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ABSTRACT

This coal education resource kit for grades K-2 was developed by the Illinois Department of Energy and Natural Resources (ENR). The kit contains activities designed to help students become familiar with the origin of coal and the process involved in its development, become familiar with safety equipment used by coal miners and understand why the equipment is needed, be able to verbally list some uses of Illinois coal and state why it is important, understand the two types of mining used by Illinois coal miners to extract coal from the ground, and become familiar with basic vocabulary words. The activities are divided into five sections: (1) origin of coal; (2) uses of coal; (3) mining; (4) mining and safety; and (5) additional activities. The teacher is provided with instructions for using the kit and background information. Each of the first four activity sections begins with a teacher narrative. Dinosaurs are also a part of many of the activities. (PVD)

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**ENR**  
Illinois Department of  
Energy and Natural Resources  
Jim Edgar, Governor      John S. Moore, Director

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# COAL EDUCATION RESOURCE KIT

**Recommended for  
Grades K-2**

Prepared by:

Illinois Department of Energy and Natural Resources  
Office of Coal Development and Marketing  
325 W. Adams Street, Room 300  
Springfield, IL 62704-1892  
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**May, 1994**

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**John S. Moore, Director**

To the educators and public of Illinois:

The Illinois Department of Energy and Natural Resources (ENR), conducts scientific research on a daily basis to increase our knowledge of water, atmospheric, biological, mineral, archaeological and cultural resources. The data gathered is then used in a variety of alternative energy and energy conservation programs to promote the environmentally efficient use of Illinois' energy resources. This is accomplished through analysis, demonstration, and education.

It is with great pride that we share with you one of our latest endeavors from the Office of Coal Development and Marketing; our K-2 Coal Education Resource Kit. Our mission is to educate the schoolchildren in this state about the importance of one of our most abundant natural resources - coal - and how it can be burned in an environmentally responsible manner.

It is my hope that you will find this kit useful in your attempts to educate schoolchildren about one of Illinois' natural resources. I assure you that ENR will continue in its ongoing commitment to develop and produce quality educational material stressing the importance of environmental and conservation education.

Sincerely,

A handwritten signature in black ink, appearing to read 'John S. Moore', with a long horizontal flourish extending to the right.

John S. Moore, Director  
Illinois Department of Energy and Natural Resources

# *Acknowledgments*

The Department of Energy and Natural Resources would like to thank all of those who assisted in the development of the K-2 Coal Education Resource Kit:

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**Illinois Clean Coal Institute**

**Illinois Coal Association**

# ***K-2 Coal Education Resource Kit Evaluation***

Dear Educator:

This material was developed with you in mind. You can help us continue to provide quality educational materials by sending us comments. Please complete this form with your evaluation and comments. Then fold it and return it to the Illinois Department of Energy and Natural Resources, Office of Coal Development and Marketing. Thank you for your time and consideration!

In which curriculum were you able to use these materials?

biological and physical sciences       language arts       fine arts  
 mathematics       social sciences

For what grade level was this material used? (Check all that apply)

kindergarten       first grade       second grade

Did your students enjoy the activities?

yes       no

Which activities did you like the best?

---

Which activities did you like the least?

---

Would you use this kit again next year?

yes       no       uncertain

Did you feel that any of the activities were too difficult for your grade level? If so, which ones?

---

Do you have any suggestions for revisions or improvements to this kit?

games       puzzles       factual stories       other

---

Additional comments:

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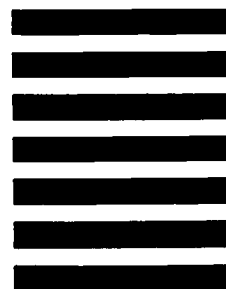
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## ***How to Use the Coal Education Resource Kit***

**The Coal Education Resource Kit provides a way for you to educate your kindergarten first-and second-grade students about one of Illinois' most abundant natural resources. Please use any or all of the materials in the kit. A limited number of kits will be distributed, so please use this as an original and make copies for classroom use. Pass the kit along to other educators in your school.**

**Every effort has been made to ensure that the kit is easy to use. Feel free to contact us with any suggestions or fill out the evaluation form to improve the usefulness of this kit.**

**Other educational materials are available upon request by contacting the ENR Clearinghouse at 1-800-252-8955. For TDD customers, call (217) 785-0211 or the Illinois Relay Center at 1-800-526-0844.**

## ***Goals of the K-2 Coal Education Kit***

By using the Department of Energy and Natural Resources' K-2 Coal Education Kit and its activities, students will learn important facts about Illinois coal. Students will:

Become familiar with the origin of coal and the process involved in the development of coal.

Become familiar with safety equipment used by coal miners and have an understanding of why the equipment is needed.

Be able to verbally list some uses of Illinois coal and be able to state why coal is important.

Have an understanding of the two types of mining used by Illinois coal miners to extract coal from the ground.

Become familiar with basic vocabulary words.

the open space in the garage would be where the coal was removed. The walls, floor, pillars and ceiling would be the coal that was left behind to support the mine so it would not collapse. During room and pillar mining, **continuous mining** machines are used to remove coal. This type of machine has a big drum with sharp teeth that spins against the wall of coal. As the coal breaks off, large arms gather the coal on a conveyor belt. The conveyor belt then carries the coal away from the seam and it is loaded into **shuttle cars**. The mining machine is then moved to the next area to be mined. Using this method of mining leaves up to **fifty percent** of the coal in the mine.

Longwall mining also uses a continuous mining machine. However, this machine moves and supports the roof of the mine at the same time, unlike the room and pillar method. This machine has large steel props that help support the roof during mining. The large spinning drum breaks off the coal and gathers it on a conveyor belt. Once the coal is removed, the roof is allowed to collapse as the machine moves on. This method allows more coal to be mined since pillars are not left for support. Since the roof collapses underground, the ground above the surface will sink. This is called **subsidence**. The coal company is required by law to protect homes and property from any damage caused by subsidence.

The sinking of the surface above a mine is a great concern for coal companies. If subsidence occurs, it could cause damage to gas, and water and sewer lines, as well as roads, sidewalks and buildings.

Planning for subsidence and reclamation takes place long before any actual mining to make sure damage is kept to a minimum. To avoid subsidence, coal miners use big steel rods to support the roof so that it doesn't cave in. Coal companies look at the soil, plant life, water and wildlife. They must provide information on how the coal will be mined, how the land will be taken care of after mining, how mining will affect the water that we drink and how the mining activity will affect the area and people around it.

Some examples of reclamation projects include using the land for ball diamonds, parks, campgrounds, wildlife preserves, lakes, trails, golf courses, pasture and farmland. Once the projects are complete you could never tell mining activities had taken place.

**Mining Safety:** Miners wear and carry several items for safety purposes. A hard hat with a battery-powered light is worn for better vision underground. A self-rescuer, or gas mask, is carried to filter out harmful gas if needed. Ankle straps are worn so the miners' pants don't get caught in any of the machines. Safety glasses are worn to protect the eyes. Steel-toed shoes are worn to protect the feet from heavy machinery, chunks of coal or rock. Safety is a very important aspect of mining.

Underground mines use ventilation systems to force fresh air into the mine because of all the dust particles and natural gases that are found underground. The air is tested and checked regularly for high levels of gas. Mines are also well lit so the miners can find their way around the mine and operate the equipment safely.

**Clean Coal Technologies:** When coal is burned, it releases sulfur and other emissions into the air. Over the past several years, scientists, coal companies and others involved in the coal industry have become concerned about the air we breathe, and want to make sure that the sulfur and other emissions that are released into the air when coal is burned does not harm the environment. Therefore, technologies are being developed to remove the sulfur and other chemicals from coal before, during and after it is burned. These technologies are called **clean coal technologies**.

Technologies that try to remove sulfur from coal before it is burned are called **pre-combustion technologies**. With these technologies, coal can be cleaned at the mine, the power plant or both. The process used to clean the coal is called coal preparation, or "cleaning." In this process the coal is crushed and washed. This removes a large amount of sulfur found in coal.

Some sulfur can be chemically bound in coal and cannot be removed by cleaning. Companies try to remove this sulfur during **combustion** (burning), or by **post combustion** (after burning) and **conversion technologies**. Examples of these technologies include: **fluidized bed combustion, flue gas desulfurization and coal gasification**. Although there is currently no single technology that can remove one hundred percent of the sulfur and other emissions released from coal as it is burned, research continues to strive for this goal.

In addition to helping to burn coal in an environmentally responsible manner, clean coal technologies are providing a more efficient use of our natural energy sources.

**References:**

1. *U.S. Department of Energy, "Dinosaurs and Power Plants," Office of Fossil Energy, August, 1990.*
2. *American Coal Foundation, Activity Book, "Power From Coal," Washington, D.C.*
3. *Illinois Department of Energy & Natural Resources, "Coal Education Resource Kit," Office of Coal Development and Marketing, 1993.*
4. *American Coal Foundation, "Coal: An Introduction," Washington, D.C.*

# ***Section One: Origin of Coal***

## ***Activities:***

1. Big Lump/Little Lump Energy Trail #3 (THERE)
2. Color-N-Learn #1 (DINOSAURS)
3. Energy Alphabet #6 (U)
4. Energy Spell Well #4 (COAL IS FORMED FROM PLANT REMAINS)
5. Find-An-Energy Phrase #2 (COAL IS A FOSSIL FUEL FORMED FROM PLANT REMAINS)
6. Energy Star Words #3 (FOSSIL)
7. Letter Find Animals #4 (FOSSIL)
8. Sum Energy Words #2 (8)
9. Coal=Sum Difference #1 (0+1)
10. Five-Way Energy Word Seek #4 (FOSSIL)

## ***Teacher Narrative:***

Millions of years ago, long before you were born, Earth was making coal. Coal is a black or brownish-black rock that is made from plants. When the plants that covered Earth died, they laid down on the ground, and the ground became their bed. Over time, sand and mud covered the plant beds just like blankets cover your bed at home. The covers were so heavy that they pressed the plants together tightly and caused the plants to change into coal. Coal contains carbon which allows it to burn. There are four different kinds of coal. They are grouped together by how much carbon they have in them. When coal is burned, it produces energy which we use every day at home and at school!

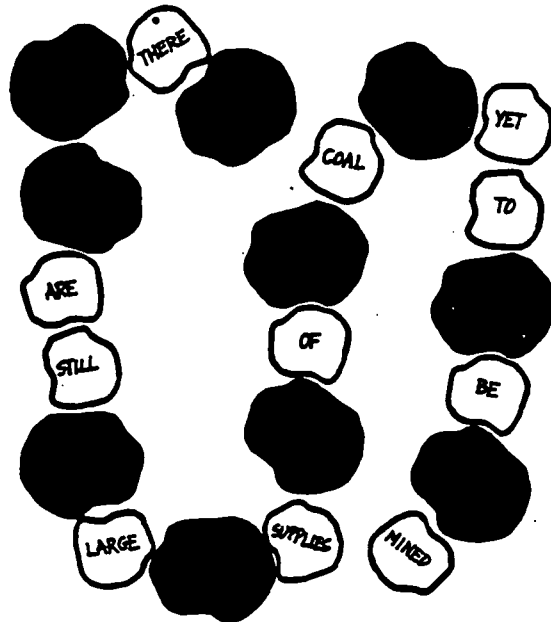
# Activity 1: Big Lump/Little Lump Energy Trail #3 (THERE)

## Instructions for Exercise:

To complete this exercise you must decide which size lump of coal begins a sentence about coal and then continue with that size lump until you finish the phrase. Begin from either ALWAYS or THERE. The words in the lumps of coal not used in the statement are basic vocabulary words. Say to yourself the words that you know and circle them. (THERE ARE STILL LARGE SUPPLIES OF COAL YET TO BE MINED.)

Answer:

### A COAL-CABULARY WORD PUZZLE BIG LUMP/LITTLE LUMP ENERGY TRAIL



**DIRECTIONS:** Begin from either the BIG LUMP or LITTLE LUMP of coal that has a small dot and continue with that size following the trail. Only one size lump will spell an energy phrase. The words in the lumps not used are basic vocabulary words.

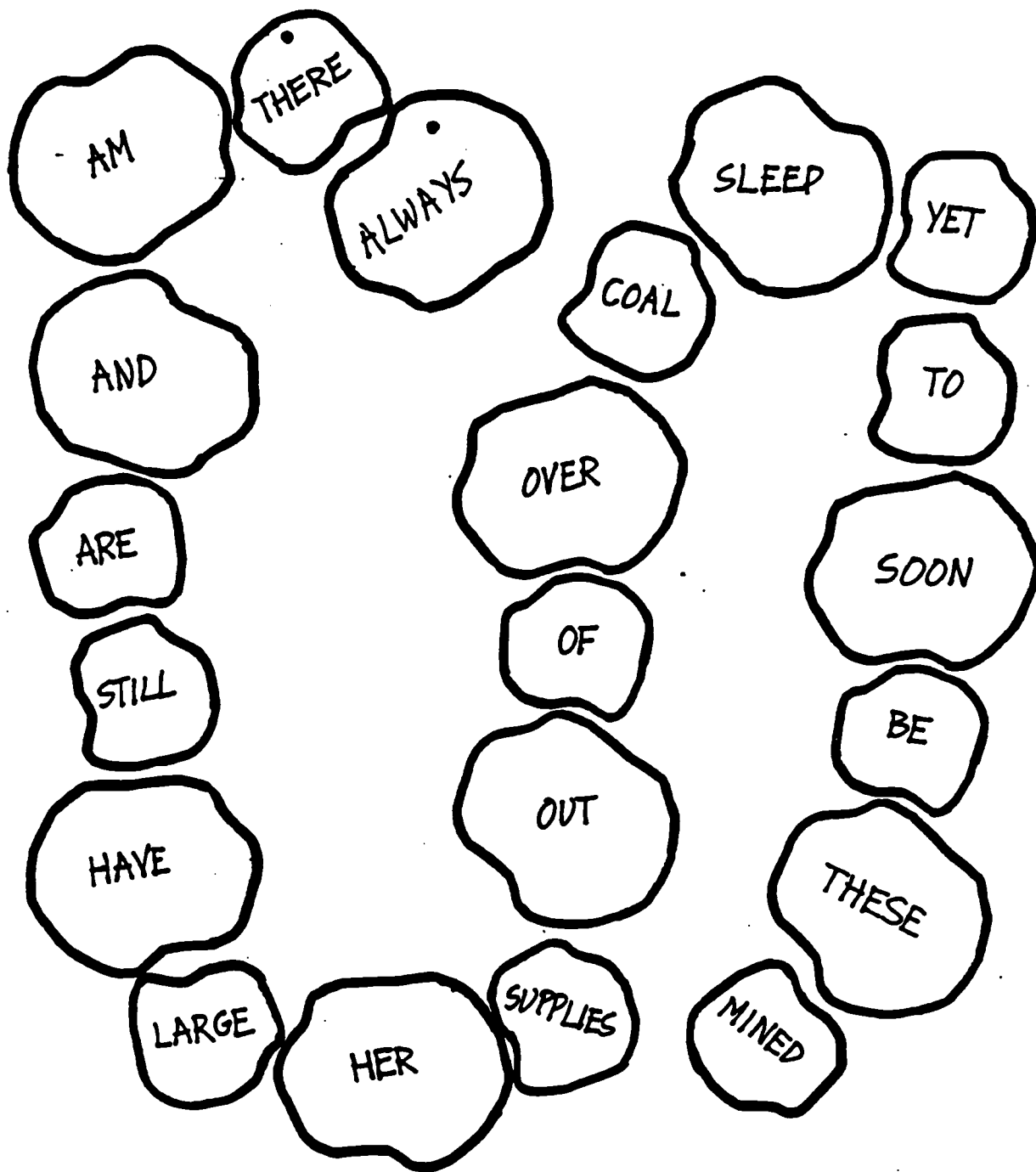


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# BIG LUMP/LITTLE LUMP LUMP ENERGY TRAIL



**DIRECTIONS:** Begin from either the **BIG LUMP** or **LITTLE LUMP** of coal that has a small dot and continue with that size following the trail. Only one size lump will spell an energy phrase. The words in the lumps not used are basic vocabulary words.





