The Nature of Science

A Grade 7 Field Study in Fish Creek Provincial Park

Teacher Resource Package

(Updated September, 2018)

Fish Creek Provincial Park
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Section I – Before You Go

1. GRADE 7 – Program of Studies

Unit A: Interactions and Ecosystems (Social and Environmental Emphasis)

Overview

Ecosystems develop and are maintained by natural processes and are affected by human action. To foster an understanding of ecosystems, this unit develops student awareness of ecosystem components and interactions, as well as natural cycles and processes of change. Building on this knowledge, students investigate human impacts and engage in studies that involve environmental monitoring and research. By reflecting on their findings, students become aware of the intended and unintended consequences of human activity, and recognize the need for responsible decision-making and action.

Focusing Questions

How do human activities affect ecosystems?

What methods can we use to observe and monitor changes in ecosystems, and assess the impacts of our actions?

Key Concepts

The following concepts are developed in this unit and may also be addressed in other units at other grade levels. The intended level and scope of treatment is defined by the outcomes below.

- interactions and interdependencies
- environmental monitoring
- environmental impacts
- producers, consumers, decomposers
- nutrient cycles and energy flow
- species distribution
- succession
- endangered species
- extinction
- environmental management
Outcomes for Science, Technology and Society (STS) and Knowledge

Students will:

1. Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions.
   - illustrate how life-supporting environments meet the needs of living things for nutrients, energy sources, moisture, suitable habitat, and exchange of gases
   - describe examples of interaction and interdependency within an ecosystem (e.g., identify examples of dependency between species, and describe adaptations involved; identify changing relationships between humans and their environments, over time and in different cultures—as, for example, in aboriginal cultures)
   - identify examples of human impacts on ecosystems, and investigate and analyze the link between these impacts and the human wants and needs that give rise to them (e.g., identify impacts of the use of plants and animals as sources of food, fibre and other materials; identify potential impacts of waste products on environments)
   - analyze personal and public decisions that involve consideration of environmental impacts, and identify needs for scientific knowledge that can inform those decisions

2. Trace and interpret the flow of energy and materials within an ecosystem
   - analyze an ecosystem to identify biotic and abiotic components, and describe interactions among these components
   - analyze ecosystems to identify producers, consumers and decomposers; and describe how energy is supplied to and flows through a food web, by:
     - describing and giving examples of energy and nutrient storage in plants and animals
     - describing how matter is recycled in an ecosystem through interactions among plants, animals, fungi, bacteria and other microorganisms
     - interpreting food webs, and predicting the effects of changes to any part of a web
   - describe the process of cycling carbon and water through an ecosystem
   - identify mechanisms by which pollutants enter and move through the environment, and can become concentrated in some organisms (e.g., acid rain, mercury, PCBs, DDT)
3. Monitor a local environment, and assess the impacts of environmental factors on the growth, health and reproduction of organisms in that environment

• investigate a variety of habitats, and describe and interpret distribution patterns of living things found in those habitats (e.g., describe and compare two areas within the school grounds—a relatively undisturbed site and a site that has been affected by heavy use; describe and compare a wetland and a dryland area in a local parkland)

• investigate and interpret evidence of interaction and change (e.g., population fluctuations, changes in weather, availability of food or introduction of new species into an ecosystem)

• identify signs of ecological succession in local ecosystems (e.g., emergence of fireweed in recently cut forest areas, replacement of poplar by spruce in maturing forests, reestablishment of native plants on unused farmland)

4. Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments

• identify intended and unintended consequences of human activities within local and global environments (e.g., changes resulting from habitat loss, pest control or from introduction of new species; changes leading to species extinction)

• describe and interpret examples of scientific investigations that serve to inform environmental decision making

• illustrate, through examples, the limits of scientific and technological knowledge in making decisions about life-supporting environments (e.g., identify limits in scientific knowledge of the impact of changing land use on individual species; describe examples in which aboriginal knowledge—based on long-term observation—provides an alternative source of understanding)

