

## **Sled Ed 12B**

**District name:** Yukon Education

**District number:** 09898023

**Developed by:** Charles Demers

**Date developed:** May 4, 2010

**School name:** Porter Creek Secondary School

**Principal's name:** Brendan Kelly

**Department Authorized Approval Date:** December 2012

**Department Authorized Signature:**

**Course name:** Sled Ed 12B – YMR12B

**Grade level of course:** Grade 12

**Number of course credits:** 4

**Number of hours of instruction:** 120

**Prerequisites:** Tech Ed 10: Mechanics

**Special Training, Facilities or Equipment required:** Teacher or resource person will need experience in using snow machines in the backcountry and mountain terrain. Small engine shop or Auto shop with access to metal and welders.

### **Course Synopsis:**

This course is designed to provide the student with the opportunity to continue their training in the field of power mechanics. Students will receive lectures and do hands on activities related to two and four stroke cycle engines, the electrical system, the fuel system, the lubrication system and the cooling system. Students will have the opportunity to work on their own project in the shop. They may bring in snow machines that they re-build; engine and bodywork will be a component of “SLED ED”. Students will be required to complete a welding project. Students will learn, Arc, Gas and Mig welding. The students will from time to time, go on snowmobile trips together. In addition, the course will teach students winter survival skills, avalanche awareness, proper beacon use, and develop a healthy respect for the outdoors in general.

**Rationale:**

Sled Ed is intended to be a continuation of instruction and training in the areas of tool use, measurement, maintenance, diagnostics, personal and shop safety, theory, design and applications as they pertain to the course subject. Students will be exposed to various methods of instruction, including, but not limited to, lecture, interactive research, and instruction via computer applications, audiovisual instruction, and hands on learning in a lab environment. The units are promoting students to demonstrate their ability to access and use technological means to achieve course goals. Critical thinking and problem solving skills will be demonstrated through completion of required projects. The course will put students on a path of preparation for continued secondary opportunities and/or career placement in the field of small engine technology.

**Organizational Structure:**

Unit I	Safety	5
Unit II	Avalanche Awareness	15
Unit III	Personal, Project Management, and Materials	40
Unit IV	Four Basic Engine System s	20
Unit V	Experiential	40
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Total		120 hrs

**Unit:** Health and Safety

**Time:** 5 hours, and throughout the course as needed.

Students will become familiar with basic safety concepts; first as they pertain to the general metal/mechanics shop, as well as topic specific safety considerations. Machines, hand tools and chemicals used in this course will receive detailed attention.

**Curriculum Organizer:** Technology

It is expected that students will:

- ~ Maintain an orderly and safe environment when engaged in a variety of activities
- ~ Select and safely use hand or machine tools to complete assigned activities
- ~ In all shop activities demonstrate safe work procedures and routines

**Curriculum Organizer:** Self and Society

It is expected that students will:

- ~ Demonstrate a positive attitude toward lifelong health and well-being
- ~ Demonstrate proper identification and handling of hazardous materials
- ~ Identify hazardous situations in the work environment and take appropriate action

**Unit:** Avalanche Awareness

**Time:** 10 hours computer lab and through out Experiential Unit

Students will learn about avalanche awareness from the Canadian Avalanche Center's online learning course. The course is designed to help learners acquire the basic knowledge and skills needed to rescue themselves and their companions in an avalanche.

**Curriculum Organizer:** Self and Society

It is expected that students will:

- ~ Demonstrate a positive attitude toward lifelong health and well being
- ~ Identify hazardous situations in avalanche terrain and take appropriate action
- ~ Identify environmental, social, and ethical considerations associated with snowmobiling in mountainous terrain
- ~ Demonstrate a willingness to participate independently and interdependently in a productive environment

**Curriculum Organizer:** Technology

It is expected that students will:

- ~ Use computers to complete the online learning course
- ~ Demonstrate the ability to use an avalanche rescue beacon and probe
- ~ Use appropriate technologies in a variety of applied contexts
- ~ Maintain an orderly and safe environment when engaged in a variety of activities

**Unit:** Personal, Project Management, and Materials

**Time:** 40 hours

Students will become familiar with design parameters set by the properties of metal. They will follow an open ended design process, which allows for improvement and change at almost every step. This unit also gives an opportunity to address different learning styles and intelligences.

**Curriculum Organizer:** Elements and Principles

It is expected that students will:

- ~ Develop a vocabulary for the metal/mechanics shop.
- ~ Identify, describe, analyze, interpret, and make judgments about the basic elements and principles while using metal.

**Curriculum Organizer:** Applied Problem Solving

It is expected that students will:

- ~ Analyze and use appropriate problem solving strategies and critical thinking when resolving the problems assigned.
- ~ Use appropriate criteria and standards based on the project to assess and evaluate products, systems, and ideas.

**Curriculum Organizer:** Technology

It is expected that students will:

- ~ Identify and organize task-related tools and materials
- ~ Identify and utilize employability skills
- ~ Identify, organize, and execute processes required to accomplish a task
- ~ Select metal stock whose size, structural shape, and finish are appropriate for specific applications

**Unit:** Four Basic Engine Systems**Time:** 20 hours

Students will engage in hands on activities related to the four basic engine systems of a two and four stroke cycle engine. The electrical system, fuel system, lubrication system, and cooling system will be further explored on projects the students bring into the shop, such as a snow machine or other type of small engine.

**Curriculum Organizer:** Shop Practices

It is expected that students will:

- ~ Correctly identify and use a variety of basic small engine tools, basic shop and test equipment, and fasteners and fittings
- ~ Demonstrate the ability to access and apply technical information
- ~ Apply general shop administrative and maintenance practices
- ~ Perform accurate measurements on a variety of small engine components and compare to specifications to determine component condition
- ~ Consistently demonstrate the correct use of tools and of shop and diagnostic equipment

**Curriculum Organizer:** Self and Society

It is expected that students will:

- ~ Apply employability skills in the small engine work environment
- ~ Compare emerging and alternative energy sources used to power vehicles
- ~ Describe the historical and potential future impact of energy, power, and transportation systems on society and the environment
- ~ Identify potential careers in small engine technology and related fields
- ~ Outline social, legal, and ethical responsibilities associated with small engine operation

**Curriculum Organizer:** Powertrain

It is expected that students will:

- ~ Describe engine types and fundamentals of engine operation
- ~ Explain the operation of engine support systems
- ~ Inspect engines, engine support systems, and drive components



**Unit:** Experiential

**Time:** 40 hours

This unit will provide students with the opportunity to have practical experiences using the information learned in previous units.

**Curriculum Organizer:** Self and Society

It is expected that students will:

- ~ Apply safe and healthy work and riding practices
- ~ Demonstrate the safe use of tools, equipment, and snowmobile
- ~ Identify potential snowmobile and terrain hazards
- ~ Identify city bylaws and MVA regulations pertaining to the operation of small engine vehicles

**Curriculum Organizer:** Health and Safety

It is expected that students will:

- ~ Demonstrate a knowledge of safety features and practices associated with metal-related tools and equipment
- ~ Demonstrate a knowledge of safety features and practices associated with small engine-related tools and equipment
- ~ Demonstrate good “housekeeping” techniques

**Instructional Components:**

Instructional components may include some or all of the following:

- ~ One to one instruction in the classroom as well as on field trips
- ~ Role plays
- ~ Direct instruction
- ~ Experiential learning
- ~ Field work
- ~ Modeling best practices
- ~ Discussion, group work, conferencing

**Assessment Component:**

Theory: **40%** of each term's grade based on assignments, quizzes and tests

Practical: **60%** of each term's grade based on projects, shop work, and field trips

Mark on projects, shop work, and field trips based on:

- Ability to follow instructions and procedures
- Craftsmanship – mastery of skills, quality of finished project, application of theory

**Performance Methods**

- Project proposals
- Sketches
- Projects
- Research
- Labs
- Quizzes
- Tests

**Personal Communication**

- Group discussion
- Student/Teacher dialog
- Self Evaluation
- Peer Evaluation

**Other**

- Weekly Assessment
- Teacher anecdotal records
- Teacher log
- Check lists

**Learning Resources:**

~ DVD's

~ Books

- *Small Gas Engines*, Alfred C. Roth, the Goodheart-Willcox Co. 2009
- *Modern Metalworking*, John R. Walker, the Goodheart-Willcox Co. 2004

~ Websites

- <http://www.avalanche.ca/cac>
- <http://access.jibc.bc.ca/avalancheFirstResponse/index.htm>
- <http://www.bcsf.org/safety/avalanche-awareness-tips-that-could-save-a-life/>