of the characteristics and basic needs of living things. Students will explore aspects of movement and behavior in humans and other animals, and will learn about their nutritional requirements. Students will also explore some basic aspects of growth in animals and plants. In all their investigations, students will continually refine their ability to observe, using all five senses, and will attempt to describe their observations as accurately as possible.

1.2 Overall Expectations

By the end of Grade 1, students will:

-demonstrate an understanding of the basic needs of animals and plants (e.g., the need for food, air, and water); FW B-2 What Fishes Need p121

-investigate the characteristics and needs of animals and plants;

-demonstrate awareness that animals and plants depend on their environment to meet their basic needs, and describe the requirements for good health for humans.

1.3 Specific Expectations

1.3.1 Understanding Basic Concepts

By the end of Grade 1, students will:

-identify major parts of the human body and describe their functions (e.g., arms and legs for movement; lungs and nose for breathing);

Fish Stories p. 13
Fish Silhouettes p. 33

-identify the location and function of each sense organ; classify characteristics of animals and plants by using the senses (e.g., texture, colour, size, sounds);

Fish Stories p. 13
Using Senses To Classify Fishes p. 29
(Modify for Primary Shapes & Fins)

-describe the different ways in which animals move (e.g., moles burrow with their large, strong front limbs; fish undulate their bodies) to meet their needs;

Fish Silhouettes p. 33
Featuring A Fish p. 161
What A Way To Travel p65
Flying Fishes p. 69
What Fishes Need p. 121

-identify and describe common characteristics of humans and other animals that they have observed, and identify variations in these characteristics (e.g., eye and hair colour);

Construct A Fish p. 51

-describe some basic changes in humans as they grow (e.g., growth of feet, hands, arms; loss of baby teeth), and compare changes in humans with changes in other living things;

Featuring A Fish p. 61

-describe patterns that they have observed in living things (e.g., sunflower, pine cone, turtle's shell).

Construct A Fish p. 51

1.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 1, students will:

- select and use appropriate tools to increase their capacity to observe (e.g., magnifying glass, stethoscope);

Gone Fishn' p. 329

- ask questions about and identify some needs of living things, and explore possible answers to these questions and ways of meeting these needs (e.g., predict how an animal will move on the basis of two or more characteristics that they have observed);

Featuring A Fish p. 61
Fish Came Leon p. 77
What Fishes Need p. 121
Reel Estate: Homes For Fish p. 137

- plan investigations to answer some of these questions or find ways of meeting these needs; use appropriate vocabulary in describing their investigations, explorations, and observations (e.g., use body, legs, wings, and feelers in describing an insect);

Featuring A Fish p. 61
Fish CameLeon p. 77

- record relevant observations, findings, and measurements, using written language, drawings, charts, and concrete materials (e.g., make a drawing of an insect, observing with the unaided eye, and a drawing of the same insect while using a magnifying glass);

Construct A Fish p. 51
A Puppet Out Of Water p. 53

-communicate the procedures and results of investigations for specific purposes, using demonstrations, drawings, and oral and written descriptions (e.g., demonstrate how a bird builds a nest).

Survival In The Plant Path p.155
Adopt A Fish p. 259

1.3.3. Relating Science and Technology to the World Outside the School

By the end of Grade 1, students will:

-compare the basic needs of humans with the needs of other living things (e.g., the need for food, air, water, light);

What Fishes Need p121
Reel Estate: Homes For Fish p. 137
Guess Who's Coming To Dinner p. 159
Musical Mussels p. 307

-compare ways in which humans and other animals use their senses to meet their needs (e.g., use of the senses of sight and smell in finding food);

-describe ways in which people adapt to the loss or limitation of sensory or physical ability (e.g., blind people develop more acute hearing; people who cannot walk may use a wheel chair);

-identify a familiar animal or plant from seeing only a part of it (e.g., a feather of a bird, a leaf of a tree);

-describe ways in which the senses can both protect and mislead (e.g., seeing enables us to avoid walking into an obstacle; the sense of smell is not reliable when we have a cold);

-describe a balanced diet using the four basic food groups outlined in Canada's Food Guide to Healthy Eating, and demonstrate awareness of the natural sources of items in the food groups (e.g., bread is made from plant products; meat and milk come from animals);

-identify ways in which individuals can maintain a healthy environment for themselves and for other living things (e.g., practice cleanliness to reduce the spreading of germs; ensure that materials such as toy balloons are not left outdoors since they are harmful to birds if they are ingested).

