

# DIY Activities to Celebrate Mining Week

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A DIY resource package to help celebrate Mining Week with activities that can be done at home or online. Online resources can be found at [MiningMatters.ca/MiningWeek](http://MiningMatters.ca/MiningWeek)

Teacher Investigation File

**Building Mineral  
Literacy through  
STEM Education**



# Table of Contents

Activity 1: Creating Mineral Mates.....	1
Activity 2: The Importance of Rocks and Minerals in Our Everyday Life.....	2
Activity 3: Rock Story Drama .....	3
Activity 4: Rock and Mineral Concentration.....	4
Activity 5: Introduction to Mining .....	5
Activity 6: Underground Mining Methods .....	6
Activity 7: Operating a Surface Mine.....	16
Activity 8: Mining Crushed Stone, Sand, and Gravel .....	18
Activity 9: Recycling Rocks and Minerals .....	19
Activity 10: Mining Comes to Ogimokwe .....	20
Activity 11: Creating a Mining CD.....	22
Activity 12: Product Life Cycle Research .....	24
Activity 13: Personal Reflections on Mining.....	26
Activity 14: Underground Mine Tour .....	27

# Creating Mineral Mates

Look carefully at your three-dimensional shape as well as the two others that your friends have made and answer the following questions.

- a) What two-dimensional shape (polygon) makes up an octahedron?

*Triangle*

- b) How many faces are there on an octahedron?

*Eight*

- c) What two-dimensional shape (polygon) makes up a cube?

*Square*

- d) How many faces are there on a cube?

*Six*

- e) What two-dimensional shapes (polygons) make up a hexagonal prism?

*Rectangle and Hexagon*

- f) How many faces in all are there on a hexagonal prism

*Eight sides in all*



# The Importance of Rocks and Minerals in Our Everyday Life

Describe how a house would look if it were built without using mined rocks and minerals.

*A house made without any mined rocks or minerals would look like a mud hut, with leather hinges and no glass in the windows. The only materials available would be wood, grasses, clay (from the surface, not below), etc.*



# Rock Story Drama

Make a drawing to show what your group will do to demonstrate your knowledge of your chosen rock group.

*An evaluation rubric is provided in the curriculum section of the **Resource Binder**.*



# Rock and Mineral Concentration

After playing the card game **Rock and Mineral Concentration** three times, write out three words and their definitions.

*Answers will vary.*

Word

Definition

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Word

Definition

---

Word

Definition

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# Introduction to Mining

1. Read the **Information Bulletin: Let's Explore Mining** to learn about mining, the process that extracts valuable minerals and rocks from the Earth. Make point-form notes about one stage of the mining process.

## Stage

*Looking for Minerals (Mineral Exploration), Evaluating a Mineral Discovery, Constructing a Mine, Mining and Processing Minerals, Closing a Mine and Reclaiming the Land, Protecting the Environment and Connecting with Communities*

## Important points

*Looking for Minerals: satellites, airplanes, magnetism, rocks, minerals, maps, drills*

*Evaluating a Mineral Discovery: costs of construction, money from selling, environment and community studies*

*Constructing a Mine: surface or underground, explosives, tunnels, diggers*

*Mining and Processing Minerals: explosives, crushing, separation, chemicals*

*Closing a Mine and Reclaiming the Land: remove buildings; make pits and tunnels safe, replant trees and grass*

*Protecting the Environment and Connecting with Communities: Throughout all the other mining activities, the soil, water, wildlife, vegetation, and air quality are carefully monitored, and companies work with the local community in terms of impact and opportunities.*

2. Look at the two posters that show you what an underground mine and a surface mine (open pit mine) look like. List three ways in which the mines are different.
  - a) *Open pit vs. tunnels and shafts*
  - b) *Underground mine uses skips and hoists to lift the rock to the surface; open pit uses dump trucks*
  - c) *Underground has a ventilation shaft and fans; no ventilation needed for a surface mine*



# Underground Mining Methods

1. As you watch the animations take note of the following:

Mining Method: Room and Pillar	
(a) heavy equipment and machinery:	<i>jumbos, dump trucks, Load Haul Dump (LHD)</i>
(b) location of where the operation begins:	<i>surface</i>
(c) presence of tunnels:	<i>yes</i>
(d) the direction of the tunnels:	<i>inclined (ramps), horizontal (drifts)</i>
(e) explosives and blasting:	<i>yes</i>
Mining Method: Sublevel Stoping	
(a) heavy equipment and machinery:	<i>jumbos, Load Haul Dump (LHD), hopper, crusher, skip</i>
(b) location of where the operation begins:	<i>underground</i>
(c) presence of tunnels:	<i>yes</i>
(d) the direction of the tunnels:	<i>horizontal (drifts)</i>
(e) explosives and blasting	<i>yes</i>
Mining Method: Cut and Fill Stoping	
(a) heavy equipment and machinery:	<i>dump trucks, Load Haul Dump (LHD)</i>
(b) location of where the operation begins:	<i>bottom (underground)</i>
(c) presence of tunnels	<i>yes</i>
(d) the direction of the tunnels:	<i>inclined (ramps), horizontal (drifts)</i>
(e) explosives and blasting:	<i>yes</i>
Mining Method: Sublevel Caving	
(a) heavy equipment and machinery:	<i>jumbos, Load Haul Dump (LHD)</i>
(b) location of where the operation begins:	<i>underground (underneath an open pit)</i>
(c) presence of tunnels:	<i>yes</i>
(d) the direction of the tunnels:	<i>horizontal (drifts), raise (vertical/inclined)</i>
(e) explosives and blasting:	<i>yes</i>





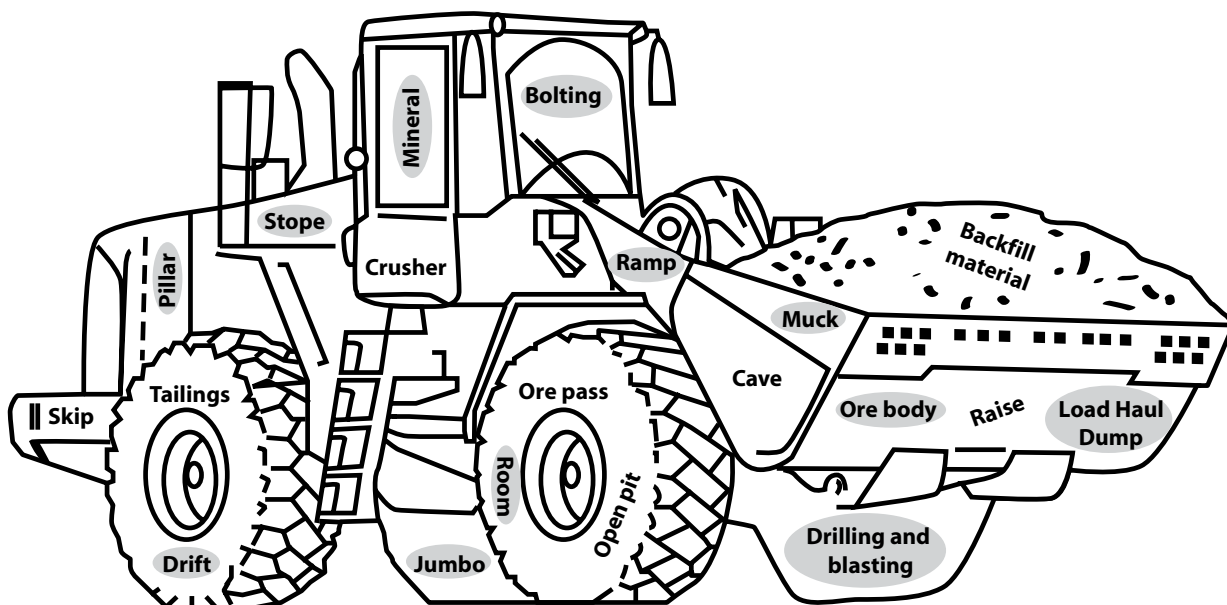
### Underground Mining Methods

2. Place a check mark in the box to identify the method your group has been assigned.

Watch the animation a second time and reflect back on the mining method description you just read.

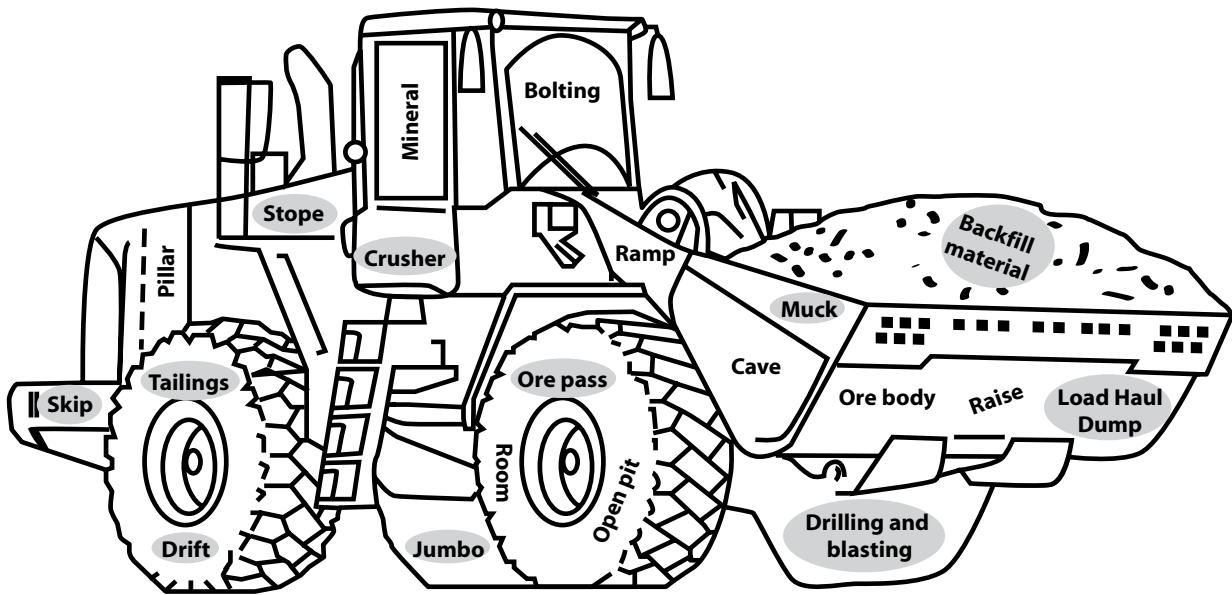
- Room and Pillar
- Sublevel Stopping
- Cut and Fill Stopping
- Sublevel Caving

In the illustration below, circle the words that apply to the mining method.

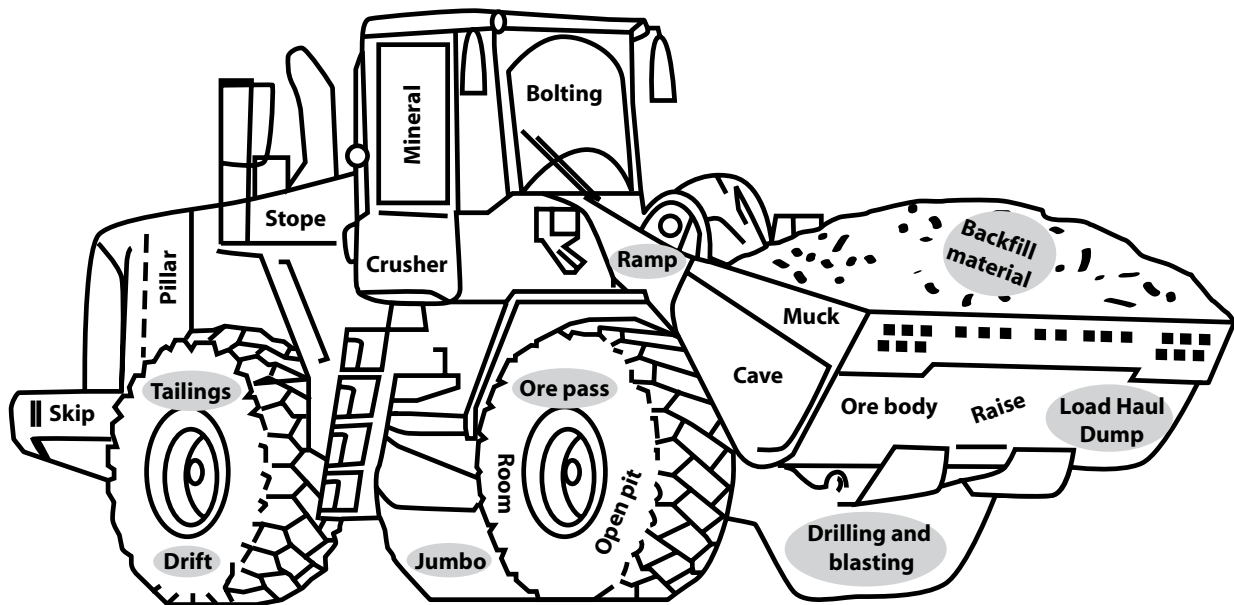


## Teacher Investigation File

- Room and Pillar
- Sublevel Stopping
- Cut and Fill Stopping
- Sublevel Caving

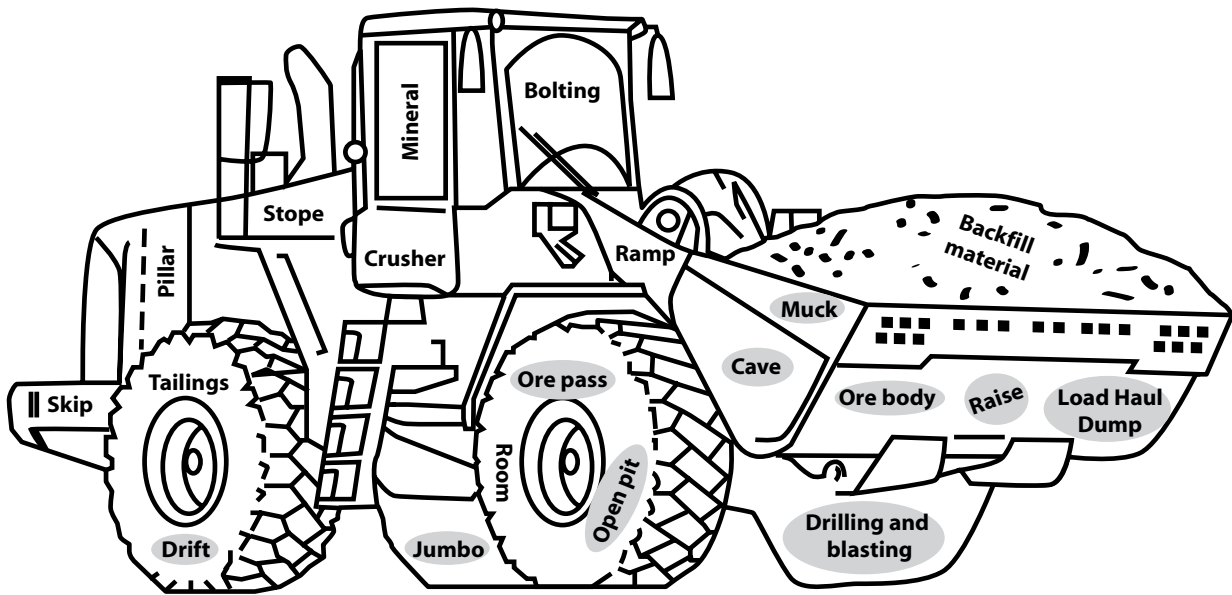


- Room and Pillar
- Sublevel Stopping
- Cut and Fill Stopping
- Sublevel Caving



## Teacher Investigation File

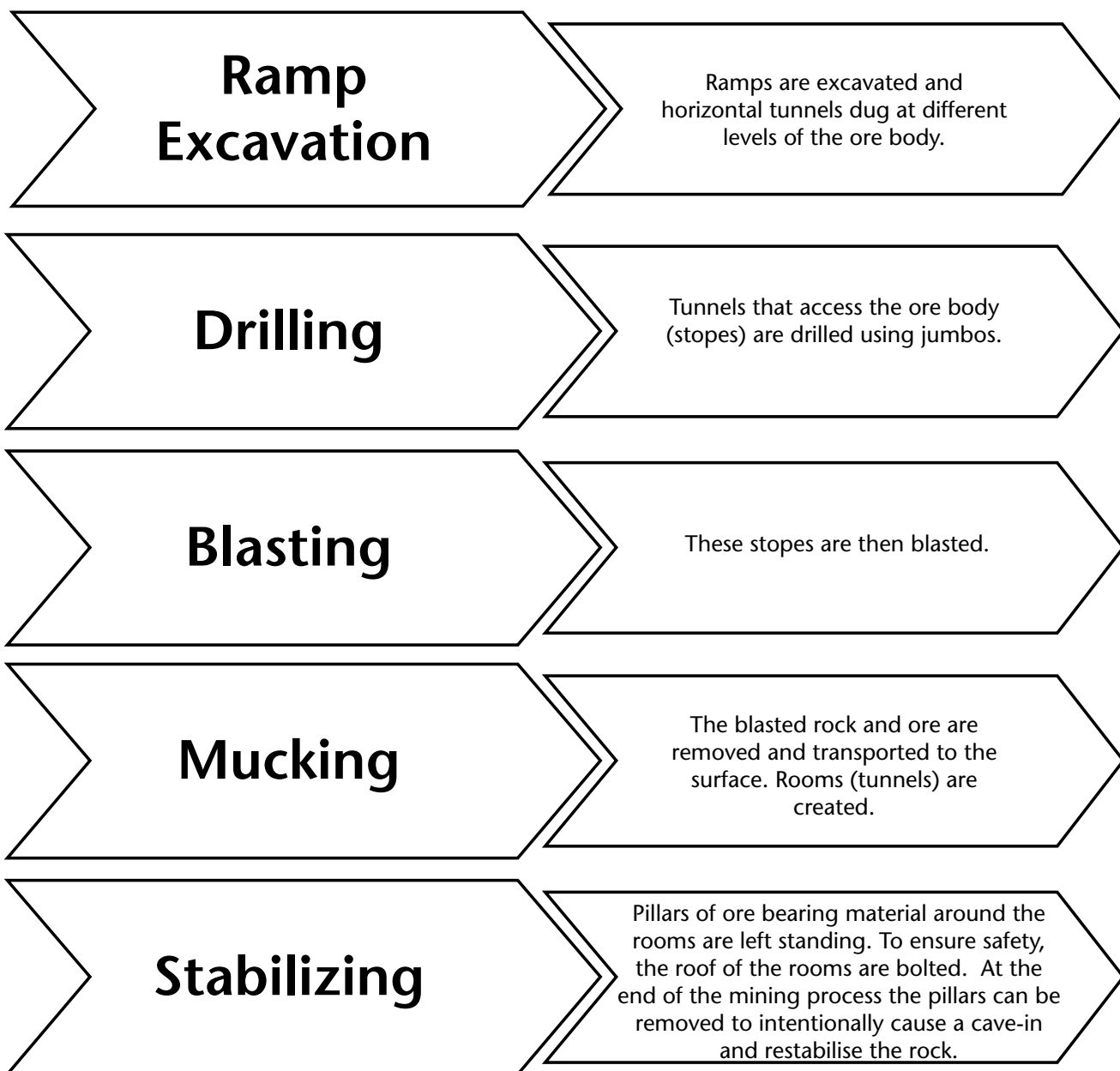
- Room and Pillar
- Sublevel Stopping
- Cut and Fill Stopping
- Sublevel Caving



### Underground Mining Methods Sequence Charts

3. There are many new terms and concepts related with underground mining methods. To demonstrate your understanding of the basic concepts, create a **Sequence Chain** outlining the steps that occur in the method assigned to your group. There are six steps presented in the Blackline Master titled, **Assigned Underground Mining Method** (next page). Not all of the steps need to be filled in in order to successfully complete the task. Most of the **Sequence Chains** can be completed in five steps.

#### Room and Pillar



## Sublevel Stoping

**Ramp  
Excavation**

A tunnel is dug right to the bottom of the mine and connected to the ore body by a series of horizontal tunnels (drifts).

**Drilling**

Starting at the base of the ore body, jumbos selectively drill holes in the roof of the tunnel that accesses the ore body (stope).

**Blasting**

Holes are filled with explosives and then blasted. Drilling and blasting continue until the roof can no longer be reached. Then a jumbo working on a higher elevation intercepts the stope. Ore falls to the lower drift.

**Mucking**

A Load Haul Dump (LHD) transports muck to another ore pass where it falls on a hopper to be sent to a crusher before being raised to the surface by a skip. All ore is removed from a single level at the bottom of the mine.

**Stabilizing**

Once the stope is completely emptied it is backfilled from the bottom up.



## Cut and Fill

**Ramp  
Excavation**

A tunnel is dug right to the bottom of the mine and connected to the ore body by a series of horizontal tunnels (drifts).

**Drilling**

Tunnels that access the ore body (stopes) by slices are drilled from the bottom tunnel up, using jumbos.

**Blasting**

These stopes are then blasted and transported by a dump truck or Load Haul Dump (LHD) and dumped into an inclined tunnel falling deeper into the mine.