• analyze a local environmental issue or problem based on evidence from a variety of sources, and identify possible actions and consequences (e.g., analyze a local issue on the control of the beaver population in a nearby wetland, and identify possible consequences)
Skill Outcomes
(focus on the use of research and inquiry skills to inform the decision-making process)

Initiating and Planning

_Students will:_

Ask questions about the relationships between and among observable variables, and plan investigations to address those questions

- identify science-related issues (e.g., identify a specific issue regarding human impacts on environments)
- identify questions to investigate arising from practical problems and issues (e.g., identify questions, such as: “What effects would an urban or industrial development have on a nearby forest or farming community?”)
- state a prediction and a hypothesis based on background information or an observed pattern of events (e.g., predict changes in the population of an organism if factor X were increased, or if a species were introduced or removed from the ecosystem; propose factors that will affect the population of a given animal species)
- select appropriate methods and tools for collecting data and information (e.g., select or develop a method for estimating a plant population within a given study plot; design a survey as a first step in investigating an environmental issue)

Performing and Recording

_Students will:_

Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data

- research information relevant to a given problem or issue
- select and integrate information from various print and electronic sources or from several parts of the same source (e.g., compile information on a global environmental issue from books, magazines, pamphlets and Internet sites, as well as from conversations with experts)
- use tools and apparatus effectively and accurately for collecting data (e.g., measure factors, such as temperature, moisture, light, shelter and potential sources of food, that might affect the survival and distribution of different organisms within a local environment)
- estimate measurements (e.g., estimate the population of a given plant in a one square metre quadrat, and use this figure to estimate the population within an area of 100 square metres)
Analyzing and Interpreting

Students will:

Analyze qualitative and quantitative data, and develop and assess possible explanations

- identify strengths and weaknesses of different methods of collecting and displaying data (e.g., compare two different approaches to measuring the amount of moisture in an environment; analyze information presented by proponents on two sides of an environmental issue)
- compile and display data, by hand or computer, in a variety of formats, including diagrams, flow charts, tables, bar graphs and line graphs (e.g., illustrate a food web, based on observations made within a given environment)
- use and/or construct a classification key (e.g., use a classification guide to distinguish and identify organisms found within a given area)

Communication and Teamwork

Students will:

Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results

- communicate questions, ideas, intentions, plans and results, using lists, notes in point form, sentences, data tables, graphs, drawings, oral language and other means (e.g., present findings from an analysis of a local issue, such as the control of the beaver population in a nearby wetland)
- evaluate individual and group processes used in planning, problem solving, decision making and completing a task
- defend a given position on an issue, based on their findings (e.g., make a case for or against on an issue, such as: “Should a natural gas plant be located near a farming community?”)

Copied from the Alberta Education Program of Studies - Grade 7 Science Unit A: Interactions and Ecosystems (2003) ©Alberta Learning, Alberta, Canada
2. Vocabulary and Definitions

Vocabulary

Objective

The following vocabulary will be used throughout the field study. It is expected that students will have a working knowledge of these terms. The following resources were used to develop these definitions:


Gage Canadian Dictionary; Gage Educational Publishing Company, (1997)

Time Required

Varies.

Teacher Instructions

There is a significant amount of vocabulary involved with this field study. This list, with definitions, is designed to help students sort the vocabulary into meaningful groups so that it can be used successfully for pre-visit activities, the field study day, and post-visit activities.

General Ecosystem Terms

abiotic: The non-living components of the environment (physical and chemical), such as air and water.

adaptation: A structure or behaviour that increases an organism's chance of surviving or reproducing in a particular environment.

biodiversity: The variety of life on Earth; most commonly, the genetic variability within individual species, variety of living species; and the variety of different ecosystems.

biotic: The living components of the environment; in other words, all other organisms in the environment.

community: A group of interacting populations of two or more different species that live together in a particular environment.

ecology: The scientific study of the inter-relationships among organisms and between them.
ecosystem: A network or system of interdependent living (biotic) and non-living (abiotic) things.

environment: The complete range of external conditions, physical and biological, in which an organism lives.

humus: The decomposed (or decomposing) organic material (usually by bacteria and fungi) found in soil.

micro-environment: A small area of an environment that has different conditions (such as temperature and/or humidity) compared with the larger environment of which it is a part.

organism: A life form.

population: A group of organisms, all of the same species, which occupies a particular area.

Measurement Terms

aspect: The directional orientation of a slope that creates differing situations of heat, light and amount of sunshine.

quadrat: A basic ecological sampling unit, ranging in size from one square metre in grasslands, to 10 square metres in forested areas. These smaller units of measure are used for making accurate estimates of the biotic and abiotic features within an ecosystem.

transect: (1) A line used in ecological study to provide a means of measuring and representing, geographically, the distribution of organisms. Recordings are made at regular intervals. Transects are particularly useful for exploring transitions and the distribution of living and non-living things across an ecosystem. (2) A technique for estimating populations that involves running a straight line of string through the area being studied. At regular intervals along the string, every organism that touches the string, or grows directly above or below it is identified and counted.
Food Web Terms

decomposer: An organism that feeds (to gain energy and nutrients) on material that had once been alive.
deciduous: Plants whose leaves fall off annually, usually in the autumn.
coniferous: Seed-bearing plants that produce cones and bear leaves all year round.
consumer: An organism that obtains its food (to gain energy and nutrients) by eating other organisms.
fauna: All the animal species of a given area.
flora: All the plant species that make up the vegetation of a given area.
producer: An organism that is able to manufacture food from simple inorganic substances.

Land Use Terms

aesthetic features: Sensory aspects of a landscape associated with its natural beauty and wonder.
conservation: The process of managing human use of the environment to ensure that heritage values are considered and such uses are sustainable.
indicator species: A species whose ecological requirements are well understood and where changing population numbers will indicate a particular environmental condition or set of conditions. Indicator species can also give a good indication of how other organisms may be surviving.
land-use: Any behaviour or activity that occurs on a parcel of land.
protected area: Protected areas are natural landscapes that are explicitly legislated to preserve natural heritage values. Management guidelines and monitoring programs must ensure the long term preservation of biodiversity. Environmental diversity (biodiversity) is understood to include all species of plants, animals and other organism, and the habitat, and ecological processes upon which they depend. Protected areas are internationally recognized as one of the cornerstones of biodiversity preservation.
stewardship: Management of the heritage of our natural spaces, species and culture in such a way that it can be passed on, intact, to future generations.
sustainable: Management that ensures that the present uses (human and otherwise) of an area and its resources, do not compromise the future health, availability and prospects for future generations.
3. Park Etiquette – Key Messages to review before your field trip

1. Alberta’s Parks and Protected Areas belong to all Albertans and contain many different natural landscapes that are home to numerous plant and animal species. The province’s network of parks and protected areas covers roughly 27,500 square kilometres and includes more than 500 sites. This network helps to ensure that Alberta’s biodiversity is preserved for future generations.

2. Our vision: “Alberta’s Parks inspire people to discover, value, protect, and enjoy the natural world and the benefits it provides for current and future generations”.

3. Provincial parks exist to protect provincially significant natural, historical and cultural features. They contain a range of outdoor recreation, interpretive, and environmental education opportunities, facilities and services so that visitors can explore, learn, understand, and appreciate the natural world.

4. The Provincial Parks Act protects Alberta’s parks. It is through this legislation that these landscapes have specific and important guidelines to help keep them healthy and vibrant.

5. Feeding of wildlife is not necessary and is potentially dangerous and is against Park rules. The Park’s ecosystem provides all the food and habitat wildlife requires for their basic needs. Human food does not meet their nutritional requirements and can cause some species to become dependent on humans. Quietly observe all wildlife from a comfortable distance.

6. Take only pictures. Everything in the Park – living and non-living is protected to help preserve the complex living system that thrives in our provincial parks. Students are welcome to share their discoveries, but must remember to leave everything as they found it. Treat plants, insects, and trees gently to avoid unnecessary injury or damage. Please do not pick plants.

7. There are no off-leash areas in Alberta’s Parks and Protected Areas. This protects the parks wildlife as well as domestic pets. Please do not bring pets on a field study. They can be distractions for students and pose a health risk for those allergic to pets. Guide Dogs and Assisted –Living Dogs are the only animals permitted in Park buildings.

8. Litter should be placed in the rubbish bins provided or in a pocket. Human litter is hazardous to Park plants and wildlife.

9. Use only designated fire pits. Open fires are a threat to public safety and Park habitats. The burning of Park vegetation is not permitted. You must bring your own firewood and water to extinguish the fire.
Class Discussion About The Field Study

Objective
To conduct a class discussion focusing on the specifics of the actual field study day.

Time Required
30 - 40 minutes

Teacher Instructions
Discuss this checklist of items at school prior to the field study day:

___ Discuss the fact that Fish Creek Provincial Park is a provincial protected area and not a city park.

___ Discuss how provincial parks and protected areas are different from local city parks. These areas are part of a plan to set aside a portion of the province’s land base of representative natural systems. This will help preserve the biodiversity of Alberta’s natural environments for future generations to enjoy.

___ Discuss the value or importance of provincial parks and the various types of protected areas.

___ Discuss the purpose of provincial parks and other types of protected areas. They are to protect and preserve the natural environment. Have the class make a list of behaviours on the field study that would show respect for living things and a commitment to their care. This list could include:

• leave anthills, nests and rotting logs alone and intact. These are homes for small animals,
• walk carefully around bushes and trees, not through the middle of them,
• stay on the trails,
• walk carefully, watching each step to avoid crushing small plants and trees.

___ Discuss outdoor safety.

• stick with your group
• always be in view of your teacher or parent volunteer,
• stay away from open water, the river and steep hillsides.

___ Discuss behavioural expectations. As the Park is visited by many people, we must be careful in how we act there. Explain that they are ambassadors for their school. Review appropriate behaviour, both indoors and outdoors. Discuss the facility or part of the Park they will be visiting. Explain that the field study will be another school day, just at a different place. All the school rules apply. Remember that other schools will probably be there trying to work also.

___ Lunch
Discuss lunch procedures. Remind the students about bringing a garbage free lunch.

Discuss appropriate clothing for the day’s activities. Review clothing needed to be appropriately dressed for the season and the activities of the day. Mornings in the shady forest will be cool and trails may be muddy and wet. Several layers of clothing, including a water resistant layer and a hat or hood, will provide the most comfort. Light hiking boots or sturdy runners are fine, no sandals or flip flops. Warm weather means hats and insect repellent will also be required.

Discuss the Park rules. These rules reflect the provincial parks’ mandate to protect and conserve our natural environment. Toward this end, it’s very important to be aware of the following Park rules.

1. Wildlife lives in the Park because they are able to meet their needs for food, water and shelter. Feeding them is not necessary. Do not feed or harass wildlife. Observe them quietly instead.

2. Millions of people visit the Park each year. If each person took only one cone or picked one plant that would represents a very significant impact on the natural environment. Cutting, defacing, picking or removal of any plant, fossil, rock or other Park material is prohibited. Leave them behind for others to enjoy and for animals to use.

3. Millions of people visit the Park each year. If each person threw their garbage on the ground it would be difficult to clean up and dangerous for wildlife that could confuse the litter for food. Litter should be placed in garbage cans or in your pocket if no garbage cans are available.

4. For as much as is possible, the Park should remain a natural place. Wildlife is not accustomed to pets chasing them or threatening them with noise. For these reasons pets must be on a leash in the Park. This not only protects wildlife it also protects people and their pets as well.

