

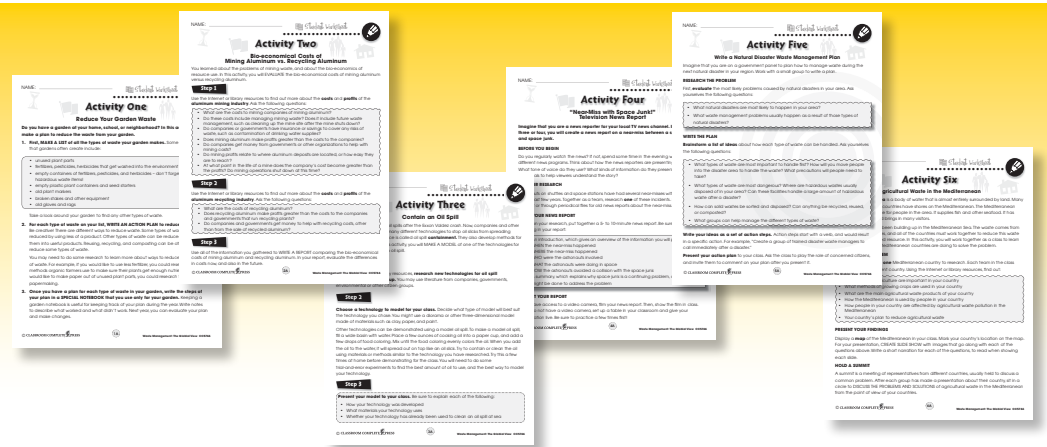
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# Waste from Mining



1. Think of a shiny metal. Now, think of a rock. Metal comes from rock. What do you think must be done to the rock to get just the metal?

\_\_\_\_\_  
\_\_\_\_\_

2. Use a dictionary to look up the terms ORE and ACID. Write the definitions on the lines below.

a) The definition of **ore** is: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b) The definition of **acid** is: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Think of **FIVE** things that you used today that contain metal or other ores.

1) \_\_\_\_\_  
2) \_\_\_\_\_  
3) \_\_\_\_\_  
4) \_\_\_\_\_  
5) \_\_\_\_\_

# Waste from Mining



What types of wastes are created from mining?

**M**ining for rocks, metals, and other **ores** creates huge amounts of waste. First, rock must be removed from the earth. Metals and other ores make up only a tiny part of rock. In order to get the ore, rock is first crushed, washed, sorted, and sometimes cooked. This process separates chunks that contain ore from chunks that do not. The rock that does not contain ore is waste. At this point, the waste material is not too harmful. It is a lot like the rock that was taken from the earth.

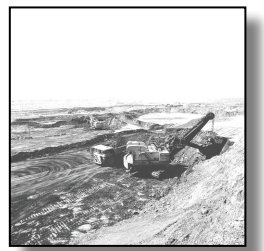
The next steps of mining create much more harmful, or **toxic**, waste. The metals we use in buildings, cars, and other products are very pure. In other words, they do not include any of the rock, only the metal. In many cases, mines use harmful substances such as **acid** and **cyanide** to separate the ore from the rock. When the metal is taken away, the leftover materials are very toxic.

**STOP** Describe two different types of mining wastes.

\_\_\_\_\_  
\_\_\_\_\_

How does mining waste cause harm?

Mining wastes can get into, or contaminate, huge areas around mines. Mining can go on for many years at one site. During that time, piles of rock and waste materials build up around the mine. Rain and snowmelt wash acids and other harmful substances into soil, ground water, lakes, and streams. Mine wastes can travel for many miles away from the mine.



Acids and other toxic waste from mines harm all kinds of living things. Mining waste can kill off plant life in an area. Animals must also move away, since they need plants to live. Mining waste has contaminated the drinking water supplies for many human communities, also.



# Waste from Mining



1. Number the events from 1 to 5 in the order they occur in mining.

\_\_\_\_\_ a) Acid is poured on the rock.  
\_\_\_\_\_ b) Large amounts of rock are taken from the earth.  
\_\_\_\_\_ c) Rock is sorted into pieces that contain ore and pieces that do not.  
\_\_\_\_\_ d) Metals are removed from the rest of the rock materials.  
\_\_\_\_\_ e) Rock is crushed and ground into small pieces.

2. a) **Circle** the words that are NOT waste products from mining

acid      biomass      cyanide      rock      oil

b) **Circle** the places where mining waste can contaminate.

soil      well water      streams      the atmosphere      lakes

3. Number the events from 1 to 4 in the order that they occur in mining.

a) piles of waste rock build up around the mine  
 b) rain falls on the piles of rock  
 c) acid and other harmful substances wash out of the rock pile  
 d) mine waste contaminates water supply

# Waste from Mining



4. Explain how mining waste can travel many miles away from the mine.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Explain how people can be harmed by mining waste.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Extension & Application

6. Learn more about mine waste. Choose **one** of the topics listed below.

- **How do today's mines control their mining waste?**
- **How are old mines cleaned up?**

Check with your teacher if you would like to make up your own topic to research.

Then, use library or Internet resources to find information about your topic. After you have found some general information to answer your topic question, look for information to do a case study. A case study is a report about one example of your topic:

- If you are researching today's mines, look for information about **one mine that is in operation right now**. Find out how that mine controls its waste. Usually, a mine will have a website with information. Or, call the mine operator and ask for brochures or other print materials.
- If you are researching how old mines are cleaned up, look for information about **one clean-up operation**. Find out why the old mine was causing problems, and what steps people took to clean it up. Your local or regional environmental protection agency will have information about clean-up operations at old mines.



