Field Studies 12

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School Name: Wood Street School	**Signature of Superintendent:**
Committee Approval Date:	**Committee Chair Signature:**
Course Name: Field Studies 12	**Grade Level of Course:** 12
Number of Course Credits: 2	**Number of Hours of Instruction:** 60

Department Authorized Prerequisite(s):

n/a

Special Training, Facilities or Equipment Required:

Field Studies provides students with opportunities to observe and record local environmental conditions. Equipment required to conduct field studies ranges from self-made gear to expensive pieces of specialized equipment.

Course Synopsis:

Field Studies 12 is designed to provide flexibility in selecting a range of environmental monitoring activities. Teachers are expected to select at least two activities within each Big Idea based on community, teacher strengths, environmental opportunities, and relationship to other courses. Field Studies 12 may be designed to integrate and enrich a variety of science and social studies courses. Teachers may combine Big Ideas, Content, and Elaborations with the Curricular Competencies to construct integrated curriculum for Field Studies 12.

The following describes how to construct Field Studies 12 curriculum for an integrated program. Field Studies 12 provides students with knowledge and skills to monitor a wide variety of environments. This program demonstrates practical applications for many principles found in biology, chemistry, human and physical geography, and environmental science, adding depth to their understanding of these fields of study. Teachers are to select at least two of the skills and knowledge from each of the Big Ideas that

support and extend content areas described in the related courses. Most of the Field Studies topics are designed to be conducted outside classrooms using environmental settings identified as environments of interest.

Goals and Rationale:

Field Studies 12 applies a range of environmental monitoring activities which may be integrated with content found in Physical Geography 12, Human Geography 12, Chemistry 11, Biology 11, and Environmental Science 11 and 12 in conjunction with community identified environmental needs. Students will find the practical application of such principles strengthens and deepens understandings in the related subjects. Conducting such environmental monitoring activities builds collaborative skills and strengthens community-student relationships.

Yukon First Nations Perspectives:

Field Studies 12 finds a foundation of support in the Yukon First Nations Umbrella Final Agreement in which Culture and traditions, Environmental Stewardship, and Renewable Resource utilization are central foundational principles. Yukon First Nations express the importance for their youth of learning on the land, for the need to gain environmental awareness integrated with traditional knowledge, and to understand that the involvement of First Nation communities and the role of knowledge keepers in environmental activities are critical elements of a young person’s education. This course helps provide many of these key learnings.

Course Name: Field Studies **Grade: 12**

BIG IDEAS

Monitoring environments following scientifically rigorous methods is a foundation to environmental stewardship	Application of terrestrial and biotic monitoring processes is essential in understanding environmental conditions	Application of aquatic and marine monitoring processes is essential in understanding environmental conditions	Application of atmospheric and climatic monitoring processes is essential in understanding environmental conditions	First Nations traditional knowledge are based on millennium of observations of the natural world

Learning Standards

Curricular Competencies	Content
Students are expected to do the following: • understand **established environmental monitoring processes** raise questions; gather, interpret, and analyze data and ideas from a variety of field studies and communicate findings and conclusions • used conventional **monitoring principles to study a variety of human impacts** on a wide variety of environments • use a number of conventional **classification, location and identification processes to map populations and environmental change** • conduct a variety of **analysis on streams, lakes, wetlands, estuaries, and marine environments** following conventional processes • conduct a variety of analysis of **human impacts on aquatic and marine environments** • conduct a variety of analysis addressing frequency and extent of extreme weather events and changing climatic conditions • explore biological indicators as indicators of impacts and resilience to climate change • **appreciate and incorporate First Nations traditional knowledge** about the natural world using appropriate protocols and honoring cultural traditions.	*Students are expected to know the following:* • monitoring environments following established, rigorous methods and long-term observations provides a foundation to environmental stewardship • understand the value of baseline information in documenting change and impacts • First Nations traditional knowledge based on millennium of observations of the natural world provides context, information, and process to environmental monitoring • how to assess human impacts on terrestrial, aquatic, marine and atmospheric environments • **monitoring terrestrial and biotic** processes following established methods is essential in understanding environmental conditions • **aquatic and marine monitoring processes** are essential in understanding environmental pressures and conditions • monitoring **atmospheric and climatic processes** are essential to understanding **climate change and extreme weather events**

Curricular Competencies – Elaborations	Field Studies 12

Conduct **established environmental monitoring processes;** gather, interpret, question, and analyze data and ideas from a variety of field studies and communicate findings and conclusions. The following activities are samples of field studies using different established environmental monitoring processes.