**Mucking**

Deep in the mine, ore is picked up by an LHD to be transported out of the mine by a ramp.

**Stabilizing**

Once a lower level is completed the empty space is backfilled and keeps the mine wall stable, also serving as a floor for mining the next level.



## Sublevel Caving

**Open pit**

Ore remaining is of lower grade (quality). Mining proceeds underneath the open pit.

**Tunnelling**

Both a raise and a network of tunnels are created.

**Drilling and Blasting**

At different underground levels of the mine, jumbos drill long holes upwards into the roof. The roof drill holes are loaded with explosives and blasted.

**Caving**

The roof caves in along with rock from the ground surface into the underground.

**Mucking**

Load Haul Dump (LHD) vehicles transport loosened rocks to an ore pass where it is raised to the surface.

**Depletion**

Blasting, transporting muck and caving continues into the drift until the entire orebody is depleted.





**After the activity**

Brainstorm with your group about the challenges of underground mining. In the second column, think of modern technologies that could help to conquer these challenges.

<b>Underground Mining Challenges</b>	<b>Modern Technology to Help</b>
Dark	<i>High efficiency LED lighting</i>
Cave-ins	<i>Remote control robotics, robotics</i>
Heat at depth	<i>Sweat wick clothing, cooling stations</i>
Bad air	<i>Ventilation shafts</i>
Communication	<i>Radio communication</i>
Ground water	<i>Precision drilling and blasting</i>
Plumbing/Access to potable water	<i>Underground safety station</i>



# Operating a Surface Mine

1. Draw a picture of your model before any mining starts.

*The picture should show an undisturbed natural habitat with trees, plants, and animals.*

2. Make a list of the steps that you will follow to mine and reclaim your surface mine.

*Answers will vary, but should consider natural habitat, soil, waste rock, minerals, etc.*

3. Draw a picture of what your surface mine looks like during mining.

*The picture should show a hole or pit that represents a surface mine. Soil, trees, and plants are absent. Piles of mined-out “waste” rock and soil are evident beside the surface mine. Topsoil is stored on-site and reused/recycled later for rehabilitation (to create landforms, backfill slopes, etc.). The soil contains an existing seed bank and serves as a growth medium for any new vegetation that is planted.*



4. Examine your surface mine model and answer the following questions:

How has mining changed the land?

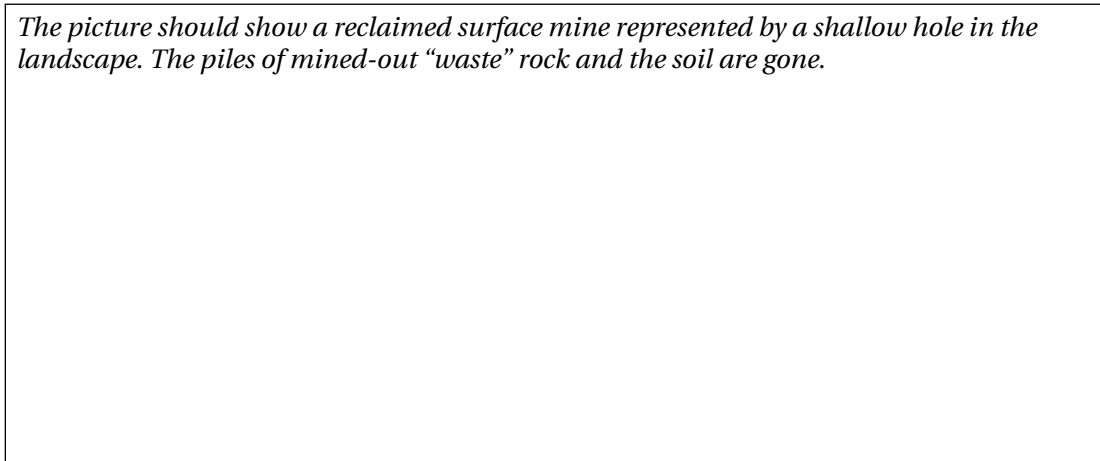
*Soil, trees, and plants are removed; a large hole in the Earth is made when extracting rocks and minerals.*

How could we use the pile of mined-out rock that you took from your surface mine?