Fish Silhouettes p. 33

Guess Who's Coming To Dinner p. 159
Yummy Fishes p. 377

The Invisible Fish p. 231
Fishes On Drains p. 291

2.0 Life Systems: Grade 2 – Growth and Changes in Animals

2.1 Overview

The study of animals in Grade 2 focuses on patterns of growth and change. Since children are interested in the changes that take place in different types of animals, observing these changes can be a powerful learning experience for them. In their exploration of growth, students will also compare patterns of growth in different animals with their own growth, and they will learn about the conditions needed to support healthy development in an animal.

2.2 Overall Expectations

By the end of Grade 2, students will:

- demonstrate an understanding of the similarities and differences among various types of animals and the ways in which animals adapt to different environmental conditions;
- investigate physical and behavioral characteristics and the process of growth of different types of animals;
- identify ways in which humans can affect other animals.

2.3 Specific Expectations

2.3.1 Understanding Basic Concepts

By the end of Grade 2, students will:

- identify and describe the major physical characteristics of different types of animals (e.g., mammals, reptiles, insects);

What Does A Body Tell Us? p. 71
Fish Stories p. 13
Fish Silhouettes p. 33

-identify and describe behavioral characteristics that enable animals to survive (e.g., migration, dormancy, hibernation);

Fish Cameleon p. 77
Construct A Fish p. 51
Featuring A Fish p. 61

-classify a variety of animals using observable characteristics (e.g., size, body covering, teeth);

Fish Stories p. 13
Name That Fish p. 19
Lets Play Fish Cards p. 23
Fish Feelings p. 223

-compare ways in which animals eat their food (e.g., tear flesh, crack shells), move, and use their environment to meet their needs (e.g., gather grass and twigs to build nests);

-describe changes in the appearance and activity of an animal as it goes through a complete life cycle (e.g., mealworm);

Featuring A Fish p. 61
Fish Cameleon p. 77

-compare the life cycles of some animals that have similar life cycles (e.g., bee and butterfly) and some that have different life cycles (e.g., gerbil and butterfly);

-identify constant traits (e.g., number of legs) and changing traits (e.g., weight) in animals as they grow, and compare the appearance of young and mature animals of the same species;

-describe ways in which animals respond and adapt to their environment (e.g., weasels change colour for camouflage in summer and winter; mammals living in colder climates have longer fur);

-compare ways in which different animals care for their young (e.g., bears, alligators, sea turtles).

Fish Silhouettes p. 33
Construct A Fish p. 51

What A Way To Travel p. 65
Flying Fishes p. 69
Fish Cameleon p. 77
Back To School p. 91
ReelEstate: Homes for Fish p. 137

2.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 2, students will:

-ask questions about and identify some needs of different animals with which they are familiar, and explore possible answers to these questions and ways of meeting these needs (e.g., examine different kinds of teeth and explain how their shape enables an animal to bite, tear, or grind its food);

-plan investigations to answer some of these questions or find ways of meeting these needs, and describe the steps involved;

-use appropriate vocabulary in describing their investigations, explorations, and observations (e.g., use the words egg, caterpillar, larva, chrysalis, and adult in describing the metamorphosis of a butterfly);

- record relevant observations, findings, and measurements, using written language, drawings, and concrete materials (e.g., make accurately labeled drawings showing the life cycle of an animal);

Back To School p. 91
Survival In The Plant Patch p. 155

Kingfisher Shadows p. 95
Let's Go Fishing p. 337

Back To School p. 91
Kingfisher Shadows p. 95
Adopt A Fish p. 259

Let's Go Fishing p. 337

-communicate the procedures and results of investigations for specific purposes, using drawings, demonstrations, and oral and written descriptions (e.g., explain how a caterpillar feeds, using a model constructed of modeling clay and a tree branch).

Survival In The Plant Patch p155
Lets Go Fishing p337

2.3.3 Relating Science and Technology to the World Outside the School

By the end of Grade 2, students will:

-describe features of the environment that support the growth of familiar animals (e.g., water and insects in a frog's environment);

What Fishes Need p. 121
Musical Mussels p. 307

-identify and compare the effects of the seasons on animals (e.g., some animals grow a thicker coat in cold weather);

-describe ways in which humans can help or harm other living things (e.g., protecting endangered species);

Fishes On Drains p. 291
Musical Mussels p. 307

-demonstrate an understanding of the requirements of small animals for survival (e.g., by maintaining an aquarium or a terrarium);

What Fishes Need p. 121

-describe the life processes of an animal that they have observed (e.g., the eating habits, movement, rest patterns, and breathing of a mealworm);

Back To School p. 91
Kingfisher Shadows p. 95

-demonstrate awareness of ways of caring for animals properly (e.g., avoid handling them too much; research nutritional requirements);

If I Were A Fish p. 179
Fishes On Drains p. 291

-describe how humans produce food by raising livestock (e.g., pigs, chickens, cattle).

