Saskatchewan's Mineral Resources

Lesson: Mineral Potential and Mines in Saskatchewan.

Overview

Using maps and online resources students will determine what minerals occur in the ground below their school; where to prospect for diamonds and other minerals; and where Saskatchewan's current mines are located. Students will gain an appreciation that Saskatchewan's mineral resources are not evenly spaced about the province.

Duration: One to two classes

Materials:

- **Mineral Resource Map of Saskatchewan Student Map**
- **Saskatchewan Energy and Mines Minerals Resource Map (SMA website)**
- Saskatchewan Energy and Mines Mineral Resource Map Paper Copy (see Resources)

Note to Teacher:

The Saskatchewan Energy and Mines Mineral Resource Map is available on-line as well as in paper copy. On the map the carnallite (potassium-magnesium chlorite) region (hot pink) is separated from the rest of the potash region. For the purposes of this lesson it is considered as part of the potash region.

This activity is similar to the Work On It Activity in the new Grade 4 Science textbook.

Instructional Methods:

- Independent and guided learning, map reading

Learning Outcomes and Indicators

SCIENCE

Grade 4: Rocks, Minerals and Erosion
RM4.2 Assess how human uses of rocks and minerals impact self, society, and the environment.
e. Identify locations where minerals, including potash, sodium sulphate, salt, kaolin, uranium, copper, coal, diamond, and gold, are extracted in Saskatchewan.

Grade 7: Earth's Crust and Resources
EC7.2 Identify locations and processes used to extract Earth's geological resources and examine the impacts of those locations and processes on society and the environment.
d. Identify locations of Saskatchewan's primary mineral resources (e.g., potash, gold, diamond, salt, uranium, copper, and graphite) and their primary uses.

Earthscience 30: Lithosphere
ES30-LS3 Investigate the processes and technologies used to locate and extract mineral resources and fossil fuels locally, provincially and globally.
b. Identify the location, method of extraction, uses and economic impact of major fossil fuel and mineral (e.g., gold, diamond, rare earth elements, copper, zinc, kaolin, coal, potash, uranium, salt, and sodium sulphate) resources.

PAA Energy and Resources 10,20, 30

Module 12,16,22

SOCIAL STUDIES

Grade 4 Resources and Wealth
RW4.3 Assess the impact of Saskatchewan resources and technological innovations on the

provincial, national, and global communities
a. Represent on a map the major resources in Saskatchewan (e.g., minerals, potash, oil, uranium, natural gas, lumber, water, crop, and livestock production).
b. Locate on a map the major industries in Saskatchewan (e.g., agriculture processing, mining, manufacturing, forestry products, energy refinement, tourism, livestock production).

Grade 7 Resources and Wealth
RW7.2. Investigate the influence of resources upon economic conditions of peoples in circumpolar and Pacific Rim countries.
b. Identify the locations of natural resources of circumpolar and Pacific Rim countries using appropriate maps, and analyse the impact of the resources on local communities. (indirectly).

Source: **Saskatchewan Evergreen Curriculum**

Big Picture Questions

1. What minerals are mined in Saskatchewan?
2. Where are Saskatchewan's mines?

Background Information

Mining is the province's third largest industry and a significant contributor to the provincial economy spending over $3 billion annually on wages, goods and services, and generating over $2 billion annually to the provincial government revenue through royalties and taxes.

Saskatchewan has over 25 operating mines. Our mines produce potash, uranium, coal, gold, salt, meta-kaolin, silica sand, sodium sulphate, clay and bentonite.

Saskatchewan also has a wealth of developing mineral resources including diamonds, platinum & palladium, rare earth elements, copper, zinc, and nickel.

Vocabulary

deposit	mine
occurrence	potential

THE ACTIVITY

Teacher Preparation:
The student Mineral Resource Map should be blown up to fit 11 x 14 paper. It will be much easier for the students to read the city/town names as well as see the outlines.

