

Reclaiming the Land



The story of bringing mined lands back to life.

Table of Contents

ABOUT THIS WORKBOOK	1
UNIT 1	
Do You Know Where Coal Comes From?	2
Circle the Correct Answer	3
Word Search	4
Problem Solving	5
UNIT 2	
Coal is All Around Us	6
Crossword Puzzle	7
UNIT 3	
How is Coal Removed from the Earth?	8
Reducing “Off-Site Impacts”	9
Complete the Following Sentences	10
UNIT 4	
Bringing the Land Back to Life	11
Coal Mining and Reclamation Timeline.....	12
Post-Mining Land Use	13
Abandoned Mine Lands	14
UNIT 5	
Stay Away from Old Mines	15
Abandoned Mine Safety	16
Abandoned Mine Land Maze	17
Game	18
The Story of Bringing Mined Lands Back to Life	19

About This Workbook

This workbook will tell five things about coal and mining.
Enjoy it. Share it with your family and friends.

1. Coal

What is coal and where it comes from?

Coal is a **rock** found in the earth. It is a black rock that burns.



2. Coal Products

What kinds of coal products do you use at home and in school? Coal is changed into energy to heat your home and electricity for your lights.



3. Mining.

How we mine coal. Mining is the way we get rocks like coal from the earth. Big machines move a lot of earth to mine. After coal is mined, it is cleaned, then moved to places where it is changed into energy to heat your home and electricity for your lights. Coal is also changed into many other products used in everyday life.



4. Safety.

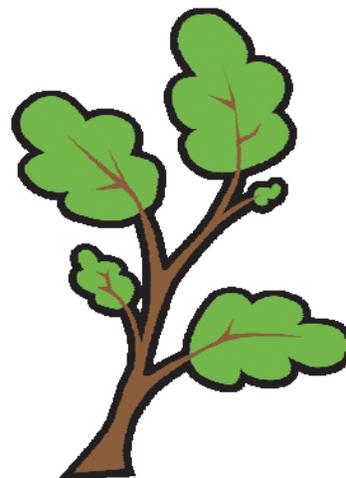
Avoiding the dangers of old mines.

Thousands of old mines were not cleaned up when mining stopped. Many of these old **abandoned** mines are dangerous. People get hurt exploring them. Stay away!



5. Reclamation

Reclaiming the land.



Abandoned mine lands are cleaned up so the land can be used again. This is called **reclamation**.

UNIT 1

Do You Know Where Coal Comes From?



Coal is a rock. It is a dull to shiny, black, solid rock that burns. Coal was formed millions of years ago when most of America was a swamp covered with large plants. When they died, the plants were covered by layers of mud and sand. As centuries went by, the weight from the layers above created pressure and heat that changed the plants into coal.



There are four different kinds of coal. They are listed below.
Say each word out loud before you read the meaning.

Anthracite – (an-thra-cite) is the best coal because it is the hardest and can be used for energy to heat your home and electricity for your lights.

Bituminous – (bi-tu-mi-nous) coal is called soft coal and is used to fuel electric utility power plants that produce electricity. It is the most plentiful form of coal in the United States.

Sub-Bituminous (sub-bi-tu-mi-nous) coal is black. It ranks below bituminous coal. It is found mainly in a half-dozen Western states and Alaska.

Lignite (lig-nite) is called "brown coal. It is mainly used to fuel electric utility power plants that produce electricity.

Circle the Correct Answer

1. Coal is a:
 - gemstone
 - rock
 - diamond
2. How many different kinds of coal are there?
 - three
 - four
 - one
3. Coal was formed millions of years ago in parts of America that were:
 - covered in ice
 - a swamp
 - under water
4. The hardest coal is:
 - lignite
 - bituminous
 - anthracite
5. Lignite coal is:
 - black
 - green
 - brown
6. Bituminous coal is:
 - hard
 - soft
 - spongy
7. Pressure and heat changed plants into:
 - plastic
 - coal
 - gold
8. Sub-bituminous coal is:
 - red
 - blue
 - black
9. Bituminous coal is used to fuel:
 - fire places
 - power plants
 - automobiles
10. Coal is a solid rock that:
 - turns to ice
 - burns
 - does not burn

Word Search

Locate each word in the word search.
The words may be written forward, backward, up, down or diagonally.
Circle each word you find.