The Invisible Fish p. 231

3.0 Life Systems: Grade 3 – Growth and Changes in Plants

3.1 Overview

The study of plants in Grade 3 focuses on the characteristics and requirements of plants and their patterns of growth. Students will observe and investigate a wide variety of local plants, from trees to mosses, in their natural environment. They will also learn about the importance of plants not only as sources of food and shelter for people and animals, but as suppliers of much of the world's oxygen.

3.2 Overall Expectations

By the end of Grade 3, students will:

- demonstrate an understanding of the similarities and differences in the physical characteristics of different plant species and the changes that take place in different plants as they grow;
- investigate the requirements of plants and the effects of changes in environmental conditions on plants;
- describe ways in which plants are important to other living things, and the effects of human activities on plants.

3.3 Specific Expectations

3.3.1 Understanding Basic Concepts

By the end of Grade 3, students will:

- identify the major parts of plants (e.g., seeds, stem, pistil) and describe their basic functions; classify plants according to visible characteristics (e.g., type of tree bark, leaf shape, type of flowers);
- describe, using their observations, the changes that plants undergo in a complete life cycle (e.g., from the germination of a seed to the production of flowers or fruit);
- describe, using their observations, the effects of the seasons on plants (e.g., leaf buds grow into leaves in the spring; leaves turn colour in the fall);
- compare the life cycles of different kinds of plants (e.g., plants that grow from bulbs or from seeds);

-identify traits that remain constant in some plants as they grow (e.g., leaf shape, leaf size, flower colour);

-describe, using their observations, how the growth of plants is affected by changes in environmental conditions (e.g., changes in light, soil);

-explain how different features of plants help them survive (e.g., leaf structure, fibrous or tap root systems).

3.3.2 Developing Skills of Inquiry

By the end of Grade 3, students will:

-design and conduct a hands-on inquiry into seed germination or plant growth;

-ask questions about and identify some needs of plants, and explore possible answers to these questions and ways of meeting these needs (e.g., predict how long a particular plant could go without water before its leaves started to droop);

-plan investigations to answer some of these questions or find ways of meeting these needs, and explain the steps involved;

-use appropriate vocabulary in describing their investigations, explorations, and observations (e.g., stem, pistil, stamen, flower);

-record relevant observations, findings, and measurements, using written language, drawings, charts, and graphs (e.g., produce a series of drawings to show a plant at different stages of development);

-communicate the procedures and results of investigations for specific purposes and to specific audiences, using drawings, demonstrations, simple media works, and oral and written descriptions (e.g., make a graph that shows the number and kinds of trees found in different yards; design and construct a terrarium or garden that reproduces the conditions that they found to be requirements of specific plants).

3.3.3 Relating Science and Technology to the World Outside the School

By the end of Grade 3, students will:

- describe ways in which humans use plants for food, shelter, and clothing (e.g., trees are used for building houses; cloth is made from cotton);

-describe ways in which humans can protect natural areas to maintain native plant species (e.g., establishing conservation areas, wildlife reserves, wetland sanctuaries);

-identify the parts of a plant that are used to produce specific products for humans (e.g., sugar, dyes, paper, cloth, lumber) and describe the steps in production;

-describe various plants used in food preparation (e.g., vegetables, fruits, spices, herbs) and identify places where they can be grown;

-describe various settings in which plant crops are grown (e.g., farms, orchards, home gardens);

-describe ways in which plants and animals depend on each other (e.g., plants provide food for energy, and animals help distribute pollen and seeds);

-compare the requirements of some plants and animals, and identify the requirements that are common to all living things (e.g., the need for water and minerals);

-demonstrate awareness of ways of caring for plants properly (e.g., ensure that a plant has sufficient light and water);

- identify some functions of different plants in their local area (e.g., trees provide shade; grass binds soil to prevent soil erosion).

4.0 Life Systems: Grade 4 – Habitats and Communities

4.1 Overview

Students in Grade 4 will be familiar with the basic needs of plants and animals, and will begin to explore and compare ways in which communities of plants and animals satisfy their needs in specific habitats. In their investigations, they will also study some of the factors that affect various habitats, including changes that occur naturally and changes brought about by people.

4.2 Overall Expectations

By the end of Grade 4, students will:

- demonstrate an understanding of the concepts of habitat and community, and identify the factors that could affect habitats and communities of plants and animals;
- investigate the dependency of plants and animals on their habitat and the interrelationships of the plants and animals living in a specific habitat;
- describe ways in which humans can change habitats and the effects of these changes on the plants and animals within the habitats.