Activity:

1. Review the terms, deposit, mine, occurrence and potential.
   Students will see these terms on the Mineral Resource Map keys on the side and bottom of the map.
2. Have students look at the Mineral Resource Map of Saskatchewan. This can be done either using a paper copy or by going on-line to the **Saskatchewan Mining Association site.**
3. Have students find the legend *(on the bottom of the map)*, locate the various mineral potential areas and colour them on their **Mineral Resource Map of Saskatchewan**. Outlines of the resource potential areas have been put on the map *(in a very light grey)* for guidance.
   Students will have to be told that it is alright to colour over the oil and gas pools. Oil and gas deposits occur in the same area as potash in the west and south east of the province. They occur in rocks that are both deeper and shallower than the potash.
4. Have the students locate mine sites using the key to the right of the map and number them on their map **according to their chart.**
   *The Government and SMA Mineral Resource Maps have a key to the mineral deposits and mines. The numbers beside the mines on the key **are not** the same numbers on the student map. The key shows the dots for the mineral deposits/mines as separate colours. Uranium red, gold yellow. This will help the students determine what mineral is being mined at each location.*
5. Have students answer the questions.

Assessment Method and Evidence

✓ **Map**

- Students will have an understanding of where Saskatchewan's resources and mines are located and be able to show this by colouring in the resource potential areas, and locating the mines on the map.
- Students will be able to identify the mineral that is mined at each mine site.

✓ **Questions**

- Students will gain an appreciation that Saskatchewan's mineral resources are not evenly spaced about the province. They will be able to show that uranium is found in the north, coal along the border in the south, potash runs across the southern part of the province, diamonds occur in a small area east and north-east of Prince Albert, gold mines are located north and east of La Ronge and most of the copper deposits in the middle along the border with Manitoba.

Extension

1. Use two different colours to indicate current mines and future mines. Add the location of newly announced mines.
2. Follow Saskatchewan's mining news in your local paper and locate the areas on the map.
3. Go on-line to the Great Western Minerals web site to find out where their Rare Earth Elements (REE) deposit is located. Learn more about rare earth minerals.

Resources

Saskatchewan Energy and Mines Mineral Resource Map.
Available at:
http://www.er.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=5145,4477,3440,3385,5460,2936,Documents&MediaID=31999&Filename=MINRESMap2010.pdf

Or purchased at:
Energy and Resources.
300 - 2103 11th Avenue and 200 - 2101 Scarth Street Regina, SK
S4P3Z8, Canada
Tel. (306) 787-2528
Web Site. http://www.er.gov.sk.ca/
Available as 8.5 x 11 and 31 x 48 maps.

Mineral posters (free). Available at:
http://www.er.gov.sk.ca/Default.aspx?DN=07781866-0b2e-4798-8022-a085766aac4b

Saskatchewan Mining Association Website:
http://www.saskmining.ca
http://www.saskmining.ca/index.php/map/Map/map.html
http://www.saskmining.ca/uploads/news_files/70/minresmap2010.pdf

Great Western Minerals:
http://www.gwmg.ca/html/projects/index.cfm

Vocabulary

Deposit: A mineral occurrence of sufficient size and grade that it might, under favourable circumstances, be considered to have economic potential.

Mine: An excavation beneath the surface of the ground from which mineral matter of value is extracted. Mines are commonly known by the mineral or metal extracted such as uranium mines, potash mines etc.

Occurrence: A concentration of a mineral that is considered to be valuable or that is of scientific or technical interest.

Ore: The naturally occurring material from which a mineral or minerals of economic value can be extracted profitably.

Prospect: An area that is a potential site of mineral deposits, based on preliminary exploration.

Showing: Surface occurrence of mineral.

Name:_____

Student Activity

1. Using the websites below, go online to the SMA or the Ministry of Energy and Resources website and find the **Mineral Resource Map of Saskatchewan**. Use the colour key at the bottom of the map to help you colour in the mineral potential areas. Don't forget to put the colours you have used in your key.

2. Find the list of deposits and mines along the side of the web page map. Zoom in on the map to locate the mines below.
   A) Put the number from your chart beside the mine location on your map.
   B) Write down what mineral is mined.