## Activity 2: Color-N-Learn #1 (DINOSAURS)

### Instructions for Exercise:

To complete this exercise, review the coal statement with your class and then color the dinosaurs. When finished, you will have a pleasing picture.

Answer:

### COLOR -N- LEARN



**DINOSAURS ROAMED EARTH WHEN COAL WAS BEING FORMED.**

**DIRECTIONS:** Color or trace the three dinosaurs shown above. When finished, you will have a pleasing picture.

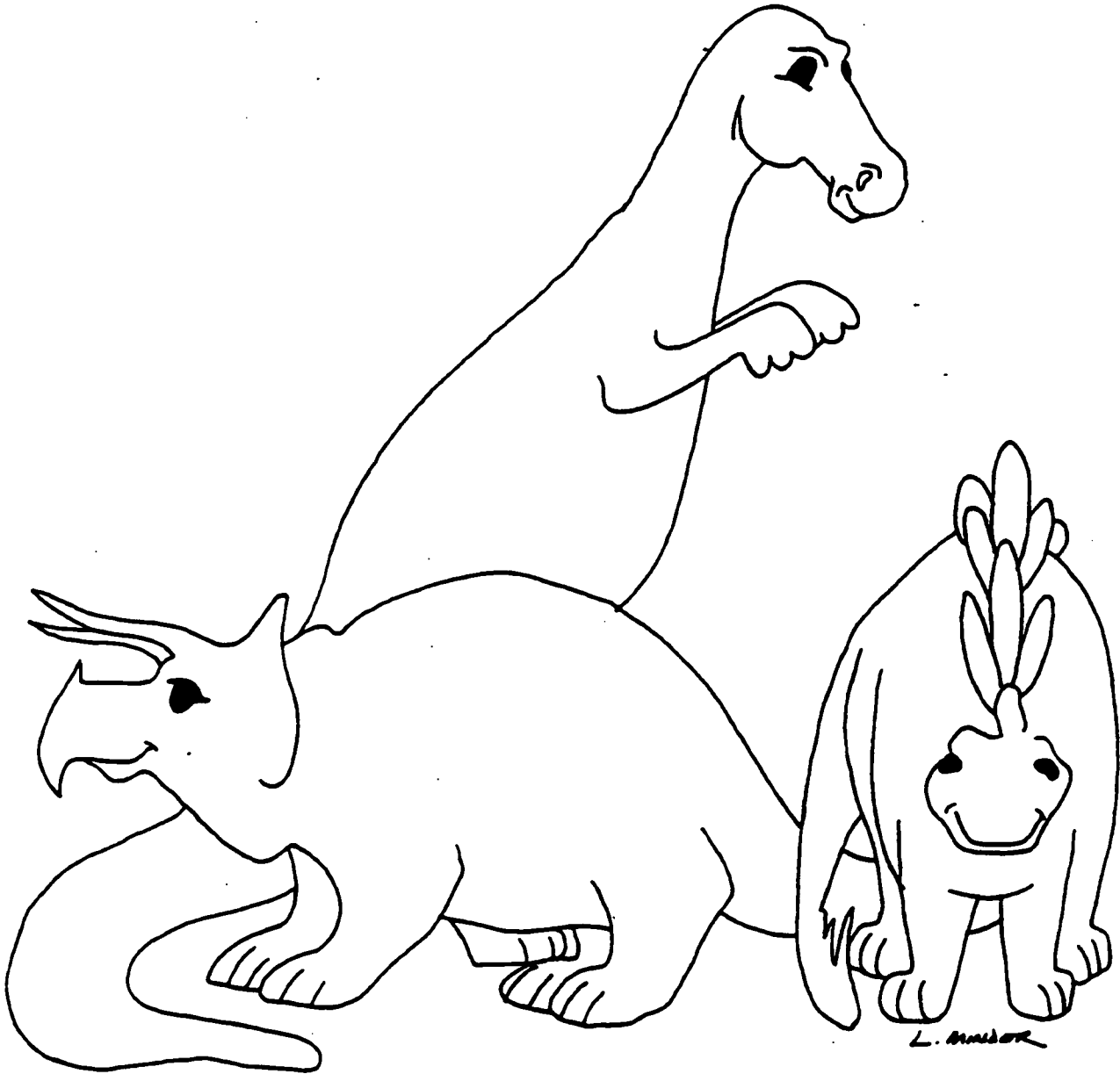


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# COLOR -N- LEARN



**DINOSAURS ROAMED EARTH WHEN COAL WAS BEING FORMED.**

**DIRECTIONS:** Color or shade the three dinosaurs shown above. When finished, you will have a pleasing picture.



### Activity 3: Energy Alphabet #6 (U)

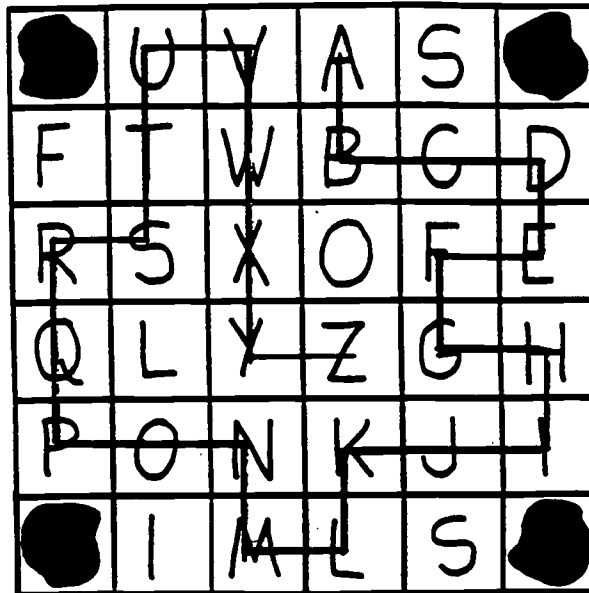
#### Instructions for Exercise:

To complete this exercise, you must begin from the letter A and draw a continuous line through to the letter Z. Once you begin you may move either forward, right, or left, but not slantwise. When you complete the alphabet you will find six letters not drawn through, as well as four lumps of coal in the corners. When these letters are arranged in correct order, they will spell an energy word. What is it? (FOSSIL)

(You may wish to give some students a choice of six-letter energy words like ENERGY, FOSSIL, and MINING.)

AN A-MAZE-IN PHRASE WORD PUZZLE  
ENERGY ALPHABET

Answer:



DIRECTIONS: Begin with the letter "A" and draw a continuous line through the corners 26-letter alphabet. You may move forward, right or left, but not diagonally. When finished, there will be four letters not drawn through. When arranged in order from top-left corner and read an energy word. What is it?



Fossil



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ENERGY

SPELL

WELL

FIRST

**FIND**

COAL IS FORMED FROM  
PLANT REMAINS.

LOOK

COLD

FAST

RIDE

FALL

SOON

AWAY

SAID

COAL IS FORMED FROM PLANT REMAINS.

**DIRECTIONS:** See how many of the basic vocabulary words you can spell in the above energy statement and circle them. For example, you would circle **FIND** since the letter **F** is in **FORMED** and **FROM**, **I** is in **IS** and **REMAINS**, **N** is in **PLANT** and **REMAINS** and **D** is in **FORMED**. Remember, you must find all the letters in the word before you circle it.



**Activity 5: Find-An-Energy-Phrase #2 (COAL IS A FOSSIL FUEL FORMED FROM PLANT REMAINS)**

**Instructions for Exercise:**

To complete this exercise you must begin from the first word of the phrase "COAL IS A FOSSIL FUEL FORMED FROM PLANT REMAINS" and draw a continuous line through the nine words in correct order until you reach the final word REMAINS. Begin from one of the four COAL words on the outer edge and begin moving either forward, right or left, but never slantwise. You may have to retrace some of your moves as you work through the maze of words since there is only one correct route.

**Answer:**

**AN A-MAZE-IN PHRASE WORD PUZZLE  
FIND-AN-ENERGY-PHRASE**

REMAINS	COAL	IS	A
PLANT	IS	FOSSIL	FUEL
FROM	PLANT	A	REMAINS
FOSSIL	A	←	COAL
FUEL	PLANT	↓	FORMED
PLANT	FROM	FOSSIL	FUEL
FROM	FORMED	→	REMAINS
PLANT	FROM	IS	COAL
FORMED	PLANT	→	REMAINS
COAL	FOSSIL	FUEL	FORMED
IS	FROM	FOSSIL	FUEL
A	REMAINS	PLANT	REMAINS

COAL IS A FOSSIL FUEL FORMED FROM PLANT REMAINS.

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across either way or straight up and down. No slant moves are allowed. There will be only one correct route.



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# AN A-MAZE-IN PHRASE WORD PUZZLE

## FIND-AN-ENERGY-PHRASE

REMAINS	COAL	IS	A
PLANT	IS	FOSSIL	FUEL
FROM	PLANT	A	REMAINS
FOSSIL	A	IS	COAL
FUEL	PLANT	A	FORMED
PLANT	FROM	FOSSIL	FUEL
FROM	FORMED	FUEL	REMAINS
PLANT	FROM	IS	COAL
FORMED	PLANT	REMAINS	FROM
COAL	FOSSIL	FUEL	FORMED
IS	FROM	FOSSIL	FUEL
A	REMAINS	PLANT	REMAINS

**COAL IS A FOSSIL FUEL FORMED FROM PLANT REMAINS.**

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across either way or straight up and down. No slant moves are allowed. There will be only one correct route.



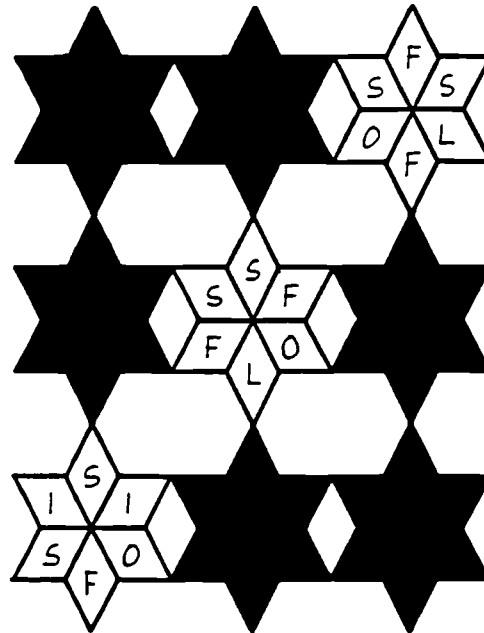
## Activity 6: Energy Star Words #3 (FOSSIL)

### Instructions for Exercise:

To complete this exercise you must shade or color all of the six-part stars that spell the word **FOSSIL**. The six letters- F, O, S, S, I and L- do not have to be in any order for its star shape to be shaded or colored in. When finished, you will have a pleasing pattern design.

**Answer:**

### A PATTERN PLAY WORD PUZZLE ENERGY STAR WORDS



**FOSSIL**

**DIRECTIONS:** Color all the six-part stars that correctly spell out the above word. They do not have to be in any order as long as all six letters are present. When finished, you will have a pleasing design.

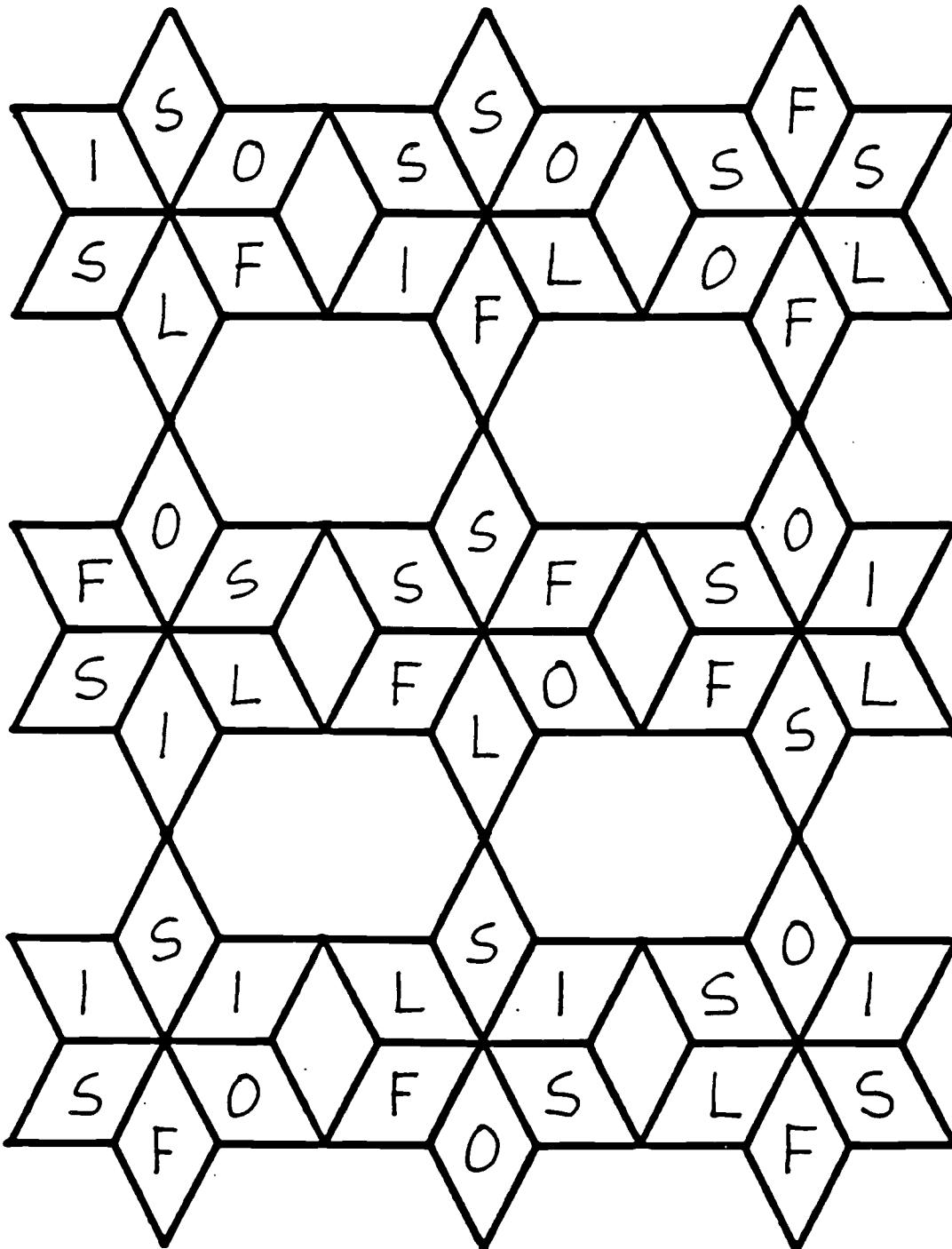


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# ENERGY STAR WORDS



## FOSSIL

**DIRECTIONS:** Color all the six-part stars that correctly spell out the above word. They do not have to be in any order as long as all six letters are present. When finished, you will have a pattern design.