4.3 Specific Expectations

4.3.1 Understanding Basic Concepts

By the end of Grade 4, students will:

-identify, through observation, various factors that affect plants and animals in a specific habitat (e.g., availability of water, food sources, light; ground features; weather conditions);

-classify organisms according to their role in a food chain (e.g., producer, consumer);

-demonstrate an understanding of a *food chain as a system in which energy from the sun is transferred eventually to animals, construct food chains of different plant and animal species (e.g., carrot'rabbit'fox), and classify animals as omnivore, carnivore, and herbivore;*

-describe structural adaptations of plants and animals that demonstrate a response of the living things to their environment (e.g., the height of a plant depends on the amount of sunlight the plant gets; many animals that live in the Arctic have white fur);

-recognize that animals and plants live in specific habitats because they are

“Home Sweet Habitat” p. 145
Featuring A Fish p. 61
Fish Cameleon p. 77
Scales For Life Underwater p. 81
The Great Water Discover Carnival p. 109
Reel Estate: Homes For Fish p. 137

Guess Who’s Coming To Dinner p. 159
If I Were A Fish p. 179

Back To School p. 91
Kingfisher Shadows p. 95
It’s A Trout’s Life p. 99
“Home Sweet Habitat” p. 145
Guess Who’s Coming To Dinner p. 159

If I Were A Fish p. 179
World Without Fishes p. 227
A Puppet Out Of Water p. 53
Featuring A Fish p. 61
Scales For Life Underwater p. 81
Back To School p. 91

Featuring A Fish p. 61
What A Way To Travel p. 65

dependent on those habitats and have adapted to them (e.g., ducks live in marshes because they need marsh plants for food and shelter and water for movement);

-classify plants and animals that they have observed in local habitats according to similarities and differences (e.g., in shape, location).

4.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 4, students will:

-formulate questions about and identify the needs of animals and plants in a particular habitat, and explore possible answers to these questions and ways of meeting these needs (e.g., predict the structural adaptations, such as webbed feet, that help aquatic animals live in water);

- plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;

-use appropriate vocabulary, including correct science and technology terminology, in describing their investigations, explorations, and observations (e.g., habitat, population, ecological niche, community, food chain);

-compile data gathered through investigation in order to record and present results, using tally charts, tables, and labeled graphs produced by hand or with a computer (e.g., display data gathered in a population-simulation exercise, using a labeled graph; classify species of insects in the neighbourhood according to habitat, using a chart or table);

- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings, and charts (e.g., prepare a poster illustrating the components of a local habitat; trace a food chain in an illustrated chart, using the sun as the starting point).

Flying Fishes p. 69
Back To School p. 91
Habitat Lost & Found p. 251
Helping Habitat p. 277

Name That Fish p. 19
Let's Play Fish Cards p. 23
Using Senses To Classify Fishes p. 29
Fish Silhouettes p. 33

Featuring A Fish p. 61
What Does A Body Tell Us? p. 71
This Fish Has A Scale To Tell p. 85
Helping Habitat p. 277
The Atlantic Salmon's Story p. 315
The Great Lakes: A Home For Fishes p. 357

What Does A Body Tell Us? p. 71
Helping Habitat p. 277
The Great Lakes: A Home For Fishes p. 357

What Does A Body Tell Us? p. 71
Helping Habitat p. 277
The Great Lakes: A Home For Fishes p. 357

How Does Your Fish Measure Up? p. 57
What Does A Body Tell Us? p. 71
Fish Cameleon p. 77
Back To School p. 91
Bass To Basics p. 151

What Does A Body Tell Us? p. 71
Fish Cameleon p. 77
Home Sweet Habitat p. 145
World Without Fishes p. 227

4.3.3. Relating Science and Technology to the World Outside the School

By the end of Grade 4, students will:

-describe ways in which humans are dependent on plants and animals (e.g., for food products, medicine, clothing, lumber);

-describe ways in which humans can affect the natural world (e.g., urban development forces some species to go elsewhere and enables other species to multiply too rapidly; conservation areas can be established to protect specific habitats);

-construct food chains that include different plant and animal species and humans (e.g., grass'cattle'humans); show the effects on plants and animals of the loss of their natural habitat (e.g., nesting sites of ducks may be destroyed when a dam is built);

-investigate ways in which the extinction of a plant or animal species affects the rest of the natural community and humans (e.g., chart the distribution of wolves on a world map and predict the effects if wolves were to become extinct; use a software program that simulates a specific environment to track the effects of the loss of a plant species).