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

plants
brown
anthracite
millions
sand

soft
black
swamp
coal
layers

mineral
four
burns
mud
pressure

Problem Solving

Read each problem and fill in the correct answers.

- 1) There are **6** trains traveling to a power plant. Each train has **8** cars filled with coal. How many cars are in all **6** trains?

There are _____ trains.

There are _____ coal cars on each train.

There are _____ coal cars in all.

- 2) A train can travel **90** miles in **1** hour. How far can it travel in **3½** hours?

- 3) There are **12** containers of coal. Each container holds **12** pieces of lignite coal and **8** pieces of anthracite coal.

There are _____ containers.

There are _____ pieces of coal in the 12 containers.

There are _____ pieces of lignite coal.

There are _____ pieces of anthracite coal.

- 4) There are **8** rows of plants in a garden. Each row contains **12** plants. Each plant cost **65** cents. How much money would you need to buy all of the plants? _____

There are _____ rows of plants.

There are _____ plants in each row.

There are _____ plants in all.

Coal is All Around Us

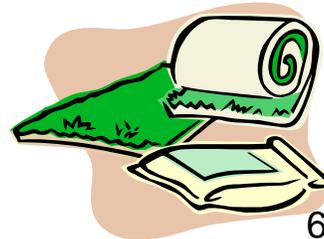
Match the description of what coal is used for to the right picture.



10

Detergents
To wash your clothes.

Dyes
Dye for your Easter eggs.



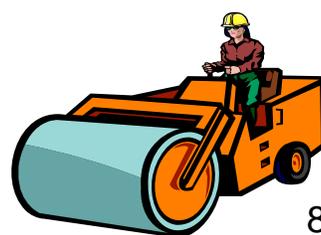
6



1

Perfumes
Make you smell nice.

Disinfectant
Kills germs in and around the house.



8



7

Paving
Concrete to surface roads.

Fertilizer
Keeps your lawn nice and green.



5



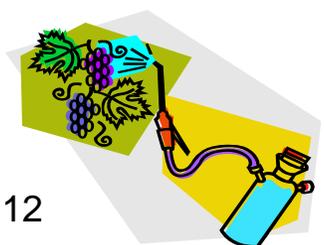
4

Varnish
Protects floors and furniture.

Briquettes
Used to barbeque at cookouts.



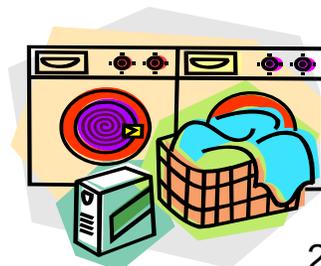
11



12

Roofing
Materials made to cover the top of your residence.

Ammonia
Kills germs in your house.



