

Mining New Opportunities

Teacher's Resource and Speaker's Guide

Your guide to the benefits of responsible mineral resource development.

An Ontario Mining Association Project

In partnership with:



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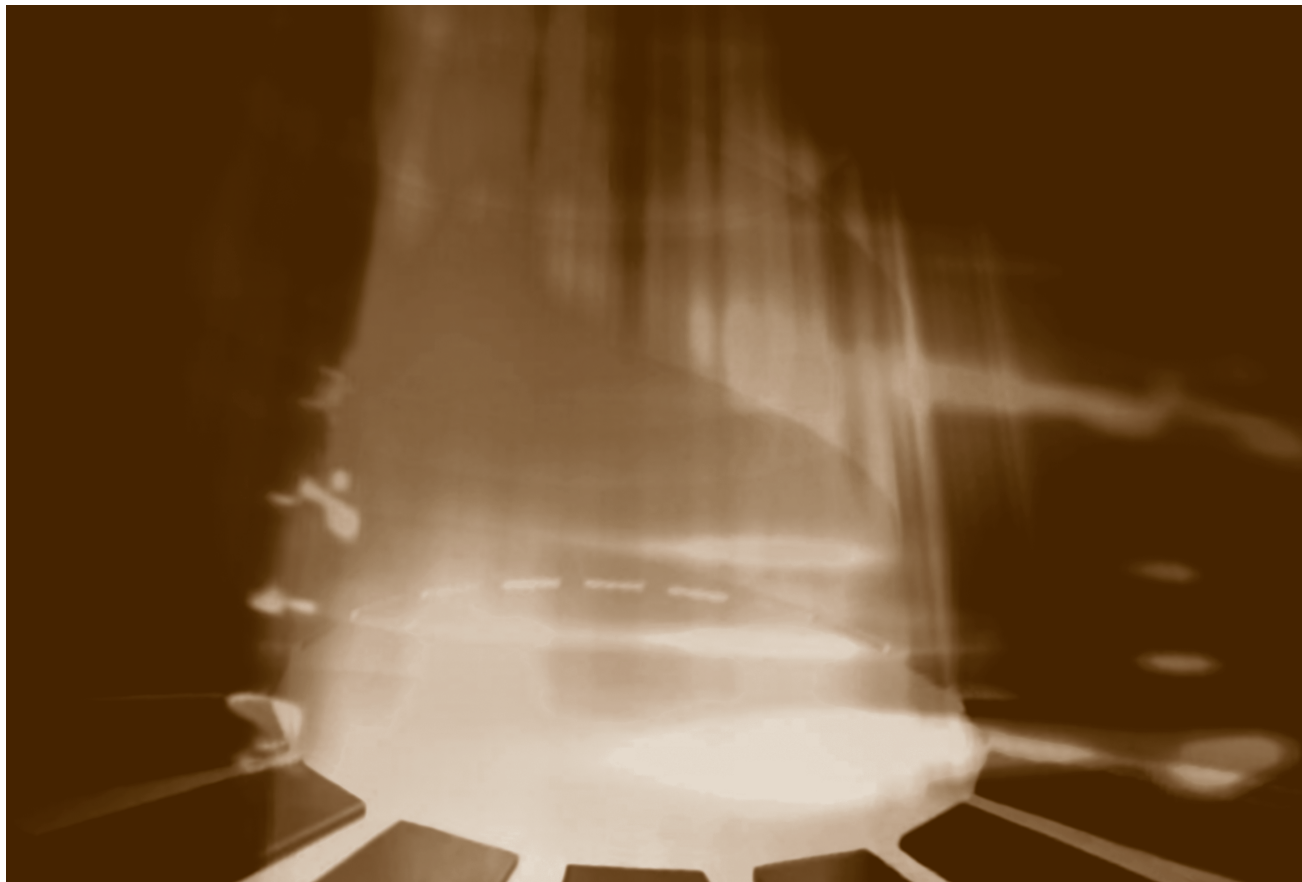


Table of Contents

Preface	3
Contributors	3
Teacher’s Resource	4
Overview	4
Learning Objectives	5
Getting Started	5
Introductory Activity	6
Video/DVD Study What Do You Know About the Mining Industry?	6
Part One	7
1.0 Video/DVD Study Mining and the Environment	7
1.1 Learning Activity Explore the Mining Process	9
1.2 Learning Activity Musselwhite Case Study: A New Way of Mining	16
Part Two	22
2.0 Video/DVD Study Careers in the Mining Industry	22
2.1 Learning Activity Mine Your Potential	24
2.2 Learning Activity Match Up Mining Careers	26
2.3 Learning Activity Apply for a Job at a Mine Site	29
2.4 Learning Activity Discover Careers in the Mining Industry	44
Part Three	49
3.0 Video/DVD Study The Importance of Mining to the Economy of a Community	49
3.1 Learning Activity What’s Yours is Mined Card Game	51
3.2 Learning Activity What Rocks, Minerals and Metals are in a Computer?.....	54
3.3 Learning Activity Become a Young Entrepreneur.....	57
Glossary	61
Speaker’s Guide	63



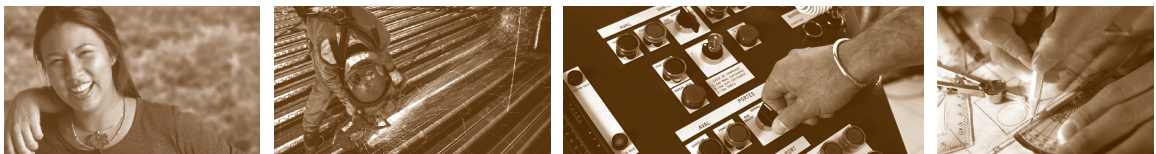
Preface

Mining New Opportunities is your guide to the benefits of responsible mineral resource development. It contains a video/DVD, **Teacher's Resource and Speaker's Guide** in print and on CD-ROM, one poster and four decks of cards with instructions. All of these resources have been designed to:

- provide First Nations people with current information about mining, including the skills needed by the industry, as well as employment and entrepreneurial opportunities;
- promote partnerships with First Nations to allow for greater participation in the social and economic benefits of responsible mineral development;
- encourage a better understanding and communication with First Nations with respect to the purpose and value of exploration and mining, that could lead to a more cooperative relationship with government and industry; and
- lay the foundation for a better understanding of the mining sequence and roles of all concerned parties, that may improve relationships during initial prospecting and exploration in areas of First Nations' traditional land use.

The **Teacher's Resource** contains 13 learning activities for educators teaching youth in junior, intermediate and senior grade levels. The learning activities are designed to build on the themes presented by the video/DVD and to encourage students to relate the knowledge acquired to the world outside their classroom. The **Speaker's Guide** has been created to assist mining industry professionals wishing to use the **Mining New Opportunities** video/DVD as a communication tool to complement their existing efforts to improve understanding of the nature of the mining industry in First Nations communities.

The video/DVD was filmed in part at the Musselwhite underground gold mine in northwestern Ontario and features interviews with employees of this mining operation. As there is no road access, this is a fly-in operation with pickup points in Thunder Bay and five northern communities. The mine employs 293 full-time employees, has 105 contract personnel providing support services, and uses First Nations contractors to provide air transportation and camp services. Musselwhite Mine is a joint venture between Placer Dome Canada Inc. (68%) and Kinross Gold Corporation (32%). Placer Dome Inc. is the world's sixth largest gold mining company.



Contributors

The **Mining New Opportunities** project has been developed through the participation and support of many partners. Project management and seed funding for the project was provided by the Ontario Mining Association and its members. FedNor and the Northern Ontario Heritage Fund Corporation provided financial assistance. The **Teacher's Resource and Speaker's Guide** has been developed by Laura Clinton of Pangaea Education in partnership with Prospectors and Developers Association of Canada Mining Matters. The project also benefited significantly from the donation of corporate video/DVD footage from Placer Dome Canada Inc., Inco Limited, Teck Cominco Limited, Caterpillar Inc. and Falconbridge Limited. Additionally, De Beers Canada Inc., J.S. Redpath Limited and Noranda Inc. provided technical guidance.

TEACHER'S RESOURCE

Overview

The **Mining New Opportunities** video/DVD and the activities provided in this **Teacher's Resource** are relevant for all levels – junior, intermediate and senior (J/I/S). The 15-minute video/DVD is divided into different segments, so that educators may stop and start the video/DVD as time and learning activities dictate.

VIDEO/DVD TOPICS AND SEGMENTS TO VIEW	LENGTH	VIDEO/DVD STUDIES AND LEARNING ACTIVITIES WITH GRADE LEVELS
Introductory Activity: <ul style="list-style-type: none"> All Topics (entire video/DVD) 	15 minutes	Introductory Video/DVD Study: What Do You Know About the Mining Industry? (J/I/S)
Part One: <ul style="list-style-type: none"> Mining: Past, Present and Future Sustainable Development 	6 minutes	1.0 Video/DVD Study: Mining and the Environment (J/I/S) 1.1 Explore the Mining Process (J/I/S) 1.2 Musselwhite Case Study: A New Way of Mining (I/S)
Part Two: <ul style="list-style-type: none"> Minerally Speaking: Employees Talk About Their Jobs Mining: Preparing for a Great Career Choice General Safety and Common Core Mine Training 	5 minutes	2.0 Video/DVD Study: Careers in the Mining Industry (J/I/S) 2.1 Mine Your Potential (J/I/S) 2.2 Match Up Mining Careers (J/I/S) 2.3 Apply for a Job at a Mine Site (I/S) 2.4 Discover Careers in the Mining Industry (I/S)
Part Three: <ul style="list-style-type: none"> Mining: Why Do We Need It? 	4 minutes	3.0 Video/DVD Study: The Importance of Mining to the Economy of a Community (J/I/S) 3.1 What's Yours is Mined Card Game (J/I) 3.2 What Rocks, Minerals and Metals are in a Computer? (I/S) 3.3 Become a Young Entrepreneur (I/S)



Learning Objectives

Activities are broadly tied to the Ontario curriculum expectations in Earth and Space System Science, Geography, and Career, Business and Entrepreneurial Studies.

After viewing **Mining New Opportunities** and completing the learning activities, students should be able to:

- identify common rocks, minerals and metals used in everyday products;
- demonstrate an understanding of the concept of sustainable development and its implications for the environment;
- recognize environmental problems associated with the mining industry, recommend solutions and communicate the solutions effectively;
- understand how mining impacts the economy of a community;
- identify the broad range of occupations associated with the mining industry;
- connect educational achievement to occupational opportunities;
- recognize resources and programs that assist entrepreneurs; and
- understand how technology has affected the discovery, extraction and processing of mineral resources.

Getting Started

To launch the **Mining New Opportunities** video/DVD, it is recommended that educators begin with the **Introductory Video/DVD Study** entitled **What Do You Know About the Mining Industry?** During this introductory brainstorming session, students will respond to a series of questions about the mining industry, watch the entire video/DVD and then review their answers to the initial questions asked at the beginning of the session. After this introduction, the learning activities in the rest of the guide may be used to build on the themes presented by the video/DVD. Review a specific segment of the video/DVD and facilitate the corresponding video/DVD study before completing the related learning activities.

Brainstorming is the collaborative learning technique that will be used to explore the information presented by the video/DVD. This technique is not grade level dependent and is designed to generate a large number of ideas in a short period of time. Brainstorming sessions may be done through a class discussion or in a small group setting.



It is helpful to structure the brainstorming sessions as a roundtable sharing of information in the following manner:

- Provide one piece of paper and a pen per group.
- Pose a question that has multiple responses.
- The first student writes one response and says it out loud.
- The first student passes the paper to the left and the second student writes one response, etc.
- The students may say “pass” at any point.
- The group stops when “time” is called.

INTRODUCTORY ACTIVITY

What Do You Know About the Mining Industry?

Teacher Activity Outline

1 of 1



VIDEO/DVD TOPICS

- All Topics (entire video/DVD)

LENGTH OF VIDEO/DVD

- 15 minutes

DURATION OF ACTIVITY

- 60 minutes

This brainstorming session serves as both an introduction and conclusion to the video/DVD **Mining New Opportunities**. It is designed to establish the students' perceptions of the mining industry before and after viewing the video/DVD. A series of questions for discussion are provided to determine the kind of images the students are familiar with and the information that they have about mining. Facilitate a discussion using these questions before watching the video/DVD. Use the answers given in this discussion to summarize both the positive and negative aspects of mining, to present a clear picture of the students' current perceptions of the mining industry. After watching the video/DVD, review the questions asked in the preliminary discussion and update the answers. Ask students if their perceptions of the mining industry have changed? Why or why not?

Questions for Discussion

- What do you think a company's responsibilities should be toward the environment before opening a mine?
- How do miners extract minerals?
- What do you think it is like to work in a mine?
- What kinds of jobs are offered by the mining industry?
- What is reclamation?
- What are minerals used for?
- Is mining a high-tech industry or a low-tech industry?

PART ONE

Mining and the Environment

Teacher Activity Outline

1 of 1



VIDEO/DVD TOPIC: PART ONE

- Mining: Past, Present and Future
- Sustainable Development

LENGTH OF VIDEO/DVD

- 6 minutes

DURATION OF ACTIVITY

- 45 minutes

Part One of the video/DVD provides an introduction to the modern mining industry and emphasizes the changing attitudes towards environmental protection and the importance of sustainable development. Sustainable development is defined in the video/DVD as *“development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”*

Facilitate a brainstorming session to identify environmental problems associated with the mining industry. Once students have noted how mining sites can negatively affect the environment, they must describe solutions they would propose to help solve these environmental conditions. Conditions and their possible solutions can be recorded on overheads, chart paper, or the blackboard.

A summary of environmental conditions that can be caused by mining, their potential impact and possible solutions is outlined on the following page to aid in facilitating the discussion.



Summary of Environmental Conditions

CONDITION	POTENTIAL IMPACT	SOLUTION
Air Emissions	<ul style="list-style-type: none"> • Many metals are extracted from ore by melting. This process is called smelting. • Air emissions from smelting can cause the production of sulphur dioxide if pollutants are not properly removed. • Acid rain can result. 	<ul style="list-style-type: none"> • Companies have invested huge sums of money into reducing sulphur and other emissions from the smelting process. • Strict government controls and a corporate willingness to keep the air clean will ensure the protection of the environment.
Land Use	<ul style="list-style-type: none"> • Excavation of orebodies in a quarry or open pit. • Development of access roads and corridors. 	<ul style="list-style-type: none"> • Reclamation returns the land to another use after extraction, or mining, is complete. • Continuous or concurrent reclamation is sometimes put into action during the life of the mine. • Ontario has mining reclamation laws to remediate lands that are used for mineral exploration and mining. • Mining companies have environmental management plans to ensure that water quality around the mine is monitored, revegetation occurs and protection of animal and plant life is encouraged. • Roads and corridors are routed to avoid wildlife and cultural areas, and they can be developed to cross a minimal number of streams or rivers.
Management of Tailings	<ul style="list-style-type: none"> • Tailing ponds are used to store many substances that are discharged from a processing mill. • Sometimes these substances leach (leak) into the environment (e.g. into streams or contaminate the earth). 	<ul style="list-style-type: none"> • Tailing ponds are designed and engineered to hold and control solids, and manage liquid effluent. • When a mining company reclaims a site, tailing ponds are covered by grass or trees. • The company must monitor the tailings disposed under water, or on the surface, to ensure that leakage into the environment is prevented.
Water Contamination	<ul style="list-style-type: none"> • Some waste rocks (tailings) can contain certain metals that can contaminate the environment over time. This is called acid drainage. • If these are not properly treated, the metals from tailings escape into the environment and may cause damage. 	<ul style="list-style-type: none"> • Mining companies have plans to handle the problems of treating acid drainage. • Sometimes lime is added to neutralize the acid.