5. To preserve and protect our natural Park environment we must be very careful with how we interact with the Park. Open fires are a threat to habitat which includes animals and plants. For these reasons, campfires are permitted only in designated firepits located in some picnic areas.
4. Scientific Teams – Preparing Students to Work Together

The field study you are preparing for is a full-day of exploration and data collection in an outdoor, natural environment setting. It is important that your students understand what they are responsible for and what your expectations are. Be sure to review the Park Etiquette and your own expectations with them before coming to the Park.

In the past teachers where asked to set up specific “scientist” roles for their students in their groups to follow over the course of the day, this did not tend to work very well.

Review the data forms that students are expected to complete while on the field study. Reflect and think about the personalities of your students. Take all of this information into account and develop the student groups that will work together on the field study. You can have a maximum of 6 groups of students.

Review with your students the data sheets and try to explain the variety of information they are expected to collect. Students usually do better if they can try a variety of equipment and exercises in each quadrat survey; rarely will they be happy doing the same thing in each survey.

Review their responsibilities regarding:

- Care of equipment
- Respect for the Park
- Respect for their classmates, teachers, volunteers
- Importance of making careful and complete observations and recordings of data and information
5. Describing an Ecosystem – Pre-trip Activity

Objective
To provide students with a list of questions or criteria they would use to help define an ecosystem when they visit it for the first time.

Time Required
40 - 45 minutes

Teacher Instructions
Instruct the students to get into their scientific teams.
Circulate a variety of posters, books, or other resources showing natural habitats, landscape images from a variety of regions. Be sure each group has a different environment or ecosystem to explore and discuss.

Challenge each group to develop a list of questions that could be reduced to five questions, that when asked, would result in information that describes any ecosystem they might visit.

Ask each group to present and post the questions they developed.
Switch group resource materials. Ask them to apply the questions they developed in the first round to the second round.

Do the answers give a complete description of the ecosystem or habitat that they now have?
How could they revise their questions to improve them?
Create three food webs that contain at least ten species in each web.

Describing an Ecosystem
Some possible questions to ask when exploring any ecosystem could include:

1. What are the primary abiotic features?
2. What are the primary biotic features such as:
   - What are the main producers?
   - What are the main consumers?
   - What are the main decomposers?
3. What unique adaptations do the plants and animals have?
4. What are the hardships and challenges organisms in this ecosystem face?
5. How does the ecosystem change over the course of the seasons?
Student Worksheet: Describing an Ecosystem Questions

Student Name: ____________________________________________

Date: ____________________________________________________

Develop five questions that when answered would result in a detailed and accurate definition of any ecosystem you visited.

1. 

2. 

3. 

4. 

5. 

Additional Questions:

1. 

2. 

3. 

4. 

5.
Student Worksheet: Describing an Ecosystem Chart

Student Name: ____________________________________________________________

Date: ___________________________________________________________________

Ecosystem:

What are the primary abiotic features?

What are the primary biotic features?

What are the main producers?

What are the main consumers?

What are the main decomposers?

What unique adaptations do the plants and animals have?

What are the hardships and challenges organisms in this ecosystem face?

How does the ecosystem change over the course of the seasons?
Alberta’s Natural Regions

Alberta is comprised of six distinctly different natural regions, each having several sub-regions. Classification of these regions is based on geology, landforms, soil, hydrology, climate, vegetation and wildlife. For more information on the six natural regions described here, visit the Tourism, Parks, and Recreation website and follow the links to https://www.albertaparks.ca/albertaparksca/management-land-use/parks-system/ and follow the links to Management & Land-use.

**Grasslands Natural Region**, located in the south east corner of the province is characterized as hot, dry and windy. Exposed badlands, bedrock, sandstone and large flat plains make up the geography. Wildflowers, grasses and shrubs are common plants. Wildlife includes cottontail, pronghorn and ground squirrel along with an abundance of birds. This ecosystem comprises about 12% of Alberta’s environment.

