

# **BAA Fish & Wildlife 12**

**District Name:** Coquitlam

**District Number:** SD#43

**Developed by:** Doug Betts

**Date Developed:** January 2005

**School Name:** Centennial Secondary

**Principal's Name:** Bryan Evans

**Board/Authority Approval Date:** February 22, 2005

**Board/Authority Signature:**

**Course Name:** Fish & Wildlife

**Grade Level of Course:** 12

**Number of Course Credits:** 4

**Number of Hours of Instruction:** 120

**Prerequisite(s):** None

**Special Training, Facilities or Equipment Required:** Science lab w/ microscopes, water testing equipment, TV monitor with compatible VHS/DVD, class set of flora & fauna resource books, binoculars, class set of raingear and access to a school bus. Teacher requires a class 2 driver's license, extensive naturalist experience and preferably a university degree specializing in Biology.

## **Course Synopsis:**

This course will explore the richness and diversity of the natural environment. Students will study the relationships between living things and their world. Binoculars to microscopes are incorporated into a curriculum designed to help students understand and respect both aquatic and terrestrial ecosystems. Learning is divided between the classroom and the outdoors. Regular field trips to local natural places make reading and written assignments alive, literally. The approach fosters a student's individual interests while providing a base naturalist knowledge. Students will learn the basic principles of ecology and apply this knowledge to their immediate environment. Finally through involvement with local volunteer naturalist societies and the school's hatchery project, students are able to understand the importance of contributing to the greater community.

**Rationale:** This course has been developed to support and encourage students to explore and understand the richness and diversity of our natural world. Students will learn how every living thing on earth interacts with other living things. The interdependence of life, structures of ecosystems, succession, adaptations and the flow of matter and energy will be explored by students. They will maintain a nature journal throughout the course, collect and learn about native plants, look at different types of ecosystems and compare them. Experiments will be conducted and written up to look at preferences that organisms have in terms of their biotic and abiotic environment. The effects of weather, climate, pollution and populations will be studied in relation to plant and animal life.

**Organizational Structure:**

<b>Unit/Topic</b>	<b>Title</b>	<b>Time</b>
Unit 1	The Connectedness of Ecology	20 hours
Unit 2	Collecting and Classifying in the Natural World	20 hours
Unit 3	Field Identification/Habitat Preferences	30 hours
Unit 4	Aquatic Ecosystems/Water Quality Testing	30 hours
Unit 5	Habitat Conservation/Preservation Activities	20 hours
<b>Total</b>		120 hours
<b>Hours</b>		

## **Unit Descriptions**

### **Unit 1: The Interconnectedness of Ecology**

**Time: 20 hours**

Students will become familiar with ecology which is defined as the relationships between living things and their environments. Such relationships occur everywhere on earth and students will compare the global situation to what is occurring in their province, city and backyard. They will practise observing their natural world using equipment ranging from microscopes to binoculars to water meters. Concepts and themes will revolve around levels of biological organization and the life balance that exists between respiration and photosynthesis. Experimental models will be used to emphasize the importance of building knowledge from developing and exploring credible hypothesis.

#### **Curriculum Organizer – Interdependence of Living Things**

*It is expected that students will:*

- Demonstrate an understanding of the ecosystem concept and identify the levels of biological organization

#### **Curriculum Organizer – Creation of a Nature Journal**

*It is expected that students will:*

- apply the creative process to create a personal journal of exploration that draws upon both their field experiences and their classroom knowledge
- research perceptions through drawing and documenting what is observed which leads to evaluation of one's own learning in a variety of unique settings

#### **Curriculum Organizer – Analysis of Biotic and Abiotic Factors**

*It is expected that students will:*

- explain types of symbiosis and provide example of each relating ecological relationships to human social patterns
- demonstrate an understanding of the effects of factors such as temperature, sunlight and moisture on how living organisms cope with their world
- demonstrate an understanding of ecological pyramids and interpret their effect on food supplies and rising populations

#### **Curriculum Organizer – Energy and Matter Flow in Ecosystems**

*It is expected that students will:*

- articulate that energy flow in ecosystems is one-way; energy is not recycled
- use their new knowledge of nutrient cycles to explain the value of recycling
- demonstrate an understanding of the importance of the sun and the basic nutrients to all living things

## **Unit 2: Collecting and Classification in the Natural World**

**Time: 20 hours**

Students will learn names and characteristics of common, local flora and fauna. Using field identification guides, their peers and their teacher, students will hone their observation skills to help one another appreciate the diversity that surrounds them in the natural world. Drawing assignments, presentations, attending local naturalist meetings, photography and video production will all be drawn into this unit. Throughout the process, students will be drawn back to what they learned in the first unit in ecology to make the connections to their new knowledge.

### **Curriculum Organizer – A System for Knowing Living Things**

*It is expected that students will:*

- demonstrate an understanding of the dilemma faced by early naturalists as they faced the staggering job of classifying living organisms
- create a system of their own for determining species by differentiating between various characteristics
- use field identification guides to learn the common names of numerous plants and animals in their area

### **Curriculum Organizer – Sharing Information**

*It is expected that students will:*

- develop and co-teach a lesson on a particular species of animal or plant which is of particular interest to them
- attend a local volunteer naturalist or environmental group and report back to the class on their findings in regards to local habitat concerns
- produce a poster, photo album or video production to demonstrate an understanding of classification/terminology in the natural world

### **Curriculum Organizer – Analysis of Structured Knowledge**

*It is expected that students will:*

- demonstrate an understanding of the ability to think critically, including the ability to define an environmental issue or problem and develop hypotheses and supporting arguments
- report using relevant information from appropriate sources including public and school libraries, internet and current news media
- use effective communication skills when gathering and sharing naturalist information both independently and in groups

### **Unit 3: Field Identification/Habitat Preferences**

**Time: 30 hours**

Building upon the knowledge developed in prior units students will connect various species to their respective habitats. Abiotic factors will be examined as they relate to their biotic potential in terms of ecological succession. Environmental conditions will be discussed as they relate to evolution as an ongoing process. Students will gain an understanding of how all knowledge interconnects and how their own lives are intricately interconnected with so many other living things and processes on our planet. Succession and extinction are two of nature's most remarkable phenomena and are the fruit of Darwin's extensive work in field identification and habitat preferences.

#### **Curriculum Organizer – Ecological Succession**

*It is expected that students will:*

- select and study a small natural area of their choice (~2mx2mx3m) by keeping an ongoing record of the flora and fauna observed – measure, count, describe, watch, sketch, record, photograph... respect individuality
- demonstrate the use of resources to seek answers to questions that develop when observing the natural area. Extend their knowledge by testing hypothesis that encouraged through personal observations.
- participate in class field trips to local beaches, forests, grasslands to gain and share knowledge about pioneer organisms (i.e. Lichens) right through to climax forests
- consider the use of woodlots in terms of both economic and ecological value; employ critical-thinking skills to understand the complexity in choosing the optimum path
- recognize the various stages of succession by its index plants and animals

#### **Curriculum Organizer – Adaptations to Environmental Conditions**

*It is expected that students will:*

- demonstrate an understanding of understand the five factors, temperature, wind, moisture, light and soil conditions that affect organisms
- experiment with their own range of tolerance and extend this knowledge to other living things
- examine the adaptations that allow plants and animals to exist in a wide range of conditions, understanding how the many variations permit greater utilization of natural resources within the biosphere
- demonstrate an understanding of that specific animals and plants may be expected to thrive or perish within given environmental conditions

#### **Curriculum Organizer – Identifying Optimum Environmental Conditions**

*It is expected that students will:*

- predict the flora and fauna to be discovered under varying habitats
- know the limiting factors that affect different species

- demonstrate an understanding of the influence that various life forms exert on one another and be able to suggest ways of creating/maintaining optimum conditions that will allow the living world to continue to thrive

## **Unit 4: Aquatic Ecosystems/Water Quality Testing**

**Time: 30 hours**

Students will continue to develop their repertoire of identification and observation skills. Fieldwork makes up about 40% of class time will be planned and organized by groups of students in this portion of the course. (teacher retains power to veto) Each group of 4 to 5 students will become the “experts” on a particular type of biotic environment and share their knowledge with their colleagues. The water quality portion will be divided into lakes and streams while investigating specifics such as dissolved oxygen, nitrates, BOD, phosphates, coliform and turbidity.

### **Curriculum Organizer – Creation**

*It is expected that students will:*

- provide information from appropriate sources
- demonstrate the use of effective communication skills when gathering and sharing information independently and in groups
- identify the ecological principles that apply to their specific area

### **Curriculum Organizer – Location Management**

*It is expected that students will:*

- visit a natural area in your locality and observe the organisms in the area and their interactions with each other and the environment
- effectively lead and teach their fellow students about their particular area
- choose a site that readily exhibits biological diversity and ecological principles
- know the names and characteristics of important species at their location
- explain biological relationships occurring at their site
- discuss the trophic levels and how energy flows between them

### **Curriculum Organizer – Using a Classification Key for Water Characteristics**

*It is expected that students will:*

- within respective groups develop a classification key of their own design to identify water quality at their site
- using accepted scientific tests teach fellow students how to identify problems with unknown water samples
- explain to the class how they constructed their key and the logic underlying their method
- investigate the similarities and differences between their methods and the standard tests used by ecologists, lifeguards and hot tub owners

## **Unit 5: Habitat Conservation/Preservation Activities**

**Time: 20 hours**

### **Curriculum Organizer – Wildlife Management**

*It is expected that students will:*

- develop a concept of how humans manage wildlife populations in different situations in our province
- understand and discuss the principle of wildlife ecology
- understand wildlife habitats and their importance to managing wildlife
- explain how populations of any one species change and adapt to variations in their environment
- understand carrying capacity and its importance in managing wildlife populations
- discuss a range of different wildlife management techniques

### **Curriculum Organizer – Analysis**

*It is expected that students will:*

- reflect on how their personal understanding of “What is Fisheries Ecology?” that has been developed through the course
- identify their role in helping to maintain a healthy, living world
- consider ethical, moral and legal considerations associated with ecology and their role in it
- discuss the past, current and future prospects for our biosphere
- prepare an in-depth report on a current environmental concern using critical analysis to try to understand the motivations of the various attitudes or viewpoints



### **Instructional Component:**

- interactive instruction
- direct instruction
- indirect instruction
- independent instruction
- group work
- brainstorming
- practical creativity
- group field work
- independent field work
- DVD/VHS
- Modelling

### **Assessment Component:**

- Effective formative assessment via:
  - Clearly articulated and understood learning intentions and success criteria
  - Questions posed by students, peers and teachers to move learning forward
    - Discussions and dialogue
  - Feedback that is timely, clear and involves a plan
  - Students are resources for themselves and others – peer and self-assessment
  - Student ownership

Formative assessment used to adapt learning experiences and inquiry plans on an on-going basis to meet specific learning goals.

Development, awareness and action, based upon metacognition intended to lead to learner independence and self-coaching.

### **Summative Assessment:**

Summative assessments will be determined as students demonstrate proficiency/mastery toward particular learning outcomes. Summative assessments and final grades will reflect the following:

- Students will work collaboratively with the teacher to determine summative achievement on assignments and letter grades based upon dialogue, and evidence of learning
- Behaviour and work habits will NOT be included when determining letter grades
- Marks will not be deducted for late work
- Extra credit and bonus marks will not be awarded

- Plagiarizing will not result in reduced marks/grades –the student will be required to demonstrate their learning authentically
- Attendance will not be considered toward letter grade
- Only individual learning demonstrated –no group marks – will be used to determine grades
- Letter grades will reflect learning towards the learning outcomes articulated above
- Letter grades will be based upon criteria provided/agreed upon toward the learning outcomes
- Letter grades will be determined in relation to the learning outcomes – not in comparison to the achievement of other students
- Poor work will not be assessed towards grades – students will only be assessed on quality work
- Professional judgment and evidence will be used to determine final letter grade in consultation with the student
- Zeros will not be assigned to missed assignments – all required assignments must be completed
- Formative or practice towards learning outcomes will not be included in final grade assessment
- Most recent evidence toward learning outcomes will be used to assign letter grades – learning is not averaged over time

**Performance Methods**

- Projects
- Notebook
- nature journal records
- presentations
- anecdotes/reports

**Personal Communication**

- nature journal reflection
- self evaluation
- peer evaluation
- student/instructor dialogue

**Other**

- weekly assessment
- teacher log
- teacher anecdotal
- checklists

**Learning Resources:**

- Visit to the Vancouver Aquarium, Science World and Mossom Creek Hatchery
- Numerous field trips (~20+) to local streams, forests, gardens, lakes, etc.
- Visit BCIT's annual open house if possible, check out Fish & Wildlife Program and other opportunities
- Books
  - *Western Birds*, Roger Tory Peterson, Houghton Mifflin Co., 1990.
  - *Plants of Coastal B.C.*, Jim Pojar & Andy MacKinnon, Lone Pine Press, 1994.
  - *Investigating Terrestrial Ecosystems*, William Andrews, Prentice-Hall Co., 1986.
  - *Investigating Aquatic Ecosystems*, William Andrews, Prentice-Hall Co., 1987.
  - *Biology*, Miller & Levine, Prentice-Hall Co., 1995.

**Additional Information:**

This is an established course that has operated continuously for over a decade at Centennial School. The former teacher, Ruth Foster, left the position in 2003 to develop an Environmental Module for Simon Fraser University's Education Program.