Explore the Mining Process

Teacher Activity Outline

1 of 2

Suggested Levels: Junior, Intermediate and Senior

Purpose	<ul style="list-style-type: none"> To introduce the stages of the mining process. To locate key information about Canadian mineral resources and their uses. To demonstrate how technology is used in the mining process. To examine the environmental concerns that can accompany mining. 														
Time	90 minutes														
Resources	<ul style="list-style-type: none"> Explore the Mining Process student handout Natural Resources Canada Web site entitled “Posters on the Mining Industry” www.nrcan.gc.ca/mms/mining/index_e.html Elements of Mining poster Explore the Mining Process teacher information sheet Two sheets of poster paper for each pair of students Art supplies 														
Link to Ontario Curriculum	<table border="0"> <tr> <td>Visual Arts Grades 4, 5, 6, 7 and 8</td> <td> <ul style="list-style-type: none"> Creative Work </td> </tr> <tr> <td>Rocks, Minerals and Erosion Grade 4</td> <td> <ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School </td> </tr> <tr> <td>The Provinces and Territories of Canada Grade 4</td> <td> <ul style="list-style-type: none"> Developing Inquiry/Research and Communication Skills </td> </tr> <tr> <td>The Earth’s Crust Grade 7</td> <td> <ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School </td> </tr> <tr> <td>Natural Resources Grade 7</td> <td> <ul style="list-style-type: none"> Understanding Concepts Developing Inquiry/Research and Communication Skills </td> </tr> <tr> <td>Human-Environment Interactions Grade 9</td> <td> <ul style="list-style-type: none"> Understanding Concepts </td> </tr> <tr> <td>Earth Materials Grade 12</td> <td> <ul style="list-style-type: none"> Relating Science to Technology, Society, and the Environment </td> </tr> </table>	Visual Arts Grades 4, 5, 6, 7 and 8	<ul style="list-style-type: none"> Creative Work 	Rocks, Minerals and Erosion Grade 4	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School 	The Provinces and Territories of Canada Grade 4	<ul style="list-style-type: none"> Developing Inquiry/Research and Communication Skills 	The Earth’s Crust Grade 7	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School 	Natural Resources Grade 7	<ul style="list-style-type: none"> Understanding Concepts Developing Inquiry/Research and Communication Skills 	Human-Environment Interactions Grade 9	<ul style="list-style-type: none"> Understanding Concepts 	Earth Materials Grade 12	<ul style="list-style-type: none"> Relating Science to Technology, Society, and the Environment
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1.1

Learning Activity

Teacher Information

This activity is designed to introduce students to the mining process. It is a great challenge to find a mineral deposit, usually buried under the Earth’s surface, and then to determine its size, content and economic potential. Mining professionals must design safe mining and processing methods and skilled workers must carry out the plans. The valuable metals or minerals must be separated from the host rock and purified for sale in a form the purchaser wants. Waste materials must be disposed of in a way that protects the natural environment. The economics of the enterprise are complicated by the fact that prices are based on supply and demand in competitive world markets, not by local producers.

Method**Junior and Intermediate Levels**

1. The **Explore the Mining Process** student handout provides students with written information describing each stage of the mining process.
2. Display the poster provided and allow students to visit the Natural Resources Canada Web site www.nrcan.gc.ca/mms/mining/index_e.html to help illustrate the written information. The concept of the open pit mine should be easy for students to understand. The diagram of the underground mine shown by the poster, however, can confuse some students. Mining is three-dimensional. Seeing illustrations in two dimensions can make visualization difficult. When looking at the diagram, some students forget that the drifts, crosscuts and shafts are surrounded by solid rock and are not suspended in open underground spaces.
3. Read the information to the class, or allow students to read specific sections aloud.
4. To review the reading, ask students to list the stages of the mining process on the board. Use the **Explore the Mining Process** teacher information sheet to help complete the list.
5. Assign one pair of students to each stage of the process and ask them to create their own poster to depict activities that occur. The posters should contain illustrations and detailed captions that describe the activities and the people involved in their stage of the mining process.
6. Each pair of students should also create a poster illustrating the use of rocks, minerals and metals in their lives.
7. Display the posters in sequence, ending with the collage of posters relating to the importance of Earth materials in day-to-day life.
8. Students may use the Internet, or print resources, to further research this assignment. Related Web site links are listed below.

Intermediate and Senior Levels

1. The **Explore the Mining Process** student handout provides students with written information describing each stage of the mining process.
2. Display the poster provided to help illustrate the written information.
3. After reading the information on the handout, instruct students to create a brochure for Canadian jewellery customers, describing the process by which gold or diamonds get from the ground in Canada's far north, to jewellery stores. Where in northern Canada are these natural resources mined? Students should also list the environmental and human impacts of gold or diamond mining and some other uses of these mined materials.
4. Students may use the Internet or print resources to further research this assignment. Related Web site links are listed below.

Related Web site Links

- **Canada: A Diamond Producing Nation**
www.nrcan.gc.ca/mms/diam/index_e.htm
- **Exploring for Minerals in Canada**
<http://sciencenorth.ca/learn/groundwork>
- **Mining and the Environment**
www.nrcan.gc.ca/mms/scho-ecol/env/mae_e.htm
- **Start a Mine**
www.nrcan.gc.ca/mms/scho-ecol/mine/english/etob.htm
- **Mining at Placer Dome**
www.placerdome.com/educentre/mining/index.html
- **Ekati Diamond Mine**
<http://ekati.bhpbilliton.com>
- **The Gold Institute**
www.goldinstitute.org

Mining means extracting (removing) valuable rock from the Earth. Gold, asbestos, sand, diamonds and petroleum are all mineral resources, but none of these resources belong to the same category. There are five different types of mineral resources – metallic minerals, industrial minerals, construction materials, gemstones and fossil fuels.

Metallic minerals are metallic chemical elements and minerals composed of valuable metals. Copper, gold, iron, silver, nickel and many other metals belong to this category.

Industrial minerals are minerals with chemical or physical properties that have an industrial use. Asbestos, talc, silica, salt, graphite, potash and mica are all industrial minerals.

Construction materials are rocky materials used in construction. This category includes: limestone (cement, dimension stone); sand and gravel (fill material, concrete); clay (brick); granite; marble; slate; and schist (dimension stone). Some construction materials such as limestone and clay also have numerous industrial applications. For example, limestone is used in papermaking and in reducing air and water pollution.

Gemstones are minerals and organic materials that have special characteristics making them desirable for jewellery and ornaments. They are set apart from other minerals by their beauty, rarity and durability.

Fossil fuels are materials made up solely of decomposed plant matter, a good source of fuel. Coal, petroleum and natural gas all belong to the category of fossil fuels.

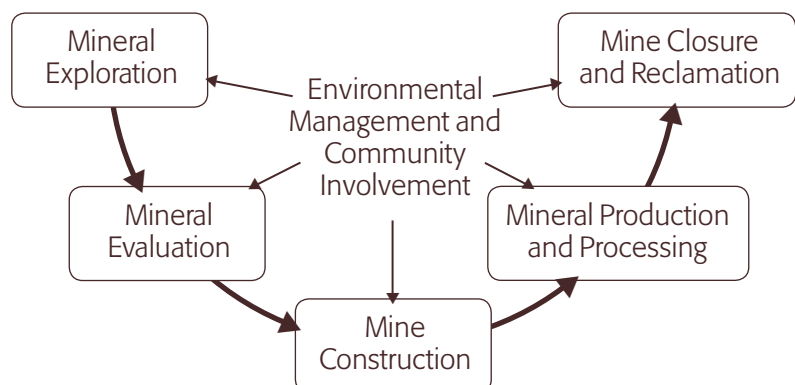
The Mining Process

The five stages of the mining process include: mineral exploration; mineral evaluation; mine construction; mineral production and processing; and mine closure and reclamation. A new stage in the process will not begin unless work in the previous stage has been successfully completed. From start to finish, the mining sequence can take a very long time. Work in each stage can take many years to complete, and can cost millions of dollars.

Environmental management occurs at every stage of the mining process. Before mining begins, a mining company must make sure that the environment will not be harmed by its mining practices. Long before the first rocks are broken in a mine, biologists and environmental specialists research all aspects of the environment and collect data against which future test results will be compared. These specialists look at the soil, water, wildlife

and vegetation and also the air quality and climate. After mining is complete, it is important that the environment at the mine is left in a safe, stable and productive state that naturally blends with the surrounding environment.

The arrival of mineral exploration companies and



prospectors in a community may raise concerns and questions. There is the potential for disagreements over land use, cultural and environmental impacts, and economic development. This is why community involvement in the mining process is important. Companies initiate dialogue with local communities at all stages of the mining process to inform them about their mining activities and to listen to the questions and concerns of the people. Companies may engage a community to gain information about local and traditional knowledge. Community involvement also includes opportunities for a community to supply goods and services or labour for jobs.

Mineral Exploration

Finding a high concentration of minerals or metals that can become a mine is extremely rare. To locate a promising mining area, geologists first study aerial photographs, photographs taken from satellites, maps published by the government and previous work completed by other mining companies to help them select an area for further work. Geologists have developed a number of techniques to help them find valuable mineral and metal deposits, called **orebodies**. Some of these techniques are described briefly below.

- **Remote Sensing**

Mining companies use space satellites in exploration. Imaging satellites are used in the analysis of land areas for the characteristics that indicate deposits. Important data from remote sites is transmitted by communications satellites and global positioning systems are used to pinpoint drilling locations.

- **Aerial Geophysical Surveys**

Concentrations of metals and minerals sometimes create areas of unusual gravity, magnetism, radioactivity or conductivity. These unusual areas, called **anomalies**, can be found using measuring devices carried in airplanes or helicopters. If interesting anomalies are found, people involved in exploration, including geologists, geophysicists, geochemists and prospectors, proceed to the next step (land acquisition).

- **Land Acquisition**

Before carrying out further work, a mining company or prospector must acquire the exclusive rights to prospect for a mineral deposit on the land. This is called land acquisition or staking a claim. Any area of open Crown (public) land can be staked, including land traditionally used by First Nations. Areas that cannot be staked include land on an Indian reserve, in a registered subdivision or town, parks or other protected areas, and land that has already been staked by another prospector or mining company.

- **Ground Surveys**

After acquiring the land, a location grid is made over the area. Detailed prospecting, geological mapping, geochemical and geophysical surveys are conducted on the ground. Prospecting involves identifying the different rocks in an area. During geochemical surveys, rock and soil samples are collected and analysed for minerals. Geophysical surveys often use similar measuring devices to those used in the aerial surveys. If results are promising, drilling is planned.

- **Drilling**

Drills are used to bore small holes into the ground. These holes are only a few centimetres in diameter but sometimes they are as deep as one or two kilometres. As it makes the hole, the drill produces a continuous, narrow cylinder of rock called a **core**. A geologist examines

the core and selects interesting sections for analysis. Using chemistry, the core is **assayed** (analyzed) to find out how much metal, or valuable mineral is present. If results of a drill hole are encouraging, many more holes are required to find out the size and shape of the orebody containing the metals, or valuable minerals. If the orebody is big enough and rich enough, a mine may be constructed.

Mineral Evaluation

Fewer than ten percent of mineral exploration properties actually move from the exploration stage to the mineral evaluation stage of the mining process. During mineral evaluation, a mining company answers the question, “Is this site going to be an economically viable mine?” Studies are completed to understand the economics of production, marketing and environmental protection.

Mine Construction

Millions of dollars may be spent constructing a mine. If a deposit is close to the surface of the Earth, it can be dug out as a hole called a **surface mine** or an **open pit mine**. Surface material and waste rock are stripped from the surface. Explosives are used to break up the rock. The broken rock is loaded into big trucks using front-end loaders and taken away for crushing, grinding and processing.

When the deposit is buried deep in the Earth, mining companies must dig tunnels to the metals or minerals. Such an operation is called an **underground mine**. The vertical tunnel to the area of the orebody is called a **shaft**. Inside the shaft, an elevator, or **cage**, is used to transport the miners and equipment from the surface to the underground workings. A bucket, or **skip**, is used to lift the broken rock and ore from underground. Other vertical tunnels called **ventilation shafts** bring fresh air to the mine. Horizontal tunnels called **drifts** provide access from the shaft to the orebody.

Mineral Production and Processing

Once construction is complete, mineral production or actual mining begins. Mineral production focuses on removing the ore from the mine and transporting it to the **mill** where processing will begin. **Stopes** are the underground production centres of the mine. It is here that the ore is first broken. The location where work is taking place is called a **face**. Drilling and blasting with explosives at the face breaks up the ore. Broken ore is **mucked** or loaded into a **scoop**, a large machine which combines a front-end loader and a truck. It is driven back to the shaft where the ore is transferred and lifted to the surface in the skip.

Mined ore contains metals and minerals of value, as well as other minerals of no economic value. The two are often evenly mixed in the ore and must be separated to form a **concentrate** of the valuable mineral. After separation, the minerals of no value are included in the leftover materials, called **tailings**.

The first step in separating the valuable metals from the host rock is to crush the rock to a fine powder in a mill. This process is called **milling**. The particles produced are small enough to allow the metals and minerals to be freed from the host rock, by one of several possible separation processes. The rock is broken up in large crushers and then pulverized in large rotating drums containing steel grinding balls or rods.

Separation processes are designed to remove the fine ore mineral particles from the particles of their host rock. Different processes have been designed for different minerals, but all are efficient at separating small amounts of ore minerals from masses of waste rock.

Flotation is the most common method of separating metals. The finely ground ore is mixed with water to form a **slurry**. Certain chemicals that coat only the desired ore mineral components are added in small amounts. Rising air bubbles capture the coated mineral particles and float them to the surface, where they are skimmed off to a separate process. These concentrated minerals are further refined to produce pure metal in a process called **smelting**.

Once the valuable metals have been separated, or concentrated, the leftover materials (rock fragments, dust and chemicals) are called tailings. Mining companies work hard to ensure that these tailings are managed effectively and responsibly. Such efforts are necessary because the tailings may contain dangerous chemicals that could leak into streams and lakes. Mine tailings are kept in specially designed ponds or cells. The base of the cell is lined with heavy plastic or dense clay. Any water leaving the pond is treated to remove acids or dangerous chemicals. The tailings are eventually covered with soil and planted with grass and trees. Strict government rules are applied to tailings. Some mining companies have even stricter internal rules.

Diamonds are Different

The diamond recovery process is somewhat different. The ore is not ground or crushed to a fine powder, because this process would destroy the diamonds. Diamonds have a very high density, which means they can be sorted out from the waste rock by density suspension. In this process, the diamond bearing rock is mixed with a muddy water suspension and stirred by rotating blades. The heavier materials, including the diamonds, settle to the bottom, while the lighter waste rises to the top. The diamonds are sorted out from the ore concentrate using either a grease table or an x-ray sorter.

- **Grease Table**

Diamonds repel water but are attracted to grease. An easy way to pick out the diamonds is to flush the concentrate with water over a surface covered with grease, called a grease table. The diamonds stick to the grease while the waste debris is washed away.

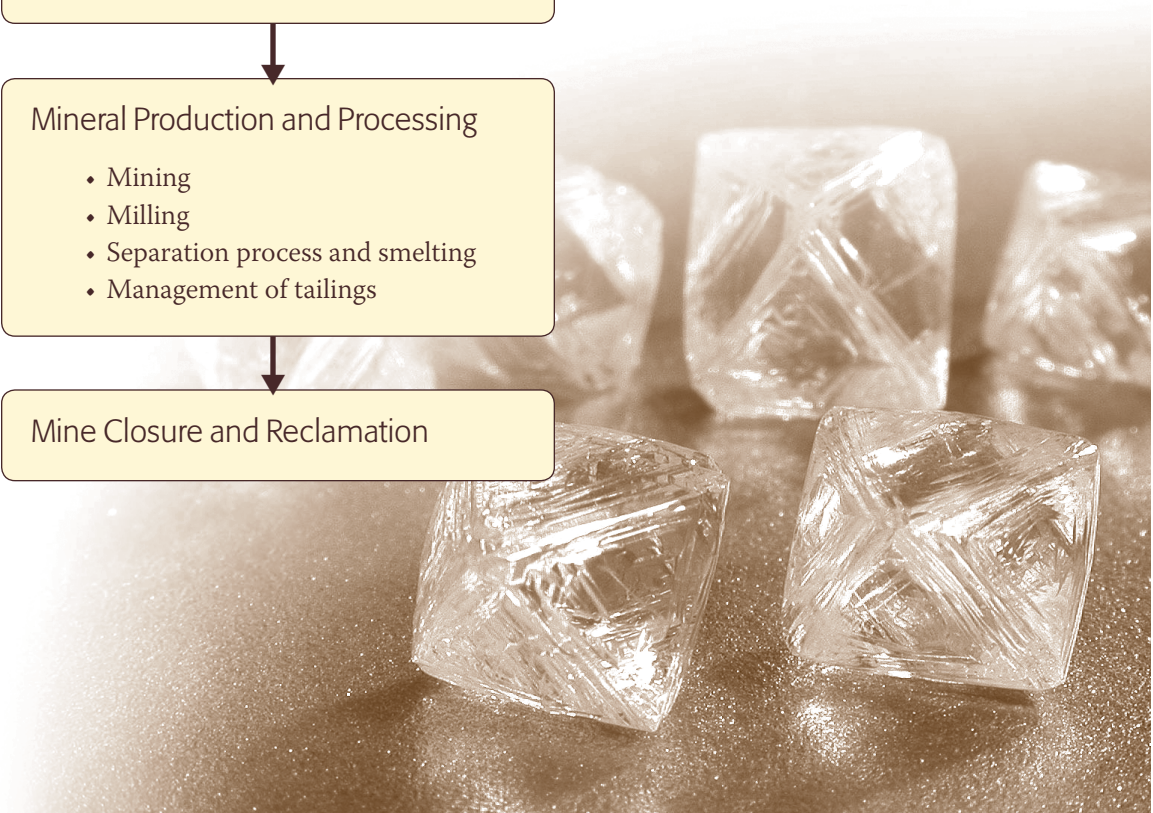
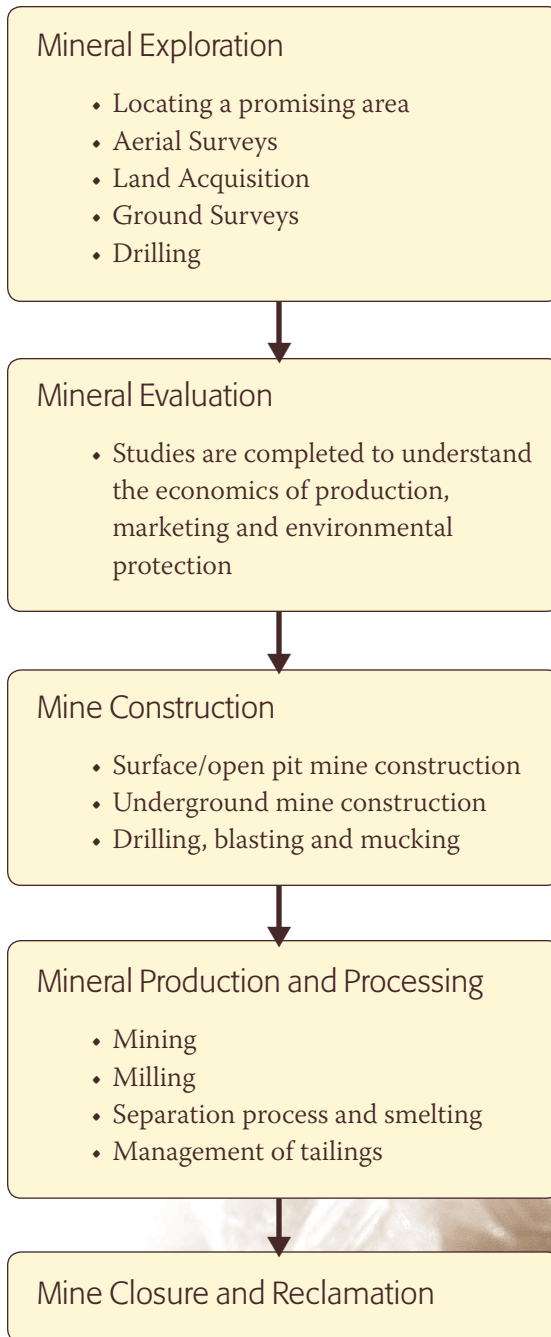
- **X-ray**

Some diamonds are fluorescent. This means that, when diamonds are exposed to ultraviolet light, the diamond can absorb the high-energy radiation and re-emit it as visible light. An x-ray sorter takes advantage of this property. When diamonds fluoresce with exposure to x-rays, a sorter detects the fluorescence and triggers a jet of air, which propels the diamond into a collection box.

Mine Closure and Reclamation

Mining is a temporary use of the land – no mine will last forever. It is an important goal of mining companies to return their mining sites to a natural and stable state, making them available for other uses. When underground and open pit mines are closed, the sites need to be restored close to their original state.

Reclamation refers to restoring the land to a state that is safe, stable and productive, and naturally blends with the surrounding environment. This process often occurs in northern Ontario where gold, copper and nickel mines are common. Reclamation involves: removing all the buildings and equipment; treating the mine tailings or wastewater; stabilizing the underground workings or open pits; and closing the mine shafts and tunnels. Excavated areas and open pits must be filled in with water, sand, cement or waste rock. The small areas that were used for the buildings are replanted with grass and trees.



Suggested Levels: Intermediate and Senior

Purpose	<ul style="list-style-type: none"> To introduce the importance of sustainable practices in the mining industry. To demonstrate how technology is used in the mining process. To examine the environmental concerns that can accompany mining. To produce an action plan for reclaiming a mine site upon closure. 												
Time	135 minutes												
Resources	<ul style="list-style-type: none"> Musselwhite Case Study student handout Musselwhite Closure Plans teacher information sheet 												
Link to Ontario Curriculum	<table border="0"> <tr> <td>The Earth's Crust Grade 7</td> <td> <ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School </td> </tr> <tr> <td>Natural Resources Grade 7</td> <td> <ul style="list-style-type: none"> Understanding Concepts </td> </tr> <tr> <td>Human-Environment Interactions Grade 9</td> <td> <ul style="list-style-type: none"> Understanding Concepts Learning through Application </td> </tr> <tr> <td>Human-Environment Interactions Grade 11</td> <td> <ul style="list-style-type: none"> Understanding Concepts </td> </tr> <tr> <td>Earth Materials Grade 12</td> <td> <ul style="list-style-type: none"> Relating Science to Technology, Society, and the Environment </td> </tr> <tr> <td>Environment and Resource Management Grade 12</td> <td> <ul style="list-style-type: none"> Understanding and Managing Change </td> </tr> </table>	The Earth's Crust Grade 7	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School 	Natural Resources Grade 7	<ul style="list-style-type: none"> Understanding Concepts 	Human-Environment Interactions Grade 9	<ul style="list-style-type: none"> Understanding Concepts Learning through Application 	Human-Environment Interactions Grade 11	<ul style="list-style-type: none"> Understanding Concepts 	Earth Materials Grade 12	<ul style="list-style-type: none"> Relating Science to Technology, Society, and the Environment 	Environment and Resource Management Grade 12	<ul style="list-style-type: none"> Understanding and Managing Change
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Earth Materials Grade 12	<ul style="list-style-type: none"> Relating Science to Technology, Society, and the Environment 												
Environment and Resource Management Grade 12	<ul style="list-style-type: none"> Understanding and Managing Change 												

Teacher Information

The **Mining New Opportunities** video/DVD was filmed in part at the Musselwhite underground gold mine in northwestern Ontario and features interviews with employees of this mining operation. As there is no road access, this is a fly-in operation, with pickup points in Thunder Bay and five northern communities. The mine employs 293 full-time employees, has 105 contract personnel providing support services, and uses First Nations contractors to provide air transportation and camp services. Musselwhite Mine is operated and owned (68%) by Placer Dome – the world's sixth largest gold mining company. Kinross Gold Corporation has the remaining 32% interest.

This case study provides students with an example of how the mining industry uses responsible and sustainable resource management. The assignment consists of designing a reclamation plan that is creative, but also has reasonable expectations. Students need to have a clear understanding of the purpose behind reclamation so that their design reflects the needs of the community and the surrounding environment.

Method

Intermediate and Senior Levels

1. The **Musselwhite Case Study** student handout provides an overview of how Placer Dome uses responsible and sustainable resource management in mine development, mineral production and community relations.
2. The **Create a Reclamation Action Plan** and **Musselwhite Site Map** sections of the student handout provide instructions and additional background information for the completion of this activity. To further research this assignment, related Web site links are also provided.
3. After reading the case study, instruct students to work in partners to develop a reclamation action plan for this site when mining operations are complete in the future.
4. The students' report should give a summary of their plans, a description of the resources and materials needed, and drawings representing what the area looked like before and after reclamation.
5. Invite students to deliver a 10 minute oral presentation to explain their action plan.
6. To summarize the activity, use the **Musselwhite Closure Plans** teacher information sheet to present the actual reclamation plans of Musselwhite. Display the series of aerial photos showing the condition of the property in the past (mine construction), present (mine operation) and future (mine closure).



Musselwhite Case Study: A New Way of Mining

In 1973, significant gold deposits were discovered 500 kilometres north of Thunder Bay, Ontario, near Opapimiskan. Since then, there has been a wide array of exploration and studies of the proposed mine to determine the effects it could have upon the region's people and environment. The water, vegetation, fish, amphibians, birds and mammals in the Musselwhite area were carefully studied to determine the effects of the mine.

Completed in 1997, Musselwhite Mine is a modern mine that is designed to address modern concerns. Musselwhite Mine, owned by Placer Dome and Kinross Gold Corporation, includes a mill fed by an underground mine and a small open pit mine. The property consists of approximately 17,000 hectares. November 1, 2001 saw the production of the first one million ounces of gold. With current mineral reserves, Musselwhite has an expected mine life through to 2013.

Musselwhite's design ensures that:

- water quality in the rivers and lakes will continue to meet provincial standards during and following mine operation;
- air emissions will be minimal;
- the small amounts of fish habitat lost to tailing and polishing ponds will be replaced;
- metal levels in fish will remain low;
- there is limited temporary displacement of vegetation and wildlife; and
- the land will be revegetated and returned as near to its original state as is economically feasible.

The mine includes state-of-the-art engineering of effluent treatment, spill containment and air emission control. The gold is recovered using an easily destroyed cyanide solution. Waste rock is washed and treated to reduce contaminants to safe levels before it is deposited in a tailing pond.

Workers travel by air to the mine from local First Nations communities and Thunder Bay. The mine employs 293 full-time employees and has 105 contract personnel providing support services. Musselwhite uses First Nations contractors to provide air transportation and camp services. A modern camp, kitchen and recreation centre are available to employees and during the summer months employees enjoy sailing, kayaking and other activities on Opapimiskan Lake. The recreation centre offers a gymnasium, weight room, saunas, lounge and Internet café.

Potential increases in the harvesting of fish and wildlife by employees and contractors will be minimized by limiting travel, by implementing a catch-and-release policy for fish and by banning firearms on the property.

An Historic Agreement: Local People, Local Concerns

The Musselwhite Mine is located on the traditional lands of the North Caribou First Nations. First Nations elders identified a birth site, a spirit site and a burial site that are preserved in the area. Archaeological studies have been conducted for the mine site, power line and road areas to ensure other culturally significant sites will not be disturbed. The assessed social and environmental effects on the area bands and the people living in local communities were compiled through public consultation, meetings and reports prepared by the First Nations. Preserving the environment and heritage of the Musselwhite Mine area is the primary concern of the First Nations people, as well as ensuring that local residents receive economic and quality-of-life benefits from the mine.

These concerns led to the signing of the Musselwhite Agreement in 1992. This accord between Placer Dome, TVX Gold (now Kinross Gold Corporation), the First Nations, the Province of Ontario and the Government of Canada was a step forward in the relationship between the mining industry and the aboriginal community. The Musselwhite Agreement defines how First Nations will benefit from the mine, provides a strategy to minimize any possible negative effects and establishes commitments to protect the environment.

Create a Reclamation Action Plan

Mining companies have a serious obligation to both their shareholders and the public to minimize the environmental impact caused by their activities. Following closure in 2013, Placer Dome will need to accelerate its restoration efforts at Musselwhite Mine. Imagine that you have been hired to develop a plan for the eventual closure and reclamation of the site. A map of the operating mine site is included in the handouts. The site includes: buildings and equipment; an underground mine; a small open pit mine; a tailing impoundment; a polishing pond; a treatment wetland; a 1,500 metre airstrip (gravel surface); and an access road.

Your job is to design a reclamation solution for this site when mining operations are complete in the future. You are required to write a report that explains:

- what the area will be used for following closure and reclamation;
- what steps you will take in your reclamation project; and
- what resources you will need and how you will use them (e.g. topsoil, trees, plants, sand and gravel, etc.)

Include two diagrams, one that shows how the area looks before and one showing how it will look after you fix it up. These diagrams can be sketches, pictures, or computer generated.

Use your imagination, be creative and have fun!

Sample photographs of rehabilitated mine sites:

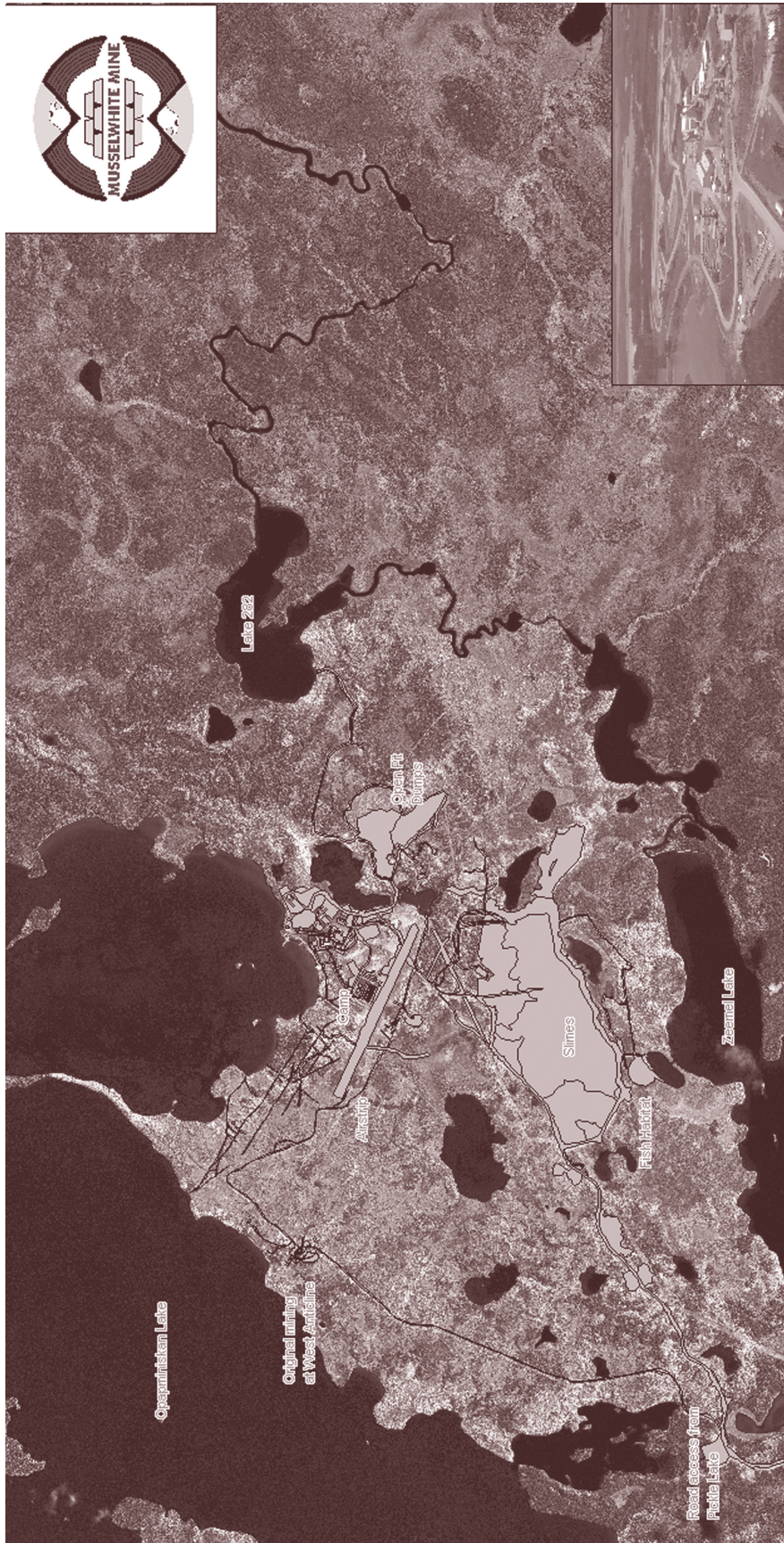
http://www.mndm.gov.on.ca/mndm/mines/mg/rehab/rehabexmp_e.asp

<http://www.mii.org/reclmetals.html>

Musselwhite Site Map

1.2

Learning Activity



Progressive reclamation continues during mine operation with the seeding of grasses and tree planting. Planning is also underway to conduct annual satellite imagery of the property to study the health of the vegetation and whether or not it indicates the presence of stress on vegetation.

As part of ongoing reclamation, water is stored onsite in various compounds including the tailings impoundment, polishing pond and treatment wetland during the winter. Water release from the polishing pond to the surrounding environment begins sometime after mid-April and can continue through to the end of November.

Following closure, anticipated in 2013, Placer Dome will accelerate its restoration efforts at Musselwhite Mine by:

- removing all structures, equipment and materials;
- establishing soil conditions conducive to plant life as well as stabilizing landscape, soil and other organic materials;
- contouring and replanting disturbed area with jack pine seedlings;
- re-establishing natural drainage systems;
- creating new fish habitat in the open pit and constructing a marsh;
- ensuring no increase in metal/pollutant levels in wildlife or drinking water;
- obstructing access road and removing bridges to limit use;
- re-establishing wetlands in treatment pond and creating new wetlands in the tailing pond and open pit; and
- monitoring the ecosystem for a minimum of five years after closure.

Upon completion, vegetation will cover the site, a wide range of wildlife will return, and new small lakes will be established in the open pit and tailings pond.

1. Mine Construction



2. Mine Operation



3. Mine Closure



PART TWO

Careers in the Mining Industry

Teacher Activity Outline

1 of 1



VIDEO/DVD TOPIC: PART TWO	LENGTH OF VIDEO/DVD	DURATION OF ACTIVITY
<ul style="list-style-type: none">• Minerally Speaking: Employees Talk About Their Jobs• Mining: Preparing for a Great Career Choice• General Safety and Common Core Mine Training	<ul style="list-style-type: none">• 5 minutes	<ul style="list-style-type: none">• 45 minutes

2.0

Video/DVD Study

Part Two of the video/DVD showcases the wide range of employment opportunities offered by the mining industry, the skills and education required to succeed and the standard safety training necessary to work in a mine, called Common Core Mine Training. Today's mining industry presents an array of rewarding careers. The industry is dynamic, technologically advanced and vital to our economy. It is a business that recruits highly skilled individuals to work as part of a team to successfully complete each stage of the mining process. The experience and skills gained at one mine site are not only transferable to other mines, but can be applied to other careers and occupational sectors as well.

Common Core Mine Training is the government's standard safety training prerequisite to work in a mine. All employees working underground must successfully complete this training. The Ontario Ministry of Training, Colleges and Universities established the training, in collaboration with representatives from the industry. As this training is standardized across Ontario, employees working in a nickel mine in Sudbury, for example, could move to a gold mine in Ontario's far north with ease. It is the employer's responsibility to certify their workers.

Lead a brainstorming session to generate a list of occupations associated with the mining industry. Allow students to discuss their thoughts about the different kinds of work and working conditions shown in the video/DVD. Which jobs were of interest to them? What is it about a particular job that makes it appealing?

A summary of mining industry occupations is provided on the following page to aid in facilitating the discussion.



Summary of Mining Industry Occupations

Management, Business and Financial Occupations

- Financial and Investment Analysts
- Financial Auditors and Accountants
- Lawyers
- Operations Specialties Managers
- Top Executives

Professional and Scientific Occupations

- Chemical Engineers
- Chemists
- Computer Programmers
- Computer Systems Analysts
- Drafting Technologists
- Electrical Engineers
- Electronic Service Technicians
- Environmental Scientists
- Environmental Technicians
- Geochemists
- Geological Engineers
- Geological Technicians
- Geologists
- Geophysical Technicians
- Geophysicists
- Laboratory Technicians
- Mechanical Engineers
- Metallurgical Control Analysts
- Metallurgical Engineers
- Mining Engineers
- Process Engineers
- Prospectors

- Quality Control Engineers
- Surveyors

Office, Administrative and Support Occupations

- Administrative Support Clerks
- Cleaners
- Clerical Occupations
- Cooks
- Graphic Designers
- Human Resource Managers
- Mailroom/Courier Services
- Payroll Clerks
- Photographers
- Purchasing Agents and Officers
- Sales, Marketing and Advertising Managers
- Specialists in Human Resources
- Writing, Translating and Public Relations Professionals

Installation, Maintenance and Repair Occupations

- Carpenters
- Construction Millwrights and Industrial Mechanics
- Heavy-Duty Equipment Mechanics
- Machinists and Machining and Tooling Inspectors
- Maintenance Analysts and Maintenance Workers
- Technical Occupations in Electronics and Electrical Engineering

- Managers of Mechanics, Installers and Repairers
- Trades Helpers and Labourers

Construction and Extraction Occupations

- Blasters
- Borer Operators
- Construction Equipment Operators
- Cutters
- Diamond Drillers
- Electricians
- Explosives Handlers and Packers
- Extraction Workers
- First-Line Supervisors/Managers of Construction Trades and Extraction Workers
- Mine Cutting and Channeling Machine Operators
- Mine Safety Inspectors
- Miners
- Mining Machine Operators
- Rock Splitters
- Roof Bolters
- Stationary Engineers

Production Occupations

- Mill Operators
- Managers of Production and Operating Workers
- Crushing, Grinding, and Polishing Machine Setters, Operators and Tenders

- Plant and System Operators
- Production Workers
- Solderers
- Welders
- Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders

Transportation and Material Moving Occupations

- Bulldozer Operators
- Conveyor Operators
- Excavator Operators
- Freight, Stock, and Material Movers
- Hand Shuttle Car Operators
- Hoistmen
- Industrial Truck and Tractor Operators
- Loading Machine Operators
- Truck Drivers

Health and Safety Occupations

- Health and Safety Training Supervisors
- Health and Safety Workers
- Nursing Supervisors and Registered Nurses

Other

- Protective Services (e.g. Security Guards)



Suggested Levels: Junior, Intermediate and Senior

Purpose	<ul style="list-style-type: none"> To determine personal work preferences. To develop skills in career planning. To promote an understanding of self-interests, abilities and aptitudes. To help make connections between personal qualities and career choices.
Time	45 minutes
Resources	<ul style="list-style-type: none"> Mine Your Potential student handout
Link to Ontario Curriculum	<p>Skills for Success in Secondary School</p> <p>Grade 9</p> <ul style="list-style-type: none"> Personal Knowledge and Management Skills <p>Career Studies</p> <p>Grade 10</p> <ul style="list-style-type: none"> Personal Knowledge and Management Skills <p>Designing Your Future</p> <p>Grade 11</p> <ul style="list-style-type: none"> Personal Knowledge and Management Skills

Teacher Information

Students who are thinking about their futures or actively planning their careers need to think about their work preferences. Choosing the right occupation requires self-knowledge. This activity has been designed to help students identify their feelings about different kinds of work and working conditions.

There are hundreds of different occupations in mining and thousands more in the larger world of work. Understanding their own interests, skills and qualities is important when people are choosing an appropriate career. People who find work matching their talents, interests and values are more likely to be satisfied in their careers than those who do not.

Method

- Junior Level**
- The **Mine Your Potential** student handout provides students with a list of statements about working.
 - Instruct students to cut out paper strips containing the statements so that they can arrange them on a scale, ranging from “strongly agree”, “agree”, “no opinion”, to “disagree” and “strongly disagree”.
 - Have the students share their choices with a partner to help clarify their thoughts and ideas.
 - Summarize this activity as a class by reading out each statement.
 - Allow the students to respond by raising their hands if they strongly agree, disagree or have placed this statement somewhere in between.
-
- Intermediate and Senior Levels**
- The **Mine Your Potential** student handout provides students with a list of statements about working.
 - Ask the students to rank the statements in terms of importance.
 - Instruct students to number the statements along a scale, ranging from “strongly agree”, “agree”, “no opinion”, to “disagree” and “strongly disagree”.
 - Have the students share their choices with a partner to help clarify their thoughts and ideas.
 - To summarize the activity, instruct students to record in their notebook what they have discovered about themselves by doing this activity.

I want work that allows me to use my hands.
I like to take things apart and figure out how they work.
I want work where I use tools and machinery.
I enjoy working on computers.
I enjoy building and repairing things.
I want work where I use advanced technology.
I want work where I can use my imagination.
I want a job where I get to create new things.
I like to try new ways of doing things.
I like work that allows me to say, "That's a job well done!"
I want work where there are many new challenges.
I like problems and figuring out different ways of solving them.
I want to travel for my work.
I want work where I follow clear rules and guidelines.
I like to finish one project before beginning another one.
I like to explain things to others.
I want to work by myself.
I enjoy working on teams.
I want the kind of job where I know exactly what I am going to do each day.
I want work that brings unexpected challenges each day.
I want a job where I can learn new things all the time.
I want a job where I am working with lots of other people.
I want the kind of job where I get to talk to people all over the country or the world.
I would enjoy being in charge of a project.
I want to work where I can make decisions and take responsibility for them.
I want work where I can use my organizational skills to juggle many tasks/projects at the same time.
Money is not as important to me as personal satisfaction.
The idea of making money motivates me a great deal.
I want the challenge of working in a different community/city than my own.
I want to work in my own community/city where I know a lot of people.
I want to be paid an hourly wage and earn overtime pay.
I want to supervise and mentor others.
I want the opportunity to advance and have input into decision-making.
I want to work in a salaried position, where my extra work may mean more vacation time rather than overtime pay.

Suggested Levels: Junior, Intermediate and Senior

Purpose	<ul style="list-style-type: none"> • To connect characteristics of specific occupations to their job description. • To recognize the broad range of occupations associated with the mining industry. • To teach the responsibilities of various occupations in the mining industry.
Time	45 minutes
Resources	<ul style="list-style-type: none"> • Match Up Mining Careers student handout • Match Up Mining Careers answer sheet
Link to Ontario Curriculum	<p>Career Studies Grade 10</p> <ul style="list-style-type: none"> • Exploration of Opportunities <p>Designing Your Future Grade 11</p> <ul style="list-style-type: none"> • Exploration of Opportunities

Teacher Information

In this activity, students match mining occupations to their corresponding job descriptions. The activity is designed to build on the career information presented in the video/DVD **Mining New Opportunities** and further inform students about the various opportunities offered by the mining industry.

Method

All Levels

1. The **Match Up Mining Careers** student handout provides students with a list of mining occupations and job descriptions, including those showcased in the video/DVD.
2. Students complete the activity by matching the occupation to the corresponding job description.
3. The **Match Up Mining Careers** answer sheet has been provided for your information.
4. Use a chalkboard to take up the answers with students.
5. As an extension to this activity, consider hosting a “Convention of Mining Professionals”, where each student creates a persona with a career in the mining industry. Allow students to create name tags, adopt their roles and walk around the classroom, introducing themselves to each other and describing the work that they do.

Match Up Mining Careers

Discover who does what in the mining industry by matching the following occupations to their job descriptions.

OCCUPATION	JOB DESCRIPTION
1. Geologist	# ___ Monitors materials extracted from the mine
2. Mine Engineer	# ___ Oversees the health of employees
3. Electrician	# ___ Orders equipment and supplies
4. Diamond Driller	# ___ Interprets seismic data to locate mineral reserves
5. Accountant	# ___ Operates equipment used in daily mine operations
6. Safety Inspector	# ___ Maintains and operates robots and computer networks
7. Environmental Scientist	# ___ Uses a drill with a diamond tipped bit to bore deep holes
8. Geophysicist	# ___ Organizes and supervises business activities
9. Prospector	# ___ Supervises extraction of metals from ores
10. Blaster	# ___ Designs plans for mine sites and mining operations
11. Lawyer	# ___ Ensures that mine operations are environmentally sound
12. Rock Boring Machine Operator	# ___ Evaluates the geological aspects of mine sites
13. Quality Control Engineer	# ___ Repairs and maintains heavy duty equipment
14. Purchasing Agent	# ___ Creates and develops industrial processes
15. Metallurgist	# ___ Visits the mine to examine working conditions
16. Equipment Operator	# ___ Analyzes samples collected daily from the mine
17. Heavy Duty Repair Mechanic	# ___ Breaks up rock and other surfaces for mining
18. Computer Specialist	# ___ Repairs a variety of electrical equipment
19. Administrative Position	# ___ Searches for valuable mineral deposits
20. Chemist	# ___ Obtains permits, rights and licenses
21. Minerals Surveyor	# ___ Operates a machine used to break through ore
22. Nurse	# ___ Manages the money spent by the company
23. Process Engineer	# ___ Maps and develops plans for sites of mineral extraction

Bonus: Can you think of any occupation in the mining industry that is not listed above? List your ideas below.

1. _____
2. _____
3. _____

Match Up Mining Careers

Discover who does what in the mining industry by matching the following occupations to their job descriptions.

OCCUPATION	JOB DESCRIPTION
1. Geologist	# 13 Monitors materials extracted from the mine
2. Mine Engineer	# 22 Oversees the health of employees
3. Electrician	# 14 Orders equipment and supplies
4. Diamond Driller	# 8 Interprets seismic data to locate mineral reserves
5. Accountant	# 16 Operates equipment used in daily mine operations
6. Safety Inspector	# 18 Maintains and operates robots and computer networks
7. Environmental Scientist	# 4 Uses a drill with a diamond tipped bit to bore deep holes
8. Geophysicist	# 19 Organizes and supervises business activities
9. Prospector	# 15 Supervises extraction of metals from ores
10. Blaster	# 2 Designs plans for mine sites and mining operations
11. Lawyer	# 7 Ensures that mine operations are environmentally sound
12. Rock Boring Machine Operator	# 1 Evaluates the geological aspects of mine sites
13. Quality Control Engineer	# 17 Repairs and maintains heavy duty equipment
14. Purchasing Agent	# 23 Creates and develops industrial processes
15. Metallurgist	# 6 Visits the mine to examine working conditions
16. Equipment Operator	# 20 Analyzes samples collected daily from the mine
17. Heavy Duty Repair Mechanic	# 10 Breaks up rock and other surfaces for mining
18. Computer Specialist	# 3 Repairs a variety of electrical equipment
19. Administrative Position	# 9 Searches for valuable mineral deposits
20. Chemist	# 11 Obtains permits, rights and licenses
21. Minerals Surveyor	# 12 Operates a machine used to break through ore
22. Nurse	# 5 Manages the money spent by the company
23. Process Engineer	# 21 Maps and develops plans for sites of mineral extraction

Suggested Levels: Intermediate and Senior

Purpose	<ul style="list-style-type: none"> • To learn the connections between educational achievement and occupational opportunities. • To develop skills in career planning. • To relate characteristics of specific occupations with skills and interests. • To investigate career pathways and the related educational requirements. • To learn how to write a résumé and cover letter. 		
Time	<p>Part One: 45 minutes</p> <p>Part Two: 90 minutes</p>		
Resources	<p>Part One:</p> <ul style="list-style-type: none"> • Apply for a Job at a Mine Site student handout • Fictional Job Postings at Trillium Mine student handout <p>Part Two:</p> <ul style="list-style-type: none"> • Fictional Job Postings at Trillium Mine student handout • Writing a Résumé and Cover Letter student handout 		
Link to Ontario Curriculum	<table border="0"> <tr> <td style="vertical-align: top;"> <p>Career Studies Grade 10</p> <p>Designing Your Future Grade 11</p> </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change • Exploration of Opportunities • Preparation for Transitions and Change </td> </tr> </table>	<p>Career Studies Grade 10</p> <p>Designing Your Future Grade 11</p>	<ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change • Exploration of Opportunities • Preparation for Transitions and Change
<p>Career Studies Grade 10</p> <p>Designing Your Future Grade 11</p>	<ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change • Exploration of Opportunities • Preparation for Transitions and Change 		

Teacher Information

This activity has been designed to provide students with an opportunity to create a fictional résumé and cover letter for a mock job posting with Trillium Mine. Many of the job postings provided are showcased in the video/DVD. A review of the various job postings will allow students to connect educational achievement to potential occupational opportunities and see the diverse range of employment opportunities provided by this mine site. Writing a résumé and cover letter helps students relate the characteristics of specific occupations to skills and interests.

Note: The salary information included in this activity was drawn from a variety of sources, and is provided as a general indication of the earning potential of each highlighted career. Individual salaries will vary depending on a variety of factors, such as: company size; the experience of the employee; the level of responsibility; and the region where a person works.

Method**Intermediate
and Senior
Levels****Part One:**

1. The **Apply for a Job at a Mine Site** student handout provides each student with background information and instructions for the activity.
2. The **Fictional Job Postings at Trillium Mine** student handout provides a selection of 15 mock job postings.
3. Review the job postings as a class and remind students about the Common Core Mine Training that was discussed in the video/DVD. Common Core Mine Training is the government's standard safety training prerequisite to work in a mine. All employees working underground must successfully complete this training. The Ontario Ministry of Training, Colleges and Universities established the training, in collaboration with representatives from the industry. As this training is standardized across Ontario, employees working in a nickel mine in Sudbury, for example, could move to a gold mine in Ontario's far north with ease. It is the employer's responsibility to certify their workers. Many of the fictional job postings in this activity list this certification as a requirement after being employed by the company for six months to a year.
4. Instruct students to select one job posting of interest and answer the questions listed on the handout.

**Intermediate
and Senior
Levels****Part Two:**

1. Instruct students to review the job posting they selected from the **Fictional Job Postings at Trillium Mine** student handout.
2. After reading the **Writing a Résumé and Cover Letter** student handout, students create a fictional résumé and cover letter to apply for the job posting of choice.
3. As an extension to this activity, consider organizing mock job interviews between pairs of students.



Apply for a Job at a Mine Site

Student Handout

1 of 1

Trillium underground nickel mine is a fictitious fly-in operation that picks up employees from Thunder Bay and five northern communities. The mine employs 293 full time employees and has 105 contract personnel providing support services. Air transportation and camp services are provided by First Nations contractors.

Read and select one of the 15 fictional job postings from Trillium Mine. In your notebook, answer the following questions:

1. What is the fictional job you have chosen to apply for?
2. Why is this job of interest to you?
3. What level of education do you need to have in order to obtain this job and succeed?
4. What skills are most important for the job?
5. What jobs might you have held in the past? List fictional job titles, dates of employment and locations.



Position No.: 001

Title: Mining Engineer

Job Description:

- Responsible for provincial and federal regulations, including: roof control and ventilation plans; mine planning and design; water management; blasting; and environmental protection.
- Oversees, mentors, and leads junior staff in: conducting field investigations; laboratory testing; field instrumentation; engineering analyses; numerical modeling; and report production.

Skills:

- Works independently and interacts well with many team members
- Capable of managing technical and financial aspects of projects
- Handles multiple tasks and deadlines simultaneously
- Willing to travel and work in the field, including underground
- Familiar with MS Office, AutoCAD, and engineering software
- Excellent communication skills

Education, Training and Certification:

- University Degree in Engineering
- Registered Professional Engineer
- Certification in Common Core Mine Training must be obtained within six months of hiring

Salary:

- \$55,000 to \$75,000 per year
- Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
- Additional bonuses are evaluated annually

2004

Position No.: 002

Title: Blaster

Job Description:

- Handles explosives in an underground mining environment and loads blast holes with explosives to create production ore
- Reads instructions and lays out drill patterns that determine the depth and diameter of blast holes
- Conducts field tests to determine the type of explosives required
- Connects electrical wires, detonating cords and detonates charges
- Maintains storage inventory of explosives and related equipment

Skills:

- Knowledge of underground mining operations and regulations
- Uses explosives safely
- Reads diagrams and instructions effectively
- Applies careful attention to detail

Education, Training and Certification:

- Engineering Technician and Technology College Diploma or University Degree in Mining Engineering
- Certification in Common Core Mine Training must be obtained within six months of hiring

Salary:

- \$60,000 to \$90,000 per year
- Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
- Additional bonuses are evaluated annually

2004

		Position No.: 003
Title:	Environmental Technician	
Job Description:	<ul style="list-style-type: none"> • Assists and participates in the implementation of environmental programs • Conducts air, water, and soil surveys and laboratory tests • Installs, operates and maintains instruments and equipment • Assists in the analysis of survey data and preparation of reports 	
Skills:	<ul style="list-style-type: none"> • Identifies potential problems and finds appropriate solutions • Demonstrates excellent judgment and able to make recommendations • Excellent written and verbal communication skills • Able to work on multiple projects and prioritize tasks 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Environmental Technician College Diploma • Certification through the Provincial Associations of Technicians and Technologists • Valid Driver's Licence 	
Salary:	<ul style="list-style-type: none"> • \$28,000 to \$52,000 per year • Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan) • Additional bonuses are evaluated annually 	
		2004

		Position No.: 004
Title:	Security Guard	
Job Description:	<ul style="list-style-type: none"> • Controls access to mine site, issues passes and directs visitors to appropriate areas • Patrols assigned areas on foot or in a vehicle, to guard against theft, vandalism and fire • Enforces regulations to maintain order • Operates security control equipment to monitor activities • Responds to all emergencies • Ensures safety and emergency procedures are followed 	
Skills:	<ul style="list-style-type: none"> • Knowledge of computers to operate security system • Capable of handling firearms • Excellent verbal communication skills • Able to write reports • Performs well under stressful situations 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Ontario Secondary School Diploma • Valid Driver's Licence • Firearms Licence 	
Salary:	<ul style="list-style-type: none"> • \$11 to \$17 per hour • Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan) 	
		2004



Position No.: 005**Title:** **Community Liaison – First Nations Specialist**

Job Description:

- Builds and maintains relationships between Trillium Mine and members of local communities
- Acts as a cultural link between Aboriginal employees and the company and implements cultural awareness workshops for employees
- Assists in the development of a community relations plan
- Meets with community representatives to communicate and obtain feedback on issues related to the mine and local policies and procedures
- Prepares and delivers presentations

Skills:

- Understanding of Aboriginal governance and policies
- Excellent verbal communication skills
- Knowledge of living and working in a small Aboriginal community
- Ability to communicate in Oji-Cree an asset

Education, Training and Certification:

- Ontario Secondary School Diploma

Salary:

- \$28,000 to \$39,000 per year
- Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
- Additional bonuses are evaluated annually

2004

Position No.: 006**Title:** **Accounting Assistant**

Job Description:

- Assists in the operation of accounting systems and helps prepare financial information
- Reviews accounting records and financial accounts
- Processes invoices and prepares cheques

Skills:

- Advanced knowledge of MS Office and other computer skills
- Works with accuracy
- Knowledge of accounting practices, principles and procedures

Education, Training and Certification:

- Ontario Secondary School Diploma

Salary:

- \$25,000 to \$32,000 per year
- Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)

2004



Title:	Computer Service Technician	Position No.: 007
Job Description:	<ul style="list-style-type: none"> • Services and repairs computers • Installs and maintains new equipment • Inspects and tests components using a variety of instruments • Locates equipment failures and replaces components using instruction manuals 	
Skills:	<ul style="list-style-type: none"> • Strong practical knowledge of computers • Excellent problem solving skills 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Computer Service Technician College Diploma 	
Salary:	<ul style="list-style-type: none"> • \$35,000 to \$48,000 per year • Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan) 	2004

Title:	Diamond Driller Assistant	Position No.: 008
Job Description:	<ul style="list-style-type: none"> • Maintains a clean and safe work area for the team • Services drills and maintains toolboxes • Coordinates and informs diamond drill operators of needed supplies • Ensures the handling of core is done according to specifications 	
Skills:	<ul style="list-style-type: none"> • Strong communication skills • Knowledge of safety rules and regulations • Ability to work on a team 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Ontario Secondary School Diploma • Certification in Common Core Mine Training must be obtained within one year of hiring 	
Salary:	<ul style="list-style-type: none"> • \$15 to \$20 per hour • Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan) • Overtime pay potential 	2004

Title:	Electrician Apprentice	Position No.: 009
Job Description:	<ul style="list-style-type: none"> • Works with an experienced mentor • Gains skills required to become an electrician • Assists in the maintenance, repair and installation of electrical systems • Learns how to diagnose malfunctions using computerized equipment • Tests repaired systems to ensure performance 	
Skills:	<ul style="list-style-type: none"> • Willingness to learn and strong communication skills • Knowledge of safety rules and regulations • Ability to work on a team 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Ontario Secondary School Diploma • Must complete provincial exam after five years • Certification in Common Core Mine Training must be obtained within one year of hiring 	
Salary:	<ul style="list-style-type: none"> • \$15 to \$18 per hour • Overtime pay potential 	2004

Position No.: 010

Title: **Administrative Assistant**

- Job Description:**
- Coordinates administrative procedures and public relations activities with executives
 - Analyzes incoming and outgoing letters and reports
 - Prepares agendas
 - Coordinates meetings, travel and catering services
 - Answers the telephone, sends faxes, files and types letters and emails

- Skills:**
- Excellent communication and organizational skills
 - Ability to work both independently and in a team environment
 - Proven track record of dependability and accuracy
 - High level of keyboarding and Internet research skills

- Education, Training and Certification:**
- Office Administration or Executive Assistant College Diploma
 - Certified Administration Professional or Certified Professional Secretary

- Salary:**
- \$25,000 to \$50,000 per year
 - Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
- 2004

Position No.: 011

Title: **Safety and Training Coordinator**

- Job Description:**
- Develops, facilitates and coordinates safety programs
 - Writes work procedures
 - Conducts safety meetings

- Skills:**
- Possesses knowledge of the Occupational Health and Safety Act and regulations for mines
 - Able to teach and motivate others
 - Excellent verbal and written communication skills
 - Extensive computer skills

- Education, Training and Certification:**
- Mining Technologist College Diploma
 - Train the Trainer Certification
 - Certification in Common Core Mine Training must be obtained within six months of hiring

- Salary:**
- \$45,000 to \$60,000 per year
 - Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
 - Additional bonuses are evaluated annually
- 2004



Position No.: 012

Title: Junior and Senior Geologists

Job Description: • Manages and participates in: geological field studies; analysis of core samples; drilling; and geological testing programs to better understand the surface and subsurface features of the area

Skills: • Excellent written communication skills
• Able to make recommendations
• Extensive computer skills

Education, Training and Certification: • University Degree in Geology, Geochemistry or Geophysics

Salary: • Senior Geologist: \$55,000 to \$85,000 per year
• Junior Geologist: \$45,000 to \$55,000 per year
• Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)
• Additional bonuses are evaluated annually

2004

Position No.: 013

Title: Occupational Health Nurse

Job Description: • Provides medical and first aid care to employees
• Promotes wellness to employees
• Administers the company's sick leave programs and coordinates employee care with other health care providers
• Conducts occupational health examinations
• Maintains health records and reports for all employees

Skills: • Possesses knowledge of the Occupational Health and Safety Act and regulations for mines
• Excellent communication and organizational skills
• Interested in helping others
• Performs well in stressful situations

Education, Training and Certification: • University Degree in Nursing
• Registered Nurse

Salary: • \$52,000 to \$62,000 per year
• Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan)

2004



		Position No.: 014
Title:	Mine Labourer	
Job Description:	<ul style="list-style-type: none"> • Assists miners with the extraction of ore and the maintenance and construction of underground installations • Cleans underground rooms, roadways, working areas and equipment • Loads, moves and sorts materials and supplies 	
Skills:	<ul style="list-style-type: none"> • Able to move materials safely and efficiently • Excellent communication and organization skills 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Ontario Secondary School Diploma • Certification in Common Core Mine Training must be obtained within one year of hiring 	
Salary:	<ul style="list-style-type: none"> • \$12 to \$17 per hour • Includes competitive benefit package (medical, dental, eyeglasses, insurance, employee assistance program and pension plan) • Overtime pay potential 	
		2004

		Position No.: 015
Title:	Cook Apprentice	
Job Description:	<ul style="list-style-type: none"> • Works with an experienced mentor • Gains skills required to become a cook • Assists in the preparation of meals and creation of menus • Completes estimates for buying food • Responsible for the safety and sanitation of the kitchen 	
Skills:	<ul style="list-style-type: none"> • Willingness to learn • Strong communication and math skills • Works well under time constraints • Creative • Ability to work in a team 	
Education, Training and Certification:	<ul style="list-style-type: none"> • Ontario Secondary School Diploma • Must complete provincial exam after three years 	
Salary:	<ul style="list-style-type: none"> • \$12 to \$15 per hour • Overtime pay potential 	
		2004



Read the Trillium Mine advertisement to the right for jobs available at this fictitious mining operation.

Use the **Fictional Job Postings at Trillium Mine** student handout to review the job posting you selected. Prepare a fictional résumé and cover letter to apply for the position. To assist you with this activity, a résumé checklist and templates for a résumé and cover letter have been provided with this handout. In addition, you may use online résumé writing resources to complete this assignment.

A **résumé** is a document, usually two pages in length, which tells a prospective employer about you, the job seeker. A well researched résumé describes who you are, what experience and skills you have, your education and training, and why the employer should hire you. Begin your sentences or phrases with powerful action verbs (a list of action verbs is provided in the handout).

A good résumé should:

- present your information so that the prospective employer can quickly and easily evaluate your qualifications;
- be inviting and easy to read with not too much information;
- create visual impact by using bullets, bold text, underlining, italics and font sizes to emphasize key words;
- use short sentences and paragraphs that are under five lines in length; and
- have no grammatical, spelling and punctuation mistakes.

A **cover letter** explains why you are sending a résumé. Don't make the reader guess what you are asking for - be specific. Do you want a summer internship opportunity or a permanent position after you graduate? Are you inquiring about future employment possibilities? The cover letter will be seen first, so it should be well written and targeted to a specific employer.

A good cover letter should:

- reveal how you learned of the position or the organization;
- draw attention to your education and experiences that are relevant to the position you are seeking; and
- reflect your attitude, personality, motivation, enthusiasm and communication skills.

Before you prepare your résumé and cover letter, carefully re-read the description of the job for which you are applying. Review the answers you wrote in response to the five questions about your job selection, asked in Part One of this activity.

ROCK SOLID JOBS!

At Trillium Mine we offer challenging and rewarding jobs and career paths. Employees work in: engineering; geology; research; technology; finance; marketing; information systems; environment roles; and many others. We understand that people truly are our greatest asset, and we value every employee's contribution as critical to the success of the team. We're your connection to rock solid jobs. Apply to join our team today!

To apply, please address your résumé and cover letter with the job posting number to:

Human Resources Manager
Trillium Mine
P.O. Box 70
Thunder Bay, ON
P7B 6S8

Résumé Checklist

1. Contact Information

- Name
- Address
- Telephone number
- Email address

2. Objective

- Describe your career goal or ideal job. Briefly indicate the sort of position, title and possible area of specialization that you are looking for in your job search.

3. Education and Training

- Start with your highest level of education.
- Provide the name, location and dates you attended the school. If you are currently completing your coursework, include your anticipated date of graduation.
- List the type of degree, diploma or certificate obtained.
- Include what subject(s) you specialized in.
- Optional: List other degrees, continuing professional education or training courses, or any studies that you have completed abroad.

4. Employment Experience

- Include all paid work experiences that are relevant to your objective.
- Start with your most recent experience and work backwards.
- List the titles of the jobs you've held, dates of employment, company names and locations.
- List the job responsibilities and accomplishments for each job that you held.
- Optional: Include your contributions to each organization (e.g. ways your work helped: increase profit, motivation, productivity, quality; save time or money; improve programs, management, communication, and information flow).
- Present your strongest qualifications first.

5. Volunteer Experience

- Include all of your volunteer and cooperative education experiences.
- Start with your most recent experience and work backwards.

6. Skills

- List any computer skills, including software applications, languages, hardware, operating systems.
- List your language skills, rating your specific level of fluency and ability to read and write as “basic,” “intermediate,” or “advanced” (English, French, Cree, Ojibway, Oji-Cree – oral, written and syllabics)

7. Awards and Achievements

- List any awards and/or scholarships that you have received.
- List your special achievements.

8. Interests

- Include a brief list of hobbies and personal interests that relate to your objective.

Résumé Template**[Your Name]**

[Street Address, City, Province, Postal Code] [Phone Number] [Email Address]

- Objective**
- [Describe your career goal or ideal job]
- Education and Training**
- [School Name], [City, Province]
[Dates of Attendance]
 - [Degree/Diploma/Certificate obtained]
 - [Subject(s) studied]
 - [Special awards/accomplishments]
- Employment Experience**
- [Job Title]
[Dates of Employment] [Company Name], [City, Province]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job Title]
[Dates of Employment] [Company Name], [City, Province]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
- Volunteer Experience**
- [Job Title]
[Dates of Volunteer Work] [Company Name], [City, Province]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job Title]
[Dates of Volunteer Work] [Company Name], [City, Province]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
 - [Job responsibility/achievement/contribution]
- Skills**
- [Computer Skills]
 - [Language Skills]
- Awards and Achievements**
- [List awards and/or scholarships received]
 - [List special achievements]
- Interests**
- [Briefly list interests that may pertain to the type of job you want]

Cover Letter Template

[Your Name]

[Street Address, City, Province, Postal Code] [Phone Number] [Email Address]

[Date]

[Address Block]

Re: [Position Number and Job Title]

[Salutation],

[In the first paragraph, reveal where you heard about the job opportunity. Describe your current occupation and tell your potential employer that you are the ideal candidate for the job.]

[In the second paragraph, you have a chance to prove yourself by outlining how well your experiences match the needs of the employer.]

JOB REQUIREMENTS	MY EXPERIENCE
• [Job requirement]	• [Your experience]
• [Job requirement]	• [Your experience]
• [Job requirement]	• [Your experience]

[In the last paragraph, briefly describe a few of your best skills. Tell the employer that you would like an interview. Invite them to contact you to further discuss your qualifications. Thank the reader for their consideration and remind them that you have enclosed a résumé for their review.]

Sincerely,

[Your signature]

[Your printed name]

Powerful Action Verbs

MANAGEMENT SKILLS	
administered	improved
analyzed	increased
assigned	organized
attained	oversaw
chaired	planned
contracted	prioritized
consolidated	produced
coordinated	recommended
delegated	reviewed
developed	scheduled
directed	strengthened
evaluated	supervised
executed	

COMMUNICATION SKILLS	
addressed	lectured
arbitrated	mediated
arranged	moderated
authored	motivated
corresponded	negotiated
developed	persuaded
directed	promoted
drafted	publicized
edited	reconciled
enlisted	recruited
formulated	spoke
influenced	translated
interpreted	wrote

CLERICAL SKILLS	
approved	organized
arranged	prepared
catalogued	processed
classified	purchased
collected	recorded
compiled	retrieved
dispatched	screened
executed	specified
generated	systematized
implemented	tabulated
inspected	validated
monitored	
operated	

RESEARCH SKILLS	
clarified	interpreted
collected	interviewed
critiqued	investigated
diagnosed	organized
evaluated	reviewed
examined	summarized
extracted	surveyed
identified	systematized
inspected	

TECHNICAL SKILLS	
assembled	operated
built	overhauled
calculated	programmed
computed	remodeled
designed	repaired
devised	solved
engineered	trained
fabricated	upgraded
maintained	

TEACHING SKILLS	
adapted	evaluated
advised	explained
clarified	facilitated
coached	guided
communicated	informed
coordinated	initiated
developed	instructed
enabled	persuaded
encouraged	set goals

FINANCIAL SKILLS	
administered	forecasted
allocated	managed
analyzed	marketed
appraised	planned
audited	projected
balanced	researched
budgeted	
calculated	
computed	
developed	

CREATIVE SKILLS	
acted	instituted
conceptualized	integrated
created	introduced
designed	invented
developed	originated
directed	performed
established	planned
fashioned	revitalized
founded	shaped
illustrated	

HELPING SKILLS	
assessed	familiarized
assisted	guided
clarified	referred
coached	rehabilitated
counselled	represented
demonstrated	
diagnosed	
educated	
expedited	
facilitated	

Suggested Levels: Intermediate and Senior

Purpose	<ul style="list-style-type: none"> • To apply research skills to find and make use of information related to job possibilities and career interests. • To provide an understanding of the interests, skills and qualities that frequently apply to a field of work. • To acquire knowledge of the benefits of educational achievement to occupational opportunities. • To examine employment-related trends. 				
Time	45 minutes				
Resources	<ul style="list-style-type: none"> • Discover Careers in the Mining Industry student handout • Mining Industry Occupations student handout • JobFutures Web site: http://jobfutures.ca/noc/browse-occupations-alphabet.shtml 				
Link to Ontario Curriculum	<table border="0"> <tr> <td style="vertical-align: top;">Career Studies Grade 10</td> <td> <ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change </td> </tr> <tr> <td style="vertical-align: top;">Designing Your Future Grade 11</td> <td> <ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change </td> </tr> </table>	Career Studies Grade 10	<ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change 	Designing Your Future Grade 11	<ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change
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Designing Your Future Grade 11	<ul style="list-style-type: none"> • Exploration of Opportunities • Preparation for Transitions and Change 				

Teacher Information

This activity provides students with an opportunity to apply their Internet research skills to obtain information about the array of career possibilities in the mining industry. After reviewing a list of industry-related occupations, students will use the **JobFutures** Web site to further investigate three occupations of interest. Using the online resource, students will write three detailed job profiles. JobFutures is Canada's national careers education planning tool, providing information on 226 occupational groups. It also describes the work experiences of recent graduates from 155 programs of study. You may wish to allow students additional time to explore the wealth of information found on JobFutures.

Method

Intermediate and Senior Levels

1. The **Discover Careers in the Mining Industry** student handout provides instructions on how to create a job profile using the information gathered from JobFutures.
2. The **Mining Industry Occupations** student handout contains an extensive list of occupations associated with the mining industry. The list is divided into occupational groups, to help direct students to their specific area(s) of interest. The list of mining industry occupations has been carefully correlated to match the online list found on JobFutures. Certain occupations may be found listed as something other than what one might expect (e.g. Environmental Scientists are listed as Life Science Professionals, or Physical Science Professionals). Notes to help find the selected occupations are included in this handout.
3. Instruct the students to select three jobs of interest to research further.
4. Allow students time to use the alphabetic listing of occupations found on the JobFutures Web site to research their selected occupations.
5. The **Discover Careers in the Mining Industry** student handout also includes a list of headings and questions to help organize and focus their research. A template of a job profile for a computer engineer is provided to further clarify the assignment.

The **Mining New Opportunities** video/DVD provides current information about mining, including the skills and needs of the industry and employment opportunities. The video/DVD was filmed in part at the Musselwhite underground gold mine in northwestern Ontario and features interviews with employees of this mining operation. There is a broad range of occupations associated with the mining industry. Mining is a leading industry in the development and application of new technology, where research and innovation are driving forces. In 2003, the Canadian mining industry directly employed over 380,000 people and contributed \$41.1 billion to the Canadian economy.

Use the **Mining Industry Occupations** student handout to select three mining related careers that interest you. It is not unusual for people to have more than three different careers in their lifetime. Explore these three careers using the alphabetical listing of occupations found on the JobFutures Web site and create a job profile for each, according to the outline below.

JobFutures is Canada's national careers education online planning tool. The Web site has been designed to help you plan for your future, by providing useful information about the 226 occupational groups that make up the entire Canadian labour market. The Web site also describes the education and work experiences of recent graduates from 155 programs of study.

JobFutures Web site:

<http://jobfutures.ca/noc/browse-occupations-alphabet.shtml>

To create a job profile, use the headings and questions listed below to summarize and record the information obtained from your research. A template for a job profile in Computer Engineering is provided in the handout.

Job Profile Headings and Questions for Your Internet Research on JobFutures

1. Title of Occupation

2. At Work

- What do they do?
- What are some related occupation(s)?
- Where do they find work? List the top occupational area.

3. Education, Training and Experience

- What education and training do you need (e.g. high school diploma, technical school, university or college education, graduate studies) for this occupation?
- What are the required/related educational programs?
- What are the experiences and skills that are useful for this occupation?
- What high school subjects should a person interested in this occupation take?

4. Work Prospects

- What are the future work prospects – good, fair or limited? Why?

5. Important Facts

- What are the average hourly earnings for this occupation?

Job Profile Template

QUESTIONS	ANSWERS
1. Title of Occupation	<ul style="list-style-type: none"> • Computer Engineer
2. At Work	
What do they do?	<ul style="list-style-type: none"> • Computer Engineers analyze a company's computer requirements. • They design and develop a system that meets the company's specific needs and verify the design of the system, through the use of prototypes or simulations.
What are some related occupation(s)?	<ul style="list-style-type: none"> • Computer and Information Systems Managers • Computer Systems Analysts
Where do they find work? List the top occupational area.	<ul style="list-style-type: none"> • Computer companies • Consulting firms • Other business services
3. Education, Training and Experience	
What education and training (e.g. high school diploma, technical school, university or college education, and graduate studies) do you need for this occupation?	<ul style="list-style-type: none"> • University education and possibly graduate studies
What are the required/related educational programs?	<ul style="list-style-type: none"> • Computer Engineering, Computer Science, Mechanical Engineering, Electrical Engineering, Chemical Engineering
What are the experiences and skills that are useful for this occupation?	<ul style="list-style-type: none"> • Project management, proposal writing, making presentations, financial management, committee work on industry ethics
What high school subjects should a person interested in this occupation take?	<ul style="list-style-type: none"> • Computer Science, Math, Business, English
4. Work Prospects	
What are the future work prospects – good, fair, or limited? Why?	<ul style="list-style-type: none"> • The future work prospects are good because the employment growth rate will likely be higher than average. The number of job seekers is also not likely to keep pace with the number of job openings.
5. Important Facts	
What are the average hourly earnings for this occupation?	<ul style="list-style-type: none"> • \$31.41 (2004)

Management, Business and Financial Occupations

- Financial and Investment Analysts
- Financial Auditors and Accountants
- Lawyers (Listed as: Judges, Lawyers and Quebec Notaries)
- Mill Superintendents (Listed as: Contractors and Supervisors, Trades and Related Workers)
- Mine Managers (Listed as: Managers in Primary Production, or Supervisors in Mining, Oil and Gas)
- Operations Specialties Managers (Listed as: Managers in Primary Production - except Agriculture)
- Top Executives (Listed as: Financial Managers, Managers in Primary Production)

Office, Administrative and Support Occupations

- Administrative Support Clerks
- Cleaners
- Clerical Occupations, General Office Skills
- Cooks
- Corporate Relations (Listed as: Business Development Officers and Marketing Researchers and Consultants)
- Graphic Designers and Illustrators
- Human Resource Managers
- Investor Relations Professionals (Listed as: Banking, Credit and Other Investment Managers)
- Mailroom/Courier Services (Listed as: Mail and Message Distribution Occupations)
- Payroll Clerks
- Photographers
- Purchasing Agents and Officers
- Sales, Marketing and Advertising Managers
- Specialists in Human Resources
- Writing, Translating and Public Relations Professionals

Health and Safety Occupations

- Health and Safety Training Supervisors (Listed as: Other Technical Inspectors and Regulatory Officers)
- Health and Safety Workers (Listed as: Other Technical Inspectors and Regulatory Officers)
- Nursing Supervisors and Registered Nurses

Professional and Scientific Occupations

- Chemical Engineers (Listed as: Civil, Mechanical, Electrical and Chemical Engineers)
- Chemical Technologists and Technicians
- Chemists (Listed as: Physical Science Professionals)
- Computer Programmers

- Environmental Scientists (Listed as: Life Science Professionals, or Physical Science Professionals)
- Environmental Technicians (Listed as: Technical Occupations in Life Sciences)
- Geochemists (Listed as: Physical Science Professionals)
- Geological Engineers (Listed as: Other Engineers)
- Geological Technicians (Listed as: Technical Occupations in Physical Sciences)
- Geologists (Listed as: Physical Science Professionals)
- Geophysical Technicians (Listed as: Technical Occupations in Physical Sciences)
- Geophysicists (Listed as: Physical Science Professionals)
- Laboratory Technicians (Listed as: Chemical Technologists and Technicians, or Technical Occupations in Physical Sciences)
- Mechanical Engineers (Listed as: Civil, Mechanical, Electrical and Chemical Engineers)
- Metallurgical Control Analysts (Listed as: Technical Occupations in Physical Sciences)
- Metallurgical Engineers (Listed as: Other Engineers)
- Mining Engineers (Listed as: Other Engineers)
- Process Engineers (Listed as: Civil, Mechanical, Electrical and Chemical Engineers)
- Prospectors (Listed as: Technical Occupations in Physical Sciences)
- Quality Control Engineers (Listed as: Other Engineers)
- Surveyors (Listed as: Architects, Urban Planners and Land Surveyors)

Construction and Extraction Occupations

- Blasters (Listed as: Crane Operators, Drillers and Blasters)
- Borer Operators (Listed as: Machining Tool Operators)
- Construction Equipment Operators (Listed as: Heavy Equipment Operators)
- Continuous Mining Machine Operators (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Cutters (Listed as: Machine Operators and Related Workers in Metal and Mineral Products Processing)
- Diamond Drillers (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Electricians (Listed as: Industrial Electricians)
- Computer Systems Analysts
- Drafting Technologists and Technicians
- Electrical Engineers (Listed as: Civil, Mechanical, Electrical and Chemical Engineers)
- Electronic Service Technicians

Construction and Extraction Occupations*(continued)*

- Explosives Handlers and Packers (Listed as: Longshore Workers and Material Handlers and Related Occupations, or Central Control and Process Operators in Manufacturing and Processing)
- Extraction Workers (Listed as: Central Control and Process Operators in Manufacturing and Processing)
- First-Line Supervisors/Managers of Construction Trades and Extraction Workers (Listed as: Contractors and Supervisors, Trades and Related Workers, Construction Managers)
- Mine Cutting and Channeling Machine Operators (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Mine Safety Inspectors (Listed as: Other Technical Inspectors and Regulatory Officers)
- Miners (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Mining Machine Operators (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Rock Splitters (Listed as: Labourers in Processing, Manufacturing and Utilities)
- Roof Bolters (Listed as: Underground Miners, Oil and Gas Drillers and Related Workers)
- Stationary Engineers and Power Station and System Operators

Installation, Maintenance and Repair Occupations

- Carpenters
- Construction Millwrights and Industrial Mechanics
- Heavy-Duty Equipment Mechanics
- Machinists and Machining and Tooling Inspectors
- Maintenance Analysts and Maintenance Workers (Listed as: Construction Millwrights and Industrial Mechanics - except Textile)
- Managers of Mechanics, Installers and Repairers (Listed as: Contractors and Supervisors, Trades and Related Workers)
- Technical Occupations in Electronics and Electrical Engineering
- Trades Helpers and Labourers

Production Occupations

- Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders (Listed as: Machine Operators and Related Workers in Metal and Mineral Products Processing)
- Managers of Production and Operating Workers (Listed as: Managers in Primary Production - except Agriculture)
- Mill Operators (Listed as: Central Control and Process Operators in Manufacturing and Processing)
- Plant and System Operators (Listed as: Central Control and Process Operators in Manufacturing and Processing)
- Production Workers (Listed as: Labourers in Processing, Manufacturing and Utilities)
- Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators and Tenders (Listed as: Labourers in Processing, Manufacturing and Utilities)
- Solderers (Listed as: Welders and Related Machine Operators)
- Welders and Related Machine Operators

Transportation and Material Moving Occupations

- Bulldozer Operators (Listed as: Heavy Equipment Operators)
- Conveyor Operators and Tenders (Listed as: Labourers in Processing, Manufacturing and Utilities)
- Dragline Operators (Listed as: Crane Operators, Drillers and Blasters)
- Excavator Operators (Listed as: Heavy Equipment Operators)
- Freight, Stock, and Material Movers (Listed as: Longshore Workers and Material Handlers and Related Occupations)
- Hand Shuttle Car Operators (Listed as: Mine Service Workers and Operators in Oil and Gas Drilling)
- Hoistmen (Listed as: Mine Service Workers and Operators in Oil and Gas Drilling)
- Industrial Truck and Tractor Operators
- Loading Machine Operators (Listed as: Heavy Equipment Operators)
- Truck Drivers, Heavy and Tractor-Trailer

Other

- Protective Services (Listed as: Security Guards and Related Occupations)
- Pilots (Listed as: Air Pilots, Flight Engineers and Flying Instructors)

PART THREE

The Importance of Mining to the Economy of a Community

Teacher Activity Outline

1 of 1



VIDEO/DVD TOPIC: PART THREE

LENGTH OF VIDEO/DVD

DURATION OF ACTIVITY

- Mining: Why Do We Need It?

- 4 minutes

- 45 minutes

Part Three of the video/DVD describes the use of rocks and minerals in our everyday life, technological innovations developed and used by the modern mining industry and the importance of mining to the Canadian economy. Aboriginal-owned businesses that supply goods and services to the mining industry are also highlighted in this section of the video/DVD. These include: airline services; janitorial services; housekeeping; catering; and the operation of various retail stores.

It is difficult to think about what life would be like without rocks, minerals and metals. Minerals make up so much of what's around us and what we use everyday. Minerals allow us to: live in a house or apartment; turn on lights; brush our teeth; listen to music; watch television; use a computer; cook meals; ride in a vehicle; and much more. There are approximately 17,700 direct jobs created by Ontario's mining industry. An additional 73,000 spin-off jobs are also created. Mineral products are sold to companies that use them to make everything from electric clocks to detergent.

It is important to recognize that mining has the potential to impact living standards, traditional Aboriginal lifestyles, social infrastructure, the environment and the economy of a community. However, this particular brainstorming activity focuses mainly on the impact of a mine opening on the economy of a local community.

Imagine that you have just learned that an open pit diamond mine will open and create 375 new jobs in your small northern Ontario community. Use the fictional town profile and mine information provided on the following page to facilitate a discussion that deals with the potential effects the mine opening will have on:

- jobs in the town;
- the school system in the town;
- medical and dental care in the town;
- current businesses, business travelers and tourism; and
- the Aboriginal and remote community.

A summary of possible answers is also provided on the following page to assist with facilitating this discussion.

Fictional Town Profile and Mine Information

Town Population:	5,050
New Mine Employment:	375
Average Miner Salary:	\$65,000 per year
Other Town Industries:	There is one existing mine with 405 employees. Over 700 other community residents are employees in schools, restaurants, stores, and other services.
Other Information:	There are currently five doctors and two dentists in the town. There are four elementary schools and one high school.