- Undertake field studies using quadrats and transects to record, compare, and contrast different plant communities.
- Use digital imagery to examine, drainage patterns, ecosystems, and atmospheric circulation patterns.
- Use digital imagery to study different environments at different scales to examine biotic zones and hydrological patterns
- Understanding of the concept of scale by examining environments at different scales such as forest land cover.

Understand and use a variety of **monitoring principles to study a variety of human impacts** on different environments. The following activities are samples of field studies that observe, record, and analyze human impacts on different environments and populations.

- Recognize geographic patterns or environmental phenomena that repeat over time and space.
- Use topographic maps, digital maps, GPS to identify terrain patterns associated with impact events.
- Recognize trends and variations in the consistency of a natural phenomenon in a particular setting over a period of time.
- Use proxy data from dendrochronology, fire histories and paleolimnology to show long term environmental change.
- Record specific cases associated with the impact of populations (human and natural) on local environments.
- Examine different forestry practices and how they affect environments in different regions

Use **classification, location and identification processes to map populations and environmental changes** The following activities are samples of field studies that observe, record, and analyze how study of populations provides insights into environmental changes.

- Use of keys to classify populations in a place and time indicating environmental conditions such as the use of aquatic invertebrate populations to determine water quality.
- Use the Modified UNESCO Code to determine type of ecology in a study area
- Use of Environmental Monitoring Assessment Network and forest structure analysis plots to observe and record environmental changes

The following examples provide ways of conducting a variety of **analysis on streams, lakes, wetlands, estuaries and marine environments** following conventional processes. The following activities are samples of field studies directed toward monitoring different aquatic and marine environments and populations.

- conduct an analysis of water chemistry, pH, conductivity, turbidity, dissolved oxygen, temperature, and lake stratification
- conduct an analysis of stream flows following “Stream Keepers” protocols
- conduct an analysis of intertidal zones flows following “Shore Keepers” protocols
- conduct an analysis of aquatic invertebrates and correlate these with water quality
- understand and evaluate causes and impacts of factors affecting the decline of Pacific Salmon populations

- conduct bathymetric, paleolimnology and river flow studies
- sample a fish population and examine how environmental conditions affect their health, population, and spawning
- conduct analysis of stream and river erosion, sedimentation, downcutting and deposition
- design, conduct and record studies on intertidal fauna
- collect information marine conditions, salinity, tidal movements
- assess impacts of human activities on localized marine environments
- conduct mark/recapture population counts within intertidal zones
- use a grab sample to examine marine benthic environments

Appreciate and incorporate First Nations traditional knowledge about the natural world using appropriate protocols and honoring cultural traditions. The following are examples of activities students may take to incorporate First Nations traditional knowledge into their field studies and describe actions showing respect and honoring First Nation cultural environmental traditions.

- understand features of the Umbrella Final Agreements that address environmental stewardship
- understand cultural practices when listening and speaking with elders
- recording First Nations environmental observation and concerns about environment impacts
- how to blend First Nations knowledge with scientific observational processes when conducting field studies
- how to seek and find First Nations support for field studies falling within their traditional territories

Content – Elaborations	Field Studies 12

Monitoring terrestrial and biotic processes following established principles are essential in understanding environmental conditions. The following activities are samples of field studies directed toward monitoring different terrestrial and biotic environments and populations.

