Geography and Mining in BC

Purpose: Students will read about six mines in BC, learn challenging new vocabulary, and practice mapping skills on modified maps of BC.

Method: Under the guise of a "Super Sleuth of BC", students will read their way through an information sheet about the mine, solve clues, complete a word scramble, deduce the mystery word for the mine, follow step-by-step instructions to place the mine on a map of BC, and plot the transportation route of the mine's product. Topics covered include general geography of a region, some history, mine operations, mineral/ metal processing, transportation routes, uses of minerals and metals, and interesting facts. The lessons are rich in new vocabulary and challenge words are highlighted in the text and reinforced in the student activities. Answer Keys are provided for each Student Page except for the mapping page. A reference map has been provided to assist with this activity.

Materials:

- atlas (one for each pair of students)
- dictionary (one for each child)
- overhead projector
- BLM for Mining Information Sheets (1 - 6)
- BLM for Super Sleuth of B.C. Clue/Word Scramble Page (1 - 6)
- BLM for Vocabulary Match Page (1 - 6)
- BLM for Mapping Instruction Page (1 - 6)
- BLM of Map of B.C. for each mine (1 - 6)
  Regional and Mine Location Reference Map (E-57) (Use for all Sleuthing)
- teacher-made overheads of B.C. maps (1 - 6)

Note: Only the worksheets for Quinsam Mine are included in the binder. The entire Geography and Mining in BC unit is in PDF form on the Resource Unit USB.

Considerations: The *Super Sleuth of British Columbia* section assumes the pre-teaching of mapping skills such as identifying a symbol, locating a body of water, understanding the function of a border, and being aware of cardinal directions.

Each of the six Mine Studies follows a similar format and may be taught independent of the others (length of information pages vary from 1 to 2 pages). As well, each activity may be completed on its own in combination with the information sheet. Select all or just one of the activities, the choice is yours. Students may work independently, with a partner or a small group, or as a whole class. A recommended sequence for the activities is listed below.

1. Read Information Sheet for the Mine
2. Complete the Vocabulary Match
3. Solve the Clue Chart and Word Scramble pages
4. Follow Mapping Instructions to locate the mine on a map of BC

SUGGESTED ACTIVITIES

K-W-L

Begin Geography and Mining in B.C. with the K-W-L strategy (E-48). Together on large chart paper, have students tell what they know about geography and mining in B.C.. Then brainstorm questions about what they want to know about these topics. At the end of each mine study, ask students to tell what they have learned.

Venn Diagram – Compare & Contrast

When you have completed two Mine studies, divide the class in half and give each group the responsibility of representing facts about one mine. On large chart paper, print facts that are "Like" and "Different" about the mines, the towns, and/or the transportation routes. Have a class discussion comparing and contrasting these topics. Print sentence frames showing comparisons (e.g. Campbell River and Kimberley are similar/different because _____) Students may complete these frames using the completed Venn Diagram as a reference.

"Jigsaw-like" Presentations

Divide the class into six groups. Provide each group with a Mine Information Sheet. Set a time limit for students to read the study and prepare an interesting presentation. Remind them to keep their ideas TOP SECRET. Upon completion, have each group present their ideas. A presentation might be a skit showing the transformation of ore into a common object or a diagram describing a miner's responsibility on the job.

Writing

Have students write their explanation of how the mystery word for each mine came to be. (See Table 2.)

Independent Research

Students may want to find out more about mining. The K-W-L chart is a good resource for ideas. Students may use resources such as the library or internet to research and present their ideas to the class. Some may want to write to the mine and ask specific questions about a particular job or process. (Addresses are included in Table 3.)

Research Topic Ideas: How Coal is Made; The Gold Rush in BC; How to Stake a Claim; Tell About Open Pit Mining; Tell About Underground Mining; Machines Used at a Mine; Why Mining is Important; Mining and the Environment; Living in a Mining Town; Barkerville. (These ideas may be used as a starting off point for a class research project).

Table 1: Mines and Regions of BC

# Mine	Nearest Town	Product	Region in BC
1. Quinsam (s), ①	Campbell River	Coal	Vancouver Island
2. Myra Falls (ug) ②	Campbell River	Lead/Zinc	Vancouver Island
3. Endako (s)*③	Endako (village)	Molybdenum	Nechako
4. Elkview (s)	Sparwood	Coal	Kootenay
5. Trend (s)*③	Tumbler Ridge	Coal	Northeast
6. Copper Mountain (s)	Princeton	Copper	Southwest

Note: UG = underground; S = surface.

Table 2: Mystery Solutions and Explanations

# Mine	"Case of the.."	Solution	Explanation
1. Quinsam	Missing Gem Stone	Diamond	Coal and Diamond are both made of Carbon
2. Myra Falls	Island Park Mine	Myra	The mine is in Strathcona Park
3. Endako	Forgotten Mine	Thirty-Seven	Production started after 37 years
4. Elkview	Overweight	Tonne	Haul truck measured in tonnes
5. Trend	Dinosaur Mine	Dinosaur	Dinosaur fossils found near the site
6. Copper Mountain	Super Pit Mine	Community	Most workers come from Princeton

Table 3: Mine Addresses c/o Public Relations Officer

# Mine	Address	
1. Quinsam	Box 5000, Campbell River, BC V9W 5C5	①
2. Myra Falls	Box 8000, Campbell River, BC V9W 5E2	②
3. Endako	General Delivery, Endako, BC V0J 1L0	③
4. Elkview	R.R.#1, Highway 3, Sparwood, BC V0B 2G0	
5. Trend	Box 919, Tumbler Ridge, BC V0C 2W0	③
6. Copper Mountain	PO Box 1400, Princeton, BC V0X 1W0	

Note: Please limit number of letters to one per class.

2018: ① Not operating at full capacity, ② Undergoing infrastructure upgrades

③ Care and Maintenance

K – W – L Geography and Mining in BC

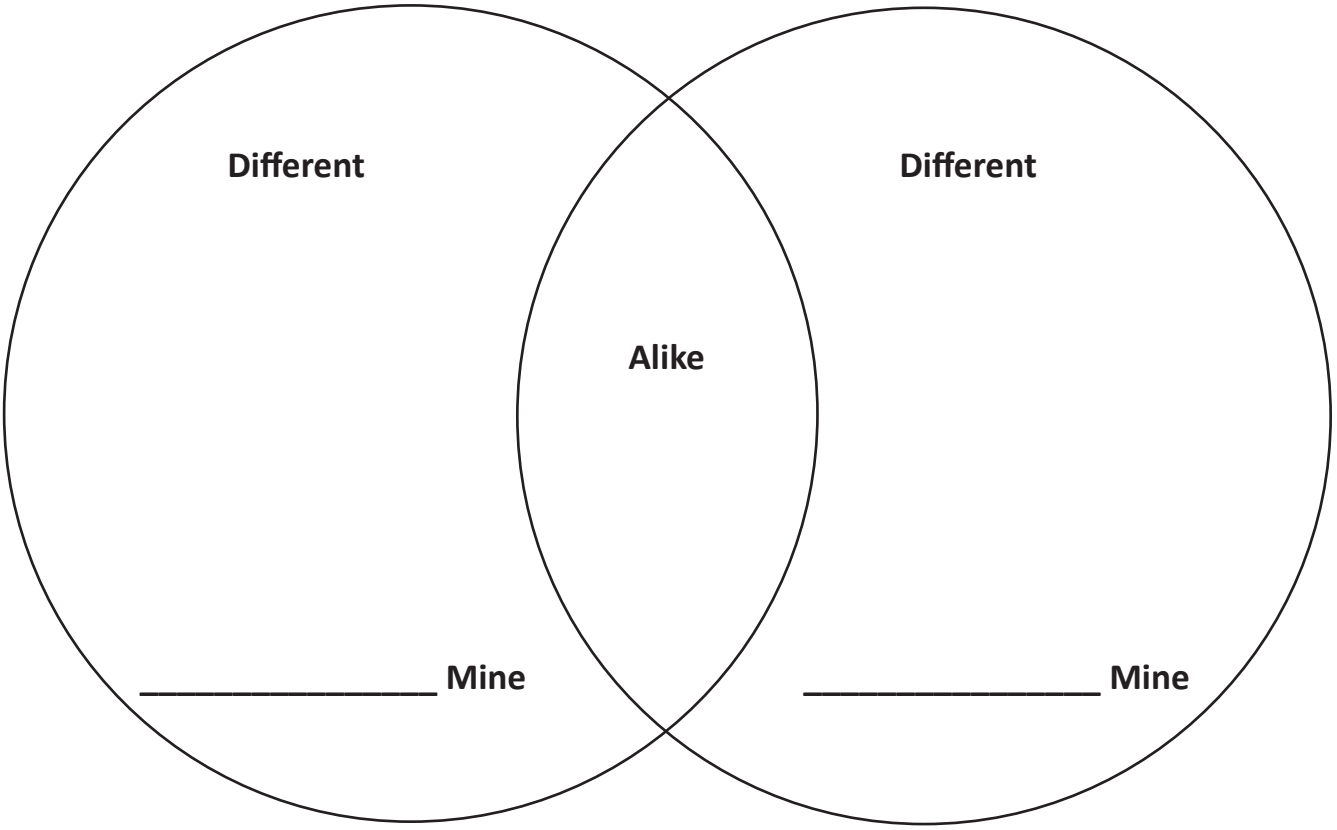
K – What I Know

W – What I Want to Know

L – What I Have Learned

Venn Diagram

Geography & Mining in British Columbia



Information Sheet #1 - Quinsam Mine

Did you know that coal is actually packaged energy made mostly of **carbon?** Millions of years ago, rainforests of large, leafy plants grew from the sun's energy and over time were **compressed** into 30 foot layers called **peat**. Peat is Mother Nature's first step in making coal! Add a few millions years more, plus layers of sand and **pressure** and you get **thermal** coal. Thermal coal is low grade coal. Add even more time and pressure, plus the shifting of the Earth, (**tectonics**) and it is compressed into a 5 foot layer known as **metallurgical** coal. This is a higher grade of coal because it took more time and pressure to make it. Remember that the energy from the sun is not lost. It's just reduced into a package that we call coal. Another form of showy carbon is diamond.

The people at Quinsam Mine on Vancouver Island appreciate the science of how coal is formed. They also understand that people today need the energy that coal provides. For instance, the energy **generated** from coal is used to make the steam that turns the **turbines** that creates the electricity for the people who live in China. Coal is also used to make lighter and stronger cement to make safer bridges and skyscrapers. Because coal is an **organic** product made from plants, it is also found in things like lipstick, aspirin, disinfectants, almond flavouring, and mothballs. Did you know that coal is rich in colour and is used to make dyes and paints brighter?

Quinsam Mine is the only underground coal mine in BC. It currently **employs** about 50 people directly from the nearby town of Campbell River. Mining is the third largest **industry** in the area. Other nearby industries are forestry, pulp and paper, fishing, and tourism. The Campbell and Tsable Rivers flow near the town and the mine. This **region** of BC is called the Vancouver Island/Coast Region.

Quinsam **operates** 24 hours a day, 7 days a week and it produces 50,000 tonnes of clean coal each year. When the raw material called **ore** is removed from the ground, it is separated into good and lesser quality piles of coal. This lesser quality coal is stored in an open pit hold for future use. The mine can easily and cheaply **export** coal around the world because it is very close to the Pacific Ocean. Dump trucks move loads of coal 28 kilometres along the highway to a boat launch. Barges are loaded using conveyor belts and the coal is flattened down for the trip to Vancouver. Later the coal is transferred to seagoing ships and is sent to buyers in other countries.