Discussion Points

Effects on Employment

New jobs will mean that millions of new dollars will flow into the community. It is estimated that, for every new mining job created, two additional jobs will result. The new workers will need housing and, as a result, construction workers, plumbers and electricians will be required. New stores will be opened, as new services will be needed to meet the demands of the additional residents. Gas stations, supermarkets, stores, restaurants, banks and even movie theatres will see an increase in customers, and accordingly they will hire more employees or perhaps open additional services to meet the increase in demand.

Effects on the Education System

The opening of the mine will have an impact on the local education system. With 375 direct jobs being created, new workers will have to be hired and many will have children that will move with them to the town. With the new employment generated in all areas, new elementary and high schools may be required or existing ones will have to be expanded to meet the increased enrolment. New teachers and support staff will be hired who will have money to spend, thus further strengthening the economy of the town.

Effects on Medical and Dental Care

The opening of the mine will have an impact on medical and dental care in the town. The new direct and indirect jobs created by the mine opening will result in a population increase. The increase in population will place a strain on existing medical and dental services, and will result in a need for new dentists, dental hygienists, doctors, nurses and secretarial staff. The local hospital will also need to hire more personnel to meet the increased demands of a growing population. More food and medical supplies will need to be ordered, positively affecting companies dependent on supplying the local hospital.

Effects on Business Travel and Tourism

The opening of the mine will have an impact on business travellers doing business in the town. Business people will come to the town to do business with the mining company. Travellers will stay in local hotels and eat in local restaurants, further strengthening the local economy. New tourists can be expected to come to the town, to visit their families and friends who have moved there to work in the mine. Some tourists will stay in hotels, which will help boost the local hotel industry. Tourists will spend money in local stores and restaurants, profiting the local service industry.

Effects on Aboriginal and Remote Community

The opening of the mine will affect traditional lifestyles, including hunting, fishing and trapping. The mining activity can change wildlife habitat, and make it difficult for people to continue to hunt and fish in the immediate area. Newly developed access roads may allow people to hunt in areas that were previously not accessible in traditional ways (on foot, by canoe or by snowmobile). However, road development is typically routed to avoid wildlife areas to minimize this impact. All-weather roads may help to reduce the cost of transporting goods to the community, and provide greater access to neighbouring communities and medical facilities. Communities will experience a movement of educated and/or skilled individuals to higher paying mine jobs. With the influx of money into the community, spin-off jobs and businesses will be created. The rotating work schedule, where employees work at the mine for two weeks and then have two weeks off, can have a significant impact on families. The mine will also bring new skills to the town, including electricians, plumbers, mechanics and welders.



Suggested Levels: Junior and Intermediate

Purpose	<ul style="list-style-type: none"> To examine the use of rocks, minerals and metals in consumer products. To demonstrate that rocks, minerals and metals are very common in everyday life. To use language to learn and communicate ideas in social interaction and group activities. 				
Time	45 minutes				
Resources	<ul style="list-style-type: none"> What's Yours is Mined Card Game student handout or Card Game Rules from the box What's Yours is Mined playing cards from the box 				
Link to Ontario Curriculum	<table border="0"> <tr> <td>Rocks, Minerals and Erosion Grade 4</td> <td> <ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School </td> </tr> <tr> <td>The Earth's Crust Grade 7</td> <td> <ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School </td> </tr> </table>	Rocks, Minerals and Erosion Grade 4	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School 	The Earth's Crust Grade 7	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School
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The Earth's Crust Grade 7	<ul style="list-style-type: none"> Relating Science and Technology to the World Outside the School 				

Teacher Information

This activity is designed to show students that rocks, minerals and metals are very common in everyday life. Students are often intrigued to discover fluorite in toothpaste, zinc in vitamins, gypsum in walls, gold in computers and granite on buildings. Minerals make up so much of what is around us and what we use every day.

Method

Junior and Intermediate Levels

- The **What's Yours is Mined Card Game** student handout and **Card Game Rules** provide students with rules for playing two different card games, and a list of correctly matching pairs for each of the 30 products and the corresponding rock, mineral or metal. (These card games are similar to "Go Fish" and "Concentration".)
- Instruct students to take five minutes to review the list of correctly matching pairs before playing either of the card games. Students may keep this list on hand for easy reference as they play their games.
- Students play both card games in pairs or in groups of four. In the first method of play, students match cards in their hand with cards in another player's hand. In the second method of play, students try to uncover matching pairs of cards that are placed face down on a table.
- The **What's Yours is Mined Card Game** may also be used to play a game with the entire class. Place one card face down on each student's desk, and instruct the students to stand and seek out the person with the matching card to the one they have. Once they have found their partner they sit down. When everyone has a match, each pair of students can read to the class their product and the corresponding rock, mineral or metal.
- To summarize the card games, ask students to imagine for a moment what their life would be like without rocks, minerals and metals. Students may share their thoughts and ideas with a partner or the entire class.
- Instruct students to record in their notebooks why Earth's rock, mineral and metal treasures are important in our everyday life.

What's Yours is Mined Card Game

Student Handout

1 of 2

Rocks, minerals and metals are everywhere around you. They are at school, at home, at play and even in your body. On the next page you will find a list of products that are used in your everyday life, and the rocks, minerals and metals that are mined to create these products. Take five minutes to review this list before playing the card game **What's Yours is Mined**.

Playing the card game **What's Yours is Mined** is simple. The rules are as follows:

Card Game One

- Two to four players can play the game. Play proceeds in a clockwise direction.
- One player (the dealer) distributes nine cards to each player. Place the remaining cards face down in a pile on the table.
- Players pair their cards according to the product and the metal, mineral or rock that is mined to create that product.
- Once all the players have put their pairs in a pile, the first player asks another player for one of his/her missing cards. If the student asks for the right card from the other player, that student continues asking for more possible matches until none remain. If that first player does not get the card requested, he/she must pick up an additional card from the table pile and wait for his/her next turn to ask again. The next player then takes over and repeats the same procedure. The winner is the first person to match up all his/her pairs.

Example

Player 1 Wants to match a toothpaste card with a fluorite card.
 "Do you have a fluorite card?"

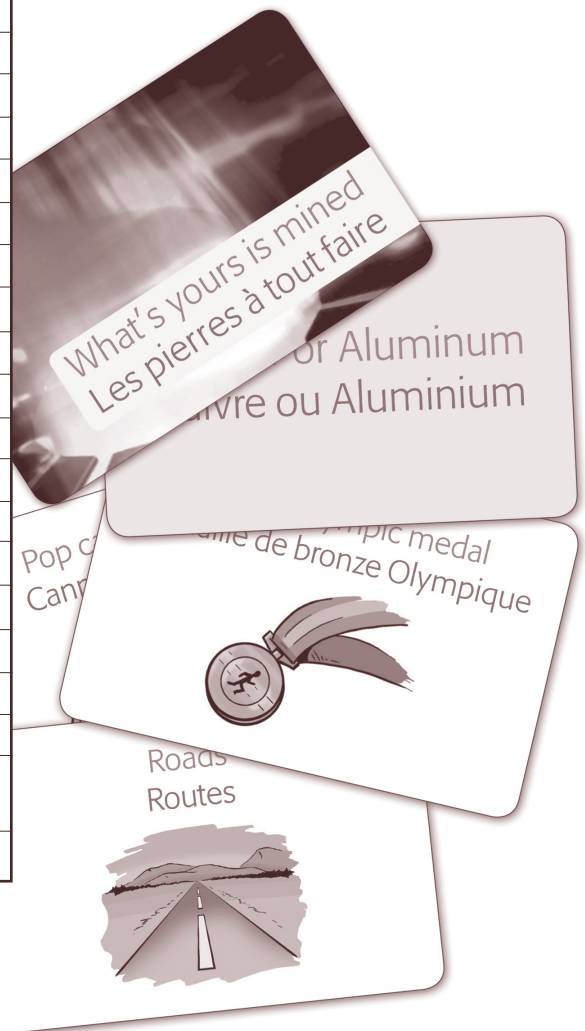
Player 2 "No, I don't. What's mined is not mine."
 or
 "Yes, I do. What's mined is now yours."

Card Game Two

- Two to four players can play the game. Play proceeds in a clockwise direction.
- All of the cards are placed face down on the table.
- Each player, in turn, reveals any two cards. If these are a match, according to the list of correctly matching pairs, then he/she may play again. If there is no match, it is the next player's turn.
- The winner is the player with the most pairs.

List of correctly matching pairs

PRODUCT	METALS, MINERALS OR ROCKS THAT HELP MAKE THIS PRODUCT
Acid washed jeans	Pumice
Baby powder	Talc
Bronze Olympic medal	Tin and copper
Cancer treatment	Cobalt
Car airbag sensor	Beryllium
Car battery	Lead
Carpet	Barite
Cement	Limestone
Computer electronics	Gold
Computer and TV screens	Indium
Electrical cables	Copper or aluminum
Fertilizer	Potash
Glass	Silica
Insulation	Vermiculite
Jewellery	Diamonds
Matches	Sulphur
Medicines	Bismuth
Pencil lead	Graphite
Pop can	Aluminum
Plastic garbage bag	Petroleum products
Roads	Crushed stone
Silver polish	Hematite
Skateboard	Chromium
Stainless steel sink	Nickel and iron
Sun block	Zinc
Table salt	Salt
Thermometer	Mercury
Toothpaste	Fluorite
Utensils	Nickel and iron or silver
X-ray	Uranium



What Rocks, Minerals and Metals are in a Computer?

Teacher Activity Outline

1 of 1

Suggested Levels: Intermediate and Senior

Purpose	<ul style="list-style-type: none">• To examine the use of rocks, minerals and metals in consumer products.• To demonstrate that rocks, minerals and metals are very common in everyday life.• To acquire knowledge of the properties of Earth materials and how these enable people to determine their potential uses.								
Time	45 minutes								
Resources	<ul style="list-style-type: none">• What Rocks, Minerals and Metals are in a Computer? student handout• What Rocks, Minerals and Metals are in a Computer? answer sheet								
Link to Ontario Curriculum	<table border="0"><tr><td>The Earth's Crust Grade 7</td><td><ul style="list-style-type: none">• Relating Science and Technology to the World Outside the School</td></tr><tr><td>Exploring Matter Grade 9</td><td><ul style="list-style-type: none">• Relating Science to Technology, Society, and the Environment</td></tr><tr><td>Technological Design Grade 10</td><td><ul style="list-style-type: none">• Theory and Foundation</td></tr><tr><td>Earth Materials Grade 12</td><td><ul style="list-style-type: none">• Relating Science to Technology, Society, and the Environment</td></tr></table>	The Earth's Crust Grade 7	<ul style="list-style-type: none">• Relating Science and Technology to the World Outside the School	Exploring Matter Grade 9	<ul style="list-style-type: none">• Relating Science to Technology, Society, and the Environment	Technological Design Grade 10	<ul style="list-style-type: none">• Theory and Foundation	Earth Materials Grade 12	<ul style="list-style-type: none">• Relating Science to Technology, Society, and the Environment
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Technological Design Grade 10	<ul style="list-style-type: none">• Theory and Foundation								
Earth Materials Grade 12	<ul style="list-style-type: none">• Relating Science to Technology, Society, and the Environment								

Teacher Information

This activity is designed to relate rocks and minerals to their use in everyday life. Students are challenged to answer the questions: “What does it take to make a computer?”, “Where do the materials come from?” and “What characteristics define how a specific rock, mineral or metal is used in products?” Rocks, minerals and metals make up so much of what is around us and what we use every day. Minerals allow us to: live in a house or apartment; turn on lights; brush our teeth; listen to music; watch television; use a computer; cook meals; ride in a vehicle; and much more.

Method

Intermediate and Senior Levels

1. The **What Rocks, Minerals and Metals are in a Computer?** student handout provides students with instructions and a list of computer components.
2. Instruct students to use the Internet to research the rocks, minerals and metals that are used to make each of the computer's major components.
3. Students then select one rock, mineral or metal to research further, in order to explain its physical characteristics and define why that specific material is chosen to build computers.
4. To summarize the activity, instruct students to record in their notebooks why Earth's rock, mineral and metal treasures are important in our everyday life. Ask them leading questions that will bring them to the realization that many different rocks, minerals and metals are used to make items we use everyday. Possible questions include: “Were you surprised at how many different Earth materials are used to make a computer? “Where do all of these Earth materials come from?” “How do we get them?”

What Rocks, Minerals and Metals are in a Computer?

Did you know that without mining, your computer, television and telephone would not exist? In fact, rocks, minerals and metals make up so much of what is around us and what we use every day.

Use the Internet to research the rocks, minerals and metals that make up your computer. Use the major computer components shown below as headings to create your list. Once your list has been compiled, select one of the Earth's materials to research. Write a short report that describes its properties and explains why it is useful in building computers.

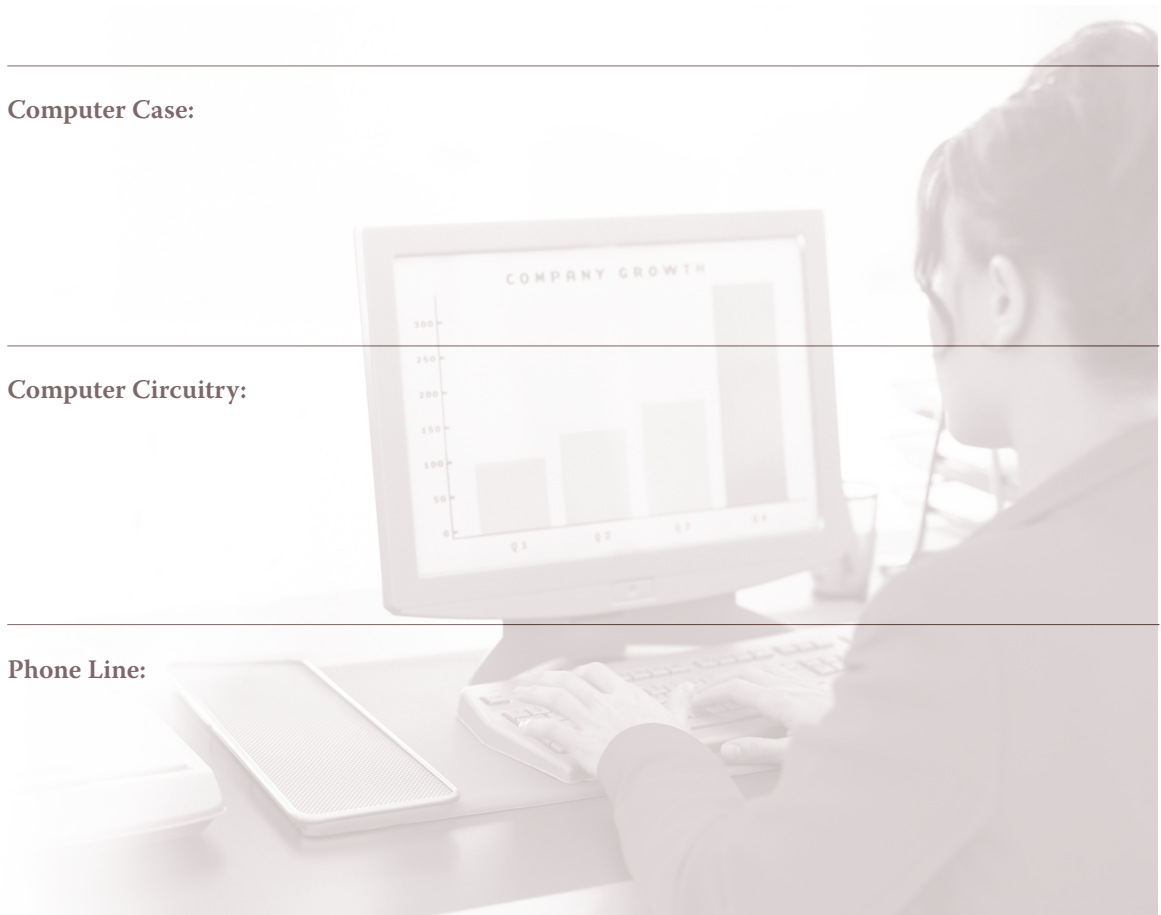
Computer Screen:

Computer Chip:

Computer Case:

Computer Circuitry:

Phone Line:



What Rocks, Minerals and Metals are in a Computer?