## Activity 7: Letter Find Animals #4 (FOSSIL)

### Instructions for Exercise:

To complete this exercise you must shade or color each shape in the grid which has a letter that is in the energy word **FOSSIL**. Four large letters will appear when you shade or color them correctly. When arranged in order, the letters will spell the name of an animal. What is it? Write your answer under the directions. (DEER)

(You may wish to give some students a choice of four-letter animal words like BEAR, DEER, WOLF, and LION).

### Answer:

#### AN OUTLINE TO FIND WORD PUZZLE LETTER FIND ANIMALS



**FOSSIL**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. Certain letters will appear if you shade them in correctly. When the shaded or colored letters are arranged in order, they will spell the name of an animal. What is it?

**DEER**

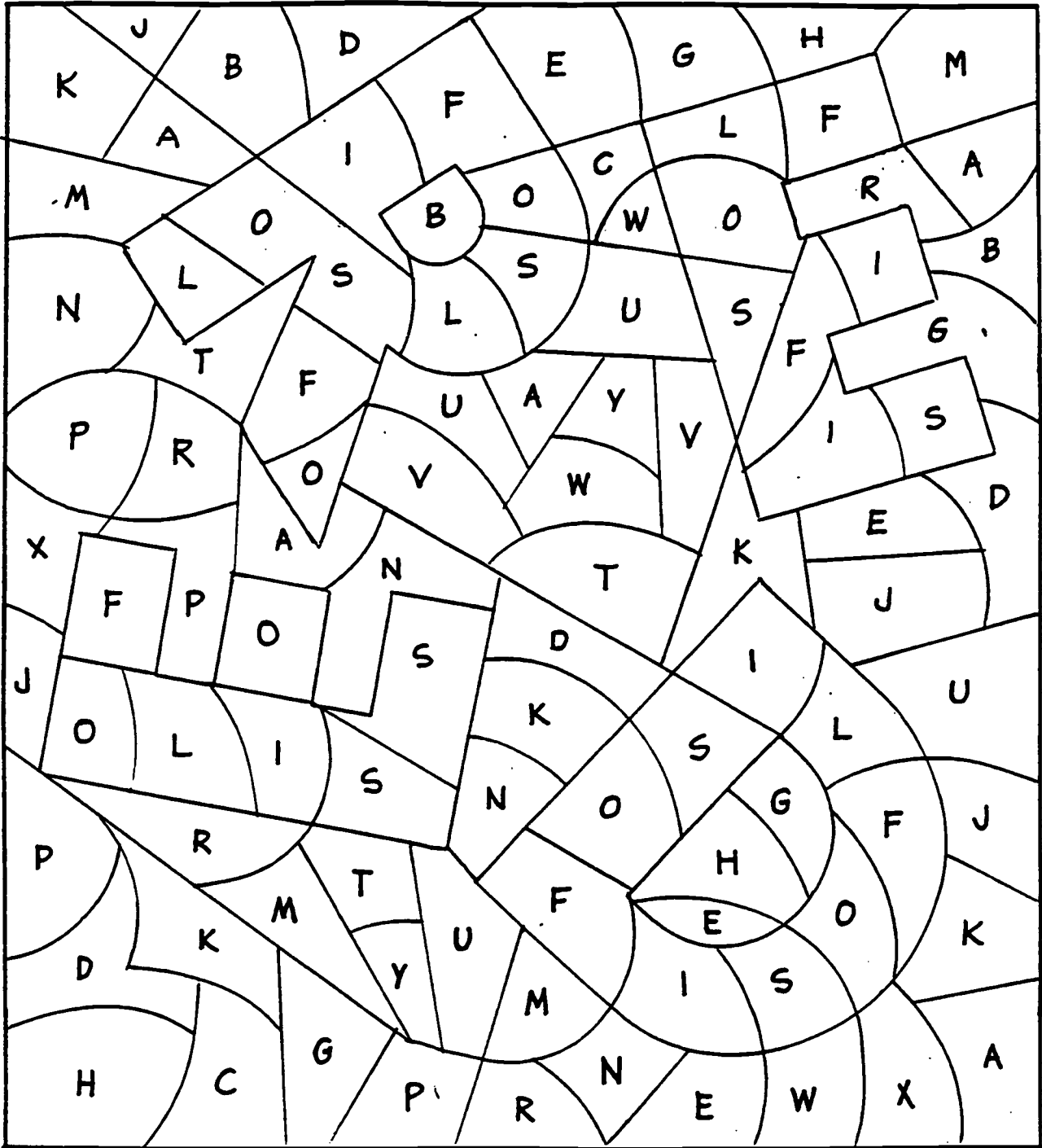


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# LETTER FIND ANIMALS



## FOSSIL

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. Certain letters will appear if you shade them in correctly. When the shaded or colored letters are arranged in order, they will spell the name of an animal. What is it?



# Activity 8: Sum Energy Words #2 (8)

## Instructions for Exercise:

To complete this exercise you must shade or color each shape in the grid which has two numbers that total eight. Six large letters will appear when you shade or color them correctly. When the letters are arranged in order, they will spell an energy word. What is it? Write your answer under the directions. (FOSSIL)

(You may wish to give some students a choice of six-letter energy words like MINING, ENERGY and FOSSIL)

## Answer:

AN OUTLINE TO FIND WORD PUZZLE

### SUM ENERGY WORDS

5+3	7+2	4+3	6+1	2+7
5+4	7+2	6+4	5+2	3+4
5+5	7+2	2+3	5+1	3+6
4+2	3+6	5+1	3+6	4+1
5+2	4+7	4+1	5+2	2+4
4+3	4+7	6+3	3+4	5+2
4+3	5+1	4+1	4+1	5+7
6+1	2+7	9+2	3+4	6+4
3+4	3+4	4+3	2+5	3+4
6+1	2+7	5+2	4+3	3+4
3+4	3+4	5+4	2+7	3+4
3+4	7+2	5+4	7+2	6+1

8

**DIRECTIONS:** Shade or color all the shapes in the grid which have two numbers that total the same sum as the number shown above. Certain letters will appear if you shade them in correctly. When the shaded letters are arranged in order, they will spell a common energy word. What is it?

Fossil



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# SUM ENERGY WORDS

8

**DIRECTIONS:** Shade or color all the shapes in the grid which have two numbers that total the same sum as the number shown above. Certain letters will appear if you shade them correctly. When the shaded letters are arranged in order, they will spell a common energy word. What is it?



**Activity 9: Coal = Sum Difference #1 (0+1)**

**Instructions for Exercise:**

To complete this exercise, you must solve twenty-three basic addition and subtraction problems and then check your sums (adding answers) and differences (subtracting answers) on the Letter Code. Use the space below each problem for your answer and then transfer its code letter to the line of spaces that will spell a coal fact. For example, if you have an answer of 10, the Letter Code shows you that you should write an A while an answer of 12 means you should write a C. (PLANT REMAINS TURN TO COAL)

**Answer:**

**A MATH CODE WORD PUZZLE**

**COAL = SUM DIFFERENCE**

0	4	5	10	6	7	10	1
+1	+3	+5	-1	+5	-5	-2	+2
1	7	10	9	11	2	8	3
6	9	3	8	3	7	9	7
+4	-5	+6	-3	+8	+6	-7	+2
10	4	9	5	11	13	2	9
9	4	8	6	7	2	9	
-4	+7	-2	+6	-1	+8	-2	
5	11	6	12	6	10	7	

**LETTER CODE**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
P	R	M	I	S	O	L	E	N	A	T	C	U			

**PLANT REMAINS TURN TO COAL**

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



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# COAL = SUM DIFFERENCE

0 +1	4 +3	5 +5	10 -1	6 +5	7 -5	10 -2	1 +2
6 +4	9 -5	3 +6	8 -3	3 +8	7 +6	9 -7	7 +2

9 -4	4 +7	8 -2	6 +6	7 -1	2 +8	9 -2

## LETTER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13
P	R	M	I	S	O	L	E	N	A	T	C	U

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



# Activity 10: Five-Way Energy Word Seek #4 (FOSSIL)

## Instructions for Exercise:

To complete this exercise you must find the word FOSSIL five times, either straight across or straight down like the arrows show. Some of the letters in the squares will help you in spelling the word FOSSIL while other letters in the squares won't allow you to completely spell the word. Once you spell FOSSIL straight across or straight down, the letters must remain in the squares. There they will either help you spell FOSSIL or keep you from spelling it in the other direction. To give you a head start, you only have to find the word four times since one is already spelled. (Across - Line 2, 4, and 6; Down - Line 2)

Answer:

A WORD SEEK WORD PUZZLE  
**FIVE-WAY ENERGY  
 WORD SEEK**



	F		S	I			
F	O	S	S	I	L		
	S	O				I	
	S	F	O	S	S	I	L
F	I	F	O	S	S	I	L
	L	F	O	S	S	I	L
F			O		L		
	O			S		L	

**FOSSIL**

**DIRECTIONS:** Try to spell the above energy word five times by filling in the empty squares either straight across or straight down. Some of the letters already there will aid you, while others will help you from completely spelling the word. Once a word is spelled straight across or straight down, these letters must remain in the same position to help spell the word in the other direction. One of the five ways has been done for you.

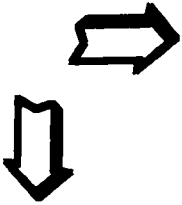


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# FIVE-WAY ENERGY WORD SEEK



	F		S	I			
	O	S			L		
		O				I	
			O				L
F		F	O	S	S	I	L
		F		S			L
F			O		L		
	O			S		L	

## FOSSIL

**DIRECTIONS:** Try to spell the above energy word five times by filling in the empty squares either straight across or straight down. Some of the letters already there will aid you, while others will keep you from completely spelling the word. Once a word is spelled straight across or straight down, those letters must remain in the same position to help spell the word in the other direction. One of the five ways has been done for you.





## ***Section Two: Uses of Coal***

### ***Activities:***

1. Find-An-Energy-Phrase #4 (ENERGY)
2. Fill-In-Energy Facts #2 (COLD)
3. Coal State-Ments #4 (MOST)
4. Sum Energy Words #4 (10)
5. Coal State-Ments #3 (SOME)
6. Tri-Energy Picture Word Find #2 (FUEL, COKE, HEAT)
7. Coal = Sum Difference #3 (9-1)
8. Dinosaur Letter Search #4 (POWER)
9. Dinosaur Letter Search #5 (ENERGY)
10. Color-N-Learn #2 (PRODUCTS)

### ***Teacher Narrative:***

The United States has more coal than any other country. We use coal in many different ways. One of the most important ways we use coal is to make electricity. Power plants burn coal to make the electricity we use. About half of the electricity in the United States comes from burning coal. In our homes, we use electricity for lights, the television., radio, and refrigerator. Can you think of other things that use electricity? We also use coal to heat our homes and cook our food. We send coal to other countries so they can make electricity too. Coal helps make our lives easier and happier!

# Activity 1: Find-An-Energy-Phrase #4 (ENERGY)

## Instructions for Exercise:

To complete this exercise, you must begin from the first word of the phrase "ENERGY IS RELEASED FROM COAL WHEN IT IS BURNED" and draw a continuous line through the nine words in correct order until you reach the word BURNED. Begin from one of the four ENERGY words on the outer edge and begin moving either forward, right, or left, but never slantwise. You may have to retrace some of your moves as you work through the maze of words since there is only one correct route.

Answer:

### AN A-MAZE-IN PHRASE WORD PUZZLE FIND-AN-ENERGY-PHRASE

RELEASED	IS	ENERGY	BURNED
FROM	COAL	IS	IT
COAL	BURNED	RELEASED	WHEN
WHEN	IT	FROM	COAL
COAL	WHEN	COAL	RELEASED
FROM	RELEASED	BURNED	IS
ENERGY	<del>IS</del>	RELEASED	ENERGY
IS	IT	FROM	IS
RELEASED	WHEN	COAL	WHEN
FROM	IT	RELEASED	IT
COAL	WHEN	BURNED	IS
FROM	RELEASED	IS	ENERGY

ENERGY IS RELEASED FROM COAL WHEN IT IS BURNED.

INSTRUCTIONS: The first word of the phrase must be found in any of the outside squares. To find the complete phrase you may move either straight across or straight up-and-down. No other moves are allowed. There is only one correct route.



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# AN A-MAZE-IN PHRASE WORD PUZZLE

## FIND-AN-ENERGY-PHRASE

RELEASED	IS	ENERGY	BURNED
FROM	COAL	IS	IT
COAL	BURNED	RELEASED	WHEN
WHEN	IT	FROM	COAL
COAL	WHEN	COAL	RELEASED
FROM	RELEASED	BURNED	IS
ENERGY	IS	RELEASED	ENERGY
IS	IT	FROM	IS
RELEASED	WHEN	COAL	WHEN
FROM	IT	RELEASED	IT
COAL	WHEN	BURNED	IS
FROM	RELEASED	IS	ENERGY

**ENERGY IS RELEASED FROM COAL WHEN IT IS BURNED.**

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across or straight up and down. No slant moves are allowed. There will be only one correct route.



## Activity 2: Fill-In Energy Facts #2 (COLD)

### Instructions for Exercise:

To complete this exercise, you must fill in all of the prearranged vertical words from the list of basic vocabulary words just above the directions. The first letter of each word spells the energy fact "COAL IS A USEFUL FUEL." The first word COLD is done for you. In addition, say to yourself the 17 basic vocabulary words, circling all of those you know. (COLD, OVER, AND, LOOK) (IT, SAID) (AFTER) (UPON, SHE, EGGS, FALL, US, LEG) (FAR, UNDER, EYE, LETTER)

### Answer:

A COAL-CABULARY WORD PUZZLE  
FILL-IN ENERGY FACTS

C	O	L	D
O	V	E	R
A	N	D	
L	O	O	K

U	P	O	N
S	H	E	
E	G	G	S
F	A	L	L
U	S		
L	E	G	

I	T		
S	A	I	D

A	F	T	E	R
---	---	---	---	---

F	A	R			
U	N	D	E	R	
E	Y	E			
L	E	T	T	E	R

A	N	D		
A	F	T	E	R
C	O	L	D	
E	G	G	S	
E	Y	E		
F	A	L	L	

F	A	R			
I	T				
L	E	G			
L	E	T	T	E	R
L	O	O	K		

O	V	E	R		
S	A	I	D		
S	H	E			
U	N	D	E	R	
U	P	O	N		
U	S				

**DIRECTIONS:** Using the pre-arranged vertical letters that spell an energy fact, choose from the basic vocabulary words listed above and place them in their correct place. All of the words will be used. The first one is done for you.



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# A COAL-CABULARY WORD PUZZLE

## FILL-IN

## ENERGY FACTS

C	O	L	D
O			
A			
L			

U			
S			
E			
F			
U			
L			

I			
S			

F			
U			
E			
L			

A			
---	--	--	--

A	N	D		
A	F	T	E	R
C	O	L	D	
E	G	G	S	
E	Y	E		
F	A	L	L	

F	A	R			
I	T				
L	E	G			
L	E	T	T	E	R
L	O	O	K		

O	V	E	R	
S	A	I	D	
S	H	E		
U	N	D	E	R
U	P	O	N	
U	S			

**DIRECTIONS:** Using the pre-arranged vertical letters that spell an energy fact, choose from the basic vocabulary words listed above and place them in their correct place. All of the words will be used. The first one is done for you.