Super Sleuth of B.C. Clue Chart for Quinsam Mine

Mining Mystery #1 – The Case of the Missing Gemstone

Step 1: Use the Quinsam Mine information sheet to solve the following clues:

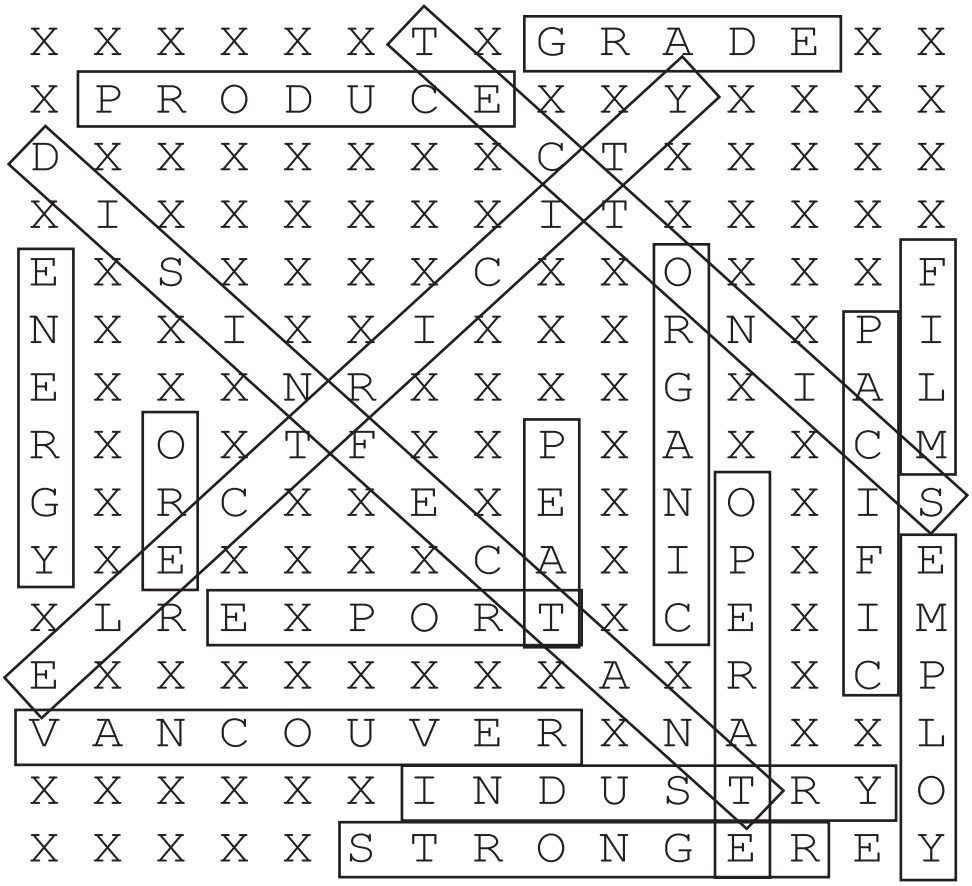
Clues	*Clues Solved*
A 30 foot layer of compressed rainforest is called	**peat**
The shifting of the Earth's layers is called	**tectonics**
When coal is burned, it releases heat and	**energy**
People in China use coal to make steam and	**electricity**
The opposite of inorganic	**organic**
Coal makes cement lighter and	**stronger**
People use this to clean their toilet's germs.	**disinfectant**
Quinsam is located on this island.	**Vancouver**
Quinsam trucks its coal to this ocean.	**Pacific**
The opposite of import.	**export**

Step 2: To solve "The Case of the Missing Gemstone", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery # 1. Good Luck!

The Case of the Missing Gemstone

Word Search

No hidden words or phrases



Extra Words

DIAMOND	ELECTRICITY	EMPLOY
DISINFECTANT	ENERGY	GRADE
EXPORT	FILM	INDUSTRY
ORGANIC	PACIFIC	OPERATE
PEAT	STRONGER	ORE
TECTONICS	VANCOUVER	PRODUCE

I have solved *The Case of the Missing Gemstone*!
The answer is *DIAMOND!* It's Elementary!

Name: _____

Super Sleuth of B.C. Clue Chart for Quinsam Mine

Mining Mystery #1 – The Case of the Missing Gemstone

Step 1: Use the Quinsam Mine information sheet to solve the following clues:

Clues	*Clues Solved*
A 30 foot layer of compressed rainforest is called	
The shifting of the Earth's layers is called	
When coal is burned, it releases heat and	
People in China use coal to make steam and	
The opposite of inorganic	
Coal makes cement lighter and	
People use this to clean their toilet's germs.	
Quinsam is located on this island.	
Quinsam trucks its coal to this ocean.	
The opposite of import.	

Step 2: To solve "The Case of the Missing Gemstone", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery # 1. Good Luck!

The Case of the Missing Gemstone

Word Search

No hidden words or phrases

V V T X G R T Y G R A D E Y W
U P R O D U C E X X Y E F N N
D R S F I B F C C T X A T J S
X I T K S E V F I T X I I T I
E E S S F W A C X W O O U L F
N Z B I X J I F Y K R N X P I
E R I L N R I T O X G R I A L
R L O X T F T Z P U A P J C M
G W R C H H E X E X N O X I S
Y S E R J A D C A X I P X F E
N L R E X P O R T L C E A I M
E F S K I S L E Y A X R S C P
V A N C O U V E R S N A B H L
Q A B O R L I N D U S T R Y O
I T U X R S T R O N G E R E Y

		Extra Words
DIAMOND	ELECTRICITY	EMPLOY
DISINFECTANT	ENERGY	GRADE
EXPORT	FILM	INDUSTRY
ORGANIC	PACIFIC	OPERATE
PEAT	STRONGER	ORE
TECTONICS	VANCOUVER	PRODUCE

I have solved *The Case of the Missing Gemstone*!
The answer is _____. It's Elementary!

Vocabulary Match for Quinsam Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

turbine	**thermal**	**operate**	**tectonics**	**export**
generate	**metallurgical**	**shale**	**compress**	**organic**

1. **compress**: (verb) To squeeze together
2. **shale**: (noun) A kind of clay-like stone that splits easily into thin plates
3. **thermal**: (noun) A low grade coal used to make electricity
4. **tectonics**: (noun) A geological change in the Earth's structure
5. **metallurgical**: (noun) A higher grade of coal used to make steel
6. **generate**: (verb) To produce; such as heat and electricity
7. **turbine**: (noun) A kind of water wheel driven by steam
8. **organic**: (adjective) Coming from living things, animals or plants
9. **operate**: (verb) To work
10. **export:** (verb) To send goods out to another country

Vocabulary Match for Quinsam Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

turbine	**thermal**	**operate**	**tectonics**	**export**
generate	**metallurgical**	**shale**	**compress**	**organic**

1. _____:	(verb)	To squeeze together
2. _____:	(noun)	A kind of clay-like stone that splits easily into thin plates
3. _____:	(noun)	A low grade coal used to make electricity
4. _____:	(noun)	A geological change in the Earth's structure
5. _____:	(noun)	A higher grade of coal used to make steel
6. _____:	(verb)	To produce; such as heat and electricity
7. _____:	(noun)	A kind of water wheel driven by steam
8. _____:	(adjective)	Coming from living things, animals or plants
9. _____:	(verb)	To work
10. _____:	(verb)	To send goods out to another country

Mapping Instructions for Quinsam Mine

What to do: Use the handout of the map of BC and the instructions below to find Quinsam Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the town of Campbell River. Colour it red.
5. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Campbell River.
6. Draw a small circle next to the symbol for Campbell River. Colour it black.
7. Draw a line above the circle you drew in #6 and print the words **Quinsam Mine** on that line.
8. Outline and lightly shade in the Vancouver Island/Coast Region of BC. Use green.
9. Name 3 other towns on Vancouver Island on the lines below:

   Courtenay, **Parksville**, **Nanaimo**, **Duncan**, etc. (check the map)

10. Name the two straits of water that surround Vancouver Island:

    Strait of Georgia and **Juan de Fuca Strait**

Congratulations! You have successfully located Quinsam Mine on the map!

Mapping Instructions for Quinsam Mine

What to do: Use the handout of the map of BC and the instructions below to find Quinsam Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
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6. Draw a small circle next to the symbol for Campbell River. Colour it black.
7. Draw a line above the circle you drew in #6 and print the words **Quinsam Mine** on that line.
8. Outline and lightly shade in the Vancouver Island/Coast Region of BC. Use green.
9. Name 3 other towns on Vancouver Island on the lines below:

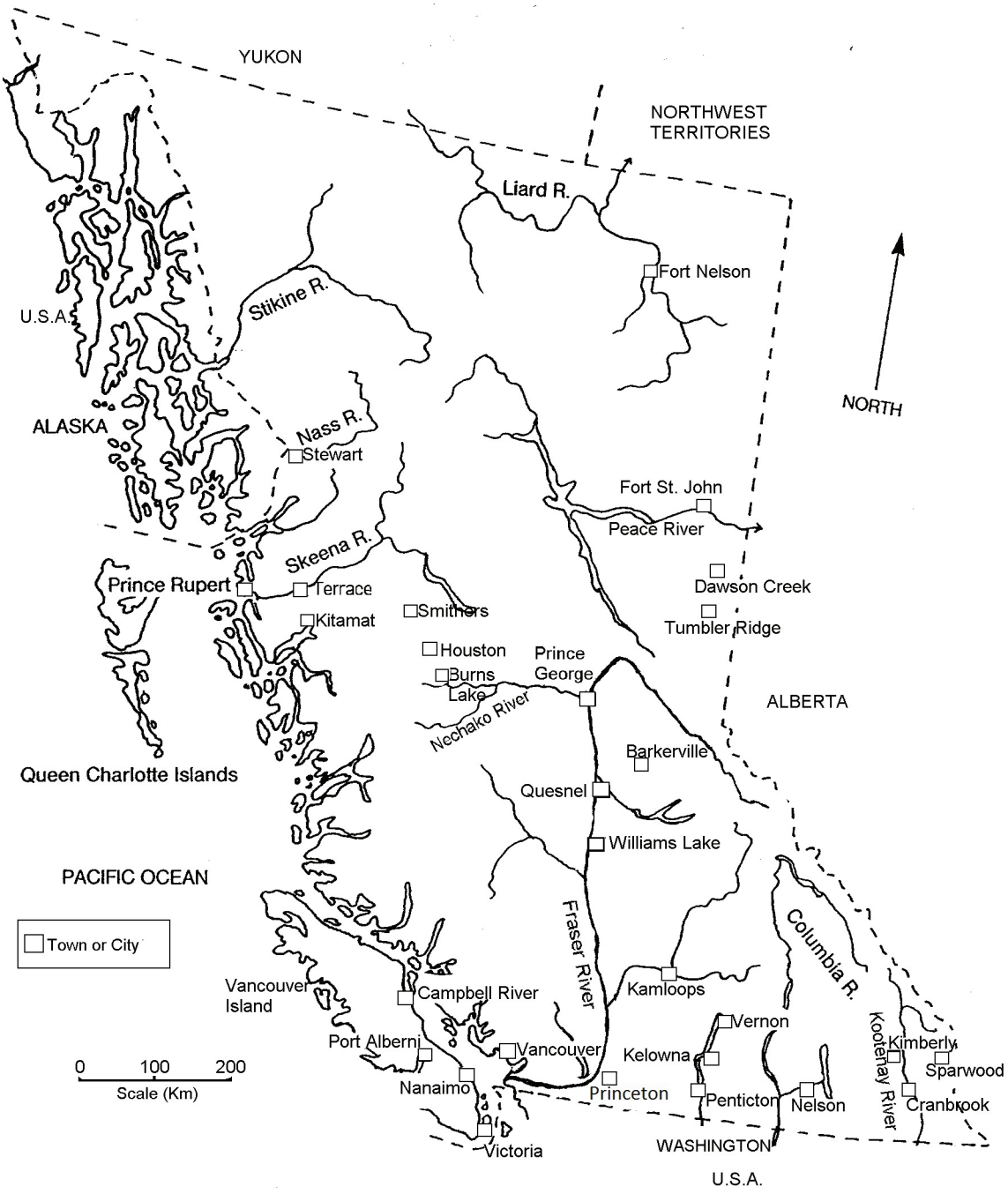
   _____ _____ _____ etc. (check the map)

10. Name the two straits of water that surround Vancouver Island:

    _____ and _____

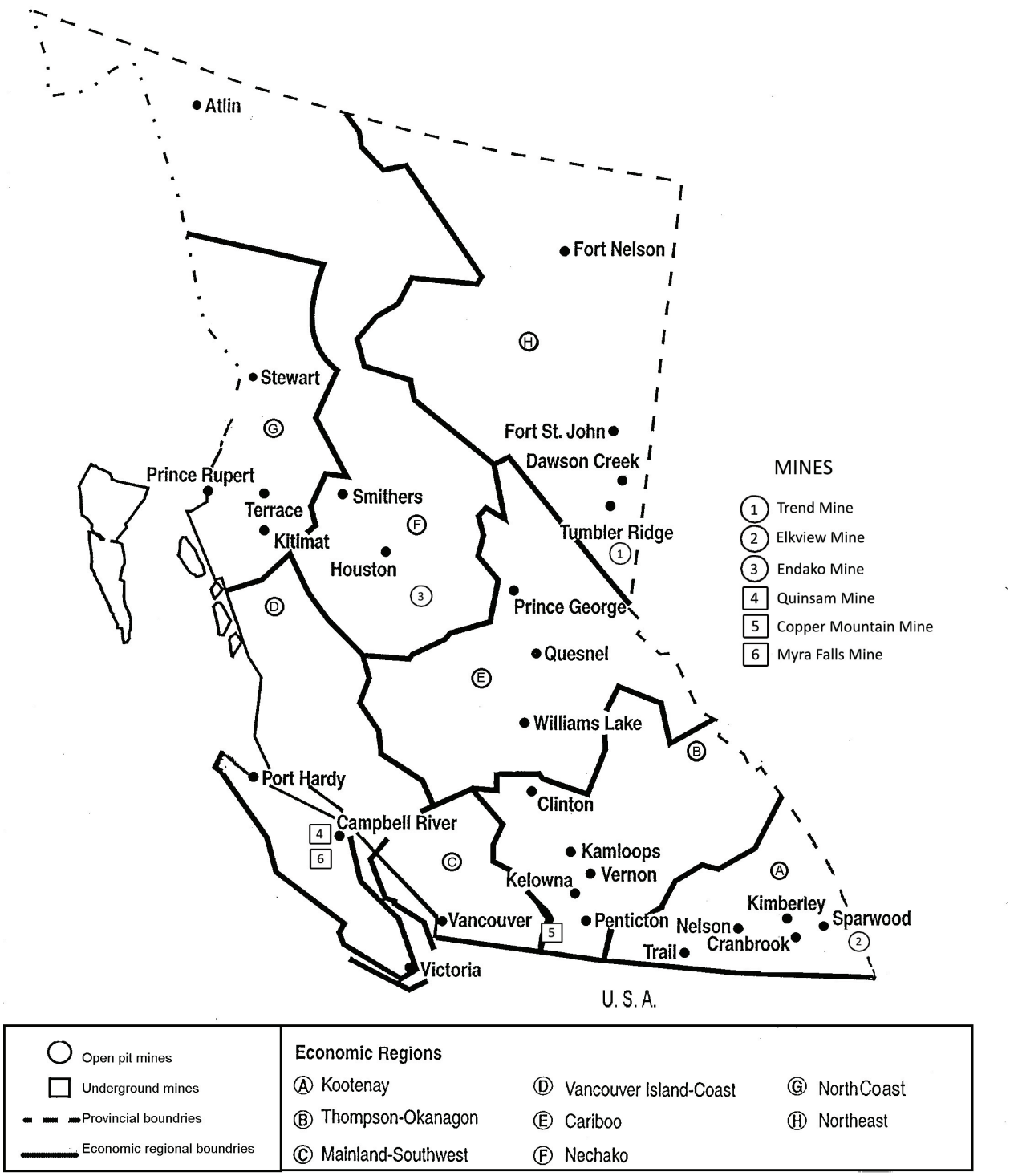
Congratulations! You have successfully located Quinsam Mine on the map!