*"Waste" rock can be used to fill the surface mine.*

5. Reclaim your mine. As much as possible, make the model look the way it did before mining, but without the minerals. Draw a picture of the land after mining

*The picture should show a reclaimed surface mine represented by a shallow hole in the landscape. The piles of mined-out "waste" rock and the soil are gone.*



6. Look at the Mine Site Reclamation photographs of mine sites during mining and the land after it has been reclaimed. Write three things that have been done to reclaim the land used for mining.

*Possible answers include the following:*

*waste piles smoothed over, flattened*

*buildings removed*

*trees and grass planted*

*roads repaved, ponds improved*



# Mining Crushed Stone, Sand and Gravel

Paste your **Crushed Stone, Sand and Gravel Matching Game Card** in the correct box. Use words and pictures to illustrate your group members' cards.

*Answers will vary; check the master copy matching cards in the **Resource Binder**.*

<b>Crushed Stone, Sand, and Gravel Activity</b>	<b>A Concern</b>	<b>A Possible Solution</b>



# Recycling Rocks and Minerals

## Product Destination

Draw a line to connect each product to the correct destination when it is no longer useful. Use different coloured pencils or pens for Reuse, Recycle, and Landfill.

Product	Destination
AAA battery	Recycle
Asphalt	Recycle
Candy bar wrapper	Landfill
Car battery	Recycle
Cardboard box	Recycle
CD and DVD	Recycle, Reuse
Coins	Recycle
Computer	Reuse, Recycle
Concrete	Recycle
Empty aerosol can	Recycle
Empty paint can and lid	Recycle
Glass juice jar	Recycle
Glasses (spectacles)	Reuse, Landfill
Jewellery	Reuse
Kitchen sink	Recycle
Lamp	Landfill
Styrofoam container	Recycle



# Mining Comes to Ogimokwe

## Thought Bubble Organizer

Using the Thought Bubble Organizer, identify the unique perspectives each character has towards mining on their traditional territories, and the evidence presented in the script.

Character	Character's Views on the Mine Coming to Ogimokwe
<b>Rita Toulouse or "Nokomis":</b> The Grandmother, who is also a community Elder	<p><i>Perspective: Worried about the impact the incoming mine will have on the environment and traditional hunting and harvesting, but also recognizes the economic benefits for the band.</i></p> <p><i>Evidence: "I understand that, I don't expect everyone to go live in the wigwam again..... We must have our ceremonies and ask for permission from the spirits that live in the bush."</i></p>
<b>Sarah Solomon:</b> Rita's daughter, who is also a Band Council employee	<p><i>Perspective: completely against the mine</i></p> <p><i>Evidence: "We don't need the mine here. Everything is okay here, so why change anything?" "If this mine comes it is going to be worse here, you'll have so many people coming in that everyone will be fighting for jobs."</i></p>
<b>Joe Solomon:</b> Rita's son who lives and works in Toronto as a salesman for a large industrial company	<p><i>Perspective: For the mine</i></p> <p><i>Evidence: "Just think of home much money this would bring to the reserve!" "They want to build a recreation facility and provide new computer and other technology to the local school. Trust me, this is so great for the community"</i></p>
<b>Catherine Morriseau:</b> Sarah's friend who is a single mother of three and currently out of work	<p><i>Perspective: For the mine</i></p> <p><i>Evidence: "I don't know Sarah. I kind of like the idea of having something big like that come to Ogimokwe.... I would just love to have a job so my kids could look up to me."</i></p>
<b>Andrew Solomon:</b> Sarah's teenage son	<p><i>Perspective: Undecided</i></p> <p><i>Evidence: "I don't know what to think. Having the mine sounds so exciting and it would be great for there to be more for us to do here. I don't know about messing up the land or the lake though."</i></p>
<b>Jake Beaucage:</b> Andrew's best friend	<p><i>Perspective: For the mine, but concerned about environmental impact</i></p> <p><i>Evidence: "My dad would love the chance to work at the mine. Who knows, maybe that's what I can be doing in a couple of years." "...I know I'd really like a youth centre" "My auntie says that the mining coming in is gonna pollute the lake..."</i></p>



Andrew was undecided about the mining project at the end of the script. Using the letter-writing template below, organize your thoughts and write a letter from Andrew’s perspective, expressing your opinion on the mining project.

*Answers will vary; can be students’ opinion.*

Date	
Salutation	Dear
Introduction Say who you are and why you are writing.	
Introduce the Evidence Review the different perspectives raised at the dinner table.	
Make a Commitment Now that you have heard all the sides, where do you stand and why?	
Conclusion Restate the purpose of the letter and your perspective/ thank reader for their time.	
Closing Yours sincerely, etc.	
Signature	



# Creating a Mining CD

## Part A: Writing a Mining Song

1. Brainstorm with your group to come up with words and ideas that you could include in a mining song about rocks, minerals, metals, mining, and the environment.

Write your ideas below. Use your **Investigation File**, science textbook, or the **Word Wall** for help.

Rocks	Minerals and Metals
<i>Answers will vary.</i>	<i>Answers will vary.</i>

Mining	The Environment
<i>Answers will vary.</i>	<i>Answers will vary.</i>

2. Review your list with your group. Circle the ideas and words your group would like to include in your song.

Our Mining Song

Group Members:

Sung to the tune of:

Lyrics:

*Answers will vary.*





**Part B: Designing a Mining Song CD Jacket**

Devise a group name, a title for your CD, and a list of the songs that will appear on your recording. Illustrate your CD cover below. Everything on your CD cover must relate to rocks, minerals, metals, mining, and the environment.

<i>Answers will vary.</i>	<i>Answers will vary.</i>
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# Product Life Cycle Research

## 1. Product Life Cycle Research Plan

*All answers are variable, student's independent research.*

- a) What products are made from rocks or minerals?
- b) Which minerals or rocks are used in these products?
- c) What type of presentation will you use to publish your research?  
*Suggestions include a poster, a PowerPoint slideshow, a brochure, or a report.*
- d) What is the Topic for your research?
- e) What is the Purpose of your research?
- f) Who is the Audience for your published research?
- g) What must be included in your presentation?
- h) Where will you look for information? Try to have a variety of resources.

## 2. Research your product's life cycle and find out the answers to the following questions:

- a) What rocks, minerals, or metals are used to make the product?
- b) How is the product made?
- c) What environmental impacts may have occurred during the manufacturing of the product?
- d) Who benefits from the use of the product, and how do they use it?
- e) What choices are there for what happens to the product at the end of its life?

## 3. Choose one rock or mineral that is used to make your product. Research your choice and find out the answers to the following questions:

- a) What are its composition and characteristics?
- b) Where is it mined?
- c) How is it extracted or processed?
- d) Are there any environmental impacts during the mining and extraction process?
- e) How is the rock or mineral used in the product?



4. Publication Check List

**Language**

My writing or printing is clear and easy to read.

I have checked the spelling.

I have used scientific vocabulary.

**Illustrations**

I have used pictures, graphs, or maps.

The illustrations are clearly labelled.

**Publishing and Design**

I have used headings and subheadings.

I have suitably used different colours.

I have suitably used different font sizes and styles.

The content of my publication is organized into sequence.

The layout of my publication is clear and organized.

**Content**

I have answered all the questions about my product.

I have answered all questions about one mineral or rock used in my product.

I have explained what I as a consumer could do to reduce the environmental impact.

**Resources**

These are the resources I have used:

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# Personal Reflection on Mining

Reflect on what you have studied during **Topic 3: Mining Responsibly**, and complete the sentences below:

*All answers are the personal opinions of students.*

- The most interesting part was...  
because....
- In this topic, I have learned....
- This topic is important to me and my life because....
- When I compare the costs of mining to the benefits of mining, I see that....
- From what I know about mining and rocks and minerals, I will change....



# Underground Mine Tour

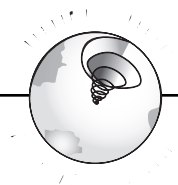
1. As you watch the video, each time something made from nickel is identified, write down its name below.

*jet engine  
airframe  
kitchen sink  
hospital operating rooms  
stainless steel  
electronics  
medicine  
farming  
manufacturing  
automobiles*

*In the processing plant:  
filter  
extractor  
particulate scrubber*

*In the credits:  
faucet (tap)  
ice skate blade  
scissors  
scalpel  
frying pan  
plane  
drum rim  
wrench  
golf club shaft  
handcuffs  
travel mug*

2. How many things did you find? \_\_\_\_\_



3. Nick finds out from Nicole how an underground mine works. When he gets back to the Tunlin Commune, he finds that he has mixed up his notes. Help him put them in the right order. Write the stages in the correct sequence on the following flow chart.