Number	Saskatchewan's Mines	Mineral mined (Ore mineral)
	OPERATING	
1	**Allan**	
2	**Belle Plaine**	
3	**Bienfait**	
4	**Big Quill**	
5	**Boundary Dam**	
6	**Chaplin**	
7	**Colonsay**	
8	**Cory**	
9	**Esterhazy K1 and K2**	
10	**Lanigan**	
11	**McArthur River**	
12	**McClean Lake**	
13	**Patience Lake**	
14	**Poplar River**	
15	**Rabbit Lake**	
16	**Rocanville**	
17	**Roy Lloyd (Bingo)**	
18	**Seebee**	
19	**Vanscoy**	
22	**Cigar Lake**	
	RECENTLY CLOSED MINES	
20	**Cluff Lake**	
21	**Key Lake**	
	IN THE NEWS	
23	**Star**	
24	**Jansen**	

3. Where do most of the potash mines occur?

4. Where do the uranium mines occur?

5. Where would you find diamonds in Saskatchewan?

6. Where in the province would you go to find coal?

7. The price of gold in rising quickly these days. If you were interested in finding a gold mine where would you look?

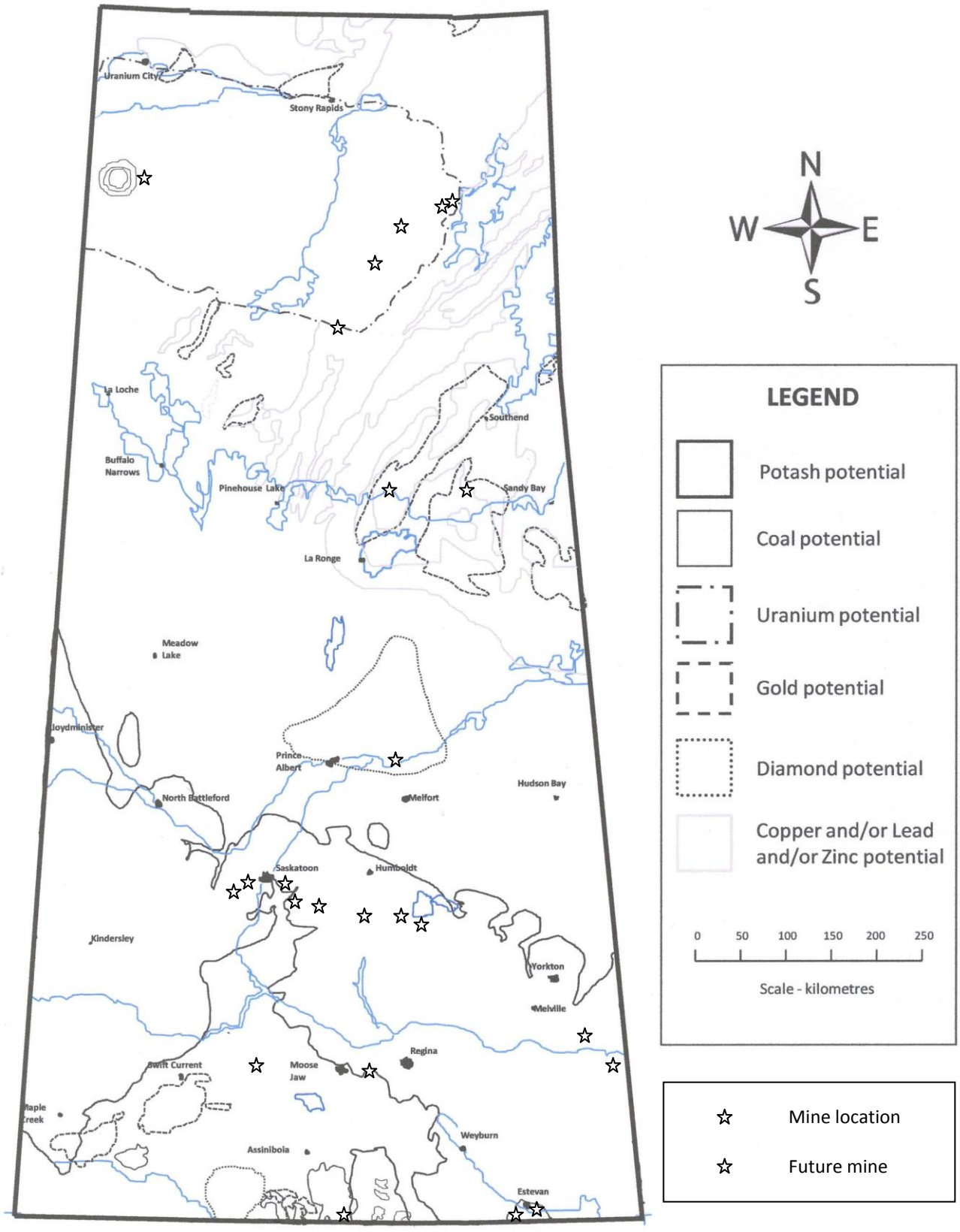
8. If you were a mining company and you owned the mineral rights under your school what mineral resource would you explore for?