Name: _____



Map of British Columbia for Quinsam Mine

Mapping Challenge: Show a possible transportation route for the trucks to take if they are moving the coal to the west coast of Vancouver Island. Then show a possible route for the barge to take to the city of Vancouver.



Region and Mine Location Reference Map

(Map may be used for all Super Sleuth investigations.)

Information Sheet #2 - Myra Falls

Can you think of a mine that is found in a park? Located within Strathcona Provincial Park, Myra Falls is the only mine in British Columbia within the boundaries of a park. Myra Falls Mine opened in 1966 as an open pit mine producing **zinc, copper, gold** and **silver.** Today, the mine operates underground. It runs 24 hours a day, 7 days a week, 365 days a year. The mine employs 30 people, mainly from the nearby towns of Campbell River and Comox. The workers that live in Campbell River and Comox travel to work by bus, just like many students get to school. Most of the workers work underground as miners, mechanics, operators, electricians and millwrights. The others work in geology, engineering and administration. Talk about supporting the local economy!

What do you think lives in the large wilderness of a park? What kinds of animals would you see? Birds, fish, mammals and amphibians all inhabit the Strathcona Provincial Park **ecosystem.** It is very important that Myra Falls Mine obeys all rules that are in place to protect the park and animals. What other activities do you do in a park? Some people hike, fish, camp or just explore the big trees and rocks around them. In this park, people can canoe Buttle Lake. This lake sits in the valley below the Myra Falls Mine site, making it an easy hike up to see the operation! Don't forget your bug spray!

The mining process begins with **jumbos** that drill long holes into the rock. The holes are filled with explosives and then blasted, producing thousands of tonnes of ore every day! The next step in the process is crushing the ore and taking it up to the surface. It is then fed onto a **conveyer belt** that moves it one kilometre to the **mill**. At the mill, the ore is processed into two sand-sized materials: **concentrate** and **tailings**. Concentrate is made up mostly of the valuable minerals that contain zinc, copper, gold and silver. Tailings are the grains that have no valuable minerals in them. They are pumped outside to be stored in a **tailings pond,** and are used to make a **concrete paste** to back-fill mined out areas. Every day, the valuable concentrates are trucked 90 kilometers to Discovery Terminal in Campbell River. Once a month, conveyors load the concentrate on to large ships that travel overseas to smelters in Asia.

Did you know that when the concentrate arrives at the smelter it is refined into pure copper, zinc, gold and silver? These metals are then sent to manufacturers around the world and used to make things we use every day. Copper is used to make copper wire. Zinc is applied as a coating to steel objects to make them rustproof. This is called galvanizing. Silver is used to make jewelry and coins, and is an ingredient in solar energy cells. Gold is also used to make jewelry and coins, and is in all new electronics such as smart phones. All of this comes from the minerals that make up our Earth.

Super Sleuth of B.C. Clue Chart for Myra Falls Mine

Mining Mystery #2 - The Case of the Island Park Mine

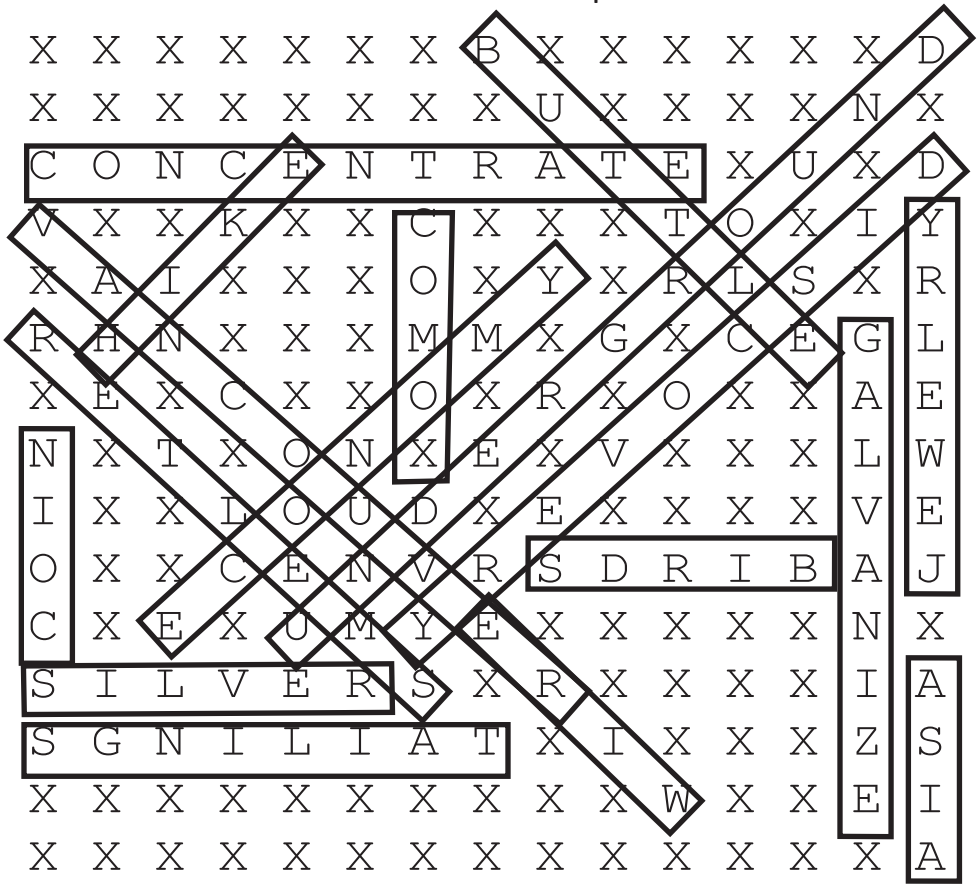
Step 1: Use the Myra Falls information sheet to solve the following clues:

Clues	*Clues Solved*
Myra Falls produced mostly zinc, copper, gold and _____	**silver**
Campbell River is located on what Island?	**Vancouver**
Where the miners work	**underground**
Sand-sized material containing valuable minerals	**concentrate**
Copper is used to make electrical	**wire**
The place where the concentrate is sent for refining	**smelter**
Sand-sized material containing no valuable minerals	**tailings**
The mine employs people who live in Campbell River and	**Comox**
Concentrate is shipped to	**Asia**
A way to make steel rust-proof	**galvanize**
People in Strathcona Park canoe in _____ Lake	**Buttle**

Step 2: To solve "The Case of the Island Park Mine", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #2. Good luck!

The Case of the Island Park Mine
Word Search

No hidden words or phrases



		Extra Words
CONCENTRATE	BUTTLE	JEWELRY
SILVER	VANCOUVER	ECONOMY
HIKE	SMELTER	ASIA
GALVANIZE	MYRA	COIN
COMOX	TAILINGS	BIRDS
DISCOVERY	UNDERGROUND	WIRE

I have solved *The Case of the Island Park Mine*!
The answer is *MYRA*. It's Elementary!

Name _____

Super Sleuth of B.C. Clue Chart for Myra Falls Mine

Mining Mystery #2 - The Case of the Island Park Mine

Step 1: Use the Myra Falls Mine information sheet to solve the following clues:

Clues	*Clues Solved*
Myra Falls produced mostly zinc, copper, gold and _____	
Campbell River is located on what Island?	
Where the miners work	
Sand-sized material containing valuable minerals	
Copper is used to make electrical	
The place where the concentrate was sent for refining	
Sand-sized material containing no valuable minerals	
The mine employs people who live in Campbell River and	
Concentrate is shipped to	
A way to make steel rust-proof	
People in Strathcona Park canoe in _____ Lake	

Step 2: To solve "The Case of the Island Park Mine", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #2. Good luck!

The Case of the Island Park Mine
Word Search

No hidden words or phrases

Z I D Z M A Y B G U A J Y F D
P M H I W R R J U N Y W I N K
C O N C E N T R A T E F U K D
V U X K I L C K T B T O Y I Y
O A I U F W O Y Y L R L S V R
R H N L C R M M V G Q C E G L
L E D C E P O U R B O E X A E
N Q T A O N X E E V F D L L W
I U R L O U D D E L W F K V E
O I K C E N V R S D R I B A J
C M E D U M Y E O O O P N N G
S I L V E R S F R S G Y Q I A
S G N I L I A T C I P O D Z S
Y F H Q C X W E F V W T U E I
T V G O N Z R V G C P M F S A

		Extra Words
CONCENTRATE	BUTTLE	JEWELRY
SILVER	VANCOUVER	ECONOMY
HIKE	SMELTER	ASIA
GALVANIZE	MYRA	COIN
COMOX	TAILINGS	BIRDS
DISCOVERY	UNDERGROUND	WIRE

I have solved *The Case of the Island Park Mine*!
The answer is _____. It's Elementary!

Vocabulary Match for Myra Falls Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

ecosystem	**employ**	**concentrate**	**mechanic**	**refine**
economy	**boundary**	**galvanize**	**valuable**	**ore**

1. **economy**:	(noun)	Production, movement and consumption of goods in a community
2. **ecosystem**:	(noun)	A web of interacting organisms and their environment
3. **employ**:	(verb)	To hire for work
4. **boundary**:	(noun)	A line that marks the extent of an area
5. **galvanize**:	(verb)	To coat steel with zinc to protect it from rust
6. **valuable**:	(noun)	Considered to be of great worth
7. **refine**:	(verb)	To remove impurities; to purify
8. **concentrate**:	(noun)	A fine powder-like material of valuable minerals
9. **ore**:	(noun)	Valuable rock that can be mined for a project
10. **mechanic**:	(noun)	A person trained in the maintenance and repair of vehicles, machinery, and other mechanical devices

Name: _____

Vocabulary Match for Myra Falls Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

ecosystem	**employ**	**concentrate**	**mechanic**	**refine**
economy	**boundary**	**galvanize**	**valuable**	**ore**

1. _____:	(noun)	Production, movement and consumption of goods in a community
2. _____:	(noun)	A web of interacting organisms and their environment
3. _____:	(verb)	To hire for work
4. _____:	(noun)	A line that marks the extent of an area
5. _____:	(verb)	To coat steel with zinc to protect it from rust
6. _____:	(noun)	Considered to be of great worth
7. _____:	(verb)	To remove impurities; to purify
8. _____:	(noun)	A fine powder-like material of valuable minerals
9. _____:	(noun)	Valuable rock that can be mined for a project
10. _____:	(noun)	A person trained in the maintenance and repair of vehicles, machinery, and other mechanical devices building material.

Mapping Instructions for Myra Falls Mine

What to do: Use the handout of the map of BC and the instructions below to find Myra Falls Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Fraser River. Colour it blue.
5. Find the town of Campbell River. Colour it red.
6. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Campbell River.
7. Draw a small circle next to the symbol for Campbell River. Colour it black.
8. Draw a line above the circle you drew in #7. Print the words **Myra Falls Mine** on that line.
9. Outline and lightly shade in Vancouver Island B.C. Use green.
10. Name 3 other towns on Vancouver Island on the lines below:
    Port Alberni, Nanaimo, Victoria
    (check other maps)
11. Which U.S. state is located southeast of Vancouver Island?
    Washington

Congratulations! You have successfully located Myra Falls Mine on the map!