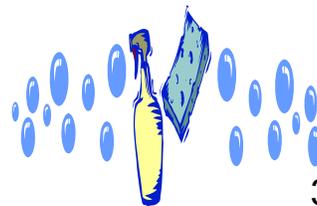
2



9

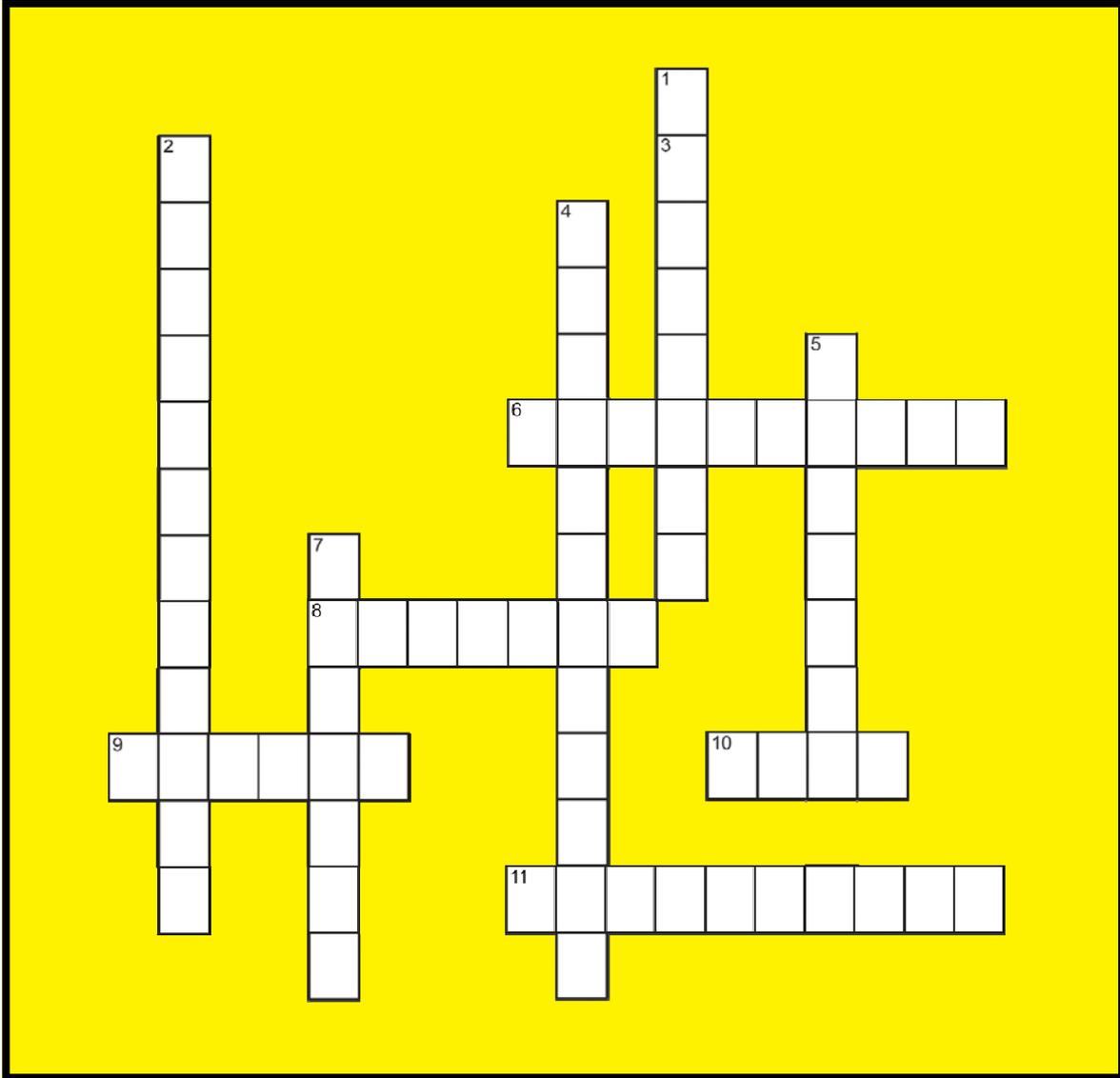
Antiseptic
Kills germs on your hands and body.

Insecticides
Keeps your fruits and vegetables free of insects.



3

Crossword Puzzle



DOWN

1. Used to cook your barbeque.
2. Kills germs.
4. Kills insects.
5. It makes girls smell nice.
7. Coats a wood floor with a clear hard film.

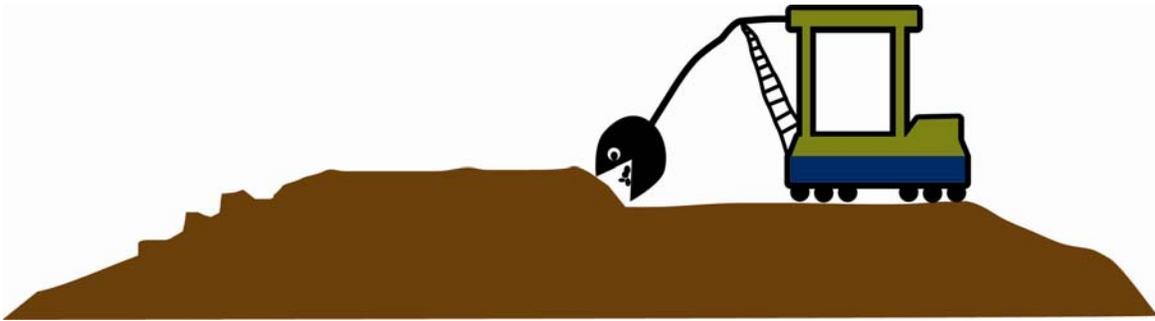
ACROSS

3. Keeps the rain out of your house.
6. Used to wash your clothes.
8. Strong smelling household cleaner.
10. Permanently changes the color of things.
11. Helps grass stay green.

