



Taconite Rocks!

*a 6th grade
curriculum of the
Taconite Industry*

IRON MINING ASSOCIATION



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Acknowledgment

This curriculum was made possible through the efforts of the following people:

Sharon Jensen, Eveleth-Gilbert Elementary School

Jim Lassi, Babbitt Elementary School

Sandy Etter, Hibbing Public Schools

Francine Schlander, Hibbing Public Schools

Sandra Ohren, Hibbing Public Schools

Suggested Activities Timeline	
<p><i>Introduction</i></p> <p>Day1</p> <ul style="list-style-type: none"> • Introduce Taconite Rocks! • Present and discuss sample taconite packet • Distribute student folders <p><i>Lesson 1, History</i></p> <ul style="list-style-type: none"> • View 9-minute video, <i>The Birthplace of Minnesota Taconite Industry</i>; discussion questions , Worksheet 1-A <p>Day2</p> <ul style="list-style-type: none"> • View video, <i>Minnesota Mining: A New Beginning</i> • Discuss questions, Worksheet 1-B • Introduce timeline activity, Worksheet 1-C <p>Day3</p> <ul style="list-style-type: none"> • Continue timeline activity • Complete map activity, Worksheet 1-D • Review videos content and previous lessons <p>Day4</p> <ul style="list-style-type: none"> • Complete Lesson 1 assessment <p><i>Lesson 2, Process</i></p> <ul style="list-style-type: none"> • Introduce Lesson 2 • Introduce “Let's Rock!” (Hard Rock) poster • Discuss questions 	<p>Day5</p> <ul style="list-style-type: none"> • View 15-minute video, <i>Where Steel Begins</i> • Compare video to “Let's Rock!” poster • Complete “Let's Rock!” Worksheet 2-A or 2-B • Complete Part I, Lesson 2 assessment <p>Day6</p> <ul style="list-style-type: none"> • Introduce and discuss poster “Reclaiming the Land”, Worksheet 2-C • Introduce class project • Complete Part II, Lesson 2 art and written language assessment <p><i>Lesson 3, Careers</i></p> <p>Day7</p> <ul style="list-style-type: none"> • Introduce Lesson 3 • Complete "Whistle While You Work" interest assessment, Worksheet 3-A <p>Day8</p> <ul style="list-style-type: none"> • Discuss and complete career grid, Worksheet 3-B <p>Day9</p> <ul style="list-style-type: none"> • Invite resource speaker • Written assessment: paragraph on "If I Worked in the Mines." <p><i>Conclusion</i></p> <p>Day10</p> <ul style="list-style-type: none"> • Complete “Cookie Mining”

WELCOME to Taconite Rocks!

Introduction to Unit

Goal: To introduce the Taconite Rocks! curriculum.

Supportive resources and curriculum materials:

Taconite sample package and student folders

Activities:

1. Pass out the taconite sample packets to students. Allow time to examine and feel the differences.
2. Discuss:
 - ✓ what taconite is
 - ✓ the process of changing rock to pellet
 - ✓ importance of taconite to Iron Range economy
 - ✓ family members or friends employed at a plant
3. Present overview of activities for the three units:
 - ✓ history
 - ✓ process
 - ✓ careers

Lesson 1, History

Goal: To know the history and the development of the iron mining and taconite industry.

Student outcomes:

The student will

- complete a time line that includes at least 5 places, 5 people and 5 events to explain the development of the iron mining/taconite industry; or complete a time line of either dates, people or events to explain the development of the iron mining/taconite industry.
- identify Vermilion, Cuyuna and Mesabi ranges with appropriate towns.
- define taconite and iron ore

Supportive resources and curriculum materials:

Videos

The Birthplace of Minnesota Taconite Industry

Description: A 9 1/2-minute video that explains the early development of the industry with a special focus on Babbitt.

Minnesota Mining: A New Beginning

Description: A 23-minute presentation that chronicles the development of the iron mining industry and the taconite industry.

Iron Range :
iron bearing area with distinct characteristics. There are three iron range districts in Minnesota: Mesabi, Vermilion, and Cuyuna.

Brochures

“Minnesota’s Iron Mining Industry”

Description: A pamphlet that includes the process, places, events and dates of the development of the taconite industry.

“Founders of the Range” from *Mining Matters*

Description: A listing of the men who lead in the development of the Ranges and mining.

Activities:

- | | |
|--|--|
| <p>1. Introduce and view video. “Today, we will view a video, <i>The Birthplace of Minnesota Taconite Industry</i>. While you are viewing, try to remember:</p> <ul style="list-style-type: none"> ✓ where it started, ✓ when it started, ✓ if the plant is still operating.” <p>Discuss questions, Worksheet 1-A</p> | <p>2. Introduce and view video, <i>Minnesota Mining, a new Beginning</i>.
Discuss questions, Worksheet 1-B</p> <p>3. Complete time line activity, Worksheet 1-C</p> <p>4. Complete map activity, Worksheet 1-D</p> |
|--|--|

Student Name _____

Worksheet 1-A
Video Discussion Questions

Birthplace of Minnesota Taconite Industry

1. Where is the birthplace of taconite? Why?
2. Why did the early developers research the low grade ore, taconite?
3. How can producing taconite be compared to recycling today?
4. What is the difference between taconite and red ore?
5. When did the first mining plant begin and how many tons were produced?
6. How was math and science used to develop the industry?
7. Why did the Babbitt plant close? What lessons were learned from this early plant?

Teacher's Key

Worksheet 1-A
Video Discussion Questions*Birthplace of Minnesota Taconite Industry*

1. Where is the birthplace of taconite? Why?

The birthplace is Babbitt because Peter Mitchell discovered a 1 1/2 miles wide by 12 miles long strip of taconite.

2. Why did the early developers research the low grade ore, taconite?

They saw a valuable resource that was not being used.

3. How can producing taconite be compare to recycling today?

Today's recycling reuses resources for a healthier planet.

4. What is the difference between taconite and red ore?

Red ore is 50-60% iron and is known as direct shipped ore. Taconite is 20-30% iron and is crushed and processed then shipped as pellets.

5. When did the first mining plant begin and how many tons were produced?

The first plant began in 1920 and produced 200 tons a day.

6. How was math and science used to develop the industry?

The early plans used flow charts and math to solve problems; science experiments discovered the process.

7. Why did the Babbitt plant close? What lessons were learned from this early plant?

The Babbitt plant closed because it could not compete with the other ores being mined. This plant supplied information for other plants to be better built. It was the foundation of today's taconite industry.

Student Name _____

Worksheet 1-B
Video Discussion Questions

Minnesota Mining: A New Beginning

1. Why did the rich ore run out?
2. In your opinion, which event, person, or place had the most important impact on the taconite industry? Explain.
3. How did the events, people, and places affect the development of the industry?
4. What would the Iron Range be without the taconite industry?
5. What future is predicted for the taconite industry?

Extension activity

Research the contributions of a founder of the Iron Range.

George Stuntz

Peter Mitchell

Charlemagne Tower

Merritt Brothers

Cuyler Adams

Captain J.G. Cohoe

Frank Hibbing

John Monroe Longyear

John McCaskill

Teacher's Key

Worksheet 1-B Video Discussion Questions

Minnesota Mining: A New Beginning

1. Why did the rich ore run out?

The heavy demand and World War II caused the ore to run out

2. In your opinion, which event, person or place had the most important impact on the taconite industry? Explain.

Answers will vary.

3. How did the events, people, and places affect the development of the industry?

Suggested themes: citing any founder's, events or places contribution(s).

4. What would the Iron Range be without the taconite industry?

Answers should include the expansion of tourism, logging, less population.

5. What future is predicted for the taconite industry?

The future of the taconite industry is competitive and viable with skilled workers using the latest technology.

Student Name _____

Worksheet 1-C
Listening & Reading

Directions: Using the people, places and events from the list, match them to the correct date on the time line.