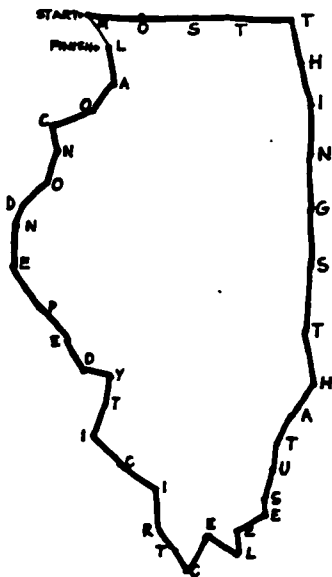
### Activity 3: Coal State-Ments #4 (MOST)

#### Instructions for Exercise:

To complete this exercise you must first trace the statement "MOST THINGS THAT USE ELECTRICITY DEPEND ON COAL." Begin with the letter M next to START and continue spelling the statement about coal until you reach the final letter L, next to FINISH. You now have an outline of one of three states - INDIANA, ILLINOIS, or OHIO. Do you know which state it is? Circle the right state. (ILLINOIS)

Answer:

#### AN OUTLINE TO FIND WORD PUZZLE COAL STATE-MENTS



MOST THINGS THAT USE ELECTRICITY DEPEND ON COAL.

INDIANA

**ILLINOIS**

OHIO

**DIRECTIONS:** In the above puzzle, trace the statement about coal. Begin with the letter next to START and continue to the last letter next to FINISH. When completed, the shape of one of the three states listed will appear. Which state is it?



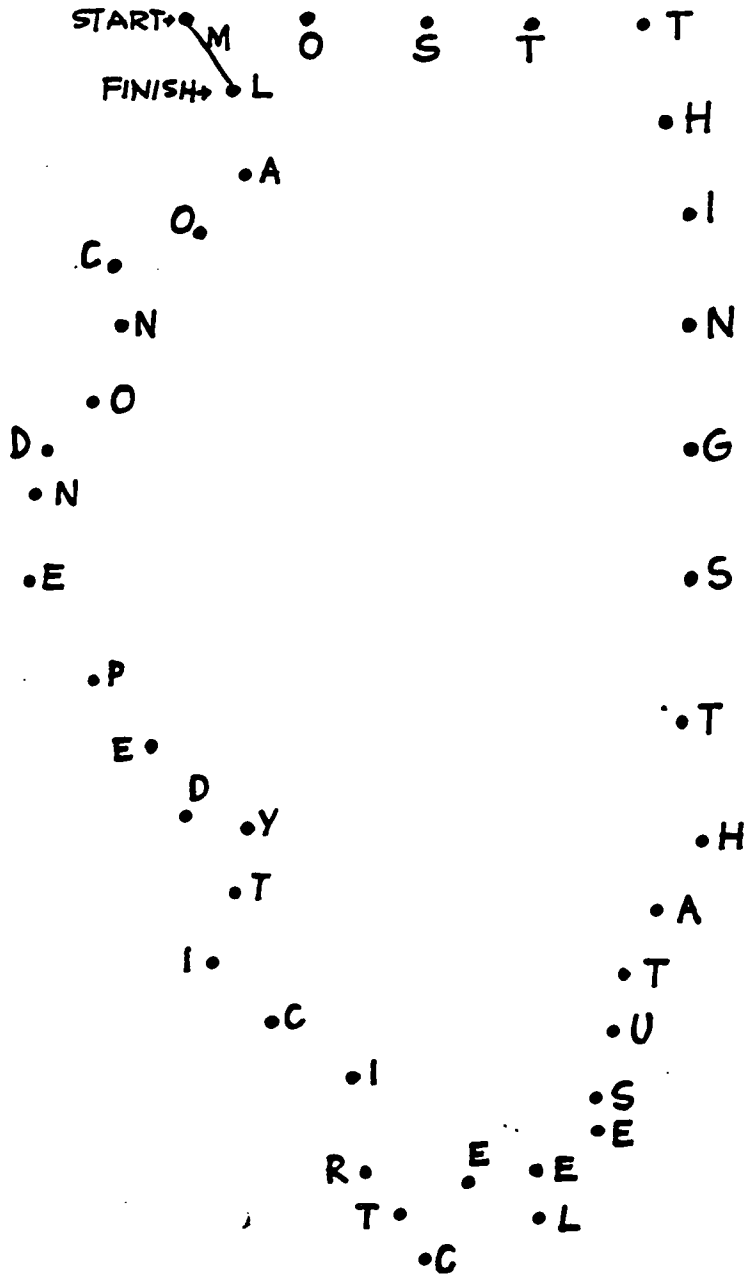
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# AN OUTLINE TO FIND WORD PUZZLE

## COAL STATE-MENTS



**MOST THINGS THAT USE ELECTRICITY DEPEND ON COAL.**

**INDIANA**

**ILLINOIS**

**OHIO**

**DIRECTIONS:** In the above puzzle, trace the statement about coal. Begin with the letter next to **START** and continue to the last letter next to **FINISH**. When completed, the shape of one of the three states listed will appear. Which state is it?



## Activity 4: Sum Energy Words #4 (10)

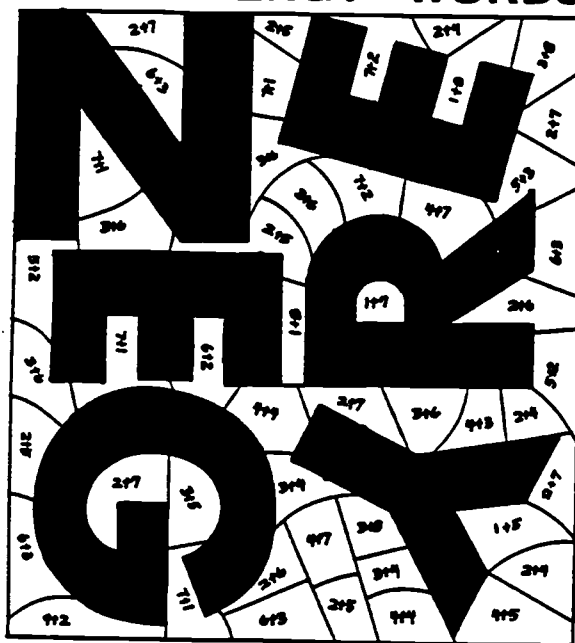
### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has two numbers that total ten. Six large letters will appear when you are finished. When the letters are arranged in order, they will spell an energy word. What is it? Write your answer under the directions. (ENERGY)

(You may want to give some students a choice of six-letter energy words like MINING, ENERGY, and FOSSIL.)

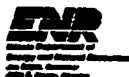
Answer:

### AN OUTLINE TO FIND WORD PUZZLE SUM ENERGY WORDS



10

**DIRECTIONS:** Shade or color all the shapes in the grid which have two numbers that total the same sum as the number shown above. Certain letters will appear if you shade them correctly. When the shaded or colored letters are arranged in order, they will spell a common energy word.



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# SUM ENERGY WORDS

The grid contains numerous addition problems. Some examples include:  $8+2$ ,  $2+7$ ,  $7+3$ ,  $2+5$ ,  $7+3$ ,  $2+4$ ,  $6+4$ ,  $9+1$ ,  $6+3$ ,  $8+2$ ,  $7+1$ ,  $7+2$ ,  $2+4$ ,  $3+7$ ,  $1+9$ ,  $4+6$ ,  $3+7$ ,  $2+8$ ,  $2+8$ ,  $1+9$ ,  $4+6$ ,  $1+8$ ,  $3+7$ ,  $3+6$ ,  $5+5$ ,  $6+4$ ,  $3+6$ ,  $3+6$ ,  $7+2$ ,  $4+6$ ,  $5+3$ ,  $2+5$ ,  $3+6$ ,  $7+2$ ,  $4+7$ ,  $5+3$ ,  $8+2$ ,  $10+0$ ,  $6+3$ ,  $4+6$ ,  $9+1$ ,  $5+5$ ,  $2+6$ ,  $1+7$ ,  $7+3$ ,  $9+1$ ,  $2+6$ ,  $8+2$ ,  $1+8$ ,  $2+8$ ,  $4+6$ ,  $3+7$ ,  $5+2$ ,  $5+5$ ,  $3+7$ ,  $2+8$ ,  $9+1$ ,  $4+6$ ,  $3+6$ ,  $3+7$ ,  $2+5$ ,  $3+6$ ,  $4+3$ ,  $2+4$ ,  $2+5$ ,  $7+3$ ,  $3+7$ ,  $1+9$ ,  $6+4$ ,  $4+4$ ,  $2+7$ ,  $3+6$ ,  $4+3$ ,  $2+4$ ,  $7+3$ ,  $2+7$ ,  $2+7$ ,  $5+5$ ,  $3+4$ ,  $2+8$ ,  $5+5$ ,  $4+6$ ,  $2+7$ ,  $4+6$ ,  $5+5$ ,  $8+2$ ,  $4+7$ ,  $3+8$ ,  $1+9$ ,  $1+5$ ,  $6+3$ ,  $2+8$ ,  $10+0$ ,  $2+6$ ,  $3+4$ ,  $1+9$ ,  $1+5$ ,  $2+4$ ,  $4+7$ ,  $3+4$ ,  $3+7$ ,  $2+4$ ,  $9+2$ ,  $7+1$ ,  $6+3$ ,  $2+5$ ,  $4+4$ ,  $2+5$ ,  $4+4$ ,  $4+5$ ,  $6+3$ ,  $2+5$ ,  $4+4$ ,  $4+5$ .

10

**DIRECTIONS:** Shade or color all the shapes in the grid which have two numbers that total the same sum as the number shown above. Certain letters will appear if you shade them correctly. When the shaded or colored letters are arranged in order, they will spell a common energy word.



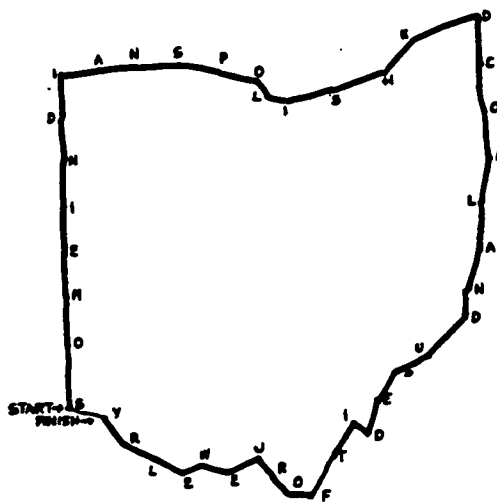
**Activity 5: Coal State-Ments #3 (SOME)**

**Instructions for Exercise:**

To complete this exercise, you must first trace the statement "SOME INDIANS POLISHED COAL AND USED IT FOR JEWELRY." Begin with the letter S next to START and continue spelling the statement about coal until you reach the letter Y, next to FINISH. You now have an outline of one of three states - MICHIGAN, OHIO or PENNSYLVANIA. Do you know which state it is? Circle the right state. (OHIO)

**Answer:**

**AN OUTLINE TO FIND WORD PUZZLE  
COAL STATE-MENTS**



**SOME INDIANS POLISHED COAL AND USED IT FOR JEWELRY.**

**MICHIGAN**

**OHIO**

**PENNSYLVANIA**

**DIRECTIONS:** In the above puzzle, trace the statement about coal. Begin with the letter next to START and continue to the last letter next to FINISH. When completed, the shape of one of the three states listed will appear. Which state is it?

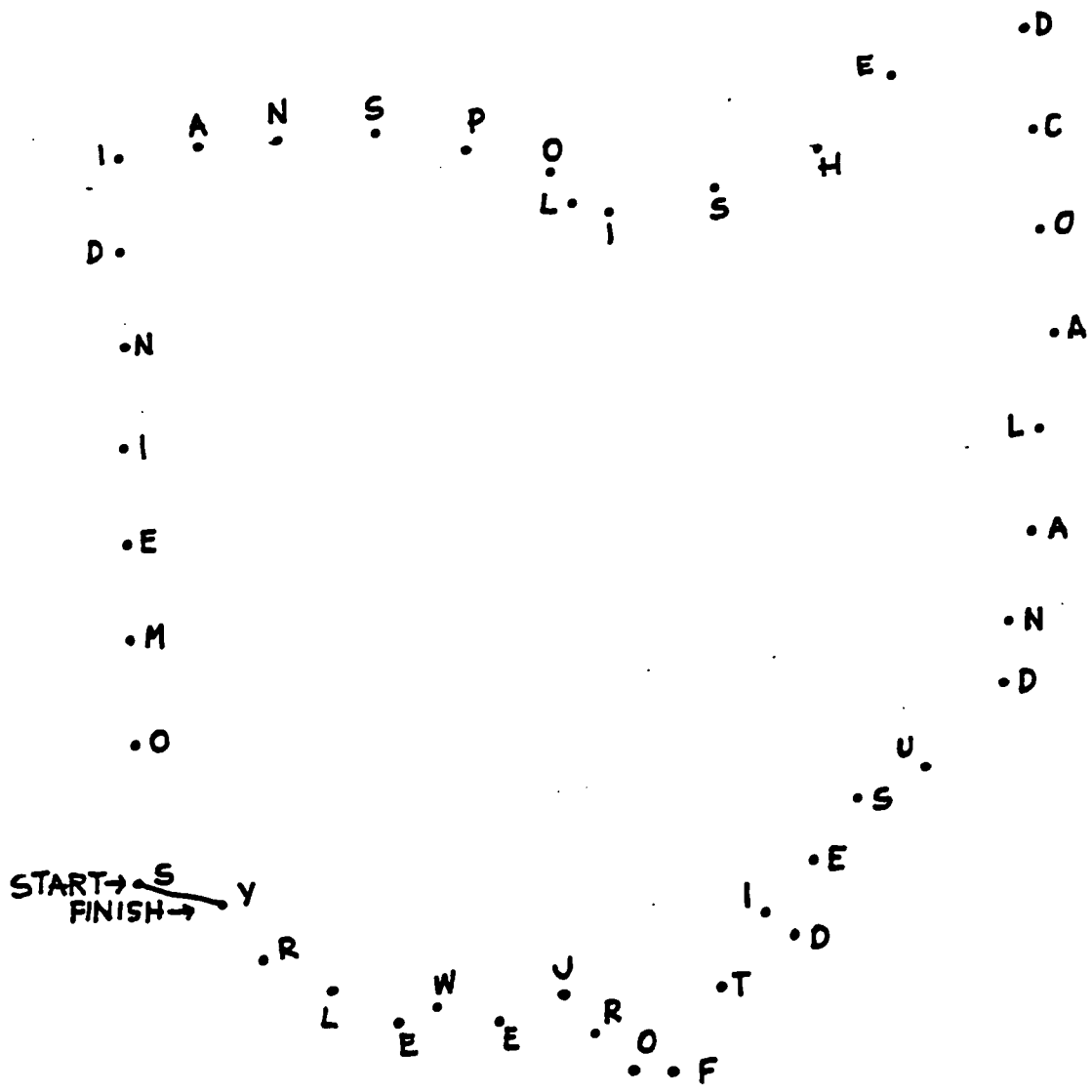


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# AN OUTLINE TO FIND WORD PUZZLE COAL STATE-MENTS



**SOME INDIANS POLISHED COAL AND USED IT FOR JEWELRY.**

**MICHIGAN**

**OHIO**

**PENNSYLVANIA**

**DIRECTIONS:** *In the above puzzle, trace the statement about coal. Begin with the letter next to START and continue to the last letter next to FINISH. When completed, the shape of one of the three states listed will appear. Which state is it?*















## Activity 6: Tri-Energy Picture Word Find #2 (FUEL, COKE, HEAT)

### Instructions for Exercise:

To complete this exercise, you must spell three energy words in three different puzzles. All of the enclosed spaces for each of the puzzles contains a drawing of a basic sight vocabulary word as well as its spelling below, but each word is missing one of its letters. To spell the three energy words, place the letters needed to complete them on the small spaces below. The letters will be in correct order and do not need to be rearranged. (1) FUEL (2) COKE (3) HEAT

### Answer:

#### A COAL-CABULARY WORD PUZZLE TRI-ENERGY PICTURE WORD FIND

			
-ISH E	B-BBY U	N-ST E	F-OWER L
			
-OW C	D-LL O	BOO- K	NOS- E
			
-EN H	GARD-N E	BO-T A	CA- T

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below a minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy words. You must spell all three words to complete the puzzle.