How is Coal Removed from the Earth?

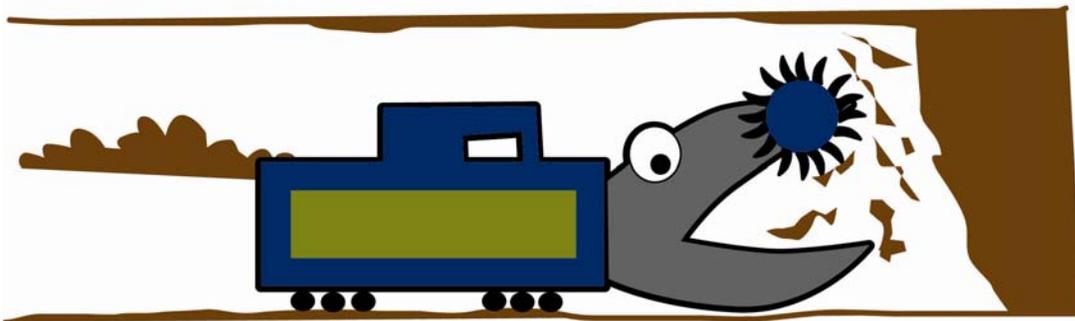
Coal is found in the earth. Some layers of coal are close to the earth's surface. Some are deep underground. Mining is the way we get coal from the earth. Big machines move a lot of earth to mine.

There are two different types of mining:



Surface Mining

Coal found close to the earth's surface is mined by the use of a large machine that digs up all the earth covering the coal. One kind of these machines is called a dragline.



Underground Mining

Coal found very deep underground can be mined by a longwall machine or a continuous mining machine. These machines continuously dig out the coal underground.

Reducing “Off-Site Impacts”

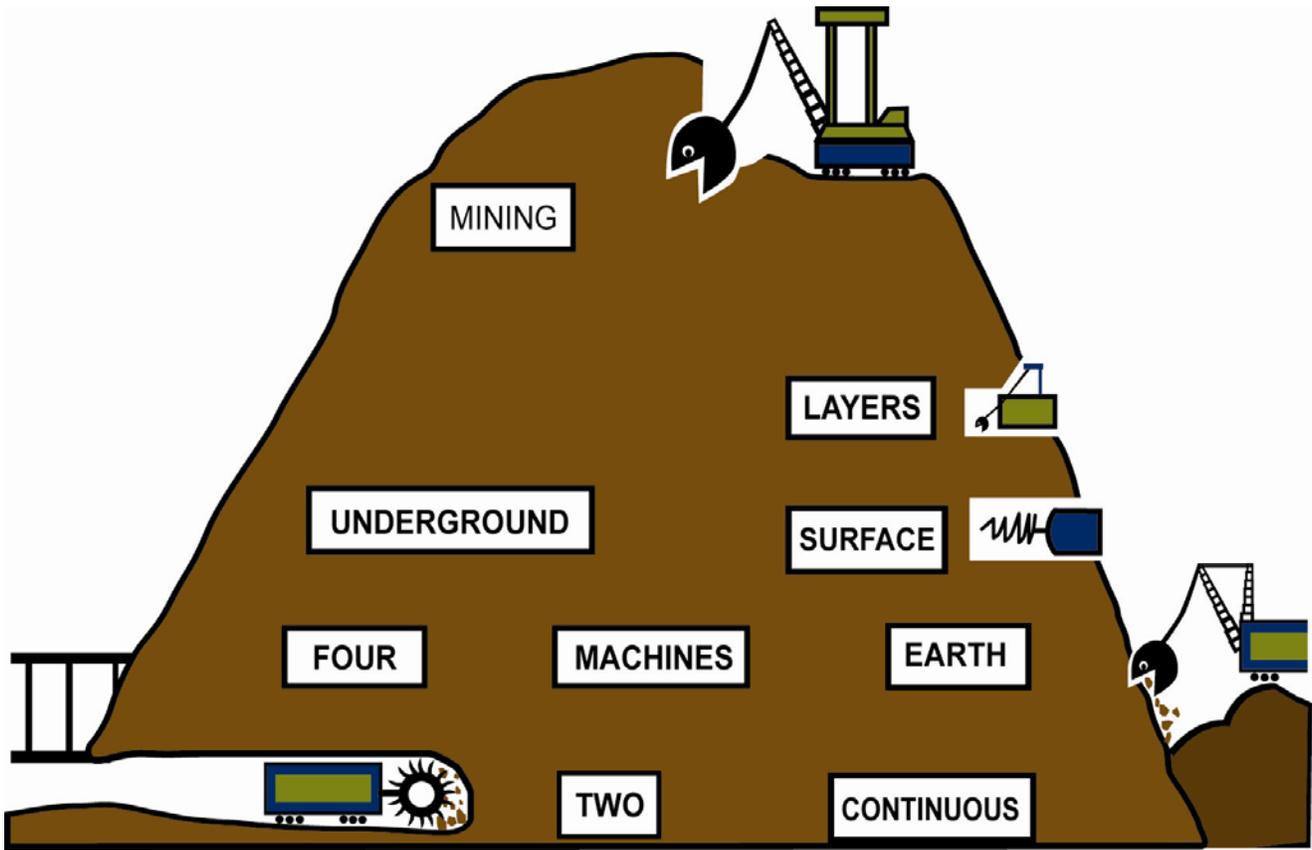
Color the picture.