E.W. Davis discovered taconite process	1860	1865 _____
Cuyuna Range settled		
Merritt Brothers discovered Mesabi Range	1870	
Soudan Mine opened		
Peter Mitchell discovered taconite	1880	1880 _____
Mesabi Range settled		1882 _____
George Stuntz		
Vermilion Range settled	1890	1890's _____
Dean Applebee		1892 _____
1st pellet production by Mesabi Iron		
Frank Hibbing	1900	1904 _____
high grade ore depleted		
8 taconite plants operating		
Reserve opened	1910	1910 _____
increased demand because of WWII		1912 _____
		1912 _____
		1913 _____
	1920	
	1930	
	1940	1944 _____
	1950	1950-52 _____
		1954 _____
		1955 _____
	1960	
	1970	1970's _____
	1980	
	1990	

Teacher's Key

Student Worksheet 1-C Listening & Reading

Directions: Using the people, places and events from the list, match them to the correct date on the time line.

E.W. Davis discovered taconite process	1860	1865 George Stuntz
Cuyuna Range settled	1870	
Merritt Brothers discovered Mesabi Range	1880	1880 Peter Mitchell discovered taconite
Soudan Mine opened	1882	1882 Soudan Mine opened
Peter Mitchell discovered taconite		
Mesabi Range settled		
George Stuntz		
Vermilion Range settled	1890	1890's Merritt Bros. discovered Mesabi Range
Dean Applebee		
1st pellet production by Mesabi Iron		
Frank Hibbing		1892 Frank Hibbing
high grade ore depleted	1900	
8 taconite plants operating		1904 Cuyuna Range settled
Reserve opened		
increased demand because of WWII	1910	1910 E.W. Davis began taconite industry
		1912 Mesabi Range settled
		1912 Vermilion Range settled
		1913 Dean Applebee
	1920	
	1930	
	1940	
		1944 increased demand because of war
	1950	1950-52 high grade ore depleted
		1954 Reserve opened
		1955 1st pellet production by Mesabi Iron
	1960	
	1970	1970's 8 taconite plants operating
	1980	
	1990	

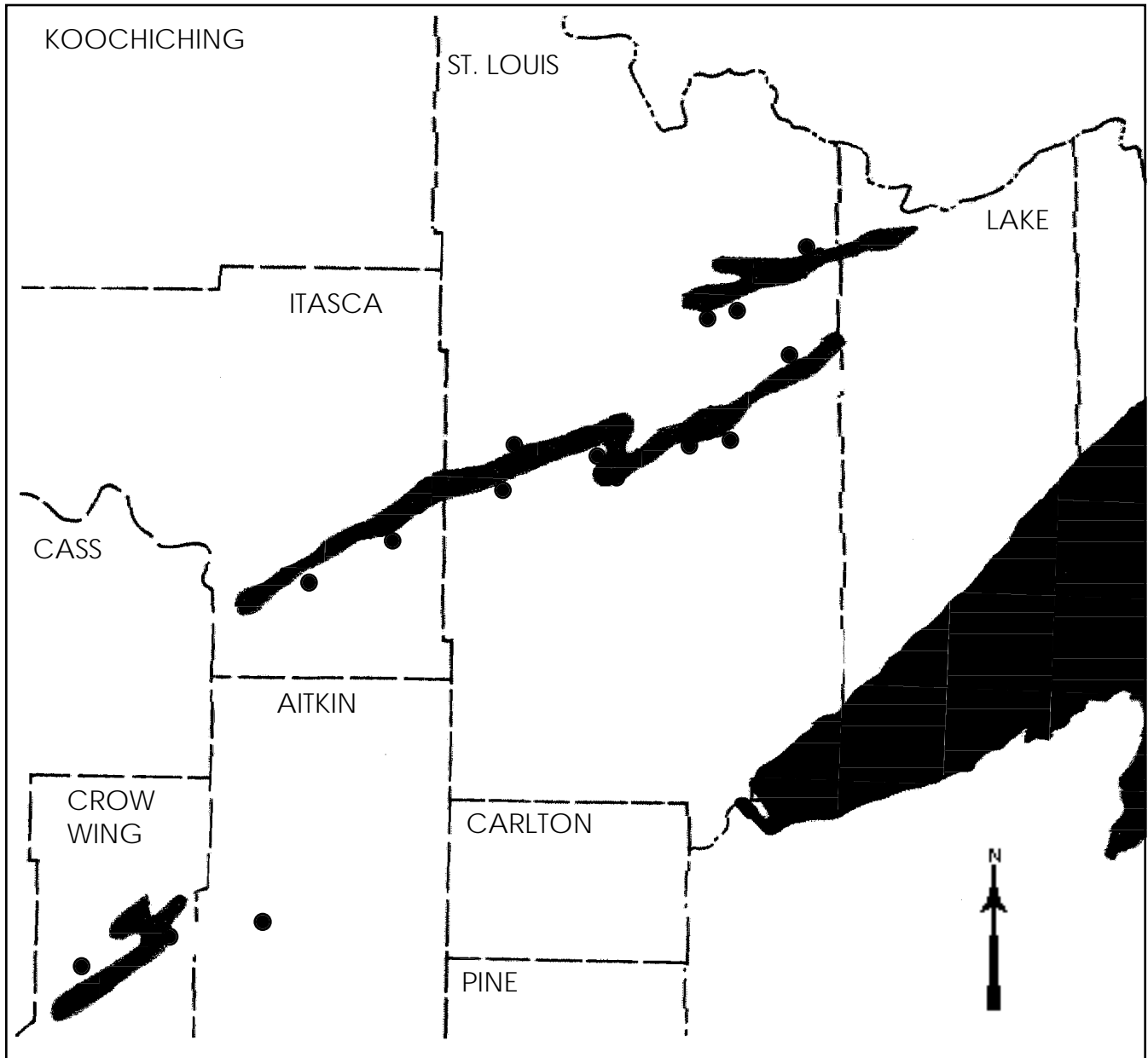
Student Name: _____

Worksheet 1 - D Map

Place the names of the towns in the Mesabi, Vermilion or Cuyuna Range on the map provided. Using a color pencil, shade the Mesabi Range area blue, Vermilion Range red and the Cuyuna Range green.

The towns to be placed are:

- | | | | |
|--|-----------------------------------|---------------------------------------|-----------------------------------|
| <input type="checkbox"/> your town | <input type="checkbox"/> Biwabik | <input type="checkbox"/> Ely | <input type="checkbox"/> Nashwauk |
| <input type="checkbox"/> Aitkin | <input type="checkbox"/> Brainerd | <input type="checkbox"/> Eveleth | <input type="checkbox"/> Soudan |
| <input type="checkbox"/> Aurora/Hoyt Lakes | <input type="checkbox"/> Chisholm | <input type="checkbox"/> Grand Rapids | <input type="checkbox"/> Tower |
| <input type="checkbox"/> Babbitt | <input type="checkbox"/> Crosby | <input type="checkbox"/> Hibbing | <input type="checkbox"/> Virginia |