# Nuclear Fuel Debate

Set up a class debate about the use of nuclear energy to make electricity. Nuclear energy has **ADVANTAGES** and **DISADVANTAGES**. It does not create air pollution like burning fossil fuels. It does not add greenhouse gases to the atmosphere. However, it does have the problem of creating radioactive waste.

## BEFORE YOU BEGIN

Have students choose whether they will argue **for** or **against** the use of nuclear energy to make electricity. Or, have students draw straws to be randomly assigned to one group or the other.

## DO YOUR RESEARCH

Together as a group, research all of the advantages and disadvantages of nuclear energy. Read what experts have to say on both sides of the issue. Find out how much nuclear energy costs compared to other types of energy. Then, try to analyze the bio-economic costs of nuclear energy compared to other types of energy.

Write a list of **five main points** that your group would like to make in the debate. After you write your list, try to think of what the other group might say in response to your points. Talk about how you will respond to arguments about the points you are making.

Choose one person in your group to make each of the points. If there are more people left in your group, choose one person to respond to each of the other team's points.

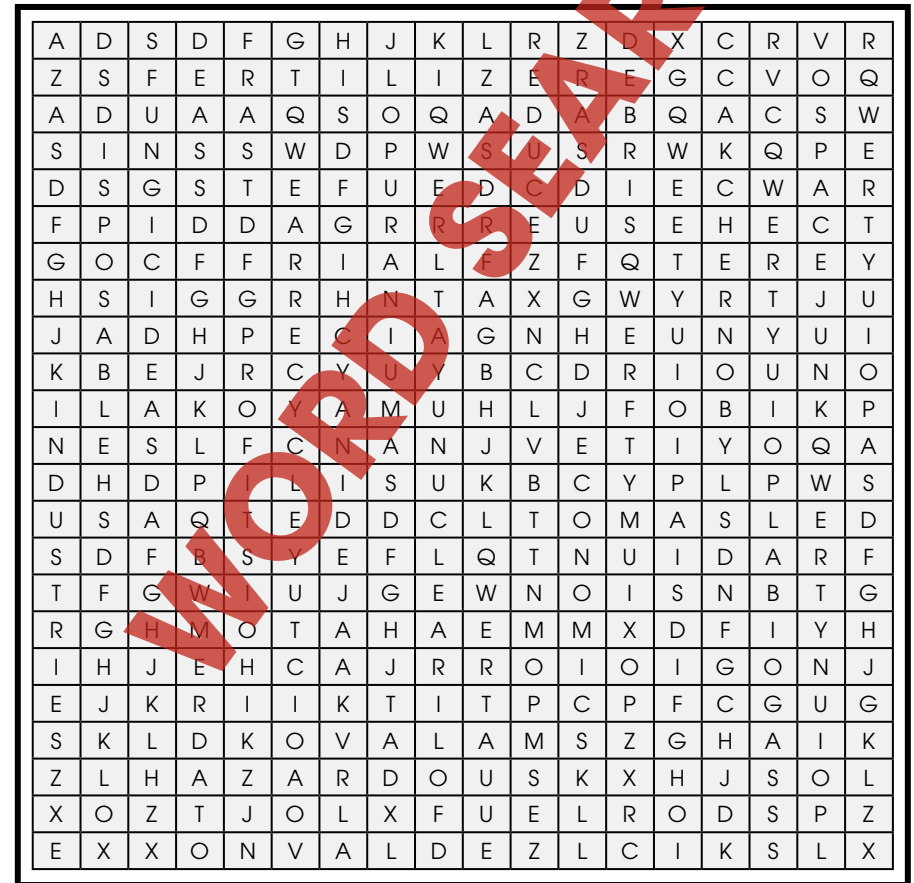
## CONDUCT THE DEBATE

In the debate, each side will have 2 minutes to make each of their points. Teams will take turns. Team A will make their first point, then Team B will have 2 minutes to make an argument against that point. Finally, Team A has one additional minute to respond to Team B's argument. Then, Team B has 2 minutes to make their first point. Team A will have 2 minutes to make an argument against that point. Then, Team B has one additional minute to respond to Team A's argument. This process continues until all of the points have been made.

# Word Search

Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

habitat	acid	fuel rods	hazardous
reduce	fertilizer	disposable	Exxon Valdez
nuclear	recycle	profits	biogas
mining	landfill	debris	industries
fungicide	cyanide	Chernobyl	atom
reuse	sustainable	Kovalam	toxic
uranium	space junk	economics	rock



# Comprehension Quiz

## Part C

Answer the questions in complete sentences.

- Describe **two** ways that farmers can lessen agricultural waste. 2
- Describe **two** types of mining waste and **compare** the amount of harm each type of waste can cause. 4
- Explain why an **oil spill** can be so harmful to a shoreline environment. Give examples to support your answer. 3
- Describe **two** ways that hazardous waste can be released in a natural disaster. 2
- Compare the **bio-economical cost** of throwing away food waste to composting food waste. 2

SUBTOTAL: /13

# Mining Waste

(Polluted River Downstream from Operating Mine)





NAME: \_\_\_\_\_

After You Read 



# Waste from Mining

4. Explain how mining waste can travel many miles away from the mine.

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5. Explain how people can be harmed by mining waste.

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## Extension & Application

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4.	Answers will vary
Rain washes harmful substances out of rock piles and into streams. Streams flow into rivers, carrying the mine waste with them.	11
5.	Answers will vary
Answers will vary, but may include loss of drinking water supply.	12
6.	Answers will vary
Answers will vary	13
Answers will vary	14
10	



# EASY MARKING ANSWER KEY