Community Bingo p. 185
World Without Fishes p. 227

A Community Of Fish Helpers p. 283
It's A Trout's Life p. 99
Bass To Basics p. 151
The Spawning Adventure p. 197
Let's Migrate p. 203
The Invisible Fish p. 231
Habitat Lost & Found p. 251
Helping Habitat p. 277

It's A Trout's Life p. 99
"Home Sweet Habitat" p. 145
Survival In The Plant Patch p. 155

World Without Fishes p. 227
The Invisible Fish p. 231
Musical Mussels p. 307
The Spawning Adventure p. 197
A Community Of Fish Helpers p. 283

World Without Fishes p. 227

5.0 Life Systems: Grade 5 Human Organ Systems

5.1 Overview

In Grade 5, study of the human body focuses on five major organ systems – the respiratory, circulatory, digestive, excretory, and nervous systems. Using models and simulations, students will learn where the major internal organs are located and will explore the functions and interactions of organs within specific systems. In studying the structure of organs, students will learn that all living tissues are composed of different kinds of cells. Students will also develop an understanding of the importance of proper nutrition and exercise to the healthy functioning of organ systems.

5.2 Overall Expectations

By the end of Grade 5, students will:

- demonstrate an understanding of the structure and function of the respiratory, circulatory, digestive, excretory, and nervous systems, and the interactions of organs within each system;
- investigate the structure and function of the major organs of the respiratory, circulatory, digestive, excretory, and nervous systems;
- demonstrate understanding of factors that contribute to good health.

5.3 Specific Expectations

5.3.1 Understanding Basic Concepts

By the end of Grade 5, students will:

- identify the cell as the basic unit of life;
- describe the basic structure and function of the major organs in the respiratory, circulatory, digestive, excretory, and nervous systems;
- describe, using models and simulations, ways in which the skeletal, muscular, and nervous systems work together to produce movement (e.g., make a model of the structure of the bones and muscles in an arm, using cardboard rolls and elastic bands);
- identify the skin as an organ and explain its purpose;
- explain what happens to excess nutrients not immediately used by the body;
- describe the components of the body's system of defence against infections (e.g., tears, skin, white blood cells).

5.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 5, students will:

- formulate questions about and identify the needs of humans, and explore possible answers to these questions and ways of meeting these needs (e.g., in studying the nervous system, investigate response times by having someone catch a ruler between the thumb and index finger after it is dropped by another person);
- investigate ways in which orthopaedic devices, such as back rests, have improved the quality of life);
- plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- use appropriate vocabulary, including correct science and technology terminology, in describing their investigations, explorations, and observations (e.g., use terms such as teeth, esophagus, stomach, and gastric juices in describing the digestive system);
- compile data gathered through investigation in order to record and present results, using tally charts, tables, and labeled graphs produced by hand or with a computer (e.g., record both qualitative and quantitative data from observations of the nutritional value of foods; produce a graph of the heartbeat rate of someone climbing a specific number of stairs in a given length of time);
- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings, and charts (e.g., create a comparison chart, grouping foods by major nutrients and by their categories in Canada's Food Guide to Healthy Eating).

5.3.3 Relating Science and Technology to the World Outside the School

By the end of Grade 5, students will:

-describe the types of nutrients in foods (e.g., carbohydrates, fats, proteins, vitamins, minerals) and their function in maintaining a healthy body (e.g., supporting growth);

-identify a balanced diet as one containing carbohydrates, proteins, fats, minerals, vitamins, fibre, and water, and design a diet that contains all of these;

-identify food sources from which people in various societies obtain nutrients (e.g., rice, potatoes, and grains furnish carbohydrates);

-interpret nutritional information to make healthy food choices (e.g., sort commercial cereals into different categories, such as high fat, low fat, high salt, low sugar, and decide which are best);

-demonstrate awareness that some disorders can be affected by diet (e.g., diabetes, heart disease);

-identify types of industries involved in the processing and preserving of foods;

-describe the relationship between eating habits, weight, height, and metabolism;

-describe ways in which various kinds of organisms (e.g., bacteria, fungi) are used to recycle human waste;

-explain the importance of daily physical activity;

-explain how the health of human beings is affected by environmental factors (e.g., smoking, smog, and pollen affect the respiratory system);

-explain the benefits and disadvantages of using some technological innovations (e.g., headsets designed to protect ears from excessive noise are helpful, but headphones used to listen to music can cause hearing impairment);

-describe some types of medical technology (e.g., exercise machines, hearing aids, prosthetics).

6.0 Life Systems: Grade 6 – Diversity of Living Things

6.1 Overview

The study of living things in Grade 6 focuses on the use of classification systems as ways of learning about the great diversity of species and as ways of organizing the study of species. Particular attention is given to the classification of organisms in the animal kingdom. Classifying animals not only will enable students to learn about many different types of animals, from mammals to microscopic organisms, but will help them to observe and describe similarities and differences among species more precisely. To acquire first-hand experience in studying the diversity of living things, students will examine and classify organisms in a specific habitat – a pond, for example.

6.2 Overall Expectations

By the end of Grade 6, students will:

- demonstrate an understanding of ways in which classification systems are used to understand the diversity of living things and the interrelationships among living things;
- investigate classification systems and some of the processes of life common to all animals (e.g., growth, reproduction, movement, response, and adaptation);
- describe ways in which classification systems can be used in everyday life.

6.3 Specific Expectations

6.3.1 Understanding Basic Concepts

By the end of Grade 6, students will:

-explain why formal classification systems are usually based on structural characteristics (e.g., type of skeleton, circulatory system, reproductive system) rather than on physical appearance or behavioral characteristics;

-recognize that the essential difference between cold- and warm-blooded animals lies in different means of regulating body temperature;

-identify and describe the characteristics of vertebrates, and use these characteristics to classify vertebrates as mammals, birds, amphibians, reptiles, and fish (the five main classes);

-identify and describe the characteristics of invertebrates, and classify invertebrates into phyla (e.g., sponges, worms, molluscs, arthropods);

A Fish In Plaster p. 45
Fish Print p. 43
Construct A Fish p. 51
What Does A Body Tell Us? p. 71

Featuring A Fish p. 61
Flying Fishes p. 69

Using Senses To Classify Fishes p. 29
What a Way To Travel p. 65
Scales For Life Underwater p. 81
This Fish Has A Scale To Tell p. 85

Adopt A Fish p. 259

-compare the characteristics of vertebrates and invertebrates;

-compare the characteristics of different kinds of arthropods (e.g., crustaceans such as crayfish, shrimp; insects such as grasshoppers, butterflies, mealworms);

-describe microscopic living things using appropriate tools to assist them with their observations (e.g., nets and microscopes for pond study);

-describe ways in which micro-organisms meet their basic needs (e.g., for food, water, air, movement).

If I Were A Fish p. 179

Community Bingo p. 185
Home Sweet Habitat p. 145
Bass To Basics p. 151

6.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 6, students will:

-formulate questions about and identify the needs of different types of animals, and explore possible answers to these questions and ways of meeting these needs (e.g., design an experiment to study whether certain insects will grow larger if given large quantities of food);

-plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;

-use appropriate vocabulary, including correct science and technology terminology, in describing their investigations and observations (e.g., use terms such as organism, species, structure, and kingdom in describing classification of animals);

-compile data gathered through investigation in order to record and present results, using charts, tables, labeled graphs, and scatter plots produced by hand or with a computer (e.g., make an inventory of animals found in a specific location);

-communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and drawings (e.g., create a clearly labeled chart of organisms observed and identified during a pond study).

Back To School p. 91
This Fish Has A Scale To Tell p. 85
Fish Cameleon p. 77
Adopt A Fish p. 259

Back To School p. 91
The Greatwater Discovery Carnival p. 109

The Greatwater Discovery Carnival p. 109
The Great Lakes: A Home For Fishes p. 357

Fish Cameleon p. 77

Fish Cameleon p. 77

6.3.3 Relating Science and Technology to the World Outside the School

By the end of Grade 6, students will:

-identify various kinds of classification systems that are based on specific criteria and used to organize information (e.g., in a telephone system, numbers are classified according to country code, area code, telephone number, extension number);

Guess Who's Coming To Dinner p. 159

-identify inherited characteristics (e.g., eye colour, hair colour) and learned or behavioral characteristics (e.g., habits of cleanliness);

-explain why characteristics related to physical appearance (e.g., size, shape, colour, texture) or behaviour are not suitable attributes for classifying living things;

-identify various kinds of plant or animal organisms in a given plot using commercially produced biological or classification keys (e.g., organisms observed in a pond study, in the school yard, in wildlife centres);

-describe specific characteristics or adaptations that enable each group of vertebrates to live in its particular habitat (e.g., fish in water), and explain the importance of maintaining that habitat for the survival of the species;

It's A Trout's Life p. 99
Featuring A Fish p. 61
What A Way To Travel p. 65
What Does A Body Tell Us? p. 71
Fish Cameleon p. 77
Scales For Life Underwater p. 81
Survival In The Plant Patch p. 155
Habitat Lost & Found p. 251

-explain how fossils provide evidence of changes in animals over geological time;

-compare similarities and differences between fossils and animals of the present.

A Fish In Plaster p. 45

7.0 Life Systems: Grade 7 – Interactions Within Ecosystems

7.1 Overview

The study of ecosystems is an introduction to the study of ecology and involves investigation of the complex interactions between all types of organisms and their environment. Students will learn that ecosystems consist of communities of plants and animals that are dependent on each other as well as on the non-living parts of the environment. They will also learn that groups of ecosystems make up biomes, which, in turn, are components of the biosphere. In investigating ecosystems, students will examine the effects of natural factors, such as climate changes, as well as the impact of technological changes on the environment.

7.2 Overall Expectations

By the end of Grade 7, students will:

- demonstrate an understanding of the interactions of plants, animals, fungi, and micro- organisms in an ecosystem;
- investigate the interactions in an ecosystem, and identify factors that affect the balance among the components of an ecosystem (e.g., forest fires, parasites);
- demonstrate an understanding of the effects of human activities and technological innovations, as well as the effects of changes that take place naturally, on the sustainability of ecosystems.

7.3 Specific Expectations

7.3.1 Understanding Basic Concepts

By the end of Grade 7, students will:

- identify living (biotic) and non-living (abiotic) elements in an ecosystem;
I Wouldn't Wish To Be A Fish p. 137
Algonquin Adaptation p. 45
Water Webs p. 105
Lethal Legacy p. 19
- identify populations of organisms within an ecosystem and the factors that contribute to their survival in that ecosystem;
Lethal Legacy p. 19
Trout Trails p. 31
Algonquin Adaptation p. 45
- identify and explain the roles of producers, consumers, and decomposers in food chains and their effects on the environment (e.g., plants as producers in ponds);
Algonquin Adaptation p. 45
Water Webs p. 105
- explain the importance of microorganisms in recycling organic matter (e.g., as decomposers);
Algonquin Adaptation p. 45
Testing The Waters p. 145
- identify micro-organisms as beneficial (e.g., yeast) and/or harmful (e.g., bacteria or viruses that cause disease);
Algonquin Adaptation p. 45
- interpret food webs that show the transfer of energy among several food chains, and evaluate the effects of the elimination or
Lethal Legacy p. 19
Water Webs p. 105
Algonquin Adaptation p. 45

weakening of any part of the food web;

-describe the process of cycling carbon and water in the biosphere;

-investigate ways in which natural communities within ecosystems can change, and explain how such changes can affect animal and plant populations (e.g., changes affecting their life span, their gestation periods, or their ability to compete successfully);

-identify signs of ecological succession in a local ecosystem (e.g., the presence of blueberries in an area recently devastated by fire; the presence of pioneer organisms that start the process of succession in sand dunes).

Trout Trails p. 31
Lethal Legacy p. 19
Going, Going...Gone p. 75
Algonquin Adaptation p. 45
The Acid Test p. 81

The Acid Test p. 81
Fishing For Facts p. 165

7.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 7, students will:

-formulate questions about and identify the needs of various living things in an ecosystem, and explore possible answers to these questions and ways of meeting these needs (e.g., research the population levels of a species over time and predict its future levels on the basis of past trends and present conditions; determine how the structure of specific plants helps them withstand high winds, live on the surface of water, or compete for sunlight);

-plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;

-use appropriate vocabulary, including correct science and technology terminology, to communicate ideas, procedures, and results (e.g., use scientific terms such as biosphere, biome, ecosystem, species);

-compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, bar graphs, line graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a chart to record the number of producers and consumers in a particular habitat);

-communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and

An Angler's Eye View p. 89
Superior Sturgeon p. 13
Dissect A River p. 37
New Fishes On The Block p. 57
Going, Going...Gone p. 75
Fishing For Facts p. 165

An Angler's Eye View p. 89
Dissect A River p. 37

An Angler's Eye View p. 89
Dissect A River p. 37

An Angler's Eye View p. 89
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An Angler's Eye View p. 89
Dissect A River p. 37

drawings (e.g., design a multimedia presentation explaining the interrelationships of biotic and abiotic elements in a specific ecosystem).

7.3.3 Relating Science and Technology to the World Outside the School

By the end of Grade 7, students will:

-investigate the impact of the use of technology on the environment (e.g., the "greenhouse effect"; redirection of water flow for human needs; use of pesticides);

The Acid Test p. 81
New Fishes On The Block p. 57

-investigate the bio-economical costs and benefits of the recycling and waste- disposal industries;

The Acid Test p. 81
What Should I Do? p. 99
Water Webs p. 105
Fishing For Facts p. 165

-explain the importance of plants as sources of energy (e.g., food, fossil fuels), as producers of carbohydrates and oxygen (e.g., phytoplankton), and as habitats for wildlife;

Water Webs p. 105
An Angler's Eye View p. 89
A Breath Of Fresh Water p. 93

-describe the conditions in an ecosystem that are essential to the growth and reproduction of plants and micro-organisms, and show the connection between these conditions and various aspects of the food supply for humans;

A Breath Of Fresh Water p. 93
Lethal Legacy p. 19
What Should I Do? p. 99

-identify the importance of plants in the Canadian economy (e.g., in farming, forestry, drug manufacturing, the nursery industry) and describe the impact of the industrial use of plants on the environment;

Going, Going...Gone p. 75
It's In The Genes p. 203

-explain the long-term effects of the loss of natural habitats and the extinction of species (e.g., loss of diversity of genetic material, both plant and animal);

-identify and explain economic, environmental and social factors that should be considered in the management and preservation of habitats (e.g., the need for recycling; the need for people to have employment).