The coal miner is ready to start work, but first he needs a plan to make sure mining doesn't hurt the people or the environment around the mine.

Blasting at a mine site may cause an off-site impact. Blasting involves placing explosives in the ground to blast out layers of rock that cover the coal. As the rocks explode they may fall on houses or injure people. Coal mining operations must guarantee that blasting activity does not affect anything outside the blasting area.

Complete the Following Sentences



The missing words are in the Word Mine.

1. Some coal is found very deep _____.
2. Coal is found in the _____.
3. _____ is the way we get coal from the earth.
4. Big _____ move a lot of earth to get to the coal.
5. There are _____ different kinds of coal.
6. A dragline is used for _____ mining.
7. There are _____ different types of mining.
8. A _____ mining machine is used to dig up coal from underground.
9. Some _____ of coal are close to the earth's surface.

RECLAMATION



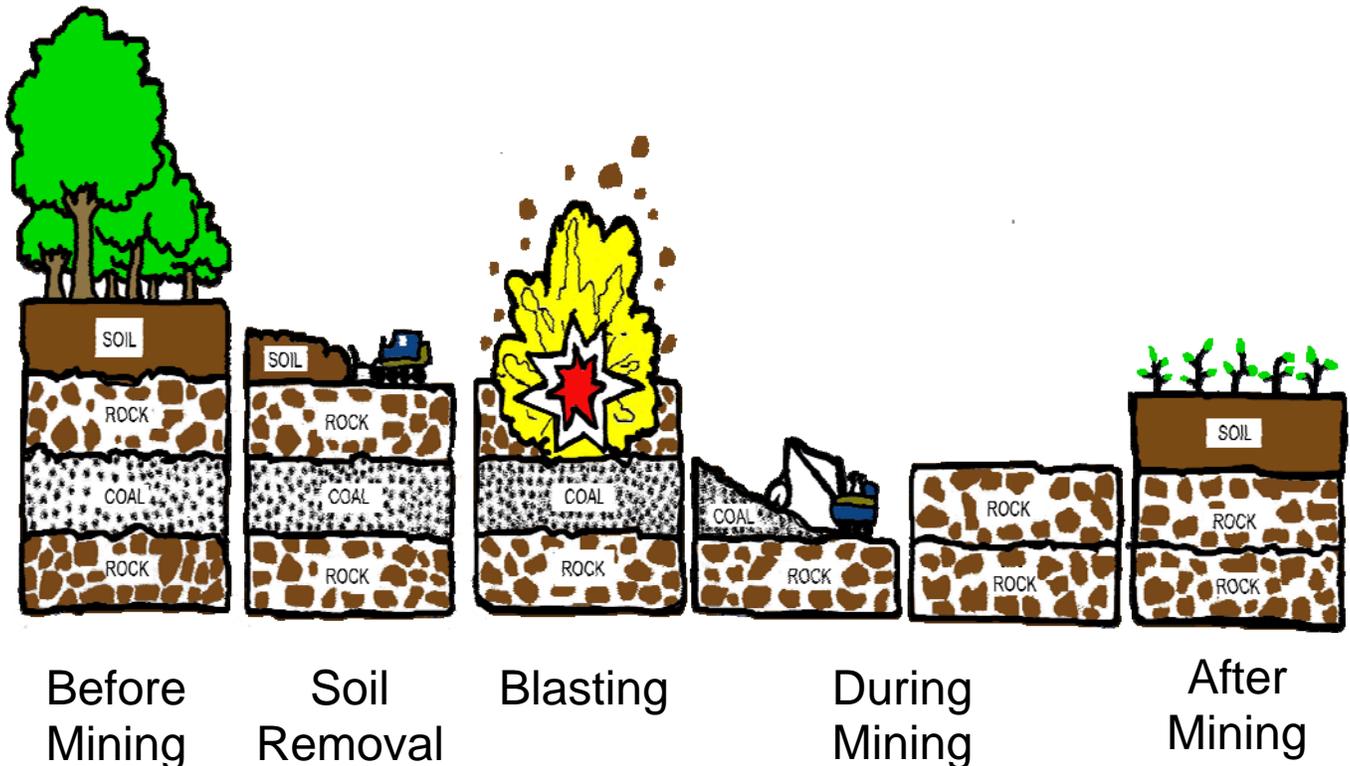
Bringing the Land Back to Life

Color the picture.