**Rocky Mountain Natural Region** lies along the Continental Divide. Here fast flowing streams and rivers dissect towering mountain ranges. Thick coniferous forests are found at lower elevations, and alpine tundra at higher elevations. Common vegetation includes Douglas fir, aspen, lodgepole pine and grassy meadows. Wildlife that live in this region include elk, bighorn sheep, deer, coyote, moose, osprey and grizzly bears. This ecosystem comprises about 6% of Alberta’s environment.

**Foothills Natural Region** is comprised of rolling hills and ridges that run parallel to mountains. This area receives more precipitation and is cooler in the summer than other regions in the province. Its coniferous forests, populated by white spruce, black spruce, lodgepole pine and subalpine fir, are home to a wide variety of birds, black bears, grizzly bears and elk. This ecosystem comprises about 12% of Alberta’s environment.

**Boreal Forest Region** is the largest natural region in Alberta. Vast stands of aspen, balsam poplar and white spruce are broken up by lakes and large areas of muskeg where black spruce and tamarack are the dominant tree species. These ecosystems are home to an extensive range of wildlife that include moose, hare, lynx, weasel, wetland birds, wolves, beaver, ermine, woodland caribou and an abundance of birds and insects. This ecosystem comprises about 60% of Alberta’s environment.

**Canadian Shield Region** reaches into Alberta from the Northwest Territories on its north east border. This small region is formed of granite covered with thin soils, patchy coniferous forests, shifting sand dunes and small shallow lakes. Common wildlife include bear, beaver, muskrat, lynx, wolf, moose, bald eagle, ptarmigan and a wide variety of other birds. This ecosystem comprises about 2% of Alberta’s environment.
What Are Protected Areas? Pre-trip Activity

Objective
To introduce the concept that people value different things in different ways and that in order to ensure an area is "safe", or "secure" from damage, certain precautions are required.

Time Required
50 - 60 minutes

Teacher Instructions
1. Make copies of “What Is A Protected Area - One” and “What Is A Protected Area - Two”.
2. Circulate copies of “What Is A Protected Area - One” to each student.
3. Ask the students to think of somewhere that is very important to them. This could be their bedroom, a local natural area, a cottage, weekend cabin or particular camping destination, for example.
4. Ask the students to answer the following questions with this place in mind.
   • Describe this important area without naming it.
   • Why is it so important to you?
   • How do you ensure it never is damaged or destroyed?
   • What would you do if a friend threatened this place?
   • Is this place important to other people? If so who and why?
   • How do you indicate to others that this place is important to you?
5. Collect the completed sheets, number them consecutively and post the sheets on the wall, without any student’s names on the sheets.
6. Hand out copies of “What Is A Protected Area - Two”.
7. Ask the students to move around and read the posted sheets. They can ask their classmates questions that can be answered with a yes or no, in an effort to determine who wrote each posted sheet.
8. Record their guesses on the sheet entitled “What Is A Protected Area - Two” by writing the name of the person they think filled out the sheet they are reviewing, beside the sheet number on their tally sheet.
9. After a few minutes, ask each person to write their name on the "What Is A Protected Area?" sheet they made.
10. Discuss the common points that students wrote for each of the questions on the "What Is A Protected Area - One?" sheet.
Discussion should include the following points:

- What sorts of protected areas are values by students?
- Why are these areas important?
- Why is there so much variance in what people value?
- How do you demonstrate to others that this is an area you protect?
Student Worksheet: What Is A Protected Area? - One

Name  (don’t write your name until you are asked to)

Date

Think of a place that is really important to you. Answer the following questions:

1. Describe the place that is really important to you without naming it

2. Why is this place so important to you?

3. How do you ensure that this place never is damaged or destroyed?

4. What would you do if a friend threatened this place?

5. Is this place as important to everyone else as they are to you and why?

6. How do you indicate to others that this place is important to you?
Student Worksheet: What Is A Protected Area? - Two

Move around the classroom and read the posted sheets. Ask your classmates questions that can be answered with a yes or a no in an effort to determine who wrote each of the posted sheets.