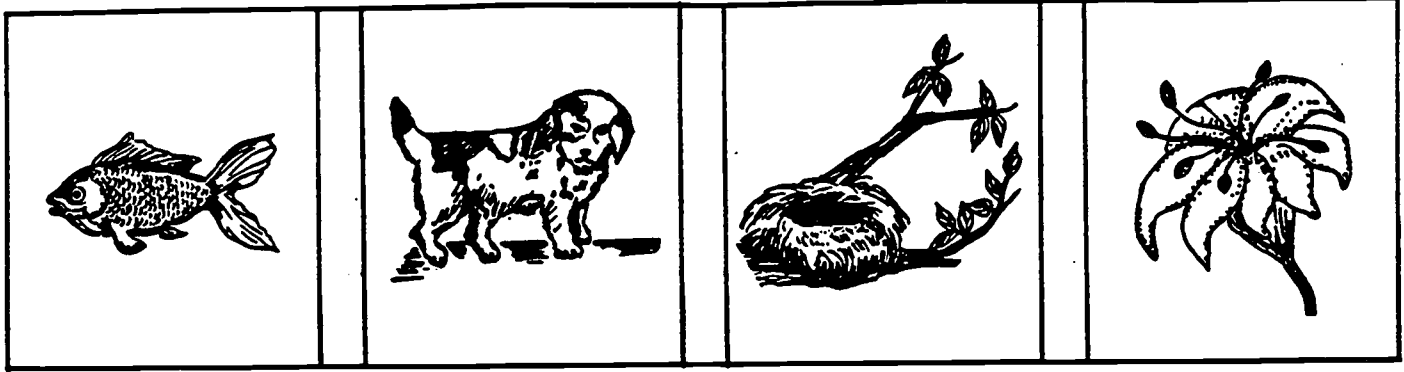
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# A COAL-CABULARY WORD PUZZLE

## TRI-ENERGY PICTURE WORD FIND

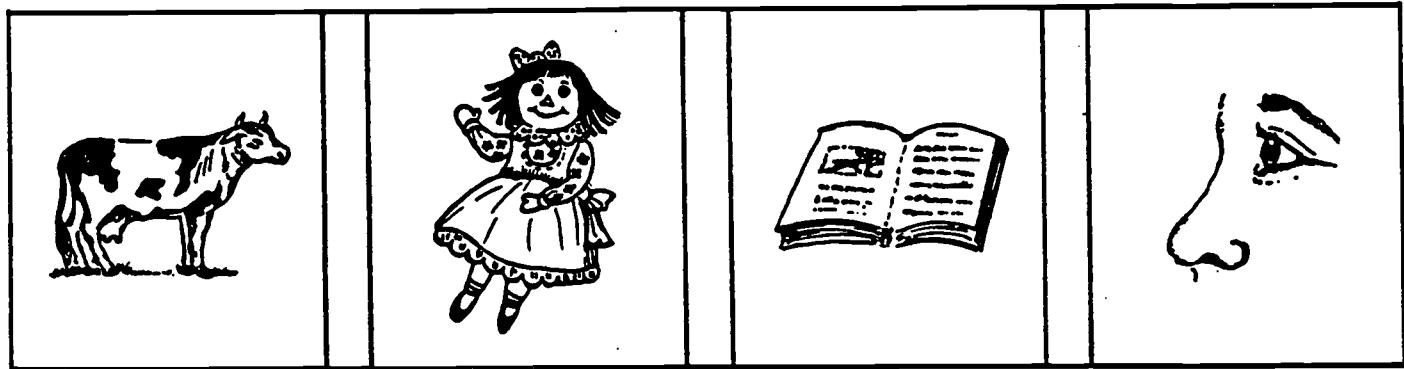


-ISH

P-PPY

N-ST

F-OWER

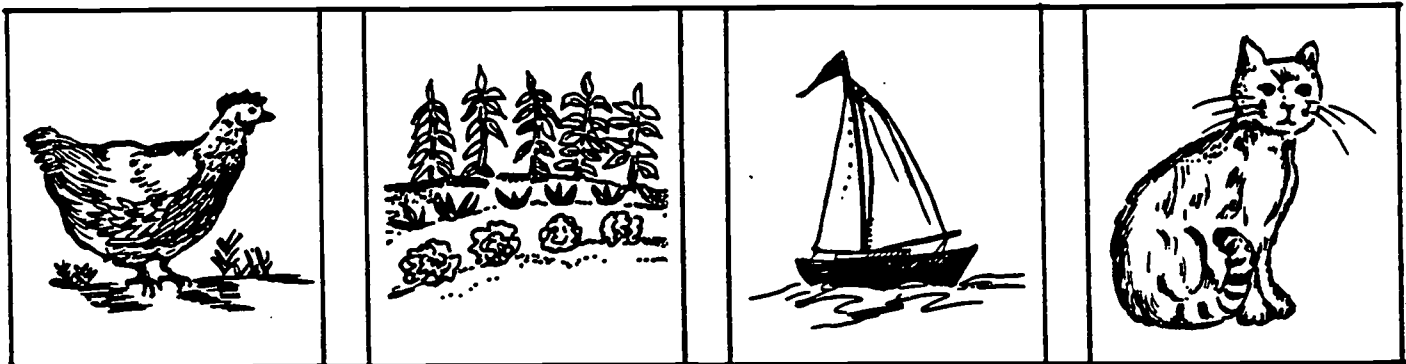


-OW

D-LL

BOO-

NOS-



-EN

GARD-N

BO-T

CA-

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.



**Activity 7: Coal = Sum Difference #3 (9-1)**

**Instructions for Exercise:**

To complete this exercise you must solve twenty-three basic addition and subtraction problems and then check your sums (adding answers) and differences (subtracting answers) on the Letter Code. Use the space below each problem for your answer and then transfer its code letter to the line of spaces that will spell a coal fact. For example, if you have an answer of 10, the Letter Code shows you that you should write an E while an answer of 12 means you should write a U. (MUCH ENERGY COMES FROM COAL)

**Answer:**

**A MATH CODE WORD PUZZLE**

**COAL = SUM DIFFERENCE**

9	7	5	8	1	9	3	10
-1	+5	+4	-6	+9	+2	+7	-3
8	12	9	2	10	11	10	7
8	7	8	9	11	8	6	8
+6	-6	+1	-3	-3	+2	-1	-4
14	1	9	6	8	10	5	4

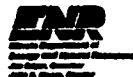
8	3	12	4	10	9	10
-1	+3	-4	+5	-4	+4	-7
7	6	8	9	6	13	3

**LETTER CODE**

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Y	H	L	F	S	O	R	M	C	E	N	U	A	G

**MUCH ENERGY COMES FROM COAL.**

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



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# COAL = SUM DIFFERENCE

9 -1	7 +5	5 +4	8 -6	1 +9	9 +2	3 +7	10 -3
8 +6	7 -6	8 +1	9 -3	11 -3	8 +2	6 -1	8 -4
8 -1	3 +3	12 -4	4 +5	10 -4	9 +4	10 -7	

## LETTER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Y	H	L	F	S	O	R	M	C	E	N	U	A	G

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



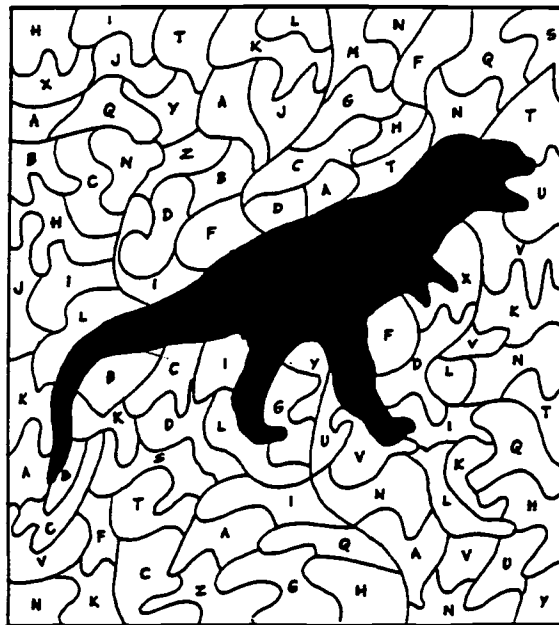
## Activity 8: Dinosaur Letter Search #4 (POWER)

### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a letter that is in the energy word **POWER**. When you are finished coloring or shading, you will have a shape of one of the many kinds of dinosaurs that roamed Earth millions of years ago. You might want to look in a book about dinosaurs to see if you can learn what kind it is. Many of the plants and trees were compressed into coal during this period.

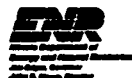
Answer:

### AN OUTLINE TO FIND WORD PUZZLE DINOSAUR LETTER SEARCH



**POWER**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.



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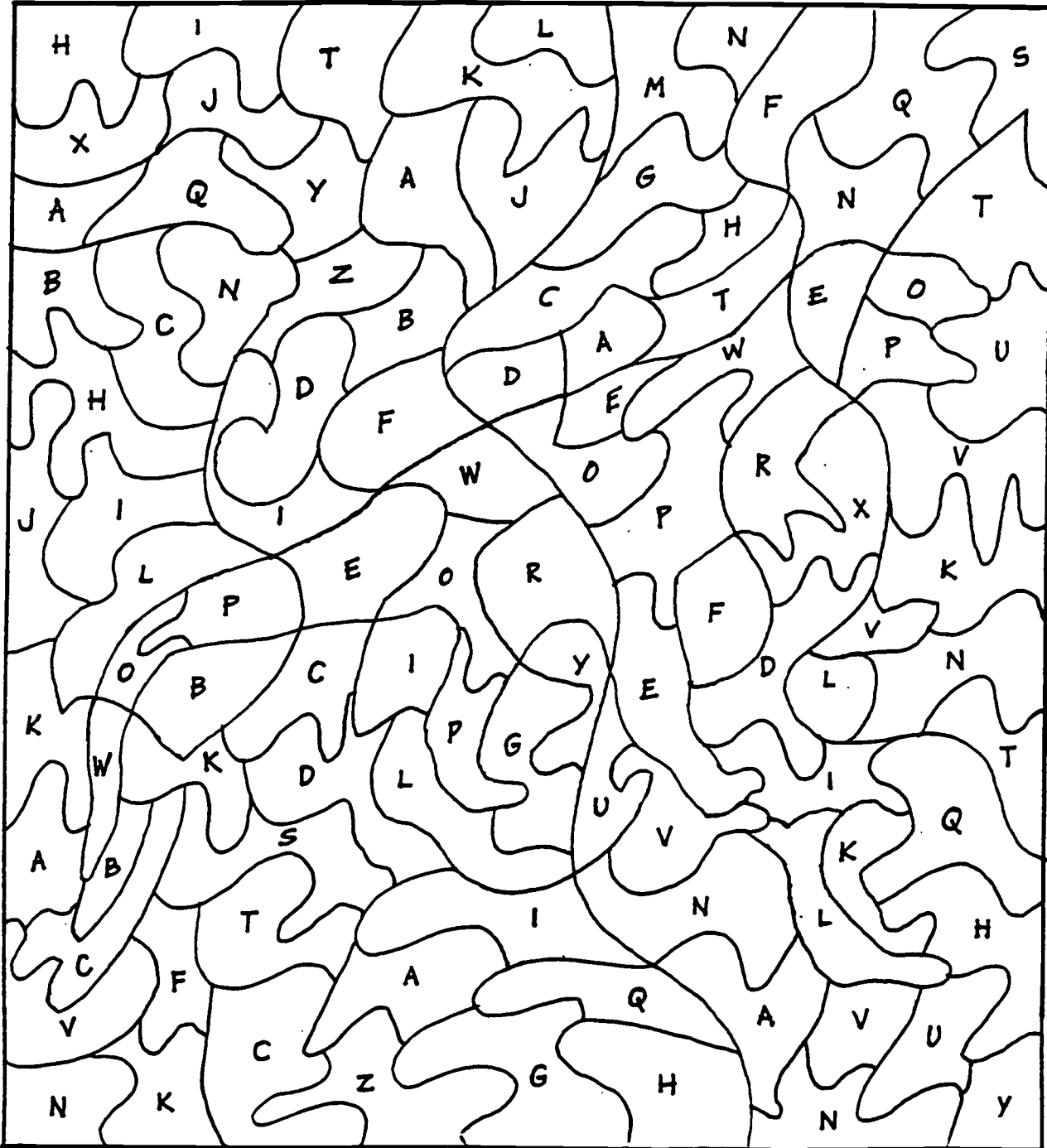


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# AN OUTLINE TO FIND WORD PUZZLE

## DINOSAUR LETTER SEARCH



### POWER

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.



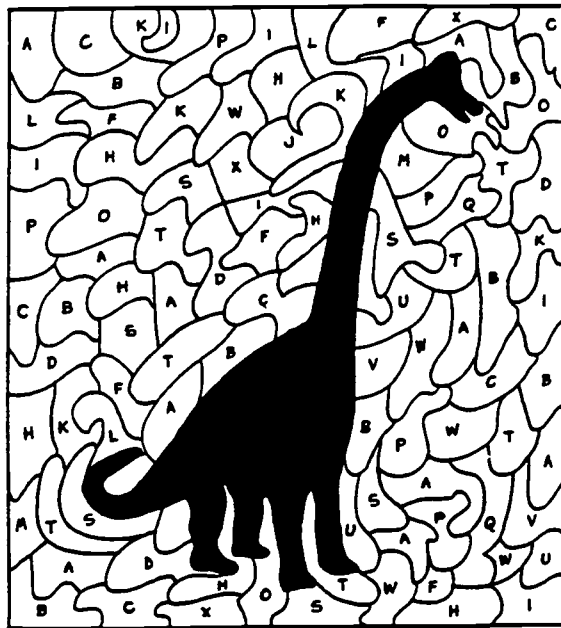
## Activity 9: Dinosaur Letter Search #5 (ENERGY)

### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a letter that is in the energy word ENERGY. When you are finished coloring or shading you will have a shape of one of the many kinds of dinosaurs that roamed Earth millions of years ago. You might want to look in a book about dinosaurs to see if you can learn what kind it is. Many of the plants and trees were compressed into coal during this period.