When miners are finished mining, they restore the land so it can be used again. The soil is replaced and the land is replanted with grass and trees. This is called **reclamation**.

Sometimes houses are built on the reclaimed land. A baseball field, soccer field or a park may also be built on the land. Families move into the houses and children play at the park.

Coal Mining and Reclamation Timeline



Before surface mining begins the land is covered with trees and grass. A mining machine is used to remove the top layer of soil. After the soil is removed explosives are placed in the ground to blast out the layer of rock that covers the coal. All of the rock is removed and another machine starts to dig out the coal. When all of the coal is removed from the mine, the rock and soil is replaced and grass and trees are planted on the land.

Post-Mining Land Use

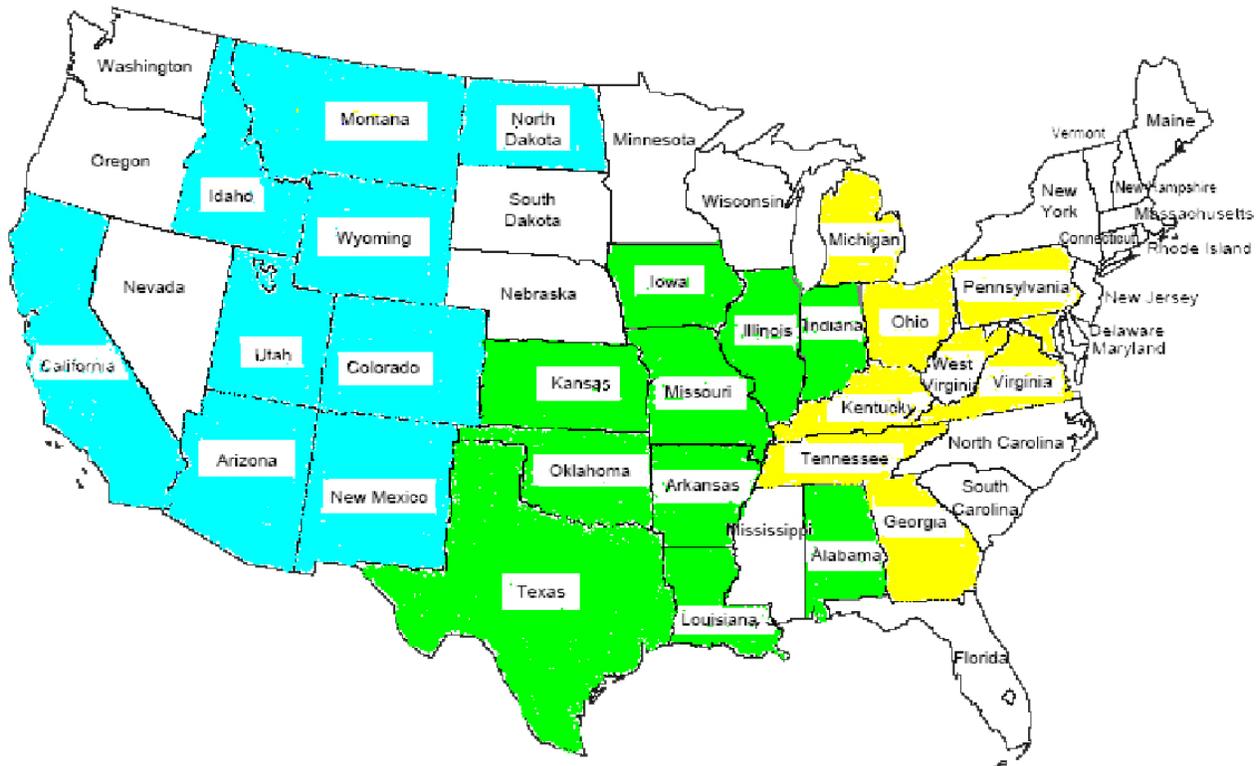
Now the mining is done and it's time for you to decide what you want to do on the land when it's reclaimed. In the space above, draw and color what you would like to do with the land. Here are some ideas:

Houses
Playground
Stores

Soccer Field
School
Shopping Mall

Forest
Home for Animals
Farm

Abandoned Mine Lands



A long time ago people didn't clean up after themselves after mining coal. They just left it a big mess and went away. Now we clean up those Abandoned Mine Lands.

We clean up the old mines as fast as we can, but there are still a lot of them and they are very dangerous! Until they're safe, everyone should just stay away!

The largest number of abandoned coal mines are located in the eastern part of the United States.

Many of the abandoned coal mines are located in the western part of the United States.

The smallest number of abandoned coal mines are in the Mid-west.

Stay Away from Old Mines!



Color the picture.

Abandoned Mine Safety

Color
the
children.



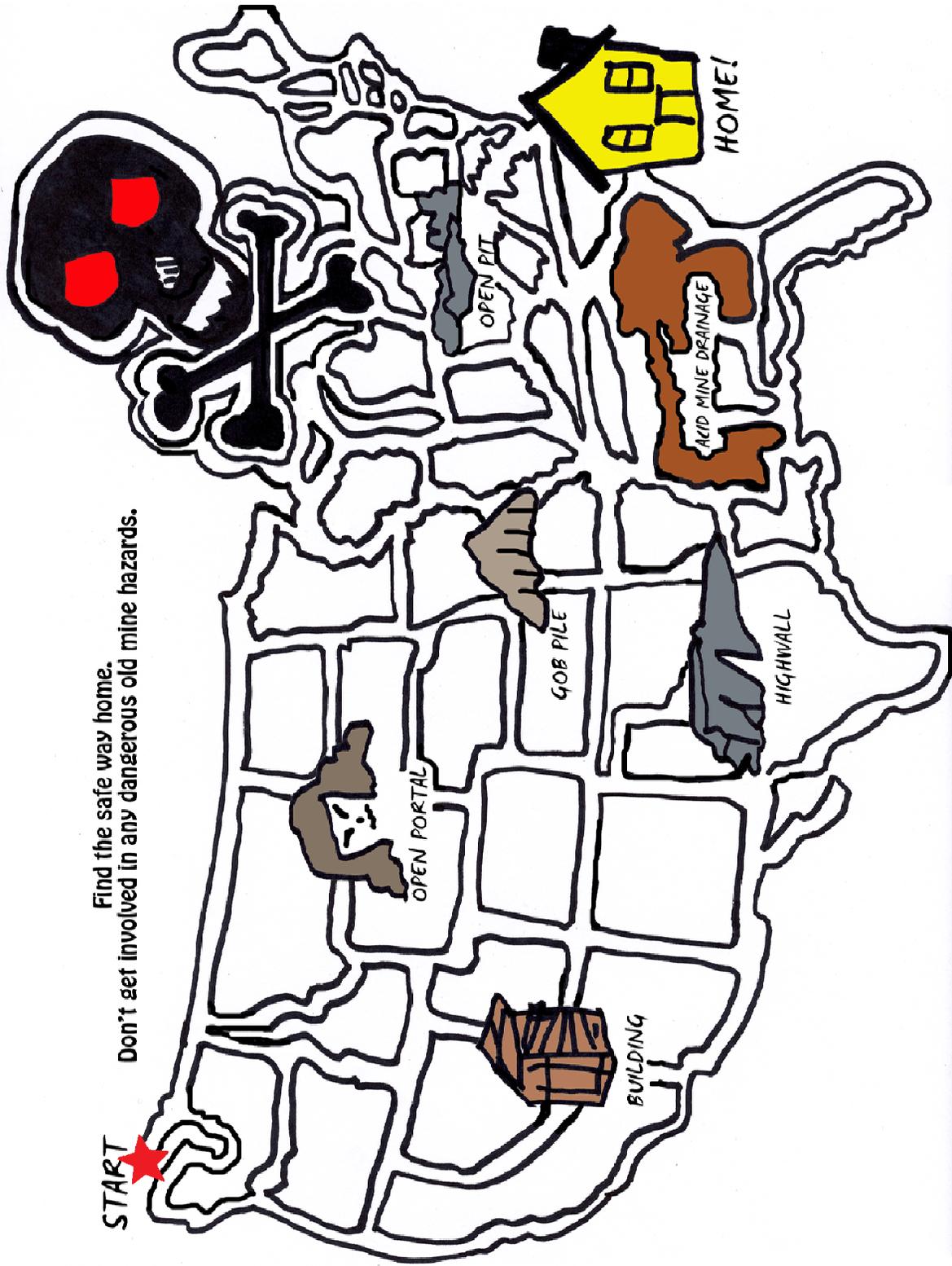
Thousands of old mines were not cleaned up when mining stopped and all the coal was removed from the mine. These are called abandoned mines. They are dangerous and people get hurt exploring them.