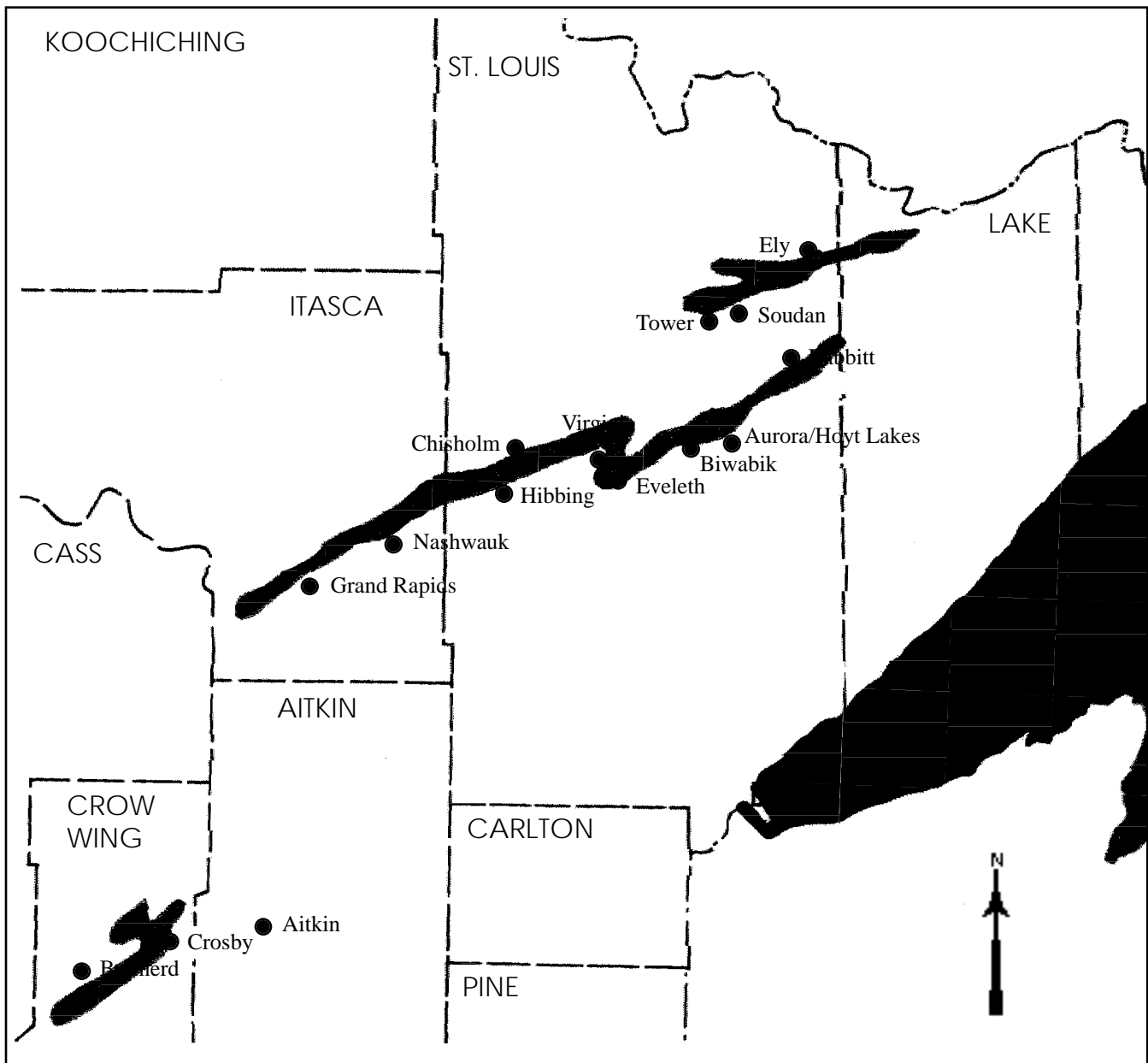
Teacher's Key

Worksheet 1 - D Map

Place the names of the towns in the Mesabi, Vermilion or Cuyuna Range on the map provided. Using a color pencil, shade the Mesabi Range area blue, Vermilion Range red and the Cuyuna Range green.

The towns to be placed are:

- | | | | |
|--|-----------------------------------|---------------------------------------|-----------------------------------|
| <input type="checkbox"/> your town | <input type="checkbox"/> Biwabik | <input type="checkbox"/> Ely | <input type="checkbox"/> Nashwauk |
| <input type="checkbox"/> Aitkin | <input type="checkbox"/> Brainerd | <input type="checkbox"/> Eveleth | <input type="checkbox"/> Soudan |
| <input type="checkbox"/> Aurora/Hoyt Lakes | <input type="checkbox"/> Chisholm | <input type="checkbox"/> Grand Rapids | <input type="checkbox"/> Tower |
| <input type="checkbox"/> Babbitt | <input type="checkbox"/> Crosby | <input type="checkbox"/> Hibbing | <input type="checkbox"/> Virginia |



Student Name: _____

Assessment Lesson 1, History

1. When and where did the taconite industry begin?
2. What is taconite?
3. Who discovered taconite?
4. Who is the “Father of Taconite” and why?
5. Describe the difference between red ore and taconite.
6. Name the three ranges of the Iron Range.
7. Name two important people who helped develop mining and tell what they did.

Teacher's Key

Assessment Lesson 1, History

1. When and where did the taconite industry begin?

The industry began in Babbitt in 1922.

2. What is taconite?

Taconite is a hard rock that contains about 20-30% iron.

3. Who discovered taconite?

Peter Mitchell discovered taconite.

4. Who is the "Father of Taconite" and why?

E.W. Davis is the "Father of Taconite" because he developed the taconite mining process.

5. Describe the difference between red ore and taconite.

Red ore is 50-60% iron and taconite is 20-30% iron. Red ore is shipped directly and taconite is processed and formed into pellets and then is shipped.

6. Name the three ranges.

The three ranges are: Mesabi, Cuyuna and Vermilion.

7. Name two important people who helped develop iron mining industry.

Any of two: George Stuntz, Peter Mitchell, Charlemagne Tower, Merritt Brothers, John McCaskill, Captain Coho, Frank Hibbing, The Longyears

Lesson 2, Process

Goal: *To know the process of taconite production.*

Student outcomes:

The student will

- describe the taconite process.
- describe land reclamation.

Supportive resources and curriculum materials:

Videos

Where Steel Begins

Description: A 15-minute video that describes the process of mining taconite. Mining occupations are shown in the video.

Posters

“Let’s Rock!”

“Reclaiming the Land”

Materials for Assessment

Some art materials may need to be supplied to the students (see page 2 - 7)

Part I Activities using *Where Steel Begins* video and “Let’s Rock!” poster

1. View video, *Where Steel Begins*.
2. List and discuss the taconite process. Use the sample taconite packet and the “Let’s Rock!” poster.
3. Use the “Let’s Rock!” poster and Worksheets 2-A or 2-B
 - 2-A: have students complete the identified tasks.
 - 2-B: have students design tasks under each heading.

Part II Activities using “Reclaiming the Land” poster

1. Introduce poster
2. Assign partners or let students choose a “Study Buddy.”
3. Worksheet 2-C, discussion questions
4. Discuss and define the terms on the back of the poster.

Worksheet 2-A

Let's Rock!**Activity Guide**

for the IMA "Let's Rock!" Poster

MATH

1. change words into numbers
2. convert tonage into pounds
3. compare numbers: mini van = weight
4. change large numbers to expanded notation

vocabulary/spelling

1. taconite

Creative Writing

1. Comparing the naming of the Cuyuna Range, rename a range of your own. Tell why.
2. Pretend you are the rock being crushed. Describe the feeling.

RESEARCH

1. List other steel products.
2. Describe the route of ore boats.
3. Measure the distance of a route.

Worksheet 2-B

Let's Rock!