Going, Going...Gone p. 75

8.0 Life Systems: Grade 8 – Cells, Tissues, Organs, and Systems

8.1 Overview

In Grade 5, students were introduced to the cell as the basic unit of life in the study of human organ systems. In Grade 8, students will continue to develop their knowledge of systems in living things, focusing on the structure and function of cells in plants and animals and on the organization of cells into tissues, organs, and organ systems.

8.2 Overall Expectations

By the end of Grade 8, students will:

- demonstrate an understanding of the basic structure and function of plant and animal cells, and describe the hierarchical organization of cells in plants and animals;
- investigate basic cellular processes and certain specialized cells in plants;
- describe ways in which study of the structure, function, and interdependence of human organ systems can result in improvements in human health.

8.3 Specific Expectations

8.3.1 Understanding Basic Concepts

By the end of Grade 8, students will:

- identify unicellular organisms (e.g., amoebae) and multicellular organisms (e.g., worms, humans); The Acid Test p. 81
- investigate ways in which unicellular organisms meet their basic needs (e.g., for food, movement); The Acid Test p. 81
- identify organelles in cells through observation (e.g., vacuole, nucleus, chloroplast) and explain their functions; The Acid Test p. 81
- describe, using their observations, differences in structure between plant and animal cells; The Acid Test p. 81
- describe the organization of cells into tissues, organs, and systems; A Breath Of Fresh Water p. 93
- explain the function of selectively permeable membranes in cells; A Breath Of Fresh Water p. 93
- describe and explain the structure and function of specialized cells and tissues in different parts of plants (e.g., in roots, stems, leaves); A Breath Of Fresh Water p. 93

-recognize that cells in multicellular organisms need to reproduce to make more cells to form and repair tissues;

-explain how the structure of the roots, stem, and leaves of a plant permit the movement of food, water, and gases;

-compare the structure of different plants (e.g., cactus, coniferous tree, moss) and show how their structure enables them to live in specific conditions;

-describe, using their observations, the movement of gases and water into and out of cells during diffusion and osmosis.

8.3.2 Developing Skills of Inquiry, Design, and Communication

By the end of Grade 8, students will:

-use a microscope accurately to find, observe, and draw microscopic objects;

The Acid Test p. 81

-formulate questions about and identify needs related to the functioning of cells, and explore possible answers to these questions and ways of meeting these needs (e.g., design and conduct an experiment to test a hypothesis about the effect of chemicals on a unicellular organism; design and conduct an experiment to test the effectiveness of different substances in preventing cut flowers from wilting);

Scales Tell Tales p. 123

-plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;

-use appropriate vocabulary, including correct science and technology terminology, to communicate ideas, procedures, and results (e.g., use scientific terms such as organelle, diffusion, osmosis, selectively permeable);

-compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a diagram to present an estimate of the number of cells in a petri dish);

Trout Lake: A Fish Community Assessment p. 287

Trout Lake: The Root Of The Problem p. 297

Trout Lake: Considering The Options p. 301

-communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and drawings (e.g., create a simulation illustrating movement of water and nutrients between cells and through various organs and systems).

Trout Lake: A Fish Community Assessment p. 287
Trout Lake: The Root Of The Problem p. 297
Trout Lake: Considering The Options p. 301

8.3.3 Relating Science and Technology to the World Outside the school

By the end of grade 8 students will:

-describe the needs and functions of various cells and organs in relationship to the needs of the human body as a whole;

The Acid Test p. 81

-describe the basic factors that contribute to the efficient functioning of the human respiratory, circulatory, digestive, excretory, and nervous systems;

-describe some ways in which the various systems in the human body are interdependent;

-describe similarities and differences in the functions of comparable structures in different groups of living things (e.g., compare the food intake and digestion of a unicellular organism, an invertebrate, and a vertebrate);

The Ins and Outs of A Yellow Perch p. 227
Designer Fishes p. 65

-describe ways in which research about cells has brought about improvements in human health and nutrition (e.g., development of medicines, immunization procedures, and diets based on the needs of organs such as the heart);

-describe ways in which substances work by altering the way cells function (e.g., insulin);

Lethal Legacy p. 93

-describe ways in which various types of cells contribute to the healthy functioning of the human body (e.g., red blood cells transport oxygen throughout the body);

A Breath Of Fresh Water p. 93

-illustrate how blood is pushed by pressure throughout the body to carry oxygen and nutrients to cells, tissues, and organs.

The Ins and Outs Of A Yellow Perch p. 227