Answer:

### AN OUTLINE TO FIND WORD PUZZLE DINOSAUR LETTER SEARCH



**ENERGY**

**DIRECTIONS:** Shade or color the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.



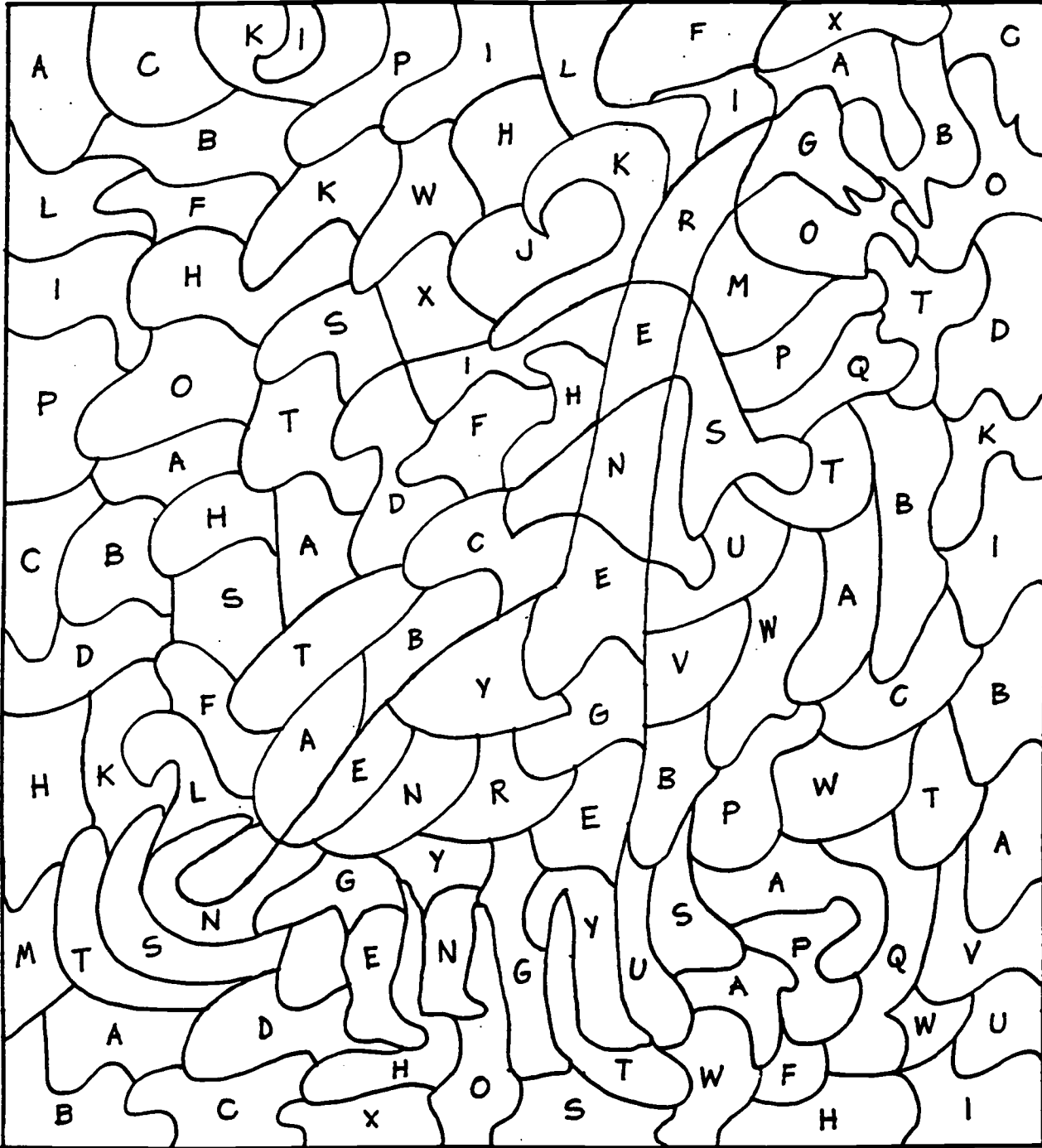
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# AN OUTLINE TO FIND WORD PUZZLE

# DINOSAUR LETTER SEARCH



## ENERGY

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.

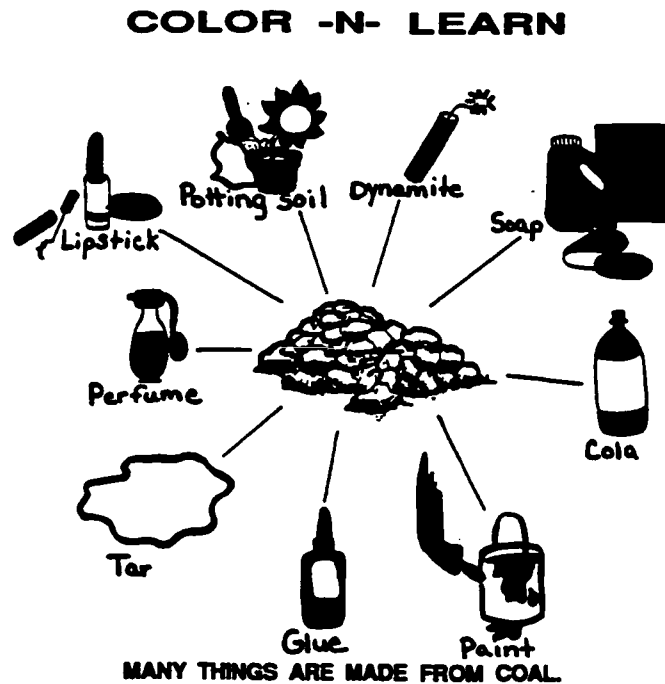


## Activity 10: Color-N-Learn #2 (PRODUCTS)

### Instructions for Exercise:

To complete this exercise, review the coal statement with your class, and then color each item. When finished, you will have a pleasing picture.

Answer:



**DIRECTIONS:** Try to name each picture shown above by using words from the following list:  
Spikes, glue, paint, tar, soap, dynamite, perfume, potting soil.  
Color each picture after it is correctly named.

**ENR**  
Energy News  
Environmental News  
Record  
The McGraw-Hill Companies  
1221 Ave. of the Americas  
New York, N.Y. 10020

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# COLOR -N- LEARN



**MANY THINGS ARE MADE FROM COAL.**

**DIRECTIONS:** Try to name each picture shown above by using words from the following list:  
lipstick glue paint tar cola soap dynamite perfume potting soil.  
Color each picture after it is correctly named.



## *Section Three: Mining*

### *Activities:*

1. Find-An-Energy-Phrase #2 (COAL-GROUND)
2. Design-Two-Shape #1 (MINE)
3. Color-N-Learn #3 (TRUCK)
4. Animal Energy Phrase #1 (WHEN)
5. Animal Energy Phrase #2 (LAND)
6. Animal Energy Phrase #3 (COAL)
7. Animal Energy Phrase #4 (LARGE)
8. Tri-Energy Picture Word Find #1 (COAL, DUST, ROCK)
9. Coal = Sum Difference #2 (2+9)
10. Tri-Energy Picture Word Find #3 (MINE, PEAT, SEAM)

### *Teacher Narrative:*

We obtain coal by digging it out of its bed in the earth. This is called mining. There are two kinds of mining. One kind of mining is called surface mining. This is when the coal is close to the surface and only has a few covers or layers. A big machine moves the layers of dirt and sand off the coal. Then the coal miners use dynamite to break up the layers. Large power shovels then scoop up the coal and put it in big trucks. The ground is then covered up and returned to its original beauty!

Another kind of mining is underground mining or deep mining. When the coal has lots of layers, the miners must go down into the earth to get the coal. They do this by taking an elevator deep into the ground. There are tunnels underground where the miners work. A machine tears coal from the walls and it is loaded into carts that are on tracks like railroad tracks. This is how they get the coal up to the surface of the earth. Once the coal is removed from the mine, it is cleaned. It is then sent to power plants and other places by train, semi-trucks, or big barges that float down the river, to make electricity and other products.

We have enough coal to last for many, many years, and a lot of it is right here in Illinois. In fact, it may be underneath us right now just waiting to be mined!

## Activity 1: Find-An-Energy-Phrase #2 (COAL-GROUND)

### Instructions for Exercise:

To complete this exercise you must begin from the first word of the phrase "COAL IS DUG OUT OF THE GROUND" and draw a continuous line through the seven words in correct order until you reach the word GROUND. Begin from one of the four COAL words on the outer edge and begin moving either forward, right or left, but never slantwise. You may have to retrace some of your moves as you work through the maze of words since there is only one correct route.

### Answer:

#### AN A-MAZE-IN PHRASE WORD PUZZLE FIND-AN-ENERGY-PHRASE

COAL	OUT	GROUND
IS	DUG	THE
THE	GROUND	COAL
OF	OUT	IS
THE	DUG	OUT
DUG	IS	COAL
IS	GROUND	IS
COAL	OUT	DUG

COAL IS DUG OUT OF THE GROUND.

**DIRECTIONS:** The first word of the above phrase can be found in several of the eligible squares. To find the complete phrase you may move either straight across or straight up and down. No slant moves are allowed. There will be only one correct route.



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# AN A-MAZE-IN PHRASE WORD PUZZLE

## FIND-AN-ENERGY-PHRASE

COAL	OUT	GROUND
IS	DUG	THE
THE	GROUND	COAL
OF	OUT	IS
THE	DUG	OUT
DUG	IS	COAL
IS	GROUND	IS
COAL	OUT	DUG

**COAL IS DUG OUT OF THE GROUND.**

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across or straight up and down. No slant moves are allowed. There will be only one correct route.





## Activity 2: Design-Two-Shape #1 (MINE)

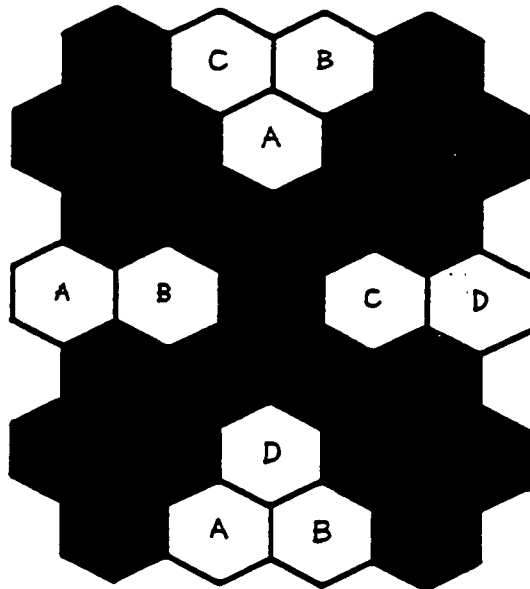
### Instructions for Exercise:

To complete this exercise, you must color all of the six-sided shapes that have letters which are in the word MINE with one color, and then with another color, do the same in all the enclosures having letters not found in the word. The letters (M, I, N and E) do not have to be in any order. When you are finished, you will have a pleasing two-color pattern design.

(You may wish to tell younger students just to color in the enclosures containing the letters M, I, N and E and leave the other six-sided shapes blank.)

Answer:

### A PATTERN PLAY WORD PUZZLE DESIGN-TWO-SHAPE



MINE

**DIRECTIONS:** Color or shade all the six-sided figures that have the same letters as the word listed above. They do not have to be in any order. All of the spaces having letters not in the above word can be left alone or colored another color. When finished, you will have a nice design.

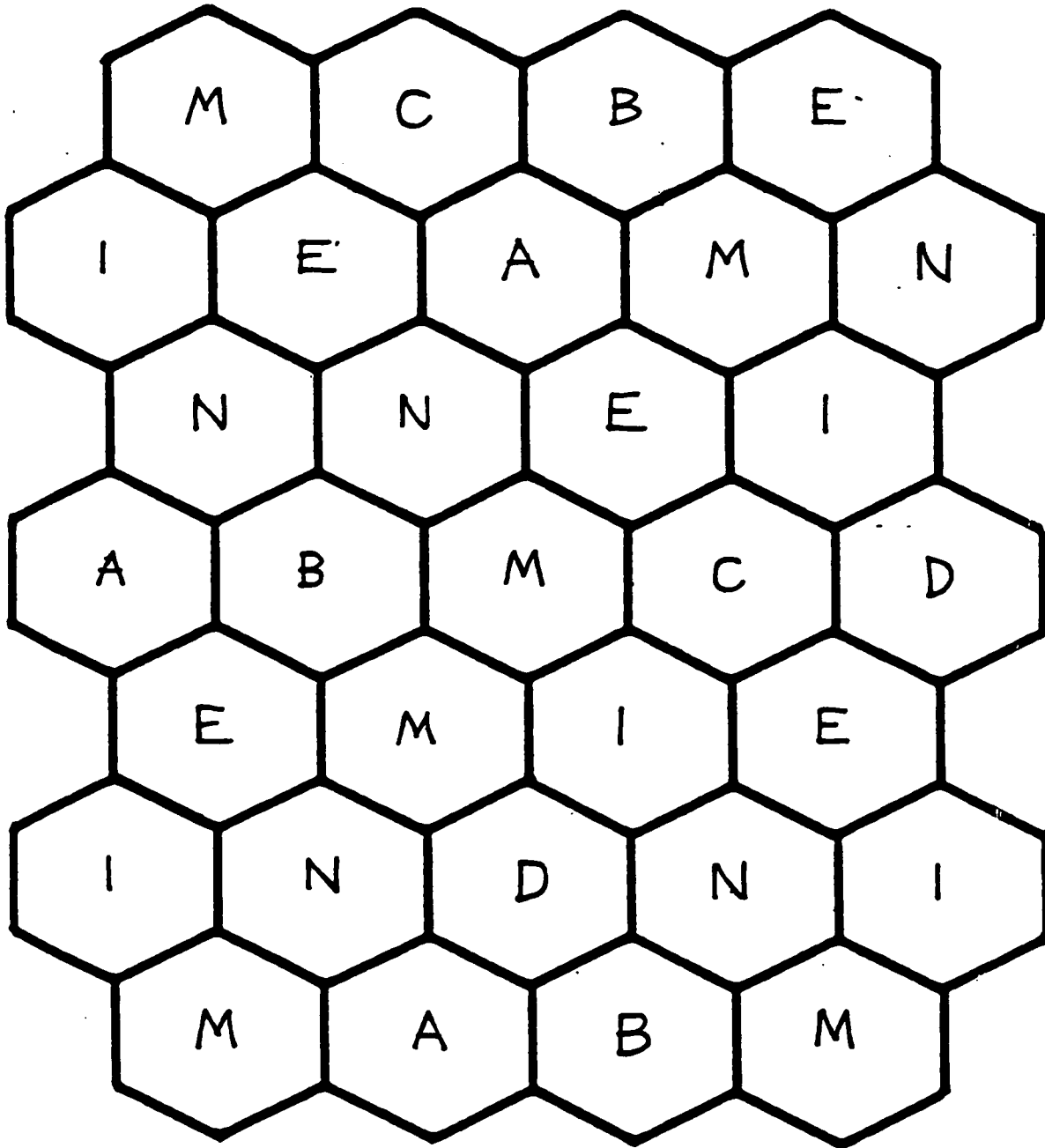


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# DESIGN-TWO-SHAPE



## MINE

**DIRECTIONS:** Color or shade all the six-sided figures that have the same letters as the word listed above. They do not have to be in any order. All of the spaces having letters not in the above word can be left alone or colored another color. When finished, you will have a nice design.



### Activity 3: Color-N-Learn #3 (TRUCK)

#### Instructions for Exercise:

To complete this exercise, review the coal statement with your class and then color the truck. When finished, you will have a pleasing picture.