Activity Guide

for the IMA "Let's Rock!" Poster

MATH

vocabulary/spelling

Creative Writing

RESEARCH

Student Name _____

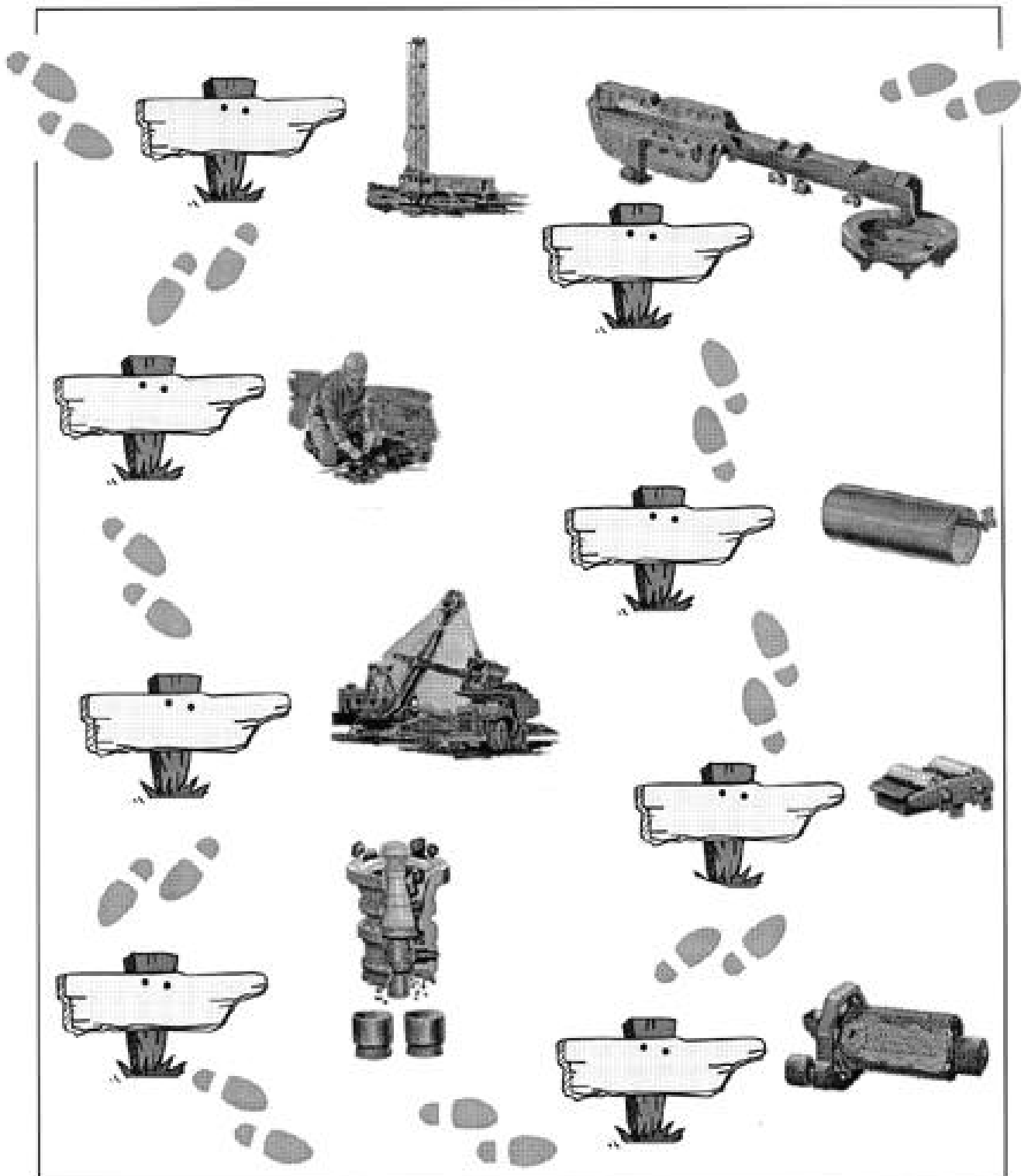
Worksheet 2-C
Discussion Questions

“Reclaiming the Land” poster

1. In what way has mining changed the environment?
2. Name the ways of reclamation.
3. Name ways of preventing erosion.
4. List ways in which the mining company has put nature back on track. Why is this important?
5. Can you think of special projects that the mining company has done to restore our community environment?
6. Compare and contrast public land use to mining land use.
7. Without reclamation, what would the land be like?
8. List the cause and effect of water and air pollution and the removal of top soil.

Assesment Lesson 2, Part I Steps in Processing Taconite Rock

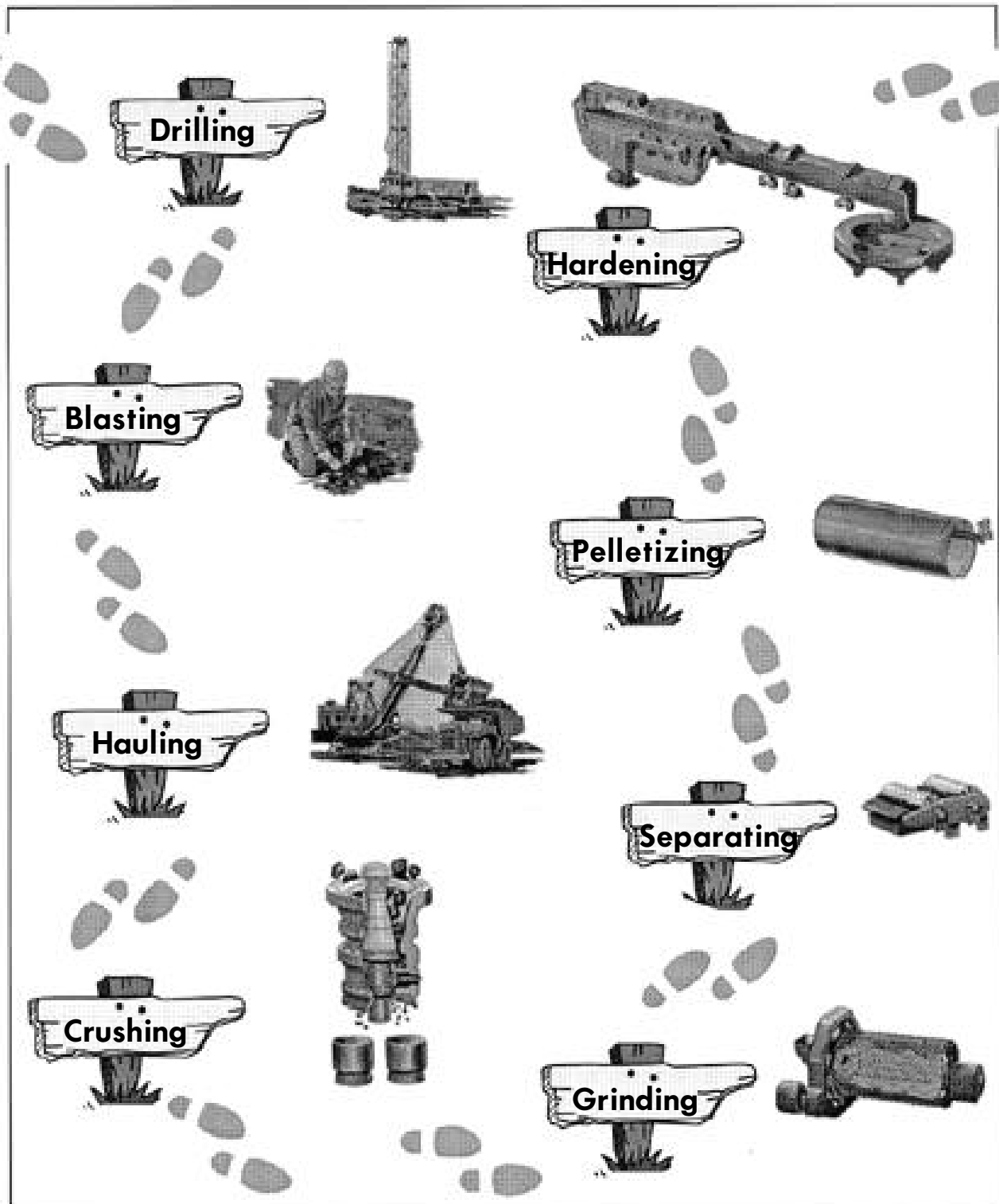
Directions: Label the signpost at each stop during your walk through the steps in processing taconite rock into pellets, ready to be shipped to the nation's steelmakers.



