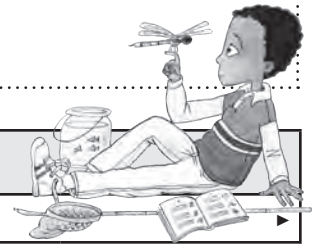
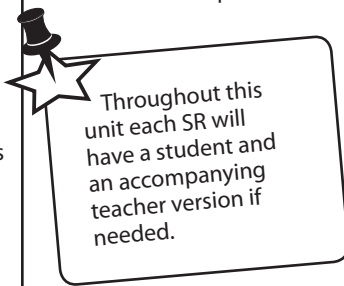
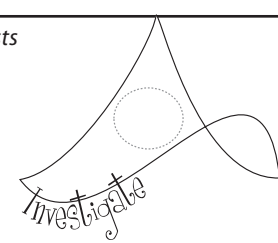


Unit Overview



Essential Questions	Activities	Time	Materials
Lesson 1: <i>Discovering Biodiversity - The Hannah Property</i>			
<p>What is biodiversity and why is it important?</p> <p>What impact do people have on the biodiversity and health of an ecosystem?</p> <p>How should we protect biodiversity when natural areas get developed?</p>	<ul style="list-style-type: none"> Distinguish living from non-living things Classify diverse objects Become familiar with the Hannah property and their task Develop a particular point of view with respect to the property Create a business logo Make a map of the property 	3 class periods	<ul style="list-style-type: none"> A cardboard box filled with a variety of natural articles such as a cone from a coniferous tree, a rock, a bag of soil, a worm, an insect, needles from different conifers, and a selection of leaves A selection of pictures of animals, plants, landscapes from various seasons, farm fields, wetlands, a large northern Ontario resort, a big box store and a log house <ul style="list-style-type: none"> TR 1-1, "Why Should We Value Biodiversity?" TR 1-2, "Essential Questions on Biodiversity" Project Handbook - one per group (see Appendix 8) Project Handbook, Worksheet 1, "Our Group's Perspective and Business" Biodiversity Box - one per group. See the Materials list in Lesson 1 for details and instructions.
Lesson 2: <i>Let's Get Organized!</i>			
<p>How do scientists make sense of so many different species?</p> <p>What is taxonomy and what is its purpose?</p> <p>How do we use identification keys?</p> <p>How do we use a field guide?</p>	<ul style="list-style-type: none"> Classify species cards Presentation on Carl Linnaeus Internet search for species A Linnaean field trip Introduce leaf collection Identification of tree species from leaves Leaf collections (due in Lesson 6) 	3 class periods	<ul style="list-style-type: none"> TR 2-1, "Portrait of Carl Linnaeus" TR 2-2, "Cover of Systema Naturæ" TR 2-3, "The Life of Carl Linnaeus" Two sets of Species Cards printed on card stock – one set per group with pictures only; a second set per group with taxonomic information (see UR-8, "Species Cards," on the CD) Samples of deciduous and coniferous leaves (minimum of two species per student)
Lesson 3: <i>Kingdom Animalia</i>			
<p>How do taxonomists organize the animal kingdom?</p> <p>How do animals interact with other species?</p>	<ul style="list-style-type: none"> Discuss classification system Classify animals 	1 class period	<ul style="list-style-type: none"> UR-8, "Species Cards" (Two sets – one set per group with pictures only; a second set per group with taxonomic information) UR-13, "Animal Classification" (placemat in front pocket of binder) Information resources, science texts, web browsers Website: http://www.vandonkelaar.ca/icon_gallery/current

Unit Overview

Materials <i>cont'd</i>	Classroom Configurations	Key Terms and Concepts
Lesson 1: <i>Discovering Biodiversity - The Hannah Property</i>		
<ul style="list-style-type: none"> Poster size paper - one per group UR-11, "Map of the Hannah Property" (placemat in front pocket of binder) UR-12, "Outline Map of the Hannah Property" (placemat) Class sets of the following SRs: <ul style="list-style-type: none"> SR 1-1, "What Is Biodiversity?" SR 1-2, "Selling the Hannah Property: A Simulation Exercise" SR 1-3, "Description of the Hannah Property" SR 1-4, "Outline Map of the Hannah Property" (class set, plus an additional copy per group) SR 1-5, "Investigating and Classifying Biodiversity" 	<ul style="list-style-type: none"> Whole class discussion Individual reading Group classification exercise and worksheet Whole class discussion on readings Individual map exercise 	<ul style="list-style-type: none"> <i>Biodiversity</i> <i>Ecosystem</i> <i>Organism</i> <i>Species</i>
Lesson 2: <i>Let's Get Organized!</i>		
<ul style="list-style-type: none"> Class sets of the following SRs <ul style="list-style-type: none"> SR 2-1, "The Kingdom Classification of Living Things" SR 2-2, "Name That Species!" SR 2-3, "A Linnaean Field Trip" SR 2-4, "Tree Identification Key" SR 2-5, "Coniferous Tree Wheel" SR 2-6, "Leaf Collection Assignment and Rubric" A notebook to collect leaves and information Field Guides - one for each student Project Handbook, Worksheet 2, "Trees and Kingdoms" 	<ul style="list-style-type: none"> Small group classification exercise Whole class discussion of classification Individual Internet search Whole class field trip Individual leaf collections 	<ul style="list-style-type: none"> <i>Binomial nomenclature</i> <i>Classification system</i> <ul style="list-style-type: none"> Kingdom phylum class order <i>genus</i> <i>species</i> <i>Metabolism</i> <i>Taxonomist</i> <i>Taxonomy</i>
Lesson 3: <i>Kingdom Animalia</i>		
<ul style="list-style-type: none"> Class sets of the following SRs: <ul style="list-style-type: none"> SR 2-2, "Name that Species!" (from Lesson 2) SR 3-1, "Animal Classification" Project Handbook, Worksheet 3, "Animal Classification" 	<ul style="list-style-type: none"> Whole class discussion Group worksheet 	<ul style="list-style-type: none"> <i>Zoologists</i> 

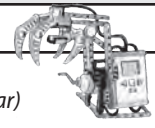
Unit Overview

Essential Questions	Activities	Time	Materials
Lesson 4: <i>Kingdom Fungi</i> ▶			
<p>How do taxonomists organize the fungus kingdom?</p> <p>How do fungi interact with other species?</p>	<ul style="list-style-type: none"> • Introduce fungi • Draw a mushroom • Investigate fungi in six experiments 	2 class periods	<ul style="list-style-type: none"> • Active dry yeast granules • A variety of mushrooms (purchased from a grocery store, taken from lawns and forests, with mycelium attached if possible) • A dead log with samples of fungi and lichens attached • Food samples with mold • Lichen samples from rocks, tree branches, etc. • Ten magnifying hand lenses • Species Cards • Teacher copies of Stations 1-6 at the stations
Lesson 5: <i>Kingdoms Protista and Monera</i> ▶			
<p>What are protista and monera like?</p> <p>What are single-cell living things like?</p> <p>What are wetlands?</p> <p>What living species can we find in wetlands?</p>	<ul style="list-style-type: none"> • Complete worksheet on wetlands • Review microscope work • Investigate wetland micro-organisms • Discuss the wetlands on the Hannah property 	2-3 class periods	<ul style="list-style-type: none"> • Microscope – one per two students, or one per group • Slides and coverslips • Water samples from freshwater wetlands, ponds (look for algae). If you plan a trip to a wetland, bring some samples from the field trip or encourage students to bring in their own samples of freshwater sources. Sample each and determine which sources have the most micro-organisms. • Prepared slides: <ul style="list-style-type: none"> • Kingdom Protista – e.g. euglena, amoeba, stentor, paramecium, volvox, vorticella, spirogyra, diatoms, mixed • Kingdom Monera – e.g. samples of three shapes: coccus, rod, spiral • Kingdom Fungi – e.g. lichen, mold, rust, yeast, spores