Answer:

### COLOR -N- LEARN



**BIG TRUCKS ARE USED TO MOVE COAL.**

**DIRECTIONS:** Color the truck shown above. When finished, you will have a pleasing picture.

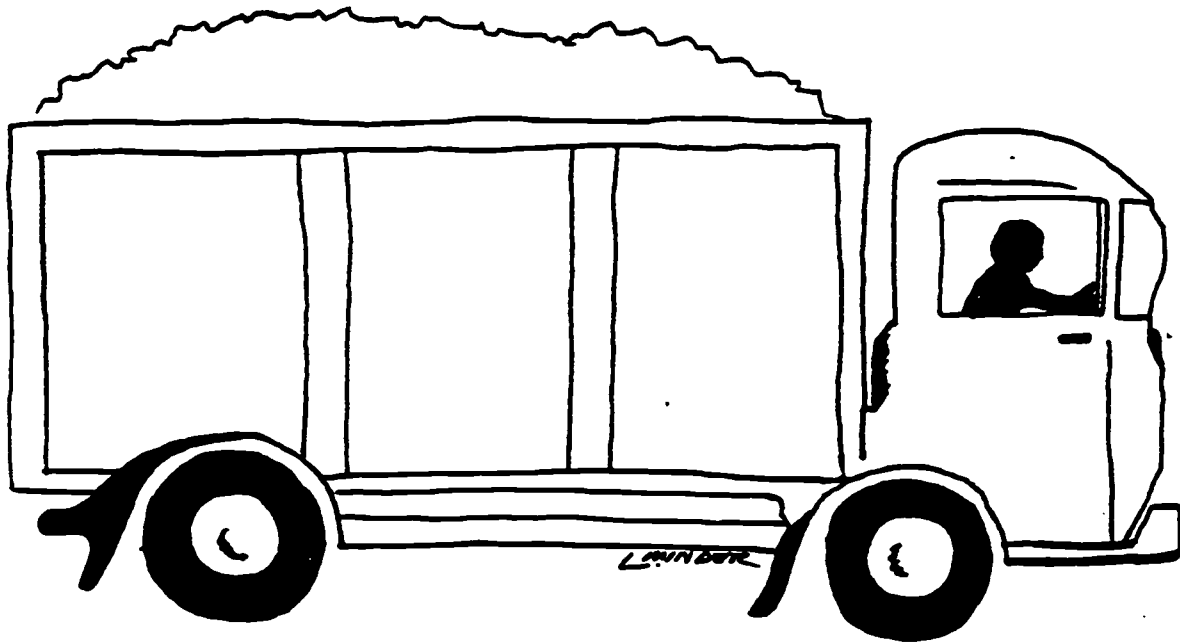


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# COLOR -N- LEARN



**BIG TRUCKS ARE USED TO MOVE COAL.**

**DIRECTIONS:** Color the truck shown above. When finished, you will have a pleasing picture.



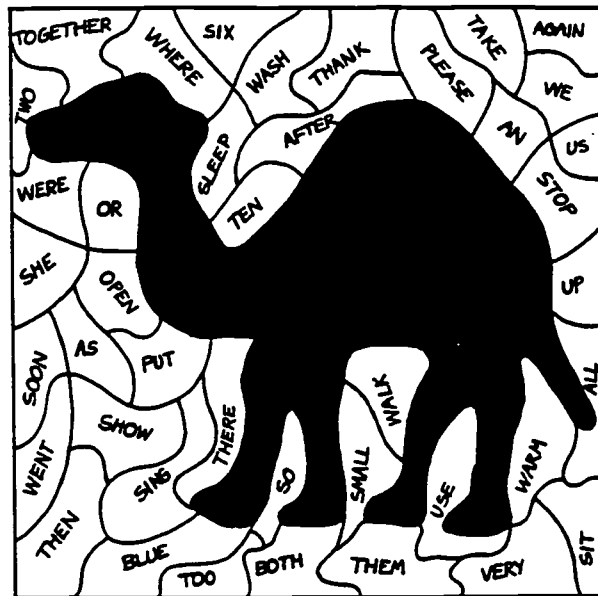
**Activity 4: Animal Energy Phrase #1 (WHEN)**

**Instructions for Exercise:**

To complete this exercise you must shade or color each shape in the grid which has a word that is in the phrase "WHEN THE COAL IS DEEP UNDER THE GROUND, MINERS MUST TUNNEL DOWN TO THE COAL TO MINE IT." When finished, the shape of an animal will appear. Tell me what animal it is or print its name under the directions. Also, say to yourself all of the basic vocabulary words you know that are in shapes not used, circling all the ones you are familiar with. (CAMEL)

**Answer:**

**AN OUTLINE TO FIND WORD PUZZLE  
ANIMAL ENERGY PHRASE**



**WHEN THE COAL IS DEEP UNDER THE GROUND, MINERS MUST TUNNEL DOWN TO THE COAL TO MINE IT.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the phrase that are not basic vocabulary words. An outline of an animal will appear if you shade each in correctly. What is the name of the animal?

Camel

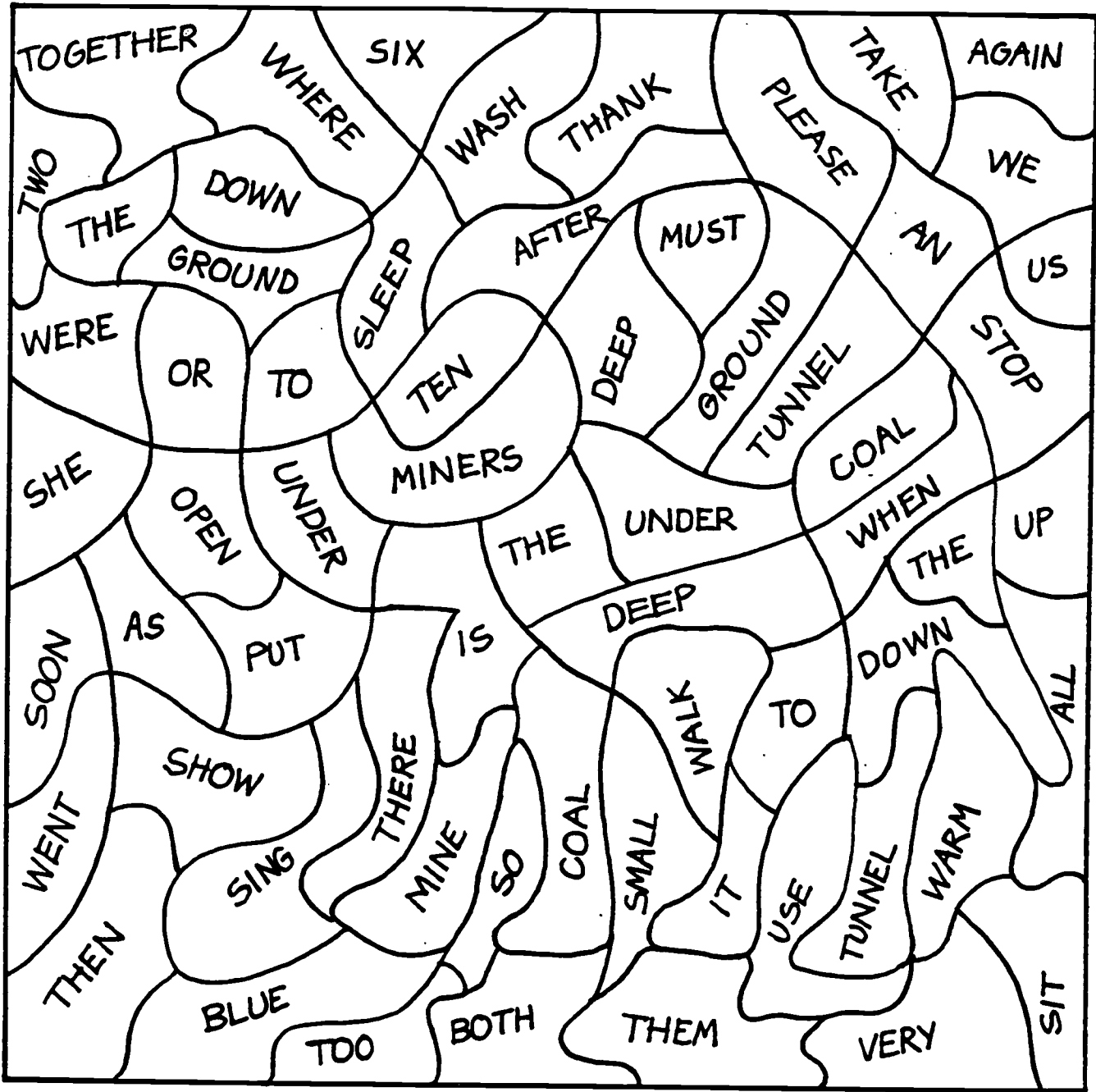


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# AN OUTLINE TO FIND WORD PUZZLE

## ANIMAL ENERGY PHRASE



**WHEN THE COAL IS DEEP UNDER THE GROUND, MINERS MUST TUNNEL DOWN TO THE COAL TO MINE IT.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?



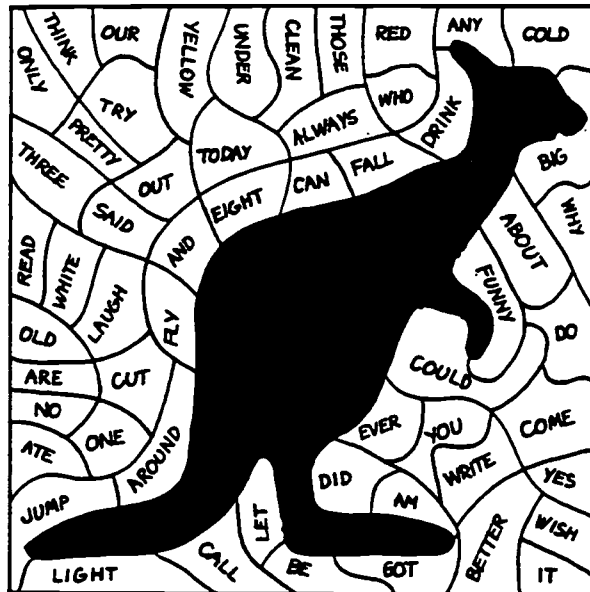
## Activity 5: Animal Energy Phrase #2 (LAND)

### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a word that is in the phrase "LAND IS PUT BACK INTO GOOD SHAPE AFTER THE MINING OF COAL IS ALL DONE." When finished, the shape of an animal will appear. Tell me what it is or print its name under the directions. Also, say to yourself all of the basic vocabulary words you know that are in shapes not used, circling all the ones you are familiar with. (KANGAROO)

Answer:

### AN OUTLINE TO FIND WORD PUZZLE ANIMAL ENERGY PHRASE



LAND IS PUT BACK INTO GOOD SHAPE AFTER THE MINING OF THE COAL IS ALL DONE.

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?

Kangaroo

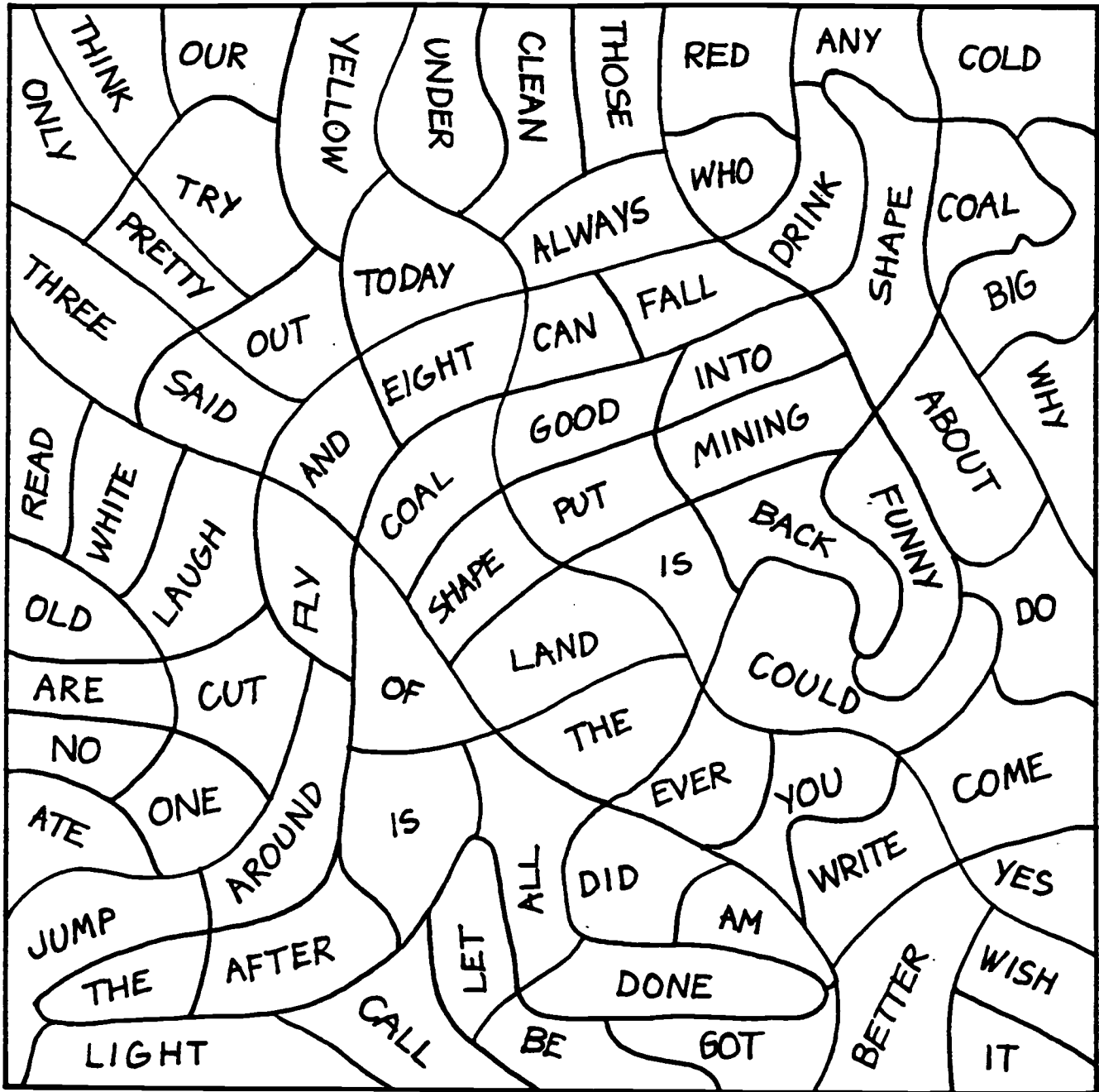


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# AN OUTLINE TO FIND WORD PUZZLE

## ANIMAL ENERGY PHRASE



**LAND IS PUT BACK INTO GOOD SHAPE AFTER THE MINING OF THE COAL IS ALL DONE.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?





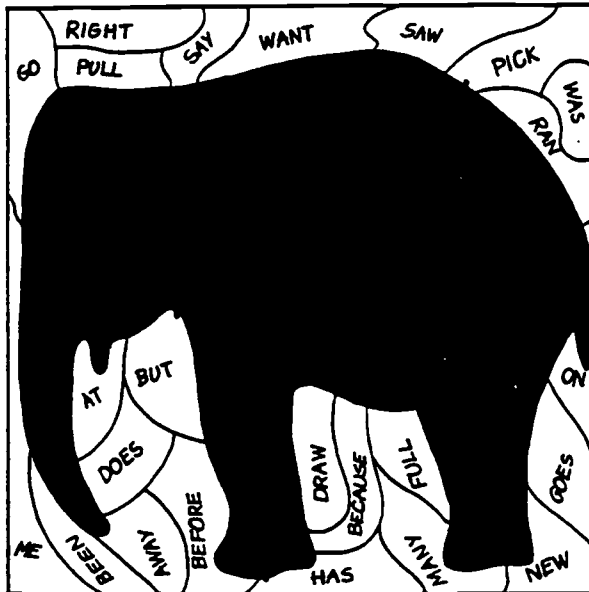
**Activity 6: Animal Energy Phrase #3 (COAL)**

**Instructions for Exercise:**

To complete this exercise, you must shade or color each shape in the grid which has a word that is in the phrase "COAL IS WASHED AND CRUSHED AFTER IT IS MINED TO MAKE IT CLEANER AND BETTER FOR BURNING." When finished, the shape of an animal will appear. Tell me what it is or print its name under the directions. Also, say to yourself all of the basic vocabulary words you know that are in shapes not used, circling all the ones you are familiar with. (ELEPHANT)

**Answer:**

**AN OUTLINE TO FIND WORD PUZZLE  
ANIMAL ENERGY PHRASE**



**COAL IS WASHED AND CRUSHED AFTER IT IS MINED TO MAKE IT CLEANER AND BETTER FOR BURNING.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?