Assesment Lesson 2, Part I **Teacher's Key**

Steps in Processing Taconite Rock

Directions: Label the signpost at each stop during your walk through the steps in processing taconite rock into pellets, ready to be shipped to the nation's steelmakers.



Assessment Lesson 2, Part II

Reclamation

Creative Writing/Art Project

***Teacher-directed
assessment***

1. Draw a picture or poster or create a 3-dimensional model. Label your reclamation project.
2. Describe your project by writing a paragraph to tell how you reclaimed a pit or a parcel of land to make it more usable. Be sure to include the materials used, people needed and the time it would take for the reclamation project.

Lesson 3, Careers

Goal: *To explore careers and interest in the mining industry.*

Student outcomes:

The student will

- explore careers and required training related to mining.
- assess his/her interests related to mining careers or occupations.

Supportive resources and curriculum materials:

Reference the previous materials used i.e., videos, posters

“Careers in Mining” transparency master

“Careers in Mining” job descriptions

Activities

1. Recalling information from posters, videos and print, brainstorm a list of careers.
2. Administer Common Ground’s “Whistle While You Work” career assessment (Worksheet 3-A) .
3. Discuss what training or education would be necessary for the careers.
4. Assign the students the “Careers in Mining” career grid (Worksheet 3-B) to identify related subjects and training for careers or jobs. Enter into groups to share information.

Assessment Lesson 3: “If I Worked in the Mines”

Written Language: Have the students write a paragraph about a career or job that is of interest. Explain their reason. The students should include information about the subjects they should study in high school as well as their plans for schooling after graduation.

Extension activities:

1. Expert Interview (Grad Rule Standard)
2. Contact resource speaker, i.e., parent, relative, friend or a person listed on the resource sheet.

Student Name _____

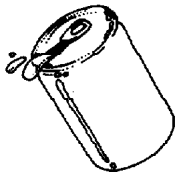
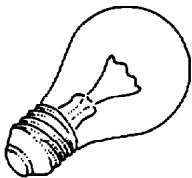
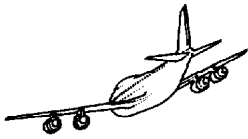
Worksheet 3-A

Careers in Mining: Whistle While You Work

You might not know what career you want, but you know what you like to do. In mining there are many diferent careers, just as there are in other industries. You have many choices for your future career, so try to find something to

do that you enjoy. Then you'll really feel like whistling while you work!

Rank the following activities from 1 to 10, with 1 being what you enjoy most.



Collecting and identifying rocks _____

Making maps and drawings _____

Solving puzzles and problems _____

Organizing group activities _____

Woods, plants and animals _____

Writing, talking on the phone _____

Computer games _____

Big trucks and machinery _____

Working with tools _____

Selling things _____

Reprinted thanks to the Nevada Mining Association

Careers in Mining

If you ranked *collecting and identifying* rocks highly, you might like being a **geologist** .

If you like *making maps and drawings*, you could become an **industrial designer** .

Solving puzzles and problems is an ability needed by a **mining engineer** .

If you're good at *organizing group activities*, you could become a good **plant manager** .

Woods, plants and animals are managed by **environmental engineers** and **wildlife managers** .

Writing and talking on the phone are among the daily activities of **public relations** and **marketing** professionals.

Students that are good at *computer games* might enjoy careers in **data processing** .

Big trucks and machinery are operated by **miners** .

Plants need people who are *good at working with tools* to be **plant workers** .

If you have a *knack for selling things*, you might enjoy being a **sales representative** .

Careers in Mining

Accountant Analyze, compile, compute and prepare a wide variety of statistical reports; analyze, prepare, maintain and audit general accounting ledgers, records and reports; set up and maintain controls for employee payrolls; initiate orders for equipment, parts, supplies and repairs and expedite to delivery, completion and payment; assemble and review data for conformance with established controls relating to time, completeness and accuracy, arrangement of data and system requirements.

Agglomerator Operator Control panel, data loggers and alarm systems, 3 agglomerating lines; control the taconite pelletizing process following specified procedure to meet product specifications.

Automotive Mechanic Make repairs to gasoline, diesel or diesel-electric powered automotive equipment.

Blaster Load blast holes with explosives and detonate charge.

Carpenter Perform any type of rough and finish carpentry work.

Communications Coordinator Coordinate communications on mine radio, maintaining computer reports and written records and notify mine foremen or maintenance personnel of movement of personnel or equipment to maintain mining and repair activity.

Concentrator Operator Control panel board, data loggers, alarm systems, 18 taconite concentrating lines.

Crane Operator (Truck) Move and operate truck crane.

Crusher Operator Control the taconite crushing process.

Data Processor Process information using computers.

Electrical Repairman Perform bench work required in repairing, testing, and assembling parts for electrical and electronic equipment.

Electrician (Field Expanded) Inspect, repair, and install and wire all electrical apparatus, devices and circuits of any voltage in the plant or assigned area.

Electrician (Shop) Make mechanical and electrical repairs to all types of electrical equipment.

Engineering Technician II Assist Mining Engineering staff.

Environmental Technician Collect and prepare data and information in connection with environmental engineering studies; make required investigations and conduct tests relative to the environmental impacts of mining upon the air, water and land resources.

Expediter Expedite ordering and procure parts and repairs; schedule employees, maintain time records and code shop cards.

Laborer Do general manual labor in and about the plant.

Ironworker Lay out, fabricate, assemble, erect, or make repairs for all types of structural and plate work; perform all kinds of welding.

Locomotive Mechanic Make repairs to diesel, diesel electric, electric and steam locomotives.

Machinist Set up and operate machine tools, perform any dismantling, fitting or assembly required for plant maintenance or construction.

Manpower Scheduler Prepare a variety of weekly work schedules for production and maintenance employees.

Mason Lay brick and perform other masonry work.

Millwright Inspect, repair, replace, install, adjust, and maintain all mechanical equipment in a major producing unit or assigned area.

Mine Draftsman Draw new stadia charts and trace maps of pits, dumps, and other properties.

Mine Engineering Analyst Collect, compile and analyze data related to crude ore and waste production with respect to quantity and quality control.

Mine Equipment Operator Perform a variety of tasks associated with the mine equipment operation: operate a crawler, tractors with front-end loaders or forks to load, semi-tractor, various types of powered mobile equipment, service trucks, crawler crane, powered graders, mobile (rubber-tired) and boom truck type cranes, rubber-tired backhoe; operates and attends pumps, services equipment.

Painter Perform interior and exterior hand and spray painting.

Physical Tester Collect and prepare samples for analysis and perform physical tests.

Rotary Drill Operator Move, set up, and operate mobile, crawler mounted, rotary blast hole drill.

Supercraft More than one trade.

Surveyor Direct crew and operate geological and surveying equipment; analyze field and office data.

Systems Repairman Install, repair, construct, adjust, modify and service all types of electronic equipment.

Technical Draftsman Prepare design layouts and design drawings of equipment and structures, or equipment alteration; photograph, develop and print pictures for use of Engineering and other departments.

Train Operator Operate train for haulage, switching and servicing work in and about mine, plant and shops by remote portable radio control.

Truck Driver (Production) Operate production trucks of all types for hauling ore or stripped materials.

Utilities Operator Operate boilers, water and waste water treatment plants, pump stations and air compressors to provide utilities for the entire plant.

Warehouseman (Salvage) Receive, check, store and issue warehouse supplies and equipment.

MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES AND LEARNING
Performance Package
Minnesota Profile of Learning
Content Standard Inquiry G5.1

Student _____

<input checked="" type="checkbox"/> Developmental Level <input type="checkbox"/> MN Standard Level
--

Course Any Content Area

Title of Package/Activity Expert Interview

Summary Statement of Content Standard

Answer questions using information gathered through direct observations, experiment and other sources.



Description of Student Performances	Performance Record	Achievement Grades/Ratings
1. Develops mind map for investigating an identified topic. 2. Plans, conducts, and documents an expert interview. 3. Writes a field note after the interview.		