Some abandoned mines are big holes in the ground. They are called shafts. The holes can be very wide and very deep. Many holes are as wide as you are tall. Others are as wide as a road and as deep as buildings in a big city.

Sometimes people climb down in the holes to explore them. Grown-ups and children do fall into these mines and get hurt. The people get caught in the holes and cannot get out. The holes are very dangerous.

Mine roofs and walls may cave in. The weight of the earth is always pressing down on the mine. There is no sure way of knowing when an old roof will fall.

Abandoned Mined Land Maze



START ★ Don't get involved in any dangerous old mine hazards. Find the safe way home.

Game

What is the secret message in this word game? Unscramble the words below. Write one letter in each square. The letters will make seven words about old mines. You can find all the words in the story.

1 I L D E L K
O L

2 A G R E N D
O R

3 T B E R A H E
O H

4 I O O S U N P O S
O N

5 A N B D E O A N D
B O

6 U R H T
O R

7 L S O T
S O

Do you like to go exploring? Most of us do! But exploring old mines can be dangerous. Children and adults have been hurt or killed at old mines.

The United States has many deserted mines. Some of these mines have not been used for many years. There is not much to see in an abandoned mine, but there is a lot of danger.

Some mines look like a cave in the side of a mountain. There are many dark tunnels in the mines. The roofs of the mines are held up by old pieces of wood. Sometimes the wood breaks and the roof falls in. If you are in a mine when this happens, you can be hurt or killed.

Fires are often burning in underground mines. They burn up the oxygen you need to breathe. These fires spread quickly and release deadly gases.

You can get lost in dark tunnels. Even miners have gotten lost while working in underground mines.

Some mines contain poisonous gases. These gases take the place of oxygen you need to breathe.

Snakes, spiders, scorpions and poisonous insects live in old mine openings. These dangerous creatures can bite or sting you.

To be safe, keep out of old mines.

Now find the secret message. The circled letters spell a message for you about old mines. Write the letters in the boxes below.

SECRET MESSAGE

--	--	--	--	--	--

The Story of Bringing Mined Lands Back to Life

The following sentences tell the story of bringing mined lands back to life.

But the sentences are all mixed up.

Read each sentence and number them in the order in which they happened.

- ___ Stay away from old abandoned coal mines. They are dangerous.
- ___ Houses, parks, and baseball fields are built on reclaimed land.
- ___ Pressure and heat changed plants to coal.
- ___ Mining is the way we get coal from the earth.
- ___ Most of America was a swamp covered with huge plants.
- ___ After mining was completed many coal mines were abandoned.
- ___ Coal is found in the earth.
- ___ Reclamation is cleaning up the land so that it can be used again.
- ___ When plants died they were covered with mud and sand.
- ___ Most coal mine reclamation is conducted in States located in the eastern part of the United States.



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