Websites:

Saskatchewan Mining Association: http://www.saskmining.ca/index.php/map/Map/map.html
http://www.saskmining.ca/uploads/news_files/70/minresmap2010.pdf

Ministry of Energy and Resources Mineral Resource Map 2011:
http://www.er.gov.sk.ca/mineralresourcemap

Mineral Resource Map of Saskatchewan



Answers

1. Using the websites below, go online to the SMA or the Ministry of Energy and Resources website and find the Mineral Resource Map of Saskatchewan. Use the colour key at the bottom of the map to help you colour in the mineral potential areas. Don't forget to put the colours you have used in your key.

2. Find the list of deposits and mines along the side of the web page map. Zoom in on the map to locate the mines below.
   A) Put the number from your chart beside the mine location on your map.
   B) Write down what mineral is mined.

Number	Saskatchewan's Mines	Mineral mined Ore mined
	OPERATING	
1.	Allan	*Potash*
2.	Belle Plaine	*Potash*
3.	Bienfait	*Coal*
4.	Big Quill	*Potassium Sulphate*
5.	Boundary Dam	*Coal*
6.	Chaplin	*Sodium Sulphate*
7.	Colonsay	*Potash*
8.	Cory	*Potash*
9.	Esterhazy K1 and K2	*Potash*
10.	Lanigan	*Potash*
11.	McArthur River	*Uranium*
12.	McClean Lake	*Uranium*
13.	Patience Lake	*Potash*
14.	Poplar River	*Coal*
15.	Rabbit Lake	*Uranium*
16.	Rocanville	*Potash*
17.	Roy Lloyd (Bingo)	*Gold*
18.	Seebee	*Gold*
19.	Vanscoy	*Potash*
22.	Cigar Lake	*Uranium*
	RECENTLY CLOSED MINES	
20.	Cluff Lake	*Uranium*
21.	Key Lake	*Uranium*
	IN THE NEWS	
23.	Star	*Diamond*
24.	Jansen	*Potash*

3. Where do most of the potash **mines** occur?

Most of the mines occur between Saskatoon and Rocanville (or the Manitoba border).

4. Where do the uranium mines occur?
   The mines are all associated with a particular rock unit, the Athabasca sandstone of the Athabasca basin in the provinces north. All of the current mines are located on the east side of the Athabasca Basin.

5. Where would you find diamonds in Saskatchewan?
   The diamond potential area occurs from Prince Albert east and northwards along highway 106 and along the Saskatchewan River.

6. Where in the province would you go to find coal?
   A person would go to the very south of the province close to the border with the United States near Estevan and south of Assiniboia. There have recently been deep coal discoveries in the Hudson Bay area.

7. The price of gold in rising quickly these days. If you were interested in finding a gold mine where would you look? (Name the nearest city/town)
   The area with the most gold deposits, mines and closed mines runs north from La Ronge towards and west of Southend. Other areas are around Uranium City, west of Stony Rapids, and Flin Flon area.

8. If you were a mining company and you owned the mineral rights under your school what mineral resource would you explore for
   Answers will vary

Websites:

Saskatchewan Mining Association: http://www.saskmining.ca/index.php/map/Map/map.html
http://www.saskmining.ca/uploads/news_files/70/minresmap2010.pdf

Ministry of Energy and Resources:
http://www.geoscapesask.ca/pdfs/riches_from_the_earth/MINRESMap2008.pdf

Great Western Minerals: http://www.gwmg.ca/html/projects/index.cfm

Mineral Resource Map of Saskatchewan