1. __________________________  18. __________________________
2. __________________________  19. __________________________
3. __________________________  20. __________________________
4. __________________________  21. __________________________
5. __________________________  22. __________________________
6. __________________________  23. __________________________
7. __________________________  24. __________________________
8. __________________________  25. __________________________
9. __________________________  26. __________________________
10. __________________________  27. __________________________
11. __________________________  28. __________________________
12. __________________________  29. __________________________
13. __________________________  30. __________________________
14. __________________________  31. __________________________
15. __________________________  32. __________________________
16. __________________________  33. __________________________
17. __________________________  34. __________________________
Section II - Your Field Study Day

1. What to Bring – What to leave behind (A few suggestions)

It is most important that you, your students and your volunteers/chaperones know and understand that your field study will be an “OUTDOOR” experience. We will use a classroom only as a home base to start and end the day. We may have lunch indoors as well, but only if the weather is poor. We will have access to washrooms at the start and end of the day, but otherwise will be in the field away from such facilities. With this in mind, it is important that everyone attending the field study is prepared. Though we are in the city, everyone needs to be prepared for the day outdoors. The weather can change drastically, we will be moving through out the land base on foot over a variety of trails and off-trail areas, and working with a variety of field equipment.

What to Bring:

- Extra clothing (rain gear, warm layers)
- Sturdy shoes (no sandals or flip-flops)
- Hat, sunscreen, bug repellent
- Food and water for the day *(there are no microwaves, coffee shops, vending machines, etc. on-site or close by)*
- Data sheets, pencils, clipboards
- Camera, binoculars (optional)
- Daypack
- Students in working groups (maximum of 6 groups)

What to Leave Behind:

- Gameboys, MP3s, PSPs, laptops, etc.
- Cell phones *(bring them, but keep them packed away and OFF)*
- Designer clothing – we will be doing field work, getting dirty
2. Your Day in the Field ....

The field study day can be covered in a 4 – 5 hour timeframe, but can be modified to fit other schedules.

The major portion of your field study will be doing transect/quadrat surveys in 3 habitats (grassland, aspen parkland, spruce forest) collecting information on the biotic and abiotic features of each and on flora and fauna.

Arrival

When doing the field study at Shannon Terrace (see map) have the bus drop your group at the Environmental Learning Centre. Staff will meet you outside and direct you to your classroom.

Park and Field Study Introduction – Classroom (60 – 90 minutes)

- Students will be introduced to Fish Creek and the provincial park system.
- Review park rules and behavioural expectations for the day
- Review the day’s agenda
- Historic photo analysis activity
- Review field study procedures, data to be collected, data sheets (pages 26 to 39 – one set per student), and field equipment
- Please have students split into working groups (Maximum 6 groups of students)

Washroom and Snack Break

1st Transect/Quadrat Study Survey (60 – 90 minutes)

The first survey always takes the most time as students are using the equipment and collecting the data for the first time. Each of the remaining surveys gets progressively quicker and easier.

- Lay out transect line
- Student groups set-up quadrats
- Collect and record data
- Inventory and equipment ready to move to next survey location
- Review findings, discuss interesting features and unique observations

Lunch – in the field or classroom (30 minutes max)

- Staff will take payment and issue receipt to teacher at this time or the end of the day
2nd & 3rd Transect/Quadrat Study Surveys (60 – 90 minutes total for both)

Conclusion – Wrap-up – Back in the classroom

- Washroom break if needed
- Inventory all equipment kits (schools are responsible to pay for lost or equipment broken due to misuse)
- Review data collected
- Questions from students
THE "NATURE" OF SCIENCE