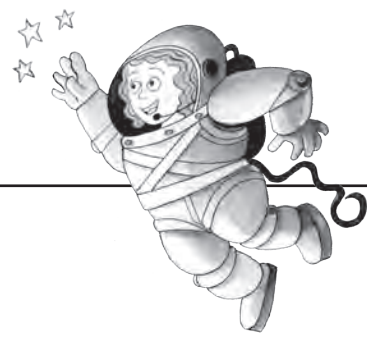
Unit Overview



Materials <i>cont'd</i>	Classroom Configurations	Key Terms and Concepts
Lesson 4: <i>Kingdom Fungi</i>		
<ul style="list-style-type: none"> Project Handbook, Worksheet 4, "The Impacts of Our Perspectives" Class sets of the following SRs: <ul style="list-style-type: none"> SR 4-1, "A Checklist for Biological Drawings" SR 4-2, "The Parts of a Mushroom" SR 4-3, "Investigating Fungi" 	<ul style="list-style-type: none"> Whole class introduction Individual drawing Group investigations at stations 	<ul style="list-style-type: none"> <i>Budding</i> <i>Fungi (Fungus – singular)</i> <i>Hyphae</i> <i>Mycologist</i> <i>Spores</i>
Lesson 5: <i>Kingdoms Protista and Monera</i>		
<ul style="list-style-type: none"> TR 5-1, "Focussing the Microscope" TR 5-2, "Preparing Wet-Mount Slides" Class sets of the following SRs: <ul style="list-style-type: none"> SR 5-1, "Parts of a Compound Microscope" SR 5-2, "A Wetland Micro-organisms Lab" SR 5-3, "Typical Wetland Micro-organisms" SR 5-4, "What Are Wetlands?" Project Handbook, Worksheet 5, "Wetlands" Optional: Microslides and microviewers with viewing slides of Protists, Monerans and Fungi 	<ul style="list-style-type: none"> Group work on worksheet Individual and small group work on microscopes Whole class discussion Group work on project worksheet 	<ul style="list-style-type: none"> <i>Microbiologist</i> <i>Micro-organisms</i>



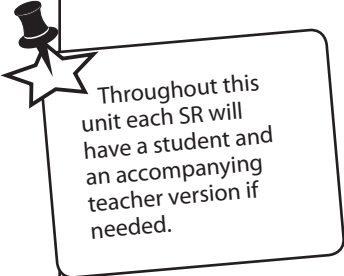

Throughout this unit each SR will have a student and teacher version if needed.



Unit Overview

Essential Questions	Activities	Time	Materials
Lesson 6: <i>How Does a Plant Grow?</i> ▶			
<p>What are the parts of a plant, leaf and flower?</p> <p>How do we classify plant species?</p> <p>Why are plants called "producers"?</p> <p>How do plant species reproduce?</p>	<ul style="list-style-type: none"> • Introduce characteristics of plants • Naming the parts of leaves and flowers • Lab investigation of plants: germination, leaves, flowers, cones 	3 class periods	<ul style="list-style-type: none"> • Selection of leaves from different tree species • Selection of seeds from different plant species • Group sets of: <ul style="list-style-type: none"> • nine bean seeds • three plastic cups • paper towel • labels • tray • one flower • Flowering plants to demonstrate the parts of a flower • Exacto knives, tweezers, magnifying hand lenses, microscopes, slides and slip covers, water droppers • Student leaf collections • Coniferous tree identification wheel • TR 6-1, "Leaf Shape and Arrangement, Margin and Venation Key" (one per group) • Field Guides (see Appendix 10) • Project Handbook, Worksheet 6, "The Great Lakes - St. Lawrence Forest"
Lesson 7: <i>The Invasion Has Begun! Unwelcome Guests</i> ▶			
<p>What are invasive species?</p> <p>How damaging are invasive species to our natural areas?</p> <p>What should we do about invasive species?</p>	<ul style="list-style-type: none"> • Discussion of invasive species • Research one invasive species • Presentation of report on invasive species • Discussion of risk of invasive species on the Hannah property • Complete project worksheet 	2 class periods	<ul style="list-style-type: none"> • Pictures of natural areas (from books, calendars, or personal photographs) • UR-8, "Species Cards," (see Appendix 9) • UR-9, "List of Invasive Species in Ontario" (see Appendix 9) • UR-12, "Outline Map of the Hannah Property" (placemat) • Computer and Internet access • Provide each group with general information to complete SR 7-2. • TR 7-1, "Controlling Invasive Plants Fact Sheet" • Internet references: <ul style="list-style-type: none"> • http://www.nrcan-rncan.gc.ca • http://www.inspection.gc.ca

Unit Overview

Materials <i>cont'd</i>	Classroom Configurations	Key Terms and Concepts
Lesson 6: <i>How Does a Plant Grow?</i>		
<ul style="list-style-type: none"> Optional items: <ul style="list-style-type: none"> Seeds from different plant species (option) Cones from coniferous trees (option) Planting trays and potting soil (option) Class sets of the following SRs: <ul style="list-style-type: none"> SR 1-4, "Outline Map of the Hannah Property" (from Lesson 1) SR 2-6, "A Leaf Collection Assignment and Rubric" (from Lesson 2) SR 6-1, "All About Plants" SR 6-2, "What's In a Leaf?" SR 6-3, "What's in a Flower?" SR 6-4, "A Plant Lab" 	<ul style="list-style-type: none"> Whole class discussion Group lab investigations Individual drawing and exercises 	<ul style="list-style-type: none"> <i>Botanist</i> <i>Germination</i> <i>Pollination</i> <i>Photosynthesis</i>
		