Computer Screen:

- Silicon
- Lead
- Strontium
- Phosphorus
- Boron
- Indium
- Barium

Computer Chip:

- Silicon
- Gallium

Computer Case:

- Calcium carbonate
- Clays
- Mica
- Talc
- Sulfur

Computer Circuitry:

- Gold
- Aluminum
- Lithium
- Chromium
- Silver
- Nickel
- Gallium
- Lead
- Zinc
- Copper
- Steel
- Tungsten
- Titanium
- Cobalt
- Germanium
- Tin
- Tantalum

Phone Line:

- Copper
-

Suggested Levels: Intermediate and Senior

Purpose	<ul style="list-style-type: none"> To identify ways to use interests, skills and knowledge to contribute to the development of a business. To promote an understanding of resources and programs that assist entrepreneurs. To motivate students to pursue further exploration and consideration of entrepreneurship. 												
Time	90 minutes												
Resources	<ul style="list-style-type: none"> Become a Young Entrepreneur student handout Additional Resources for Young Entrepreneurs student handout Venture Plan Checklist student handout 												
Link to Ontario Curriculum	<table border="0"> <tr> <td>Introduction to Business Grades 9 and 10</td> <td> <ul style="list-style-type: none"> Entrepreneurship </td> </tr> <tr> <td>Career Studies Grade 10</td> <td> <ul style="list-style-type: none"> Exploration of Opportunities Preparation for Transitions and Change </td> </tr> <tr> <td>Designing Your Future Grade 11</td> <td> <ul style="list-style-type: none"> Interpersonal Knowledge and Skills Preparation for Transitions and Change </td> </tr> <tr> <td>Introduction to Entrepreneurial Studies Grade 11</td> <td> <ul style="list-style-type: none"> Ideas and Opportunities The Venture Plan </td> </tr> <tr> <td>The Enterprising Person Grade 11</td> <td> <ul style="list-style-type: none"> The Entrepreneurial Experience </td> </tr> <tr> <td>Entrepreneurial Studies: Venture Planning Grade 12</td> <td> <ul style="list-style-type: none"> Challenges of a Venture Start-up Venture Conception </td> </tr> </table>	Introduction to Business Grades 9 and 10	<ul style="list-style-type: none"> Entrepreneurship 	Career Studies Grade 10	<ul style="list-style-type: none"> Exploration of Opportunities Preparation for Transitions and Change 	Designing Your Future Grade 11	<ul style="list-style-type: none"> Interpersonal Knowledge and Skills Preparation for Transitions and Change 	Introduction to Entrepreneurial Studies Grade 11	<ul style="list-style-type: none"> Ideas and Opportunities The Venture Plan 	The Enterprising Person Grade 11	<ul style="list-style-type: none"> The Entrepreneurial Experience 	Entrepreneurial Studies: Venture Planning Grade 12	<ul style="list-style-type: none"> Challenges of a Venture Start-up Venture Conception
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Teacher Information

The **Mining New Opportunities** video/DVD showcases some of the Aboriginal-owned businesses that currently supply goods and services to the mining industry. These include: airline services; janitorial services; housekeeping; catering; and the operation of various retail stores. Other spin-off businesses may include trucking, drilling, blasting, explosives manufacturing and the development of all-weather and winter roads. These businesses all began as entrepreneurial opportunities. Many young people today are considering entrepreneurship as a viable career option.

In this activity, students explore the impact of mining on the economy of a community, identify entrepreneurial opportunities and develop a venture plan for a hypothetical business.

Method

Intermediate and Senior Levels

1. The **Become a Young Entrepreneur**, **Additional Resources for Young Entrepreneurs** and **Venture Plan Checklist** student handouts provide each group with background information and instructions for developing a venture plan.

The **Mining New Opportunities** video/DVD showcases some of the Aboriginal-owned businesses that supply goods and services to the mining industry. These include: airline services; janitorial services; housekeeping services; catering services; and the operation of various retail stores. Other spin-off businesses may include trucking, drilling, blasting, explosives manufacturing and the development of all-weather and winter roads. These businesses all began as entrepreneurial opportunities. The business owners or entrepreneurs recognized an opportunity for business and incurred the risk to start it, with the intention of earning a profitable income. Starting your own business requires dedication, strong organizational skills, and an excellent idea for a product or service. Today, many young people consider entrepreneurship as an exciting career opportunity. A joint venture with a non-Aboriginal business is a viable option to acquire expertise and management experience first, before you launch into your own venture.

Imagine you have just learned that a gold mine will open and create 375 new jobs in your small northern Ontario community. In preparation for the mine opening, you and your potential business partners discuss possible business opportunities that may arise. Consider the following: the special needs of different groups of people in the community; the types of products or services that would improve their lives; and the ways in which a new business might be developed.

Complete the following statement to create your group's list of opportunities:

When the mine opens, this town will need a good...

Write a Venture Plan

Decide which of the business opportunities you proposed will be the most successful and the most interesting for you to operate. Prepare to write a venture plan with your group. A venture plan is a written document that gives an overview of your business idea. It tells the entrepreneur's story, by explaining what you want to do, how you're going to do it, how much it will cost and how much money you'll make. A venture plan is required when an entrepreneur approaches a bank for a business loan.

To write your venture plan, follow the outline and answer the questions provided by the **Venture Plan Checklist** student handout. Use the **Additional Resources for Young Entrepreneurs** student handout to research funding, information and resources that are available for young entrepreneurs to start up a business.

Thinking of starting a real business? Visit www.cbsc.org/ontario/english/start.cfm

The Canada-Ontario Business Service Centre provides information on programs, services and regulations to Ontario businesses. Visit this government Web site to learn about getting a business started. Topics include:

- a brief description of the four types of business structures and some of the advantages and disadvantages of each;
- a glossary of key business terms;
- points to consider when naming your business;
- an outline of the legal aspects of going into business;
- a Web-based workshop designed to provide you with techniques for developing your business, ideas for starting a new venture, and improving your existing small business; and
- general information for potential entrepreneurs wishing to start various types of businesses.

www.aboriginalresourcenet.com

This user-friendly resource site is designed to aid Aboriginal people's search for information required to develop their entrepreneurial skills. This database contains information and programs about: education and training; business planning; sources of funds; business environment; and help to run your business.

www.ontario-canada.com

The Ontario Ministry of Economic Development and Trade provides numerous programs to encourage young people to start their own businesses. These include awards of up to \$3,000 to help you start up and run your own summer business, and hands-on business training. Visit the Aboriginal Affairs section of the site to see how the Office of Aboriginal Affairs helps to connect Aboriginal entrepreneurs and businesses with services and resources at the Ministry of Economic Development and Trade.

www.aboriginalbusiness.on.ca

Aboriginal Development Online provides an extensive list of programs and services available provincially and nationally in Canada that can benefit new and existing Aboriginal entrepreneurs.

<http://strategis.ic.gc.ca/epic/Internet/inabc-eac.nsf/en/home>

Aboriginal Business Canada (ABC) is an Industry Canada program that promotes the growth of commerce as one means towards economic self-sufficiency for all Aboriginal people. ABC provides financial assistance, information, resource materials and referrals to other possible sources of financing or business support.

www.cybf.ca

The Canadian Youth Business Foundation is the national leader in youth entrepreneurship through mentorship and financial support resulting in sustainable economic development. This foundation provides information on start-up financing and learning resources.

www.nacca.net/programs.html#first

The First Nations and Inuit Youth Business Program works with financial institutions to offer on-reserve First Nations and Inuit community youth business opportunity counseling and advice, mentoring, and start-up funds to explore or develop a business opportunity.

www.ccab-canada.com

The Canadian Council for Aboriginal Business is a non-profit organization that focuses on sustainable economic development for Aboriginal communities and their businesses.

Other Publications of Interest

Canadian Aboriginal Business: Network and Communities Directories

The Canadian Aboriginal Business and Communities Directories are reference guides that allow you to discover and directly reach over 20,000 Aboriginal companies and organizations.

Visit www.indianamarketing.com for more information.

1. Title Page

- Names of the owners
- Name of company
- Address
- Telephone, fax and email

2. General Description of Business Venture

- What is the purpose of your business?
- What service(s) or product(s) do you provide?
- What do you expect to happen to your business in the future?
- Who will do the work at your company?

3. Management Team

- Who will run the daily operations of your business?
- What skills does each individual bring to the business?

4. Financial Data

- Where will your money come from to start the company?
- How much money of your own do you plan to invest into the business?
- What income do you predict from your operations for the first year? Second year? Within the first five years?

5. Marketing Plan

- What type of advertising do you plan to use?
- Who are your potential customers?
- Have you chosen a location?
- What are the advantages of your location choice?
- What day-to-day promotions do you plan to use to market your business?

6. Conclusion

- Have you made any assumptions about this business that may not turn out exactly as you anticipated?

GLOSSARY

Mining Terms

Glossary

1 of 2

Acid Rain	Rain containing increased acid content, due to atmospheric pollutants, that is harmful to the environment.
Anomaly	An area on the surface of the Earth, or below, that has different properties than the surrounding area (e.g. one spot on the Earth may be highly magnetic while the area around it is not magnetic at all).
Assay	To chemically analyze a rock sample to determine the valuable metal or mineral content.
Cage	A type of elevator used to transport miners and their equipment to the underground workings of a mine.
Concentrate	A fine, powdery product of the milling process containing a high percentage of valuable metal.
Contaminate	To make unfit for use by the introduction of undesirable substances.
Core	A long continuous sample of rock brought up from the Earth by diamond drilling.
Crosscut	A horizontal opening in an underground mine that is driven from a shaft at a right angle to the direction of a valuable rock formation.
Cyanide Process	A method of extracting exposed gold or silver grains from ground ore by dissolving it in a weak cyanide solution.
Dimension Stone	Rock that is extracted from quarries to be cut to specific dimensions and used for building stone, tiles, roofing, countertops and paving.
Drifts	Horizontal tunnels that lead from the shaft to the orebody.
Emissions	Substances discharged into the air.
Effluent	Waste material (smoke, liquid industrial refuse, or sewage) discharged into the environment.
Extract	To remove ore from the ground.
Face	The location in the mine where ore is being extracted from the Earth.
Flotation Process	A type of separation process in which the desired metal or mineral is coated by a chemical that makes it float to the surface of a liquid mixture.
Fluorescence	The property of emitting electromagnetic radiation, usually as visible light, resulting from the absorption of radiation from some other source.
Fly-in Operation	A mining operation with no road access.
Grease Table	A surface covered with grease, to which diamonds will stick while waste debris is washed away.
Host Rock	The rock surrounding an ore deposit.
Metal	Any of various opaque, fusible, ductile, and typically lustrous substances that are good conductors of heat and electricity.
Mill	A building where broken ore is crushed to a fine powder in order to separate out a concentrate of valuable metals or minerals.
Mineral	Naturally occurring homogeneous, inorganic chemical compounds which are the building blocks of rocks. Every mineral has set internal molecular structure, crystal form, and identifying physical properties.
Muck	To load broken ore into a scoop that will transport it to the shaft.
Open Pit Mine	A broad, massive, often funnel-shaped excavation that is open to the air and used to extract or mine valuable metals, minerals or rocks - also called a surface mine.

Orebody	A well-defined, solid, continuous mass of material containing enough ore (valuable metal or mineral in rock) to make mining economically worthwhile.
Polishing Pond	The last in a series of settling ponds through which mill effluent flows before being discharged into the natural environment.
Prospecting	The process of searching for valuable minerals, oil or gas by studying rocks on the surface, or below the surface (by drilling deep boreholes).
Reclamation	A process which returns land to a safe, stable and productive environmental state after mining is complete. Continuous or concurrent reclamation describes this process when it is put into action during the life of the mine.
Rock	A naturally formed, consolidated material composed of two or more minerals and having some degree of chemical and mineralogical consistency.
Scoop	A large machine, combining a front-end loader and a truck, used to transport broken ore from the face to the shaft.
Shaft	A deep, vertical hole dug below the surface of the Earth for the purpose of opening and servicing an underground mine. Shafts usually contain an elevator-type hoist that lifts people or machinery to the different levels of the mine.
Skip	The bucket used to lift the broken rock and ore from the underground mine to the surface.
Slurry	A mixture of water with finely ground ore used as part of a separation process.
Smelting	The process of removing or separating metals from ore by melting the finely crushed concentrate from the mill.
Stope	The production centre of an underground mine, where the ore taken from the face is first broken.
Subsurface	The area below the surface of the Earth.
Sulphur Dioxide	A gas that is released during the smelting of most sulphide ores. It is either converted into sulphuric acid or released into the atmosphere in the form of a gas.
Surface Mine	A broad, massive, often funnel-shaped excavation that is open to the air and used to extract or mine valuable metals, minerals or rocks - also called an open pit mine.
Sustainable Development	Industrial development that does not detract from the potential of the natural environment to provide benefits to future generations.
Tailings	Waste materials rejected from a mill after most of the recoverable valuable minerals have been extracted.
Tailing Pond/Impoundment	A low-lying depression used to confine tailings, the prime function of which is to allow enough time for heavy metals to settle out or for cyanide to be destroyed before water is discharged into the local watershed.
Treatment Wetland	A constructed wetland used to treat water.
Underground Mine	A mine that is entirely under the surface of the Earth.
Ventilation Shafts	Vertical tunnels that lead from the ground surface to the underground mine to bring fresh air.
Wastewater	Water that requires treatment to remove pollutants.

Overview

This **Speaker's Guide** has been created to assist mining industry professionals wishing to use the **Mining New Opportunities** video/DVD as a communications tool to complement their existing efforts to improve understanding of the nature of the minerals industry in First Nations communities.

Project History

During a series of visits to Northern Ontario First Nations communities in 2001, and in consultation with these communities, John Gammon, Assistant Deputy Minister, Ontario Ministry of Northern Development and Mines, identified the need for specific video/DVD and written communication tools.

These tools were needed to help explain the role of government in mineral development, the nature of exploration, mine construction, operation and closure activities and opportunities for First Nation peoples to participate in and benefit from responsible mineral development.

To address this need, the Ontario Mining Association decided to produce a video/DVD that would illustrate modern mine practices, with an emphasis on environmental responsibility, and employment and entrepreneurial opportunities for First Nations people.

Objectives

The **Mining New Opportunities** video/DVD provides an introduction to the modern mining industry, and emphasizes the changing attitudes towards environmental protection and the importance of sustainable development. It has been designed to:

- provide First Nations people with current information about mining, including the skills needed by the industry, as well as employment and entrepreneurial opportunities;
- promote partnerships with First Nations to allow for greater participation in the social and economic benefits of responsible mineral development;
- encourage a better understanding and communication with First Nations with respect to the purpose and value of exploration and mining, that could lead to a more cooperative relationship with government and industry; and
- lay the foundation for a better understanding of the mining sequence, and roles of all concerned parties, that may improve relationships during initial prospecting and exploration in areas of First Nations' traditional land use.

Suggested Introduction/Conclusion

To introduce and conclude the **Mining New Opportunities** video/DVD, it is recommended that speakers begin and end with a brainstorming session that is designed to establish the attendees' perceptions of the mining industry before and after viewing the video/DVD.

A series of questions for discussion are provided below, to help determine the kind of images the attendees are familiar with and the information that they have about mining. Facilitate a discussion using these questions before watching the video/DVD. Summarize both the positive and negative aspects of mining, to present a clear picture of the attendees' current perceptions of the mining industry. After watching the video/DVD, review the questions asked in the preliminary discussion and update the answers. Ask attendees if their perceptions of the mining industry have changed? Why or why not?

It is valuable to ask attendees to describe their needs, in terms of the information they would like to acquire about the mining industry. Offer to provide guidance as to where attendees can access this needed information.

Questions for Discussion

- What do you think a company's responsibilities should be toward the environment before opening a mine?
- How do miners extract minerals?
- What do you think it is like to work in a mine?
- What kinds of jobs are offered by the mining industry?
- What is reclamation?
- What are minerals used for?
- Is mining a high-tech industry or a low-tech industry?



Map of Canada's Earth Materials



Map Legend

ICE



Ice

MODERN SEDIMENT



Peat



Mud, sand and gravel



Sand

ICE AGE SEDIMENT



Silt and clay (or mud)



Sand and gravel



Till

ROCK



Carbonate rock



Clastic sedimentary rock



Metamorphosed clastic sedimentary rock



Volcanic rock



Metamorphosed volcanic rock



Granitic rock



Gneissic rock



Mining New Opportunities

Teacher's Resource and Speaker's Guide contains 13

learning activities for educators teaching youth in junior, intermediate and senior grade levels. The learning activities are designed to build on the themes presented by the video/DVD. Explore the mining process, discover careers in the mining industry, create a venture plan for a new business, investigate how sustainable development applies to mining, and unearth the importance of rocks, minerals, metals and mining in everyday life.

Also available in printable format on CD-ROM.

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