INTERACTIONS AND ECOSYSTEMS
STUDENT DATA FORM

Date: ________________

Time: ________________

Weather Observations:
________________________________________

Group Members:
________________________________________

________________________________________

Student Data Sheet
In this field study, you will be exploring three different ecosystem; a grassland, an aspen parkland, and a spruce/boreal forest. In your assigned groups, complete the data sheet with as much detail and accuracy as possible as directed in this data form.
## Grassland Data

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Temp. (°C)</strong></td>
<td></td>
<td></td>
<td></td>
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**Notes:**

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Grassland - Soil Characteristics

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| **A Horizon** |                                                           |
| A Horizon     | Also called topsoil; it is dark brown to black in colour.   |

| **B Horizon** |                                                           |
| B Horizon     | It is often light brown to orange in colour and known as the mineral layer due to the leaching of materials from upper layers. |

| **C Horizon** |                                                           |
| C Horizon     | Contains weathered parent rock material that is unconsolidated into soil. |

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Grassland – Evidence of Animals and Insects

Using the square below, complete a detailed drawing of your entire 3m x 3m quadrat that highlights all evidence of animal activity (insects, mammals, birds or reptiles). Sketch, draw and label with as much detail as possible all evidence you find.
**Grassland - Plants**

Randomly place your 50 cm x 50 cm grid square into your quadrat. In the grid below, do a detailed drawing of the plants found in your grid square. You may include labels or codes to identify different types of plants (G = Grass, M = Moss, F = Flower, S = Shrub).

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### Aspen Parkland Data

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Avg.</th>
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</thead>
<tbody>
<tr>
<td><strong>Air Temp. (°C)</strong> 2 m above the ground.</td>
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<td></td>
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**Aspen Parkland - Plants**

Randomly place your 50 cm x 50 cm grid square into your quadrat. In the grid below, do a detailed drawing of the plants found in your grid square. You may include labels or codes to identify different types of plants (G = Grass, M = Moss, F = Flower, S = Shrub).
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(continued on the next page)
**Focusing Questions**

Based on your studies today, how would you describe a grassland, aspen parkland, and boreal ecosystems?

_____________________________________________________________________________________
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What ecosystem did you enjoy the most, list these factors. Do you think other visitors (e.g. recreationalists) would have the same conclusion?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

What land use impacts (human impacts) did you observe in each of the ecosystems?
Grasslands: ________________________________________________________________________
Aspen Parkland: ______________________________________________________________________
Boreal Forest: _______________________________________________________________________

Which ecosystem do you think was the most sensitive to human impacts? Detail the reasons why you think this.
_____________________________________________________________________________________
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If you were a land manager, which ecosystem would you work to protect, why?
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
ACCESS MAP
Fish Creek Environmental Learning Centre
13931 Woodpath Road S.W., Calgary, Alberta T2W 5R6
Phone: (403) 297-7827  Fax: (403) 297-7849

Directions:
Take Anderson Road West to 37th Street S.W. Head south on 37th Street S.W. to 130th Avenue S.W. (second set of lights on 37th Street S.W.). Turn left onto 130th Avenue S.W. and then take your first right onto Woodpath Road S.W. Drive straight ahead into the Park and continue to the bottom of the hill. The Environmental Learning Centre is on the right hand side (watch for signs).

NOTE:
- Park speed limit is 30 km/hr.
- Please park in the picnic area and walk to the Centre along the paved path.
- Do not leave valuables in your vehicle.
The speed limit in provincial parks is 30 km per hour. Please drive carefully.
Please stay on designated paved, granular, or single track pathways.
There are no off-leash areas in any Alberta provincial parks. ALL pets must be leashed and pet waste must be picked up and removed.
Liquor is prohibited in all public areas of Fish Creek Provincial Park.
Please note the gate closure times at each facility area change seasonally.
For Park information phone 297-5293. EMERGENCY phone 911.
www.fish-creek.org