Name _____

Mapping Instructions for Myra Falls Mine

What to do: Use the handout of the map of BC and the instructions below to find Myra Falls Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Fraser River. Colour it blue.
5. Find the town of Campbell River. Colour it red.
6. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Campbell River.
7. Draw a small circle next to the symbol for Campbell River. Colour it black.
8. Draw a line above the circle you drew in #7. Print the words **Myra Falls Mine** on that line.
9. Outline and lightly shade in Vancouver Island B.C. Use green.
10. Name 3 other towns on Vancouver Island on the lines below:

_____ _____ _____

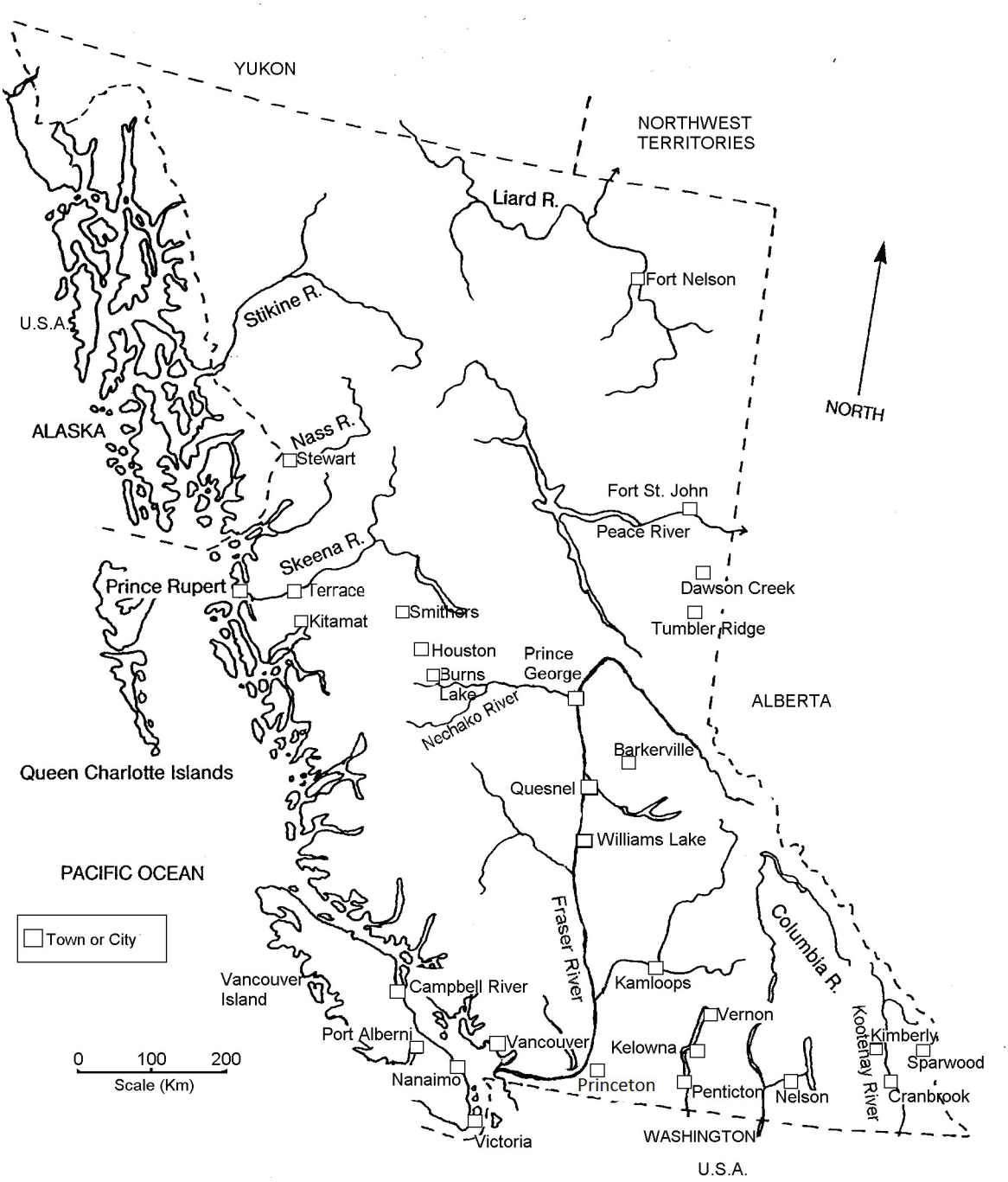
(check other maps)

11. Which U.S. state is located southeast of Vancouver Island?

_____

Congratulations! You have successfully located Myra Falls Mine on the map!

Name _____



Map of British Columbia for Myra Falls Mine

Mapping Challenge: Find the route the boat takes to deliver Myra Falls Mine concentrate to the smelter. Highlight the route on the map of BC. Good luck!

Information Sheet #3 – Endako Mine

What do the Jurassic Age and Endako Mine have in common? Answer: a mineral called **molybdenite** that contains the metal **molybdenum.** The conditions for the Earth to make molybdenum were started millions of years ago with the **formation** of sedimentary and volcanic rock layers. Two local hunters discovered the molybdenum deposit at Endako in 1927 but the mine did not start open pit mining until June 1964—37 years later! Endako is the third largest producer of molybdenum in the world! The mine was named after the small **village** of Endako—a community that is not shown on the map provided. The Mine is located near the towns of Fraser Lake and Burns Lake and a 160 kilometres west of Prince George. Nearby bodies of water are the Stilako and Nechako Rivers and the Francois and Fraser Lakes. The name of this region of B.C. is called Nechako.

Like many of the larger mines in B.C., Endako has become **automated.** This means they use computers and satellites to plot blasting hole patterns in the ground or to check for **stability** of rock walls in the open pit mine. 24 hours a day, workers truck the ore from the pit to the mill where it is **crushed** many times over and then **floated** and **roasted** to make the **grade** of molybdenum concentrate that a customer has ordered. Companies buy different blends of molybdenum depending on their needs. For example, the steel industry uses it to harden steel products like **I-beams** to build high-rises, while the oil companies use it to improve **lubricants** like oil and grease for smoother running machines and cars.

The molybdenum concentrate is packaged in 10 kilogram cans, 250 kilogram drums, or 2000 kilogram bags. It might travel to Japan by truck along the Trans Canada Highway to the port of Vancouver, and then by **freighter** across the Pacific Ocean. It might be trucked to Hamilton, Ontario through Prince George, over to Edmonton, Alberta, across the prairies, and finally to the southwest tip of Lake Ontario. Or, it might stop in Regina, Saskatchewan where it waits in a **warehouse** until the steel company is ready to use it. The molybdenum **mined** at Endako is shipped around the world to companies that make products like steel pipes and frying pans.

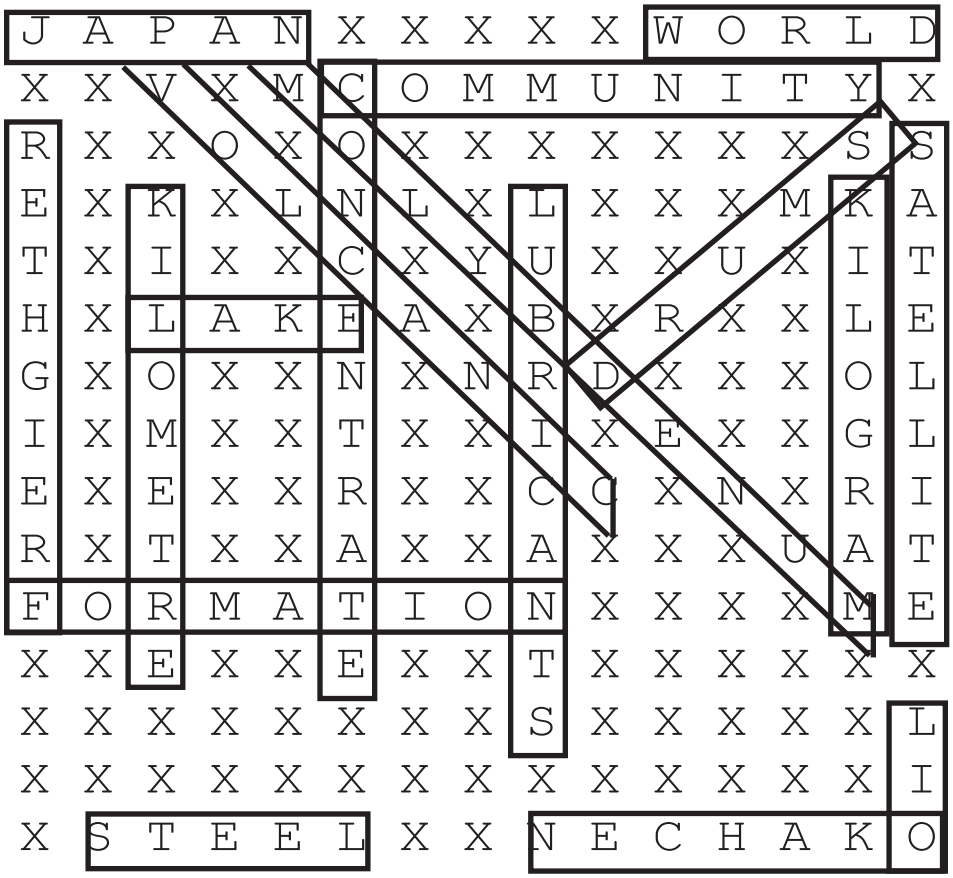
Super Sleuth of B.C. Clue Chart for Endako Mine
Mining Mystery #3 - The Case of the Forgotten Mine

Step 1: Use the Endako Mine Information Sheet to solve the following clues:

Clue	*Solution*
The word that means the forming of rock layers	**formation**
The mineral mined at Endako	**molybdenite**
Another word for a small town or neighborhood	**community**
A body of water surrounded by land	**lake**
The distance equal to 1 000 metres	**kilometre**
This is used to plot blast hole patterns from orbit	**satellite**
Oil and grease make things run smoothly and are called	**lubricants**
Ore that is crushed into a fine powder is called	**concentrate**
The weight equal to 1 000 grams	**kilogram**
Concentrate is packaged in cans, bags, and	**drums**
A type of ship that carries large shipments	**freighter**

Step 2: To solve "The Case of the Forgotten Mine", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #3. Good luck!

The Case of the Forgotten Mine
Word Search
No hidden words or phrases



		Extra Words
MOLYBDENUM	FREIGHTER	OIL
DRUMS	THIRTY-SEVEN	WORLD
CONCENTRATE	KILOGRAM	STEEL
COMMUNITY	KILOMETRE	VOLCANIC
LUBRICANTS	SATELLITE	NECHAKO
FORMATION	LAKE	JAPAN

I have solved *The Case of the Forgotten Mine!*
The answer is <u>THIRTY-SEVEN.</u> It's Elementary!

Name: _____

Super Sleuth of B.C. Clue Chart for Endako Mine

Mining Mystery #3 - The Case of the Forgotten Mine

Step 1: Use the Endako Mine Information Sheet to solve the following clues:

Clue	*Solution*
The word that means the forming of rock layers	
The mineral mined at Endako	
Another word for a small town or neighborhood	
A body of water surrounded by land	
The distance equal to 1 000 metres	
This is used to plot blast hole patterns from orbit	
Oil and grease make things run smoothly and are called	
Ore that is crushed into a fine powder is called	
The weight equal to 1 000 grams	
Concentrate is packaged in cans, bags, and	
A type of ship that carries large shipments	

Step 2: To solve "The Case of the Forgotten Mine", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #3. Good luck!

Name: _____

The Case of the Forgotten Mine
Word Search

No hidden words or phrases

J A P A N T N A B L W O R L D
O F V R M C O M M U N I T Y E
R E V O L O H I S T I Y W S S
E N K B L N L X L X F X M K A
T C I T H C I Y U N T U R I T
H E L A K E A V B X R N E L E
G R O B R N F N R D I S P O L
I E M Z Q T G L I B E R T G L
E B E H L R F X C C X N X R I
R Q T J O A M I A L O U U A T
F O R M A T I O N C E K S M E
B I E Z Q E L A T R A E N E R
B O T M I R Q Y S P T E N T L
A C E F H J L N P R T V X Z I
T S T E E L E V N E C H A K O

Extra Words

MOLYBDENUM
DRUMS
CONCENTRATE
COMMUNITY
LUBRICANTS
FORMATION
FREIGHTER
THIRTY-SEVEN
KILOGRAM
KILOMETRE
SATELLITE
LAKE
OIL
WORLD
STEEL
VOLCANIC
NECHAKO
JAPAN

I have solved *The Case of the Forgotten Mine*!
The answer is _____ . It's Elementary!

Vocabulary Match for Endako Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

deposit	**warehouse**	**automated**	**roast**	**float**
stability	**village**	**lubricant**	**mine**	**molybdenum**

1. **village**: (noun) a collection of houses smaller than a town
2. **deposit**: (noun) a rock body of naturally occurring ore minerals (e.g. molybdenite)
3. **molybdenum**: (noun) a silvery-white, brittle, metallic element
4. **stabile** (adjective) firmly fixed; not easily moved
5. **float**: (verb) to use chemicals and air bubbles to separate waste rock from valuable ore minerals
6. **roast**: (verb) to heat a mineral (like molybdenite) to remove sulphur
7. **lubricant**: (noun) any fluid or slippery substance used to reduced friction between materials
8. **automated**: (adjective) the use of machinery to make work easier
9. **mine**: (verb) to dig in the Earth for ore
10. **warehouse**: (noun) building in which goods are temporarily stored

Name: _____

Vocabulary Match for Endako Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

deposit	**warehouse**	**automated**	**roast**	**float**
stability	**village**	**lubricant**	**mine**	**molybdenum**

1. _____: (noun) a collection of houses smaller than a town

2 _____: (noun) a rock body of naturally occurring ore minerals (e.g. molybdenum)

3. _____: (noun) a silvery-white, brittle, metallic element

4. _____: (adjective) firmly fixed; not easily moved

5. _____: (verb) to use chemicals and air bubbles to separate waste rock from valuable ore minerals

6. _____: (verb) to heat a mineral like molybdenite to remove sulphur

7. _____: (noun) any fluid or slippery substance used to reduced friction between materials

8. _____: (adjective) the use of machinery to make work easier

9. _____: (verb) to dig in the Earth for ore

10. _____: (noun) building in which goods are temporarily stored

Mapping Instructions for Endako Mine

What to do: Use the handout of the map of BC and the instructions below to find Endako Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Nechako River. Colour it blue.
5. Find the town of Burns Lake. Colour it red.
6. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Burns Lake.
7. Draw a small circle next to the symbol for Burns Lake. Colour it black.
8. Draw a line above the circle you drew in #7 and print the words **Endako Mine** on that line.
9. Outline and lightly shade in the Nechako Region of BC. Use green.
10. Name 3 other towns in the Nechako Region on the lines below:
    Smithers, **Dease Lake**, **Cassiar**, **Houston** (check other maps)
11. Name the two borders that touch this northeast corner of BC.
    Yukon Territory and **Alaska, USA**

Congratulations! You have successfully located Endako Mine on the map!

Name: _____

Mapping Instructions for Endako Mine

What to do: Use the handout of the map of BC and the instructions below to find Endako Mine. Remember to check off each number before moving along to the next step. Good luck!

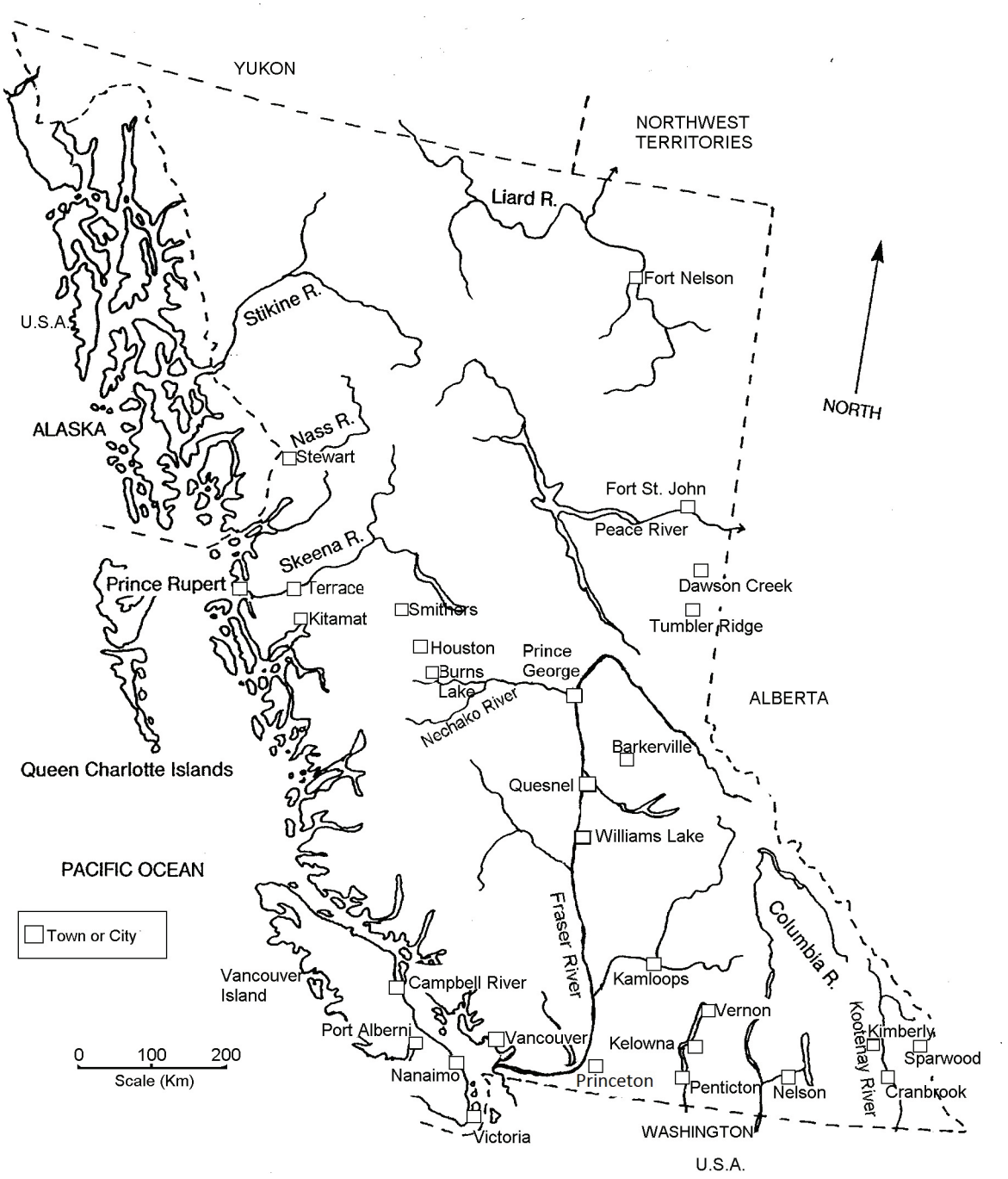
1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Nechako River. Colour it blue.
5. Find the town of Burns Lake. Colour it red.
6. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Burns Lake.
7. Draw a small circle next to the symbol for Burns Lake. Colour it black.
8. Draw a line above the circle you drew in #7 and print the words **Endako Mine** on that line.
9. Outline and lightly shade in the Nechako Region of BC. Use green.
10. Name 3 other towns in the Nechako Region on the lines below:

    _____ _____ _____ (check other maps)

11. Name the two borders that touch this northeast corner of BC.

    _____ _____

Congratulations! You have successfully located Endako Mine on the map!



Map Of British Columbia for Endako Mine

Mapping Challenge: Find the transportation route for molybdenum on the Endako Information Sheet. On the map above, highlight the possible routes within B.C. that a truck might travel to deliver its cargo. Good luck!

Information Sheet #4 – Elkview

What do roaming herds of elk and mining for coal have in common? Answer: a fantastic view of the Rocky Mountains! Elkview Mine sits at the very top of a tall mountain. At the bottom of the mountain is the town of Sparwood. Sparwood has a population of about 3,700 people who either work at the mine, work for the logging industry, work for the government, or work for the tourism industry. All of these **industries** make Sparwood a thriving community in BC. The town of Fernie, BC is the next closest town to the mine. Just like the mine itself, the Elk River and the Elk Valley are named for the great elk herds. Mining in the **Kootenay Region** has been going on for over 100 years.

Elkview Mine is an **open pit** coal mine close to the BC/Alberta border. Today, Elkview blends its coal to make sure that customers are satisfied with their product. Workers at Elkview drive their cars to the base of the mountain and ride a bus to the top. At the end of a **work shift**, the bus takes the workers back to their cars and they go home until their next shift. A work shift is 12 hours for an **employee,** and the mine **operates** 24 hours a day, 7 days a week, 365 days a year. Imagine working for years and years without stopping! **Maintenance crews** work steadily to keep machinery running smoothly no matter what the weather is like. In the winter, snowfall can be as deep as 20 feet and the miners must wear winter coveralls to keep from freezing.

To mine for coal, miners drill and blast the rock and then **separate** the **overburden** (waste rock) from the coal. The overburden is sent to the waste rock dump. The coal is loaded into huge 240 **tonne** haul trucks and is taken to the breaker station where it is put into machines that look like cement mixers. Can you guess what happens at the “breaker” station? You’re right if you thought that the big chunks of coal are broken down into smaller chunks. Any rock that might be mixed with the coal is also removed. After the coal is **downsized,** it travels through a tunnel in the **mountain** along a conveyor belt to the **valley** below where it ends up at the coal plant. Once there, the coal is washed and dried and then loaded into a **silo**. When a customer, like the Japanese, buy coal, it is loaded onto a train for the long journey to a **port** near Vancouver. Where it is either loaded into ships in North Vancouver or at Robert's Bank in Delta. The train travels from Elkview to Cranbrook to Radium to Golden to Revelstoke to Kamloops and finally to Vancouver. After the coal is loaded onto the ship, it is sent overseas to Japan. The Japanese use coal to make steel and steel is used to build cars, trucks, and countless other things for people all over the world!

Super Sleuth of B.C. Clue Chart for Elkview Mine

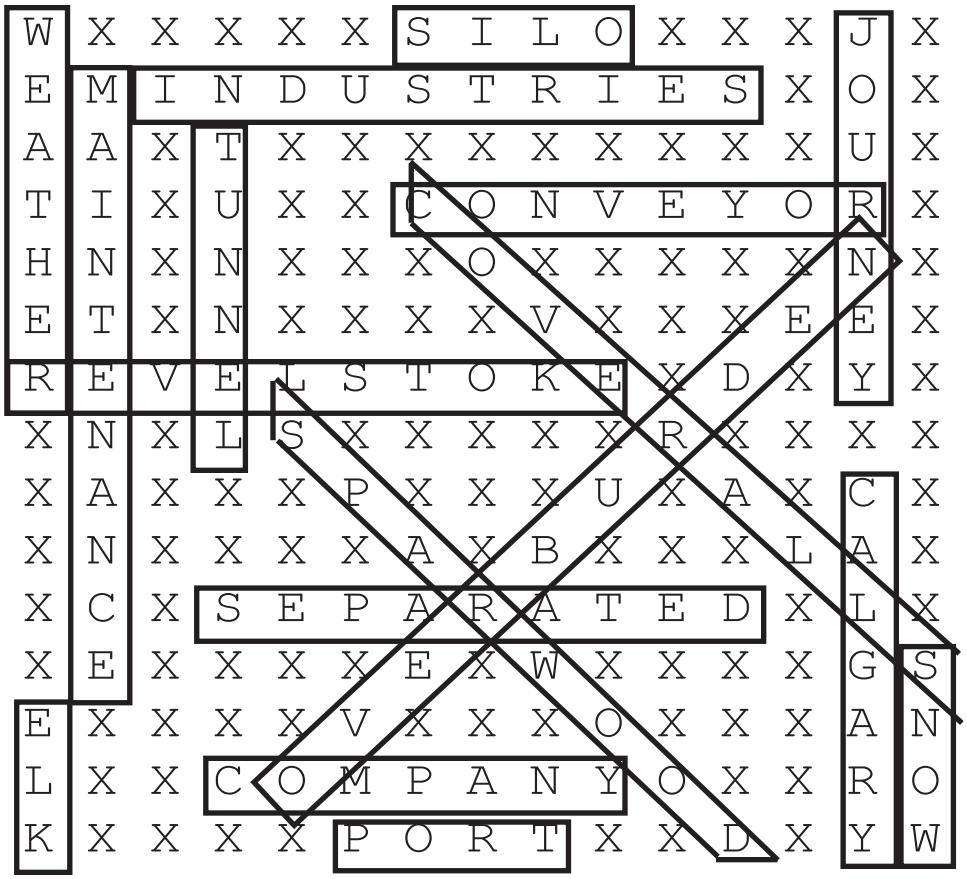
Mining Mystery #4 - The Case of the Overweight Truck

Step 1: Use the Elkview Mine information sheet to solve the following clues:

Clues	*Clues Solved*
Mining, logging, and tourism are called	**industries**
The mine is named after this four-legged animal	**elk**
The town closest to Elkview Mine	**Sparwood**
The crew that takes care of machinery	**maintenance**
Cold, white fluffy stuff that falls from the sky	**snow**
What the miners must wear to keep from freezing	**coveralls**
Rock and coal are drilled, blasted, and	**separated**
Another name for waste rock	**overburden**
Coal travels through the mountain on this belt	**conveyor**
Clean coal is loaded and stored in a	**silo**
Trains carry the coal to this place near Vancouver	**port**

Step 2: To solve "The Case of the Overweight Truck", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #4. Good luck!

The Case of the Overweight Truck
Word Search
No hidden words or phrases



		Extra Words
MAINTENANCE	CONVEYOR	COMPANY
COVERALLS	PORT	CALGARY
OVERBURDEN	SNOW	TUNNEL
INDUSTRIES	ELK	REVELSTOKE
SPARWOOD	SILO	WEATHER
SEPARATED	TONNE	JOURNEY

I have solved *The Case of the Overweight Truck!*
The answer is _TONNE_ It's Elementary!

Name: _____

Super Sleuth of B.C. Clue Chart for Elkview Mine

Mining Mystery #4 - The Case of the Overweight Truck

Step 1: Use the Elkview Mine information sheet to solve the following clues:

Clues	*Clues Solved*
Mining, logging, and tourism are called	
The mine is named after this four-legged animal	
The town closest to Elkview Mine	
The crew that takes care of machinery	
Cold, white fluffy stuff that falls from the sky	
What the miners must wear to keep from freezing	
Rock and coal are drilled, blasted, and	
Another name for waste rock	
Coal travels through the mountain on this belt	
Clean coal is loaded and stored in a	
Trains carry the coal to this place near Vancouver	

Step 2: To solve "The Case of the Overweight Truck", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you're done, all words but one will be circled. This word is the solution to Mystery #4. Good luck!

Name: _____

The Case of the Overweight Truck
Word Search

No hidden words or phrases

W F E V A R S I L O T T O J R
E M I N D U S T R I E S T O R
A A C T H O U R E N F A L U X
T I W U E G C O N V E Y O R J
H N W N S A N O J O I C E N O
E T E N S A N D V E R E E J P
R E V E L S T O K E B D O Y W
O N E L S R O U G E R J L A E
S A L L E P L E O U C A X C R
X N S P H A A X B I O T L A Y
I C N S E P A R A T E D X L X
H E M A P B E A W N A C L G S
E F E S C V P B S O S N O A N
L A L C O M P A N Y O H E R O
K C S T T P O R T V P D X Y W

Extra Words

MAINTENANCE
COVERALLS
OVERBURDEN
INDUSTRIES
SPARWOOD
SEPARATED
CONVEYOR
PORT
SNOW
ELK
SILO
TONNE
COMPANY
CALGARY
TUNNEL
REVELSTOKE
WEATHER
JOURNEY

I have solved *The Case of the Overweight Truck!*
The answer is _____. It's Elementary!

Vocabulary Match for Elkview Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

open pit mine	**silo**	**region**	**mountain**	**maintenance crew**
port	**valley**	**industry**	**site**	**overburden**

1. **industry**:	(noun)	a branch of trade or manufacture (e.g. mining)
2. **region**:	(noun)	a place marked by boundaries
3. **open pit mine:**	(noun)	a surface mine, open to daylight such as a quarry
4. **maintenance crew** :	(noun)	a group of skilled workers keeping things in good repair
5. **site**:	(noun)	a location or place
6. **mountain**:	(noun)	a large or high landmass
7. **valley**:	(noun)	a long low area of land between hills or mountains
8. **silo**:	(noun)	a large structure in which material is stored (e.g. coal)
9. **port**:	(noun)	a harbour for the importing and exporting of goods
10. **overburden**:	(noun)	waste rock that occurs within coal beds

Name: _____

Vocabulary Match for Elkview Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

open pit mine	**silo**	**region**	**mountain**	**maintenance crew**
port	**valley**	**industry**	**site**	**overburden**

1. _____ (noun) a branch of trade or manufacture (e.g. mining)
2. _____ (noun) a place marked by boundaries
3. _____ (noun) a surface mine, open to daylight such as a quarry
4. _____ (noun) a group of skilled workers keeping things in good repair
5. _____ (noun) a location or place
6. _____ (noun) a large or high landmass
7. _____ (noun) a long low area of land between hills or mountains
8. _____ (noun) a large structure in which material is stored (e.g. coal)
9. _____ (noun) a harbour for the importing and exporting of goods
10. _____ (noun) waste rock that occurs within coal beds

Mapping Instructions for Elkview Mine

What to do: Use the handout of the map of BC and the instructions below to find Elkview Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the town of Sparwood. Colour it red.
5. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Elkview Mine.
6. Draw a small circle just to the right of Sparwood near the Alberta border. Colour it black.
7. Draw a line above the circle you drew in #6 and print the words **Elkview Mine** on that line.
8. Outline and lightly shade in the Kootenay Region of BC. Use green.
9. Name the famous national park in this corner of the province:

   Banff National Park

10. Name the mountain range that travels along the BC and Alberta Borders

    Rocky Mountains

Congratulations! You have successfully located Elkview Mine on the map!

Name: _____

Mapping Instructions for Elkview Mine

What to do: Use the handout of the map of BC and the instructions below to find Elkview Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of British Columbia. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the town of Sparwood. Colour it red.
5. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Elkview Mine.
6. Draw a small circle just to the right of Sparwood near the Alberta border. Colour it black.
7. Draw a line above the circle you drew in #6 and print the words **Elkview Mine** on that line.
8. Outline and lightly shade in the Kootenay Region of BC. Use green.
9. Name the famous national park in this corner of the province:

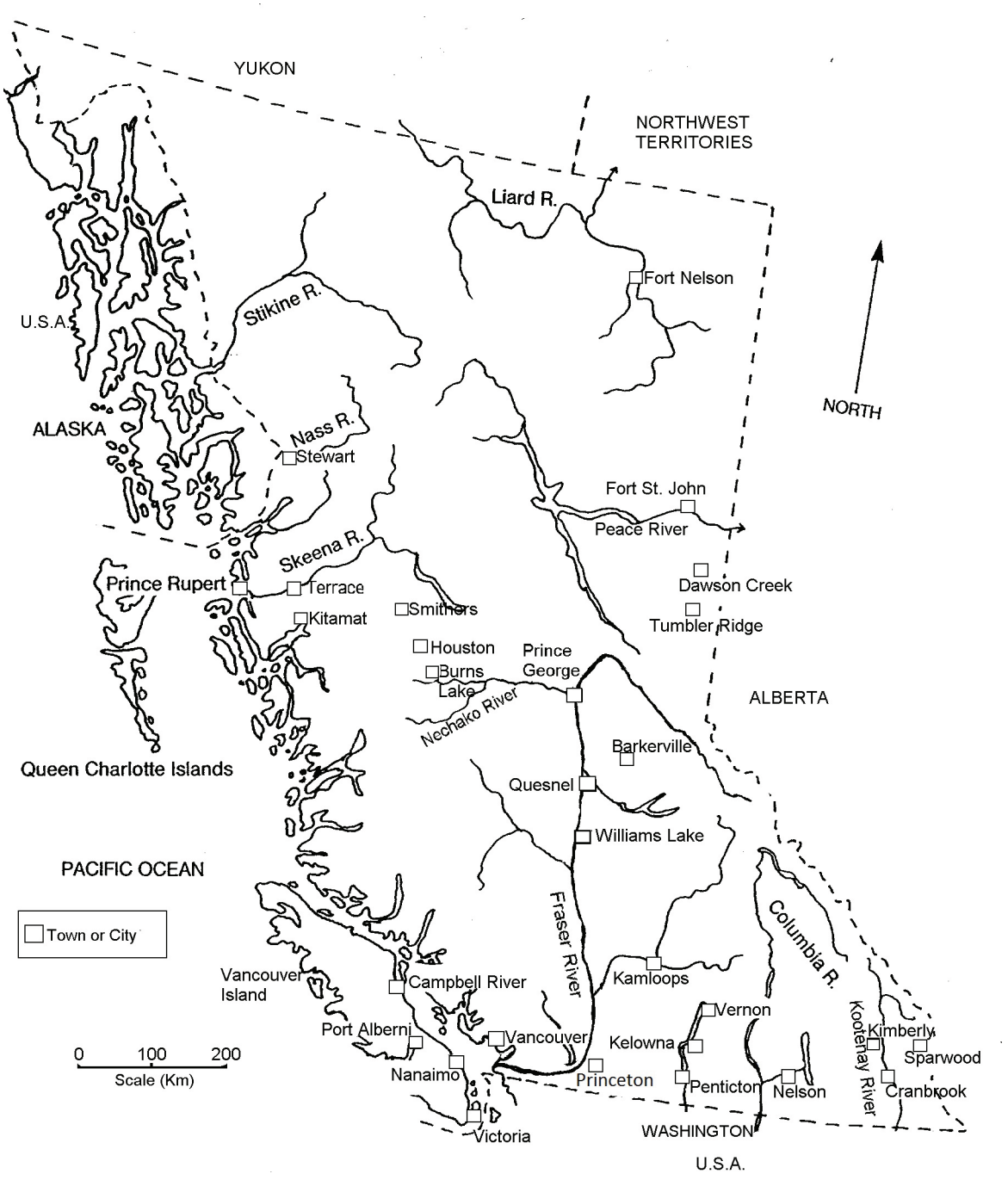
   _____

10. Name the mountain range that travels along the BC and Alberta Border.

    _____

Congratulations! You have successfully located Elkview Mine on the map!

Name: _____



Map of British Columbia for Elkview Mine

Mapping Challenge: Read the Information Sheet to discover where Elkview sends its coal. Use the information to highlight the railway route on the map. Good luck!

Information Sheet #5 – Trend Mine

What do dinosaurs and Trend Mine have in common? Answer: The town of **Tumbler Ridge!** Trend Mine is located in northeast British Columbia, 25 kilometers south of Tumbler Ridge. The mine opened in 2005 to produce **metallurgical coal**. It operates as an **open pit**, 24 hours a day, 7 days a week, 365 days a year. The mine employs 300 people, mainly from the nearby town of Tumbler Ridge. Each morning, the workers are transported out to the mine site by bus. Trend Mine is expected to be in operation for the next 10 years.

So what does the mine have in common with dinosaurs? It was back in 2000, when two local boys were tubing down Flatbed Creek that runs through Tumbler Ridge. They fell off their tubes and decided to walk back upstream along the bedrock. As they were walking, they noticed a series of depressions, or oddly shaped holes, in the rock. Right away they thought that it might be the footprints of a dinosaur, but knew it would be best to contact an expert. They called a **paleontologist.** A paleontologist is a scientist who studies fossils and trace fossils. He came out and examined the holes, and sure enough, they were dinosaur footprints! What would you do if you found dinosaur footprints? The paleontologist later went on to discover other evidence of dinosaurs, including fossil bones! So that means Trend Mine is built in rock made from sediments that dinosaurs used to walk on!

Coal occurs in layers, called **seams**, that alternate with sedimentary rocks, like sandstone, siltstone and shale. The coal mining process begins by blasting the sedimentary rock with explosives. Blasting also helps separate the rock from the coal. All the blasted material is hauled from the pit to the nearby processing plant or **mill. Waste rock** is transported to waste rock dumps. Both are done using **shovels, loaders** and **haul trucks.** At the plant, the coal is taken along a conveyor system to a **crusher**. It is crushed into smaller pieces and is spray washed to keep down dust. The processed coal is transported by truck to a railway where it is loaded onto a train that takes it all the way to the port in **Prince Rupert.** How far is Prince Rupert from Tumbler Ridge? The coal is then shipped from Prince Rupert to Asia. Western Canada is one of the few places in the world that produces high quality metallurgical coal.

But what do we use coal for these days? Metallurgical coal is a very important resource. Mainly, coal is used in **blast furnaces**. These furnaces are used to turn iron ore into **steel**. Think of how many things around you that are made from steel!

Super Sleuth of BC Clue Chart for Trend Mine

Mining Mystery #5 - The Case of the Dinosaur Mine

Step 1: Use the Trend Mine Information Sheet to solve the following clues:

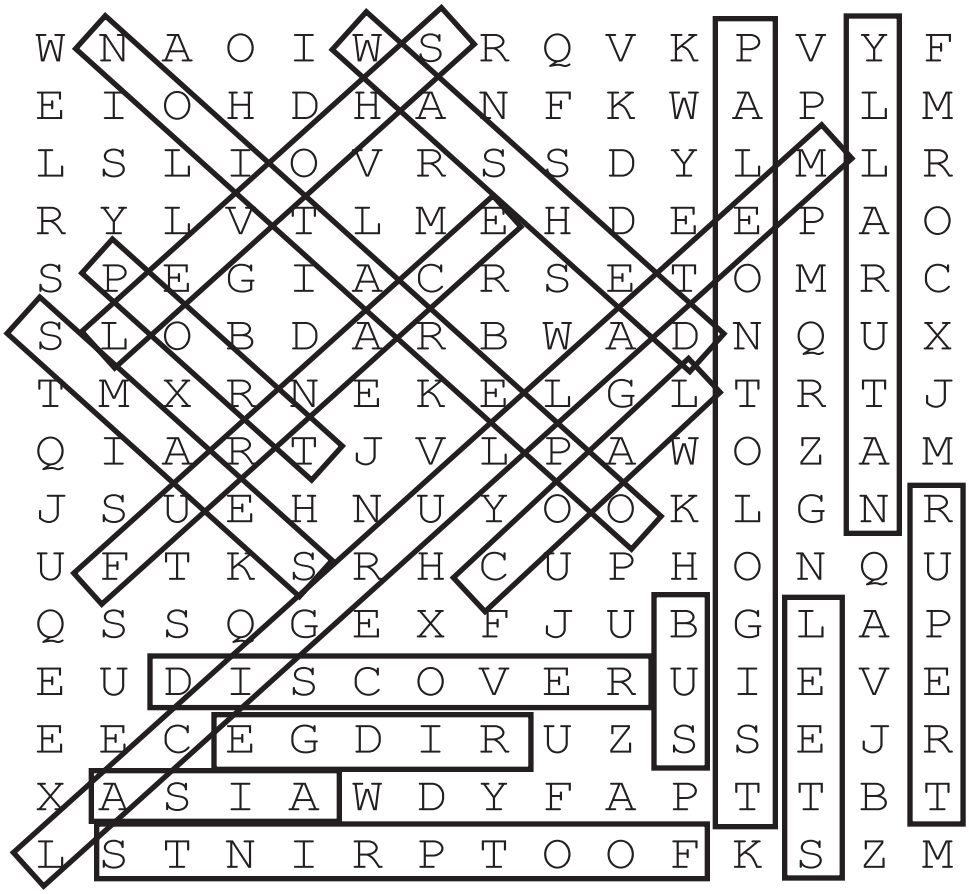
Clue	*Solution*
Trend Mine is found near the town of Tumbler	**Ridge**
The workers are transported to the mine site by	**bus**
The two local boys found dinosaur	**footprints**
Someone who studies dinosaurs is a	**paleontologist**
To reduce dust, the coal is spray	**washed**
Coal from Trend Mine is shipped to Prince	**Rupert**
Coal naturally occurs in	**seams**
Coal is a necessary ingredient in manufacturing	**steel**
The product mined at Trend Mine is metallurgical	**coal**
Coal is used in blast	**furnaces**
Trend mine coal is shipped to	**Asia**

Step 2: To solve “The Case of the Dinosaur Mine”, use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you are done all words but one will be circled. This word is the solution to Mystery #5. Good luck!

The Case of the Dinosaur Mine

Word Search

No hidden words or phrases



Extra Words

RIDGE	PALEONTOLOGIST	OPERATION
BUS	WASHED	DISCOVER
FOOTPRINTS	RUPERT	NATURALLY
SEAMS	COAL	SHOVEL
STEEL	FURNACE	DINOSAUR
METALLURGICAL	ASIA	PORT

I have solved *The Case of the Dinosaur Mine*!
The answer is <u>DINOSAUR!</u> It's Elementary!

Name: _____

Super Sleuth of BC Clue Chart for Trend Mine

Mining Mystery #5 - The Case of the Dinosaur Mine

Step 1: Use the Trend Mine Information Sheet to solve the following clues:

Clue	*Solution*
Trend Mine is found near the town of Tumbler	
The workers are transported to the mine site by	
The two local boys found dinosaur	
Someone who studies dinosaurs is a	
To reduce dust, the coal is spray	
Coal from Trend Mine is shipped to Prince	
Coal naturally occurs in	
Coal is a necessary ingredient in manufacturing	
The product mined at Trend Mine is	
Coal is used in blast	
Trend Mine coal is shipped to	

Step 2: To solve "The Case of the Dinosaur Mine", use the words from the list of solutions and the Extra Words list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you are done all words but one will be circled. This word is the solution to Mystery #5. Good luck!

Name: _____

The Case of the Dinosaur Mine
Word Search
No hidden words or phrases

W N A O I W S R Q V K P V Y F
E I O H D H A N F K W A P L M
L S L I O V R S S D Y L M L R
R Y L V T L M E H D E E P A O
S P E G I A C R S E T O M R C
S L O B D A R B W A D N Q U X
T M X R N E K E L G L T R T J
Q I A R T J V L P A W O Z A M
J S U E H N U Y O O K L G N R
U F T K S R H C U P H O N Q U
Q S S Q G E X F J U B G L A P
E U D I S C O V E R U I E V E
E E C E G D I R U Z S S E J R
X A S I A W D Y F A P T T B T
L S T N I R P T O O F K S Z M

Extra Words

RIDGE	PALEONTOLOGIST	OPERATION
BUS	WASHED	DISCOVER
FOOTPRINTS	RUPERT	NATURALLY
SEAMS	COAL	SHOVEL
STEEL	FURNACE	DINOSAUR
METALLURGICAL	ASIA	PORT

I have solved *The Case of the Dinosaur Mine*!
The answer is_____. It's Elementary!

Vocabulary Match for Trend Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

explosive	**paleontologist**	**convey**	**steel**	**furnace**
metallurgy	**loader**	**bedrock**	**naturally**	**expert**

1. **explosive:**	(noun)	a substance that can be made to explode
2. **paleontologist:**	(noun)	someone who studies fossils
3. **bedrock:**	(noun)	solid rock at Earth's surface or beneath soil
4. **loader:**	(noun)	a large machine with a shovel or bucket
5. **expert:**	(noun)	person who has special knowledge about a topic
6. **metallurgy:**	(noun)	a science that studies the properties of metals
7. **naturally:**	(adverb)	in a natural or normal state
8. **convey:**	(verb)	to carry on a belt from one place to another
9. **furnace:**	(noun)	a fuel burning structure to generate heat
10. **steel:**	(noun)	material made of iron and carbon largely used as a building material

Name: _____

Vocabulary Match for Trend Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

explosive	**paleontologist**	**convey**	**steel**	**furnace**
metallurgy	**loader**	**bedrock**	**naturally**	**expert**

1. _____:	(noun)	a substance that can be made to explode
2. _____:	(noun)	someone who studies fossils
3. _____:	(noun)	unbroken solid rock at Earth's surface or beneath the soil
4. _____:	(noun)	a large machine with a shovel or bucket
5. _____:	(noun)	person who has special knowledge about a topic
6. _____:	(noun)	a science that studies the properties of metals
7. _____:	(adverb)	in a natural or normal state
8. _____:	(verb)	to carry on a belt from one place to another
9. _____:	(noun)	a fuel burning structure to generate heat
10. _____:	(noun)	material made of iron and carbon largely used as a building material

Mapping Instructions for Trend Mine

What to do: Use the handout of the map of BC and the instructions below to find Trend Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of BC. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Peace River. Colour it blue.
5. Find the town of Tumbler Ridge. Colour it red.
6. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Tumbler Ridge.
7. Draw a small circle beside Tumbler Ridge. Colour it black.
8. Draw a line above the circle you drew in #7 and print the words Trend Mine on that line.
9. Outline and lightly shade in the Northeast Region of BC. Use green.
10. Name 3 other towns in the Northeast Region on the lines below:

    Dawson Creek, Fort St. John, Fort Nelson (check other maps)

11. Name the three borders that touch this northeast corner of BC:

    Alberta, Yukon Territory, Northwest Territories

Congratulations! You have successfully located Trend Mine on the map!

Name: _____

Mapping Instructions for Trend Mine

What to do: Use the handout of the map of BC and the instructions below to find Trend Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
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8. Draw a line above the circle you drew in #7 and print the words Trend Mine on that line.
9. Outline and lightly shade in the Northeast Region of BC. Use green.
10. Name 3 other towns in the Northeast Region on the lines below: (check other maps)

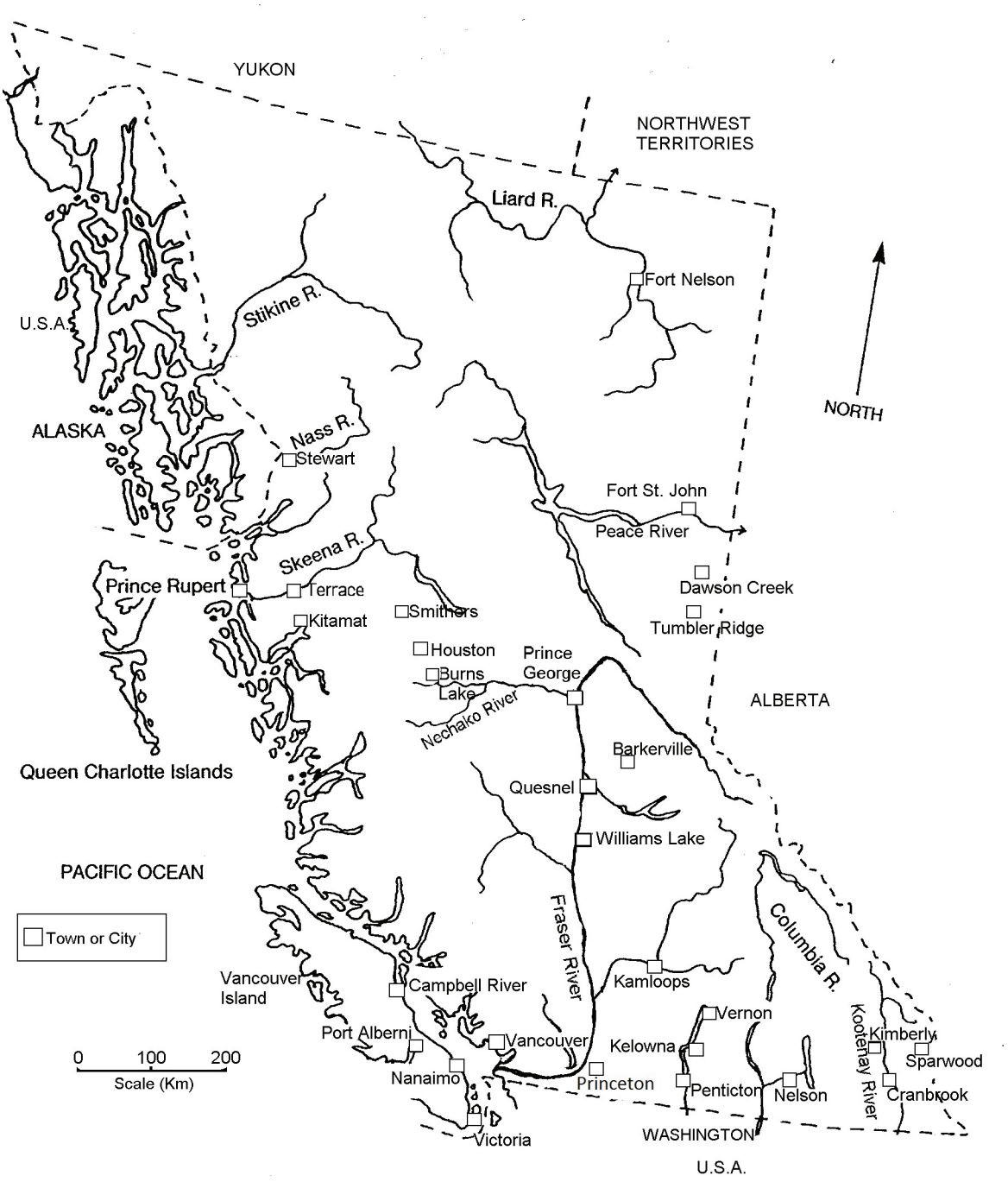
_____ _____ _____

11. Name the three borders that touch this northeast corner of BC:

_____ _____ _____

Congratulations! You have successfully located Trend Mine on the map!

Name: _____



Map of BC for Trend Mine

Mapping Challenge: Read the Information Sheet to discover where Trend Mine sends its coal. Use the information to highlight the transportation route on the map. Good luck!

Information Sheet #6 - Copper Mountain Mine

What could be better than finding a small piece of copper? How about finding a whole mountain of it! Located in south-western British Columbia, Copper Mountain Mine is located about 20 kilometers south of the town of **Princeton** and mainly produces **copper**, along with some **gold** and **silver.** Princeton has a population of 2,800 people, with most working in ranching, forestry, tourism or mining. Today, Copper Mountain Mine operates as an open pit mine and employs 350 people on site. Most of the workers live in Princeton. These local workers help Copper Mountain Mine enjoy the full support of the **community**.

Exploration of Copper Mountain dates back to 1884! How old would you be if you were born in 1884? Mining on the mountain has gone on in three main stages. From 1923-1957 it was operated as an underground mine. From 1972 to 1996 it was operated as an open pit mine. From 2011 to today, it is operating again as an open pit mine. Each time the mine closed it was because of poor economic factors. Today, there is not just one, but three large pits close to each other that make up a "**Super Pit**." By having these large pits, the miners can reach the minerals in the ground faster and easier.

The mining process begins by drilling holes 13 metres into the ore in the pit surface. The holes are filled with explosives and then blasted. The blasted ore is loaded by a large shovel into a large haul truck. Some of these trucks can be the size of your house! The trucks haul the ore to the primary **crusher** that breaks it down into football sized pieces. The ore from the crusher is then fed onto a conveyer belt that moves it into the **mill**.

At the mill, the ore is ground down and seperated into two sand-sized materials: **concentrate** and **tailings**. Concentrate is made up mostly of the minerals that contain copper, gold and silver. Tailings are the grains that have no valuable minerals in them. The next step is to transport the sand sized material, or slurry, to **flotation cells**. These flotation cells are used to separate **copper concentrate** from the **tailings**, or **waste rock.** The concentrate is dried, loaded in large transport trucks and hauled to Vancouver's port. From there it is shipped to **smelters** in Japan.

Today, Copper Mountain mine is expected to have a 17 year life span, producing 105 million pounds of copper every year! Copper is everywhere. Take a minute and look around you. It's in what you see and even in what you don't see. Copper is used to bring electricity into our homes. Electrical wiring in our walls, refrigerators, microwaves, TV's and computers are all made of copper. Can you think of other items around you that might be made from copper?

Super Sleuth of BC Clue Chart for Copper Mountain Mine

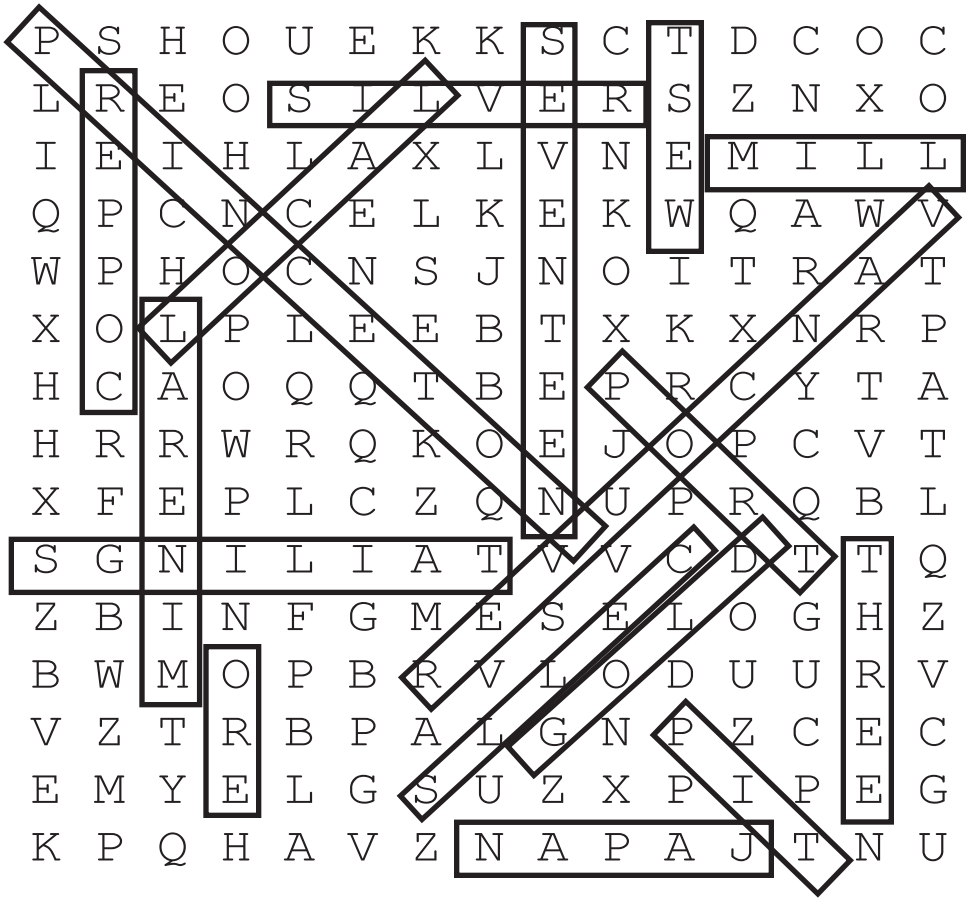
Mining Mystery #6 - The Case of the Super Pit Mine

Step 1: Use the Copper Mountain Mine Information Sheet to solve the following clues:

Clue	*Solution*
Copper Mountain is located in South-____ BC	**west**
The mine produces copper, gold and	**silver**
The mining process begins by drilling deep	**holes**
Most mine employees live in	**Princeton**
Copper Mountain has full support of the	**community**
How many open pits does this mine have?	**three**
Ore is conveyed from the crusher to the	**mill**
The ore is processed into concentrate and	**tailings**
The slurry is piped to flotation	**cells**
Copper Mountain is expected to operate for how many years?	**seventeen**
Copper concentrate is shipped to	**Japan**

Step 2: To solve “The Case of the Super Pit Mine," use the words from the list of solutions and the Extra Word list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you’re done, all words but one will be circled. This word is the solution to Mystery #6. Good luck!

The Case of the Super Pit Mine
Word Search
No hidden words or phrases



Extra Words

WEST	CELLS	COPPER
MILL	JAPAN	LOCAL
PRINCETON	SILVER	VANCOUVER
COMMUNITY	THREE	PIT
ORE	GOLD	MINERAL
TAILINGS	SEVENTEEN	PORT

I have solved *The Case of the Super Pit Mine*!

The answer is <u>COMMUNITY!</u> It's Elementary!

Super Sleuth of BC Clue Chart for Copper Mountain Mine

Mining Mystery #6 - The Case of the Super Pit Mine

Step 1: Use the Copper Mountain mine Information Sheet to solve the following clues:

Clue	***Solution***
Copper Mountain is located in South-____ BC	
The mine produces copper, gold and	
The mining process begins by drilling deep	
Most mine employees live in	
Copper Mountain has full support of the	
How many open pits does this mine have?	
Ore is conveyed from the crusher to the	
The ore is processed into concentrate and	
The slurry is piped to flotation	
Copper Mountain is expected to operate for how many years?	
Copper concentrate is shipped to	

Step 2: To solve “The Case of the Super Pit Mine," use the words from the list of solutions and the Extra Word list. Words are printed horizontally and vertically. Be watchful! Some letters belong to more than one word! Each time you find a word, draw a circle around it and then cross the word off the list. When you’re done, all words but one will be circled. This word is the solution to Mystery #6. Good luck!

Name: _____

The Case of the Super Pit Mine

No hidden words or phrases

P S H O U E K K S C T D C O C
L R E O S I L V E R S Z N X O
I E I H L A X L V N E M I L L
Q P C N C E L K E K W Q A W V
W P H O C N S J N O I T R A T
X O L P L E E B T X K X N R P
H C A O Q Q T B E P R C Y T A
H R R W R Q K O E J O P C V T
X F E P L C Z Q N U P R Q B L
S G N I L I A T V V C D T T Q
Z B I N F G M E S E L O G H Z
B W M O P B R V L O D U U R V
V Z T R B P A L G N P Z C E C
E M Y E L G S U Z X P I P E G
K P Q H A V Z N A P A J T N U

Extra Words

WEST
MILL
PRINCETON
COMMUNITY
ORE
TAILINGS
CELLS
JAPAN
SILVER
THREE
GOLD
SEVENTEEN
COPPER
LOCAL
VANCOUVER
PIT
MINERAL
PORT

I have solved *The Case of the Super Pit Mine*

The answer is_____ . It's Elementary!

Vocabulary Match for Copper Mountain Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

tourism	**economic**	**approximately**	**port**	**community**
copper	**flotation**	**explosives**	**haul**	**ore**

1. **tourism:**	(noun)	the organization of vacations and visits to places of interest
2. **economic:**	(noun)	relating to the state of the economy
3. **explosives:**	(noun)	a substance that can be made to explode
4. **ore:**	(noun)	naturally occurring Earth material from which a metal or mineral can be extracted
5. **community:**	(noun)	group of people living and working together in one space
6. **copper:**	(noun)	a good conductor of electricity and heat
7. **flotation:**	(noun)	a process to separate different ore minerals from waste rock
8. **port:**	(noun)	town or city with a harbor where ships load and unload
9. **approximately:**	(noun)	close to reality, but not completely accurate or exact
10. **haul:**	(verb)	to transport, as with a truck or cart

Name: _____

Vocabulary Match for Copper Mountain Mine

What to do: Match each word to the correct meaning. You may use the mine information sheet and a dictionary for clues. When you have a match, print the word on the line next to the definition. Remember to cross each word off the list once it's been matched. Good luck!

tourism	**economic**	**approximately**	**port**	**community**
copper	**flotation**	**explosives**	**haul**	**ore**

1. _____:	(noun)	the organization of vacations and visits to places of interest
2. _____:	(noun)	relating to the state of the economy
3. _____:	(noun)	a substance that can be made to explode
4. _____:	(noun)	naturally occurring Earth material from which a metal or mineral can be extracted
5. _____:	(noun)	group of people living & working together in one space
6. _____:	(noun)	it is a good conductor of electricity and heat
7. _____:	(noun)	a process to separate different ore minerals from waste rock
8. _____:	(noun)	town or city with a harbor where ships load and unload
9. _____:	(noun)	close to reality, but not completely accurate or exact
10. _____:	(verb)	to transport, as with a truck or cart

Mapping Instructions for Copper Mountain Mine

What to do: Use the handout of the map of BC and the instructions below to find Copper Mountain Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
2. Find the symbol that represents Victoria, the capital of BC. Colour it purple.
3. Find the symbol that represents Barkerville, an historical gold mining town in BC. Colour it yellow.
4. Find the Fraser River. Colour it blue.
5. Find the city of Princeton. Colour it red.
6. Draw a small circle just below Princeton. Colour it black.
7. Draw a line below the circle you drew in #6 and print the words Copper Mountain Mine on that line.
8. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Copper Mountain Mine.
9. Outline the US border.
10. Name three other communities close to Copper Mountain Mine.

Kelowna, Penticton, Vancouver, Merrit, Hope

Congratulations! You have successfully located Copper Mountain Mine on the map!

Name: _____

Mapping Instructions for Copper Mountain Mine

What to do: Use the handout of the map of BC and the instructions below to find Copper Mountain Mine. Remember to check off each number before moving along to the next step. Good luck!

1. Find the symbol that represents where *you* live in BC. Colour it orange.
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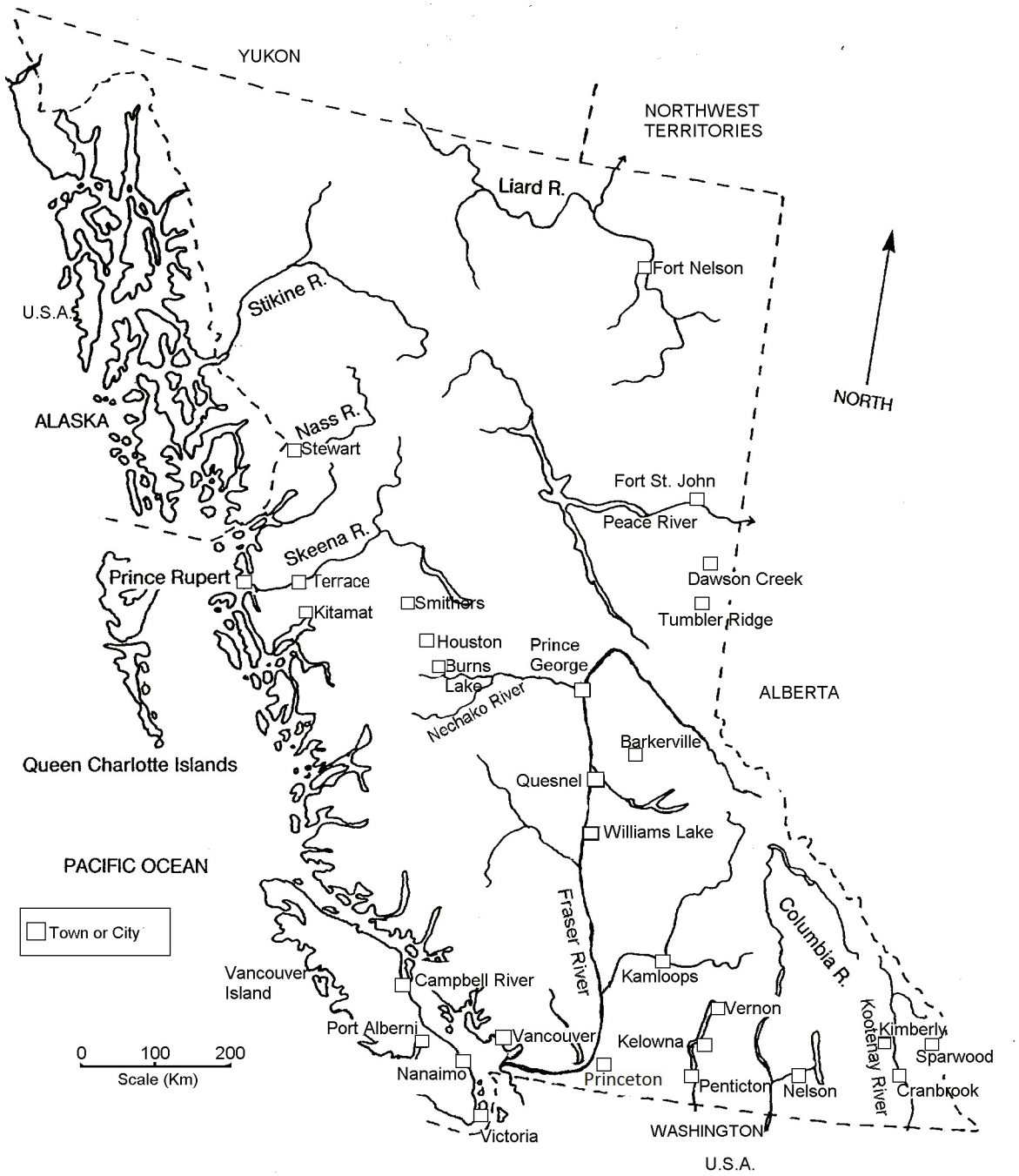
8. Draw pencil lines *from* your town, Victoria, and Barkerville *to* Copper Mountain Mine.
9. Outline the US border.
10. Name three other communities close to Copper Mountain Mine.

_____ _____ _____

Congratulations! You have successfully located Copper Mountain Mine on the map!

Name: _____



Map of BC for Copper Mountain Mine

Mapping Challenge: Read the Information Sheet to discover where the Copper Mountain Mine exports its copper concentrate. Highlight the transport route on the map. Good luck!