Lesson 7: <i>The Invasion Has Begun! Unwelcome Guests</i>		
<ul style="list-style-type: none"> Project Handbook, Worksheet 7, "Invasive Species" Class sets of the following SRs: <ul style="list-style-type: none"> SR 7-1, "Possible Futures Wheel" (and TC) SR 7-2, "Invasive Species Research (class set)" SR 1-4, "Outline Map of the Hannah Property from Lesson 1 (also on overhead)": 	<ul style="list-style-type: none"> Whole class discussion Group research and presentation Whole class discussion Group project worksheet 	<ul style="list-style-type: none"> <i>Invasive species</i> 

Essential Questions	Activities	Time	Materials
Lesson 8: Interactions - The Story of the Hannah Land Deepens ▶			
<p>How do you really get close to the land?</p> <p>If our land has a history, is it our responsibility to preserve that history?</p>	<ul style="list-style-type: none"> Field trip (full day or several class periods) Various field exercises Completion of naturalist journals 	2-3 class periods (or a full day trip)	<ul style="list-style-type: none"> Field trip location Map of the area to be visited Clipboards, paper and pencils Magnifying lenses Cameras One metre stick or measuring tape Small shovel Field Guides (Appendix 10)
Lesson 9: God's Wisdom - God's Grace ▶			
<p>Why should we care about biodiversity?</p> <p>What threatens biodiversity?</p> <p>How can I be a caregiver in God's creation?</p>	<ul style="list-style-type: none"> Discussion of God's gift of biodiversity Play Biodiversity Game Hear or watch the story of Wangari or the film on the tree planter Discussion of how we can make a difference Praise God for his gift of biodiversity 	1 class period	<ul style="list-style-type: none"> TR 9-1, "God's Gift of Biodiversity" TR 9-2, "Wangari Maathai – A Story of Hope" TR 9-3, "How Can I Make a Difference?" UR - 8, "Biodiversity Game (placemat) plus game pieces and dice <i>Planting The Trees of Kenya – The Story of Wangari Maathai</i> by Claire A. Nivola (optional)
Lesson 10: Who Gets the Property? ▶			
<p>What is the best decision the Hannahs can make about the property?</p> <p>What role do the various perspectives play in the decision?</p> <p>What is the most effective way to make a persuasive presentation?</p>	<ul style="list-style-type: none"> Discussion of God's gift of biodiversity Play Biodiversity Game Hear or watch the story of Wangari or the film on the tree planter Discussion of how we can make a difference Praise God for his gift of biodiversity 	3 class periods	<ul style="list-style-type: none"> Class sets of: <ul style="list-style-type: none"> SR 10-1, "The Hannah Project Rubric: Oral Presentation" SR 10-2, "The Hannah Project Rubric: Content" Project Handbook, Worksheet 9, "Threats to Biodiversity"

Materials <i>cont'd</i>	Classroom Configurations	Key Terms and Concepts
Lesson 8: Interactions - The Story of the Hannah Land Deepens ▶		
<ul style="list-style-type: none"> • Project Handbook, Worksheet 8, "The Hannah Property Food Web" • Class sets of the following SRs : <ul style="list-style-type: none"> • SR 8-1, "A Field Study Guide" • SR 8-2, "A Field Study Naturalist Journal" • TR 8-1, "Guidelines for a Naturalist Journal" • SR 8-2 TC, "A Field Study Naturalist Journal" • Optional – Tree identification books • Optional – Adult chaperones for field trip 	<ul style="list-style-type: none"> • Whole class discussions • Group work • Individual completion of naturalist journals 	<ul style="list-style-type: none"> • <i>Adaptation</i> • <i>Consumer</i> • <i>Food web</i> • <i>Natural selection</i> • <i>Producer</i> • <i>Succession</i>
Lesson 9: God's Wisdom - God's Grace ▶		
<ul style="list-style-type: none"> • YouTube video. <i>The Man Who Planted Trees</i>. This is a 30-minute film based on a story written by Jean Giono (optional). • Class sets of: <ul style="list-style-type: none"> • SR 9-1, "God's Wisdom, God's Grace" 	<ul style="list-style-type: none"> • Whole class discussion • Group game • Whole class story or film • Whole class discussion • Whole class praise 	<ul style="list-style-type: none"> • <i>Ecological footprint</i>
Lesson 10: Who Gets the Property? ▶		
	<ul style="list-style-type: none"> • Individual and group review • Group preparation • Group presentations to class 	<ul style="list-style-type: none"> • None indicated