Circle Final Achievement Grade/Rating: 4 3 2 1

Test Management Skills	Performance Record	TMS Grades/Ratings
Manages time well Keeps trying Uses resources appropriately		
Key: 4 = Exceeds expectations, approximately "A" work 3 = Meets expectations, approximately "B" work 2 = Work has deficiencies or process lacks independence 1 = Unacceptable or incomplete	Circle Final Task Management Skills Grade/Rating	4 3 2 1

STUDENT PERFORMANCE TASK 1

Expert Interview

Standard Code	Level	Topic	Amount of Time	
Inquiry G5.1	 	Developmental MN Standard	Interviewing	2 weeks

Specific Statement(s) from the Standard

What students should do:

3. Gather information through direct observation and interviews:
 - a. identify a topic or area for investigation
 - b. write a rich and detailed description of the observation
 - c. conduct an interview with follow-up questions or design and conduct a survey
 - d. record and organize information
 - e. evaluate the findings to identify areas for further investigation.

Product

1. Mind map for investigating a topic
2. Interview documentation
3. Field note

Central Learning

Gather information by framing initial questions, listening to responses, and immediately developing further questions to probe for relevant information.

Description of Task

1. When the students begin the research process, it is helpful to explore how an expert in the topic area might organize an inquiry. For this task, provide the students with a list of potential topics.
2. They will prepare a mind map for an investigative topic by brainstorming all of the resources:
 - people that might provide information for their study
 - experts
 - places

If their knowledge is limited on the topic, it would be helpful to access at least one general source of information. For example, on the topic of immigration, they might read *Do People Grow on Family Trees: Genealogy for Kids and Other Beginners*, *The Official Ellis Island Handbook* by Ira Wolfman (New York: Workman Publishing, 1991) and develop a mind map for investigating the topic that might include the following:

Mind Map for Immigration

<u>People</u>	<u>Experts</u>	<u>Places</u>
Jacob Lattimer	History Professor	University of Minnesota
Elizabeth Walker	Genealogist	The Research Center at the MN History Museum
James Swanson	Local Historian	MN Historical Society
Susan Petrocelli	Historical Interpreter	Statue of Liberty Ellis Island Foundation

3. Using the available technology (telecommunications, phone, letter), the students will contact one of the sources of information on their list and ask for permission to interview.

STUDENT PERFORMANCE TASK 1

Expert Interview

Description of Task, continued

4. They should design an interview guide with four questions. The purpose of the interview is to find out HOW to do a study on a topic, not to find out detailed information ON a topic. The interview questions should help them understand the kinds of research questions experts ask about a topic, issues related to the main topic, important sources of information on the topic, and organizations they could contact for additional information.
5. The student will now conduct the interview with their expert source. If the interview is written (questionnaire handed out in person or via e-mail), the student will have a written copy of the interview response. If the interview is oral (over the phone or in person), they will need to tape the interview. Inform them that they can only tape an interview after obtaining permission from the expert.
6. They are required to write a field note for their interview that identifies their source, date of interview, and the background of their source. They need to include a copy of their interview guide, a summary of answers to the interview questions given by their source, and what they have learned about how to conduct a study on their topic (in this last section, they should include a revised mind map for their investigation).
7. They will submit their original mind map, documentation of their interview (in written or taped

Task Management Skills

Manages time well
Keeps trying
Uses resources appropriately

Special Notes

The materials and topics used in this task can be adapted based upon the curriculum used by individual school districts,

This assessment task should be linked with units of instruction and the parameters for topic choice should be determined by the curriculum. Good resources on interviews skills include: *Reaching Out: School-Based Community Service Programs* (from the National Crime Prevention Council, 733 15th Street, NW, Suite 540, Washington DC 10005) *Families Writing* by Peter Stillman (Cincinnati, OH: Writer's Digest Books, 1989), and *Oral History in the Classroom* (from Social Studies School Service, 10000 Culver Blvd., Culver City, CA 90230).

The task in this package will also allow students to demonstrate competencies in any content area. However, the performance criteria listed here reflect the requirements for meeting the inquiry standard at the developmental level. Additional criteria would need to be generated if the task in this package is used to assess other standard areas.

This assessment package is based upon material that may appear in the following publication: Monson, M.P and Monson, R.J. (in press). *Integrated Learning Assessment: Building Stronger Bridges Between Learning, Curriculum and Assessment*. Tucson, AZ: Zephyr Press. Task designer Michele Pahl Monson can be reached through e-mail at 0197supt@informns.k12.mn.us,

STUDENT PERFORMANCE TASK 1
Expert Interview

Performance Criteria

CHECKLIST FOR TASK 1 (For teacher information)	
E=Excellent S=Satisfactory N=Needs Improvement	
	Teacher Evaluation
Demonstrates preliminary research work in developing mind map for the investigation.	_____
Demonstrates ability to contact sources (within the limits of available technology and the accessibility of sources).	_____
Designs an expert interview guide that addresses four areas (research questions, issues, sources of information, and organizations).	_____
Conducts interview effectively (within the limits of available technology and the accessibility of sources).	_____
Documents the interview in written or taped formats.	_____
Prepares a field note that gives the background of the interview: <ul style="list-style-type: none">• includes a copy of interview guide• summarizes answers given by source• summarizes what was learned about conducting research on the topic• revises the mind map for the investigation	_____
	OVERALL EVALUATION _____

STUDENT PERFORMANCE TASK 1
Expert Interview

CHECKLIST FOR TASK 1 (To use with students)		
E=Excellent S=Satisfactory N=Needs Improvement		
Student Evaluation		Teacher Evaluation
_____	Makes a list (mind map) of people to question about how to research a topic.	_____
_____	Finds fitting ways to contact sources.	_____
_____	Makes an interview guide that is complete and easy to read: <ul style="list-style-type: none"> • asks questions that can be researched • brainstorms ideas about the main topic • suggests people to ask about topic • suggests places to find facts about the topic 	_____
<u>The Interview</u>		
_____	Asks questions that are related to the topic.	_____
_____	Asks questions that are clear.	_____
_____	Writes down or tapes the answers.	_____
_____	Writes field notes that are detailed and easy to understand: <ul style="list-style-type: none"> • includes a copy of the interview guide • summarizes answers from the source • states what was learned from the research • completes and revises the mind map. 	_____
OVERALL EVALUATION		_____

Notes following Performance

ATTACH ALL DOCUMENTS THAT ARE APPROPRIATE TO THIS ASESSMENT

Great **Internet** Ideas



1. Correspond with email pen pals around the world.
2. Mentoring—have an expert in a field answer your questions.
3. Contact important figures—send email to company CEOs or government officials.
4. Find mailing lists and newsgroups on appropriate subjects.

WORDSEARCH

Find career possibilities in the mineral industry.

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

ACCOUNTANT

BLASTER

CHEMIST

CLERK

COMPUTER

CRUSHER OPERATOR

DIESEL MECHANIC

DRILLER

ENGINEER

EQUIPMENT OPERATOR

FOREMAN

GEOLOGIST

LABORER

MANAGER

MECHANIC

METALLURGIST

OILER

PERSONNEL

PLANT OPERATOR

PURCHASE AGENT

REFINER

SAFETY

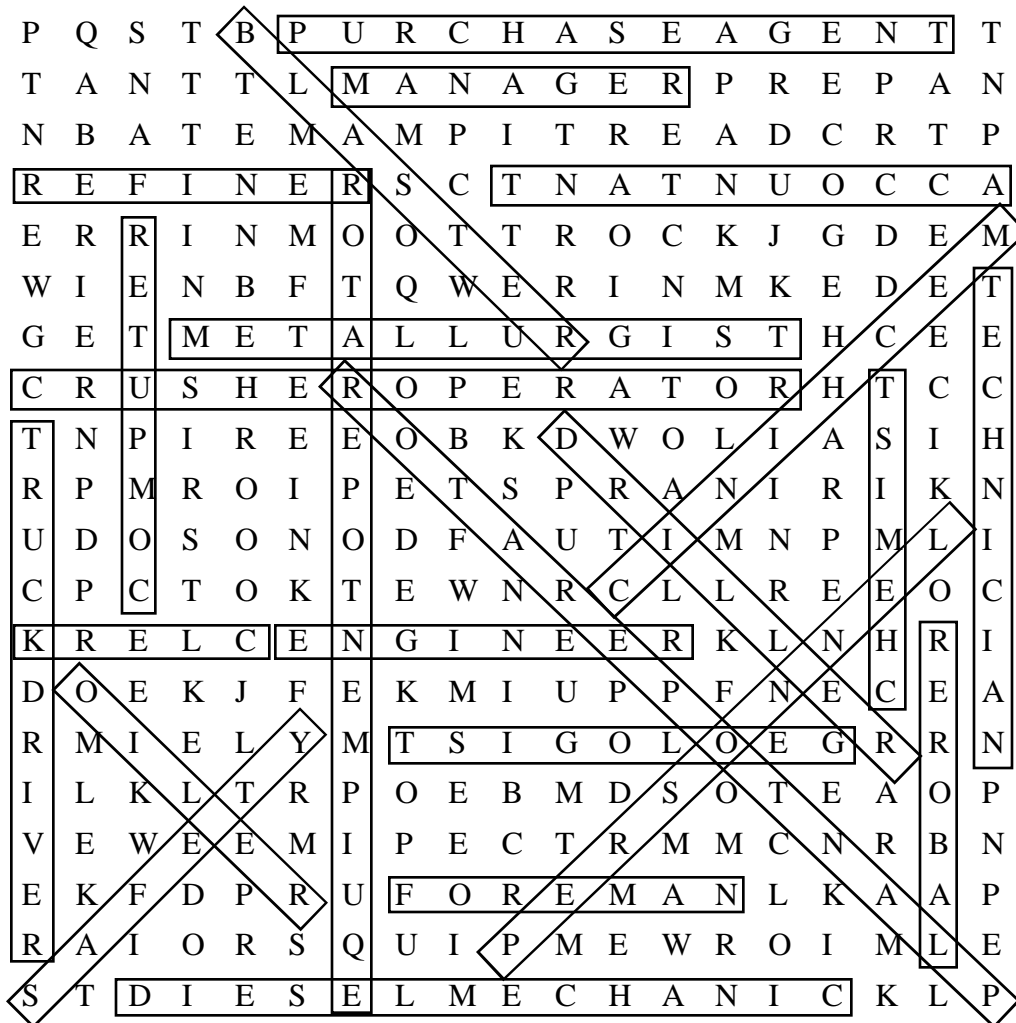
TECHNICIAN

TRUCK DRIVER

Teacher's Key

WORDSEARCH

Find career possibilities in the mineral industry.



ACCOUNTANT

BLASTER

CHEMIST

CLERK

COMPUTER

CRUSHER OPERATOR

DIESEL MECHANIC

DRILLER

ENGINEER

EQUIPMENT OPERATOR

FOREMAN

GEOLOGIST

LABORER

MANAGER

MECHANIC

METALLURGIST

OILER

PERSONNEL

PLANT OPERATOR

PURCHASE AGENT

REFINER

SAFETY

TECHNICIAN

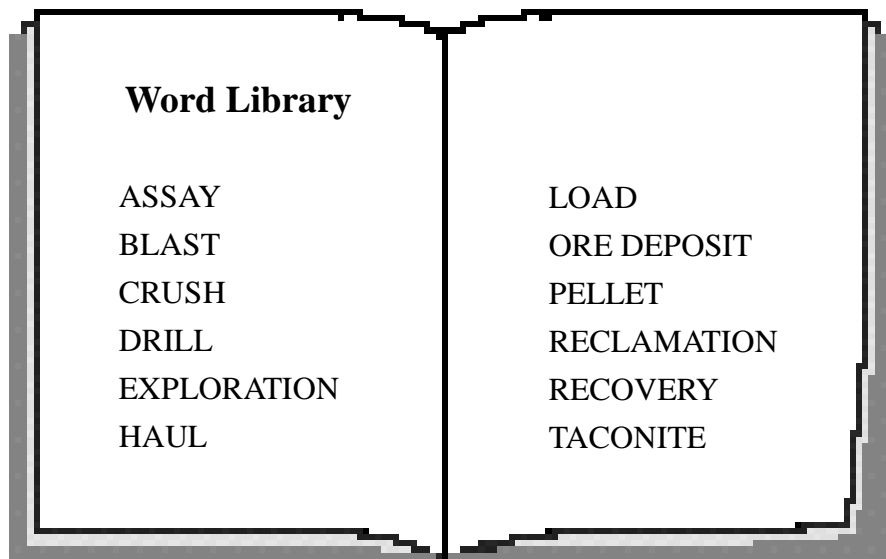
TRUCK DRIVER

Mining Terms

SCRAMBLE

Use the Word Library below to unscramble the words.

1. H S C U R _ _ _ _ _
2. Y O R V E E R C _ _ _ _ _
3. L R I D L _ _ _ _ _
4. M E O R I T A L C N _ _ _ _ _
5. A U H L _ _ _ _ _
6. L P T E L E _ _ _ _ _
7. D L O A _ _ _ _ _
8. A T T O C N E I _ _ _ _ _
9. S Y A S A _ _ _ _ _
10. E R O P D O S T I E _ _ _ _ _
11. T A L B S _ _ _ _ _
12. P O R X E T O L I N A _ _ _ _ _



Mining Terms

SCRAMBLE

Use the Word Library below to unscramble the words.

1. HSCUR **CRUSH**
2. YORVEERC **RECOVERY**
3. LRIDL **DRILL**
4. MEORITALCN **RECLAMATION**
5. AUHL **HAUL**
6. LPTELE **PELLET**
7. DLOA **LOAD**
8. ATTOCNEI **TACONITE**
9. SYASA **ASSAY**
10. ERO PDOSTIE **ORE DEPOSIT**
11. TALBS **BLAST**
12. PORXETOLINA **EXPLORATION**

Word Library

ASSAY
BLAST
CRUSH
DRILL
EXPLORATION
HAUL

LOAD
ORE DEPOSIT
PELLET
RECLAMATION
RECOVERY
TACONITE



Mining Economics: Cookie Mining

Materials needed:

- 3 types of chocolate chip cookies— Mothers, or another low-priced store brand (fewer chips). Chips Ahoy (more chips), and Chips Deluxe (most chips)
- Flat toothpicks
- Round toothpicks
- Paper clips
- Cookie Mining Sheet
- Cookie Mining Grid
- Cookie Mining Money

Procedure:

1. Explain the object of cookie mining: to make a profit. Each student buys property (a cookie), equipment (toothpicks or paper clips), pays for the mining operation and reclamation. In return, the students receive money for the ore mined (chocolate chips).
 2. Each player starts with \$19 worth of Cookie Mining Money, a Cookie Mining Sheet, and a sheet of the grid paper.
 3. Each student must buy his/her own “mining property” or cookie. Write the cookie prices on the board:
 - Store brand chocolate chip - \$3.00
 - Chips Ahoy - \$5.00
 - Chips Deluxe - \$7.00
 4. After the cookies are bought, have the students give their “mine” a name, and record it, along with the price of their cookie on the sheet.
 5. Have them place their cookie on the grid paper and trace the outline of the cookie. They should then count each square that falls inside the circle, counting partial squares as a full square, and record that number on the sheet.
 6. Students must now buy mining equipment. They can purchase more than one piece or type of equipment. If a mining tool breaks, it is no longer usable, and a new tool must be purchased. Write the prices on the board:
 - Flat toothpick - \$2.00 each
 - Round toothpick - \$4.00 each
 - Paper clip - \$6.00 each
- Have them record the price of mining equipment on their sheets.
7. Now they can mine the chips out of the cookies. No student can use his fingers to hold a cookie. The only things that can touch the cookie are the mining tools and the paper the cookie is sitting on. The maximum mining time is 5 minutes, at a cost of \$1.00 per minute. Students can finish mining before the 5 minutes are up, and record the time spent mining on the sheet.
 8. Students receive \$2.00 for each chocolate chip mined. Broken chips can be combined to form one whole chip.
 9. After the cookie has been mined, students should use the tools to “reclaim” the property, placing it back into the circled area. No fingers or hands allowed. Draw another circle around the reclaimed cookies, and assess students \$1.00 for each square over the original count.
 10. The player with the most money at the end of the game wins, and everyone gets to eat the remainder of their cookie!