- classify different organisms and determine the overall state of an ecosystem using a dichotomous key.
- conduct plot and transect sampling of a forest
- measure tree age, diameter, height, condition, and habitat
- measure impacts on forest stands
- describe past climatic conditions using dendrochronology
- identify and map forest floor coverings
- map and classify different terrestrial ecosystems
- conduct studies examining the character of snow landscapes
- conduct studies examining the character of wetlands and their role in water on the landscapes
- use maps and make map features using GPS and satellite/ air photo imagery
- use maps to navigate to a specific location, find and mark a specific location
- identify natural impacts on a landscape using both direct and indirect evidence
- conduct studies examining slope stability
- conduct studies examining impacts of roads and transportation systems on natural populations

Following established protocols for **monitoring terrestrial and biotic** provides comparable longitudinal data**.** The following examples provide a framework for conducting terrestrial and biotic field studies.

- understand the established processes for studying plant communities
- understand the established processes for studying animal communities
- how seasonal changes alter terrestrial and biotic environments
- methods and techniques to count species directly and indirectly in a terrestrial ecosystem
- know the principles associated with the design of a forest monitoring procedure
- how to evaluate effects of aspect and slope on forest development
- how landscape dynamics and characteristics affect biotic systems
- how the complexity and interconnectedness of cyclic and noncyclic populations impacts ecological systems
- how to identify and compare forest ecology in the boreal and coastal forests
- how to develop a skeleton plot from dendrochronology samples and how to use such data in forest harvesting
- how to conduct a soil sample evaluating texture, structure, pH, moisture, soil chemistry and color
- understand the variety of career options and educational paths related to field studies in terrestrial environments
- how Yukon First Nations used and cared for terrestrial systems

Content – Elaborations	Field Studies 12

Following established protocols for **aquatic and marine monitoring processes** provide comparable longitudinal data**.** The following examples provide a framework for conducting such field studies.

- characteristic water chemistry within healthy aquatic systems
- methods and tools used to capture aquatic invertebrates and use a key to determine water quality
- understand how to study the morphology of rivers and lakes through stages of development
- how persistent organic pollutants and pathogens find their way into aquatic systems
- a variety of methods for studying water quality
- methods and techniques to directly, and indirectly, count species in an aquatic ecosystem
- how tidal systems work on the west coast
- identify and classify different organisms found in the west coast intertidal zones
- how estuaries provide transition habitat for salmon
- how wave action shapes the shoreline
- consequences of depositing waste in the ocean - how coastal First Nations used and cared for marine systems
- the variety of career options and educational paths related to field studies in aquatic environments
- methods and techniques to count species directly, and indirectly in a marine ecosystem

Monitoring **atmospheric and climatic processes** are essential to understanding **climate change and extreme weather events**.

- understand relationship between weather and climate
- understand air mass movements and related precipitation, pressure, and POP movement in global air cycles
- how snow cover effects energy reflection, and plant and animal populations
- how different climatic conditions may affect plant and animal populations
- record the extent and duration of extreme weather events
- relationships between atmosphere, biosphere, cryosphere, oceans and aquatic systems
- shifts in seasonal patterns

Monitoring **atmospheric and climatic processes** are essential to understanding **climate change and extreme weather events.** The following activities are samples of field studies directed toward monitoring changes to weather, seasonal events, and climate change.

- observe and record weather parameters (temperature, pressure, wind, cloud cover, precipitation) and changes in each feature
- observe and record long term historical weather records
- observe and record seasonal changes such a snow periods, phenology, and budburst
- gather proxy climatic evidence through dendrochronology and paleolimnology
- observe and measure particulates in air
- observe and record sunlight, energy received from the sun, and albedo at different seasons
- observe and record snow cover, depth temperature variations within snowpacks and snow profile features
- record extreme events such as flooding, landslides, forest fire histories
- examine climate models for predicted regional changes

Recommended Instructional Components:

n/a

Recommended Assessment Components: Ensure alignment with the Communicating Student Learning E-book and the Principles of Quality Assessment

Learning Resources: https://experientialscienceprojects.weebly.com/

Equipment required to monitor forestry, wetlands, wildlife populations, aquatic environments, marine intertidal environments, atmospheric conditions following conventional monitoring processes.

Additional Information: