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Dear Teachers;

According to Alberta Education, science education in Alberta will:

- Encourage students at all grade levels to develop a critical sense of wonder and curiosity about scientific and technological endeavours.
- Enable students to use science and technology to acquire new knowledge and solve problems, so they may improve the quality of their lives and the lives of others.
- Prepare students to address critically science related societal, economic, ethical and environmental issues.
- Provide students with a foundation in science that creates opportunities for them to pursue progressively higher levels of study, prepares them for science-related occupations, and engages them in science-related hobbies appropriate to their interests and abilities.
- Enable students, of varying aptitudes and interests, to develop knowledge of the wide spectrum of careers related to science, technology and the environment.

The North Saskatchewan Watershed Alliance hopes the ***Atlas of the North Saskatchewan River (NSR) Watershed in Alberta*** will be useful in helping to attain these goals.

These resources contain information suitable for science teachers and students in high schools in Alberta. This document offers real-life, western Canadian examples of the kinds of watershed issues explored in science classrooms.

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**Suggested uses for the Watershed Atlas in Alberta High School Curriculum:**

## **Biology 20**

**Unit A:** Energy and Matter Exchange in the Biosphere

**Themes:** Energy, Equilibrium, Matter and Systems

**Focusing Questions:** How are carbon, oxygen, nitrogen and phosphorus cycled in the biosphere? How is the flow of energy balanced in the biosphere? How have human activities and technological advances affected the balance of energy and matter in the biosphere?

**General Outcome 2:** Students will explain the cycling of matter through the biosphere. (*Social and environmental contexts*)

- Students will explain that science and technology have both intended and unintended consequences for humans and the environment.

**Maps 21 – 23 (pages 42 – 47)** show agricultural land use, manure application, and areas of potential groundwater contamination.

These maps may help in the discussion of *the influence of human activities on the biogeochemical cycling of phosphorus, sulfur, iron and nitrogen*.

**Maps 12 – 20 (pages 26 – 41)** show how humans use and impact the watershed. They include land cover, population density over time; water licenses in the whole watershed, as well as a close-up view of water licenses in the Greater Edmonton area; water well density; wastewater treatment; density of linear disturbance; and oil and gas well density.

These maps may help in the discussion of *use of water by society, the impact such use has on water quality and quantity in ecosystems, and the need for water purification and conservation*.

# Biology 20

**Unit B:** Ecosystems and Population Change

**Themes:** Energy, Matter and Systems

**Overview:** In this unit, students become familiar with a range of ecosystems by studying their distinctive biotic and abiotic characteristics. Students are introduced to the concept of populations as a basic component of ecosystem structure and complete the unit by examining population change through the process of natural selection.

**General Outcome 1:** Students will explain that the biosphere is composed of ecosystems, each with distinctive biotic and abiotic characteristics.

*(Social and environmental contexts)*

- Students will explain how terrestrial and aquatic ecosystems support a diversity of organisms through a variety of habitats and niches.

The section on **Wetlands and Map 4 (pages 10 – 12)** show the importance of wetlands to biodiversity, classes of wetlands, and wetland status in the Vermilion River sub watershed.

These pages may help in *evaluating the impact that human activity has had, or could have, on the biodiversity in an ecosystem:*

- wetlands management
- land use
- habitat fragmentation
- urbanization
- monoculturing of forests, lawns, field crops

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