Discussion Points:

- Did it matter which cookie you bought? Which cookies were harder or easier to mine, and why? Which cookies were more expensive?
- What about the mining equipment? Which tools, or combination of tools were most effective? Did certain tools break?
- When you tried to reclaim your cookie, what happened? Was it difficult to return this cookie back to the same exact size that it was before mining the chips?



Mining Economics: Cookie Mining

1. Name of cookie mine.....

2. Price of cookie.....
(Mothers \$3.00, Chips Ahoy \$5.00, Chips Deluxe \$7.00)

3. Size of cookie _____ squares covered

4. Equipment:

Flat toothpick _____ x \$2.00 = _____

Round toothpick _____ x \$4.00 = _____

Paper clip _____ x \$6.00 = _____

Total Equipment Cost

5. Mining: _____ minutes x \$1.00
Cost of removing chips.....

6. Total Cost of Mining.....

7. Chip removal:
Number of chips _____ x \$2.00
Value of Chips.....

How much did I make?	
Value of chips	_____
Total cost of mining.....	_____
Profit/Loss.....	_____

8. Reclamation: _____ squares x \$1.00



Mining Economics: Cookie Mining

Sample

1. Name of cookie mine..... BIG CHIP

2. Price of cookie..... 7.00
(Mothers \$3.00, Chips Ahoy \$5.00, Chips Deluxe \$7.00)

3. Size of cookie 59 squares covered

4. Equipment:

Flat toothpick	<u>2</u> x \$2.00 = <u>4.00</u>
Round toothpick	___ x \$4.00 = ___
Paper chip	___ x \$6.00 = ___

Total Equipment Cost 4.00

5. Mining: 4 minutes x \$1.00
 Cost of removing chips..... 4.00

6. Total Cost of Mining..... 15.00

7. Chip removal: 10 x \$2.00
 Value of Chips..... 20.00

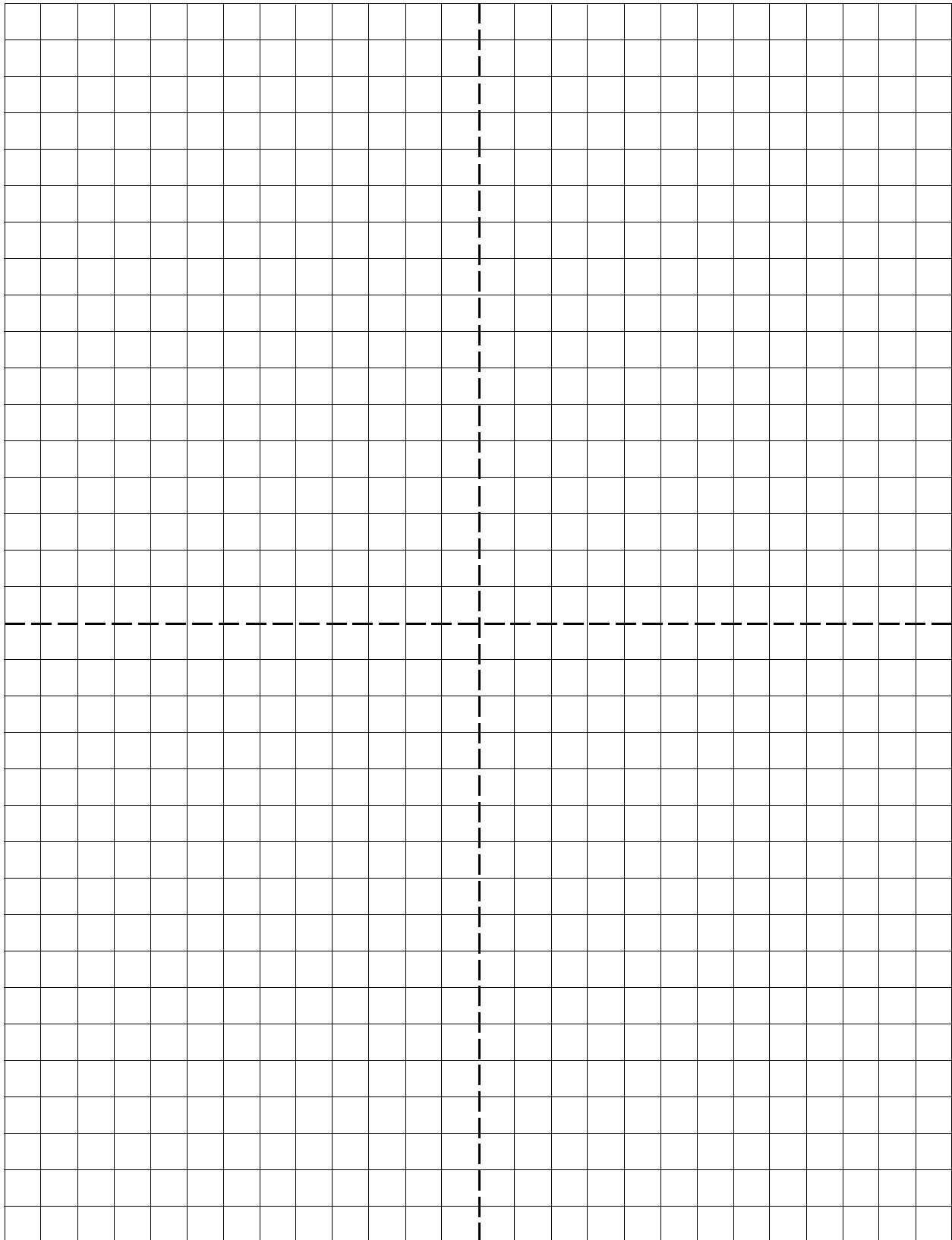
How much did I make?	
Value of chips.....	<u>20.00</u>
Total cost of mining.....	<u>15.00</u>
Profit/Loss.....	<u>+5.00</u>

8. Reclamation: 50 squares x \$1.00 50.00





Cookie Mining

Cut this grid paper in four parts



\$5 *Cookie Mining Money* \$5





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ Five Dollars \$

\$5 *Cookie Mining Money* \$5

\$5 *Cookie Mining Money* \$5





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ Five Dollars \$

\$5 *Cookie Mining Money* \$5

\$5 *Cookie Mining Money* \$5





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ Five Dollars \$

\$5 *Cookie Mining Money* \$5

\$5 *Cookie Mining Money* \$5





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ Five Dollars \$

\$5 *Cookie Mining Money* \$5

\$1 *Cookie Mining Money* \$1





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ One Dollar \$

\$1 *Cookie Mining Money* \$1

\$1 *Cookie Mining Money* \$1





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ One Dollar \$

\$1 *Cookie Mining Money* \$1

\$1 *Cookie Mining Money* \$1





COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ One Dollar \$

\$1 *Cookie Mining Money* \$1

\$1 *Cookie Mining Money* \$1



COMMON GROUND
Modern Mining And You

COMMON GROUND
Modern Mining And You

\$ One Dollar \$

\$1 *Cookie Mining Money* \$1