Elephant

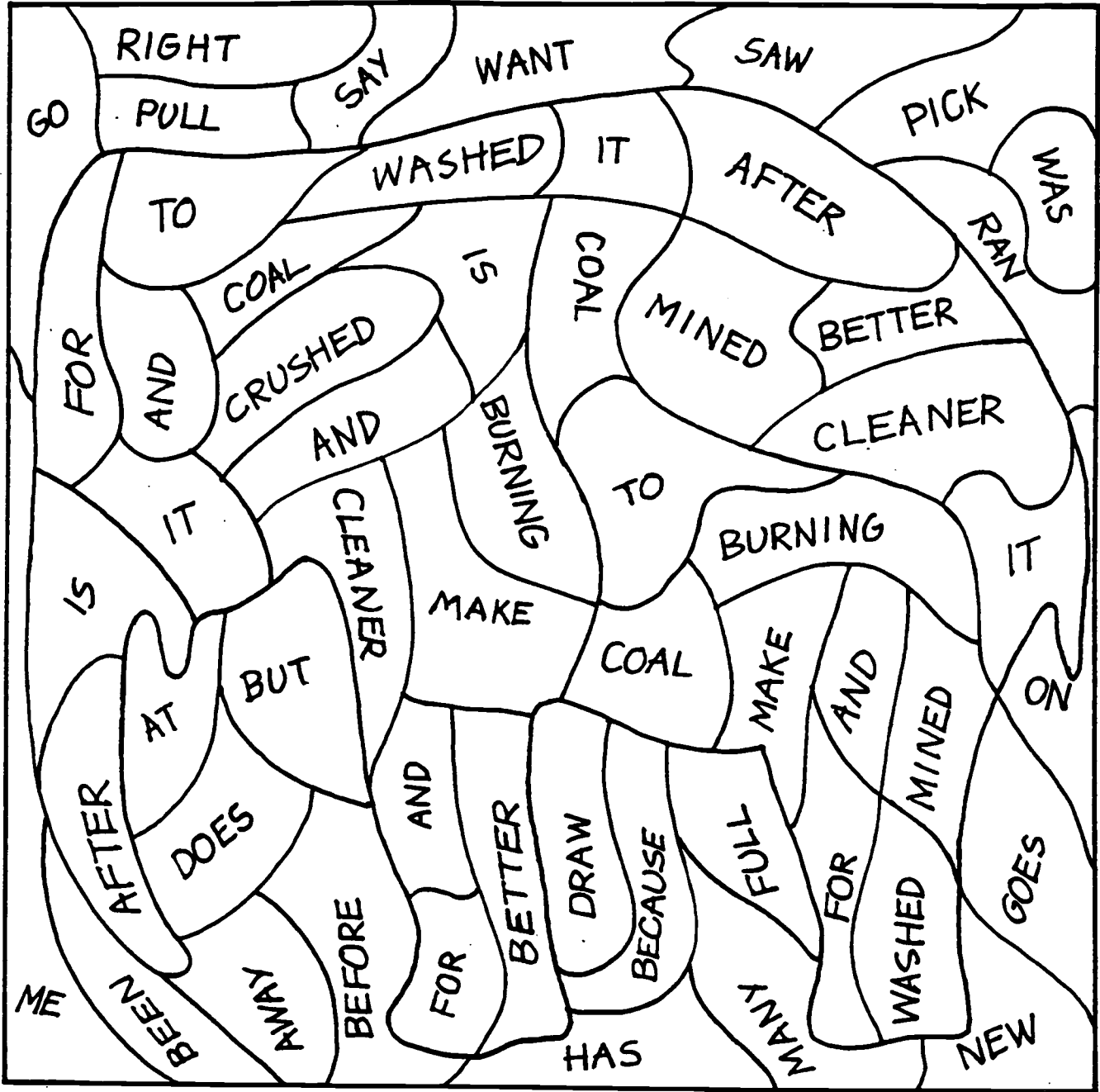


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# AN OUTLINE TO FIND WORD PUZZLE

## ANIMAL ENERGY PHRASE



**COAL IS WASHED AND CRUSHED AFTER IT IS MINED TO MAKE IT CLEANER AND BETTER FOR BURNING.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?



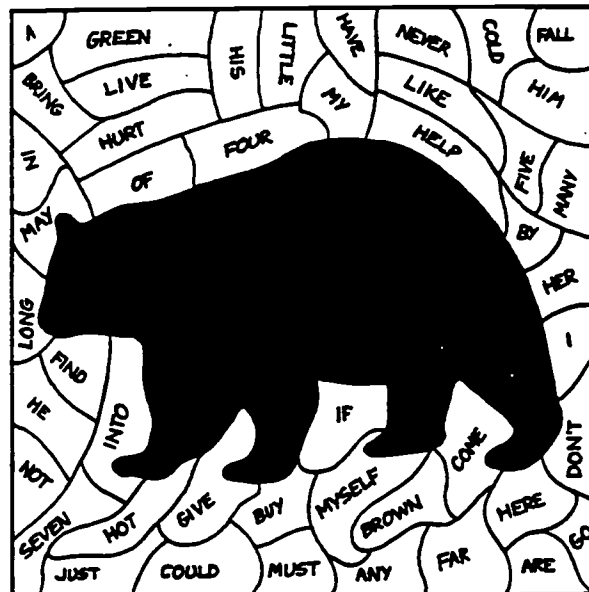
## Activity 7: Animal Energy Phrase #4 (LARGE)

### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a word that is in the phrase "LARGE SHOVELS AND DRAGLINES ARE USED TO DIG THE COAL WHEN IT IS CLOSE TO THE SURFACE." When finished, the shape of an animal will appear. Tell me what it is or print its name under the directions. Also, say to yourself all of the basic vocabulary words you know that are in shapes not used, circling all the ones you are familiar with. (BEAR)

Answer:

### AN OUTLINE TO FIND WORD PUZZLE ANIMAL ENERGY PHRASE



LARGE SHOVELS AND DRAGLINES ARE USED TO DIG THE COAL WHEN IT IS CLOSE TO THE SURFACE.

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?

Bear



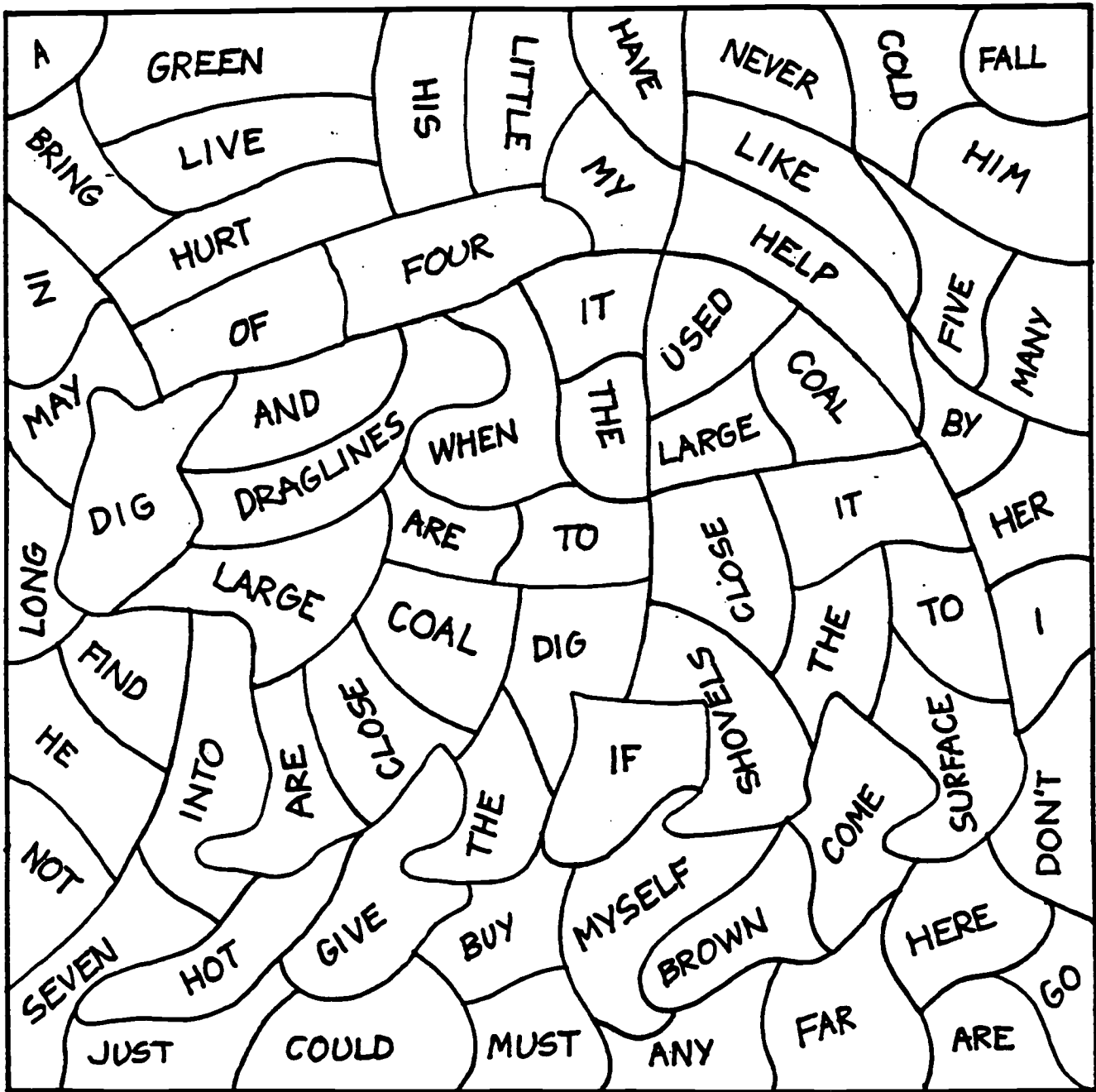
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# AN OUTLINE TO FIND WORD PUZZLE

## ANIMAL ENERGY PHRASE



**LARGE SHOVELS AND DRAGLINES ARE USED TO DIG THE COAL WHEN IT IS CLOSE TO THE SURFACE.**

**DIRECTIONS:** Shade or color all the shapes in the grid which have words that are in the above phrase. The words in the spaces not used are basic vocabulary words. An outline of an animal will appear if you shade them in correctly. What is the name of the animal?







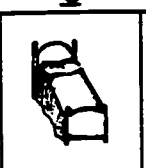
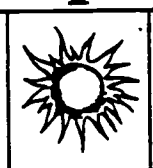
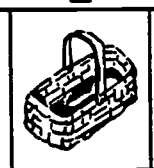

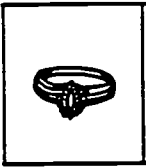



## Activity 8: Tri-Energy-Picture Word Find #1 (COAL, DUST, ROCK)

### Instructions for Exercise:

To complete this exercise, you must spell three energy words in three different puzzles. All of the enclosed spaces for each of the puzzles contains a drawing of a basic sight vocabulary word as well as its spelling below, but each word is missing one of its letters. To spell the three energy words, place the letters needed to complete the words on the small spaces below. The letters will be in correct order and will not need to be rearranged. (1) COAL (2) DUST (3) ROCK

Answer:

### A COAL-CABULARY WORD PUZZLE TRI-ENERGY PICTURE WORD FIND

			
STI-K C	FO-T D	R-BBIT A	MI-K L
			
BE- D	S-N L	BA-KET H	-REE I
			
-ING R	C-AT O	DU-K C	CA-E K

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.

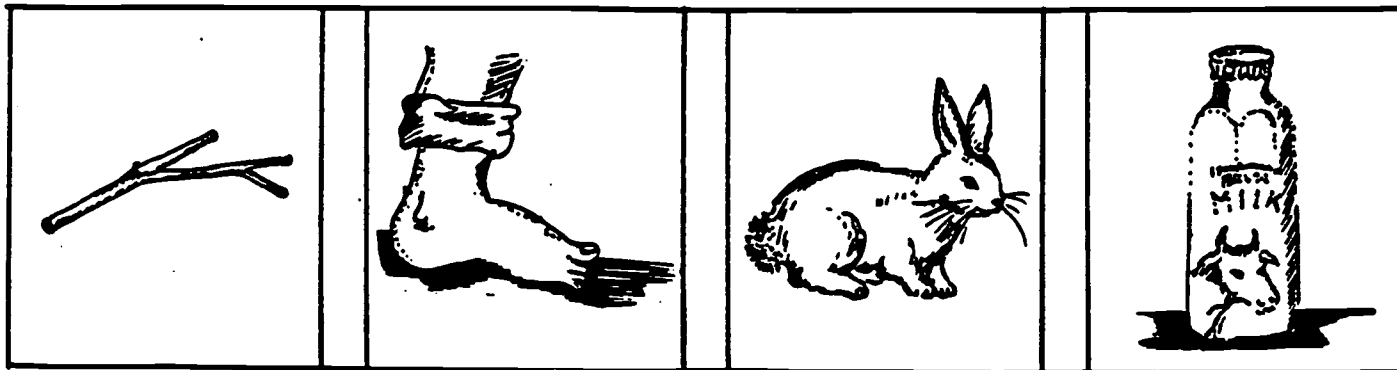
**ENR**  
Energy News  
Energy Department of  
Energy and Natural Resources  
Washington, D.C.  
John A. Smith, Director

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# TRI-ENERGY PICTURE WORD FIND

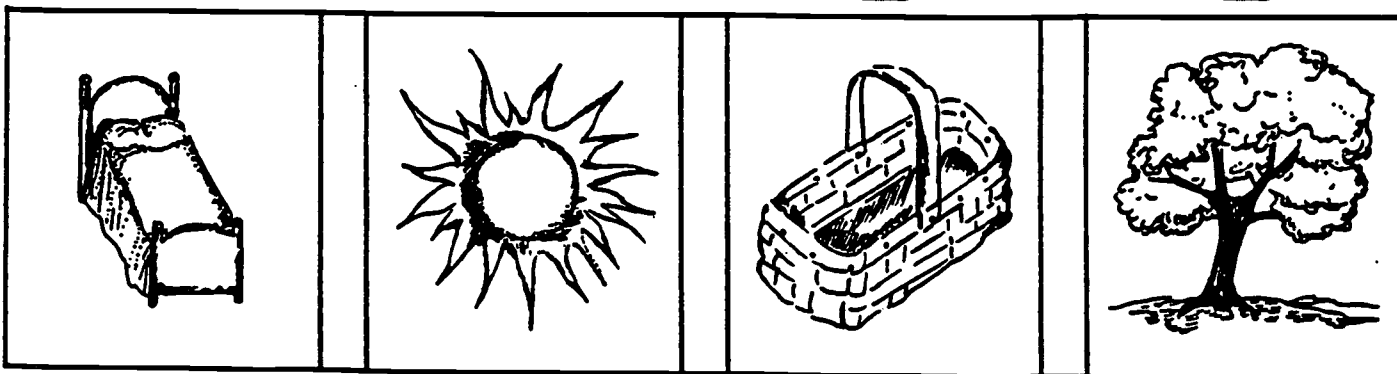


STI-K

FO-T

R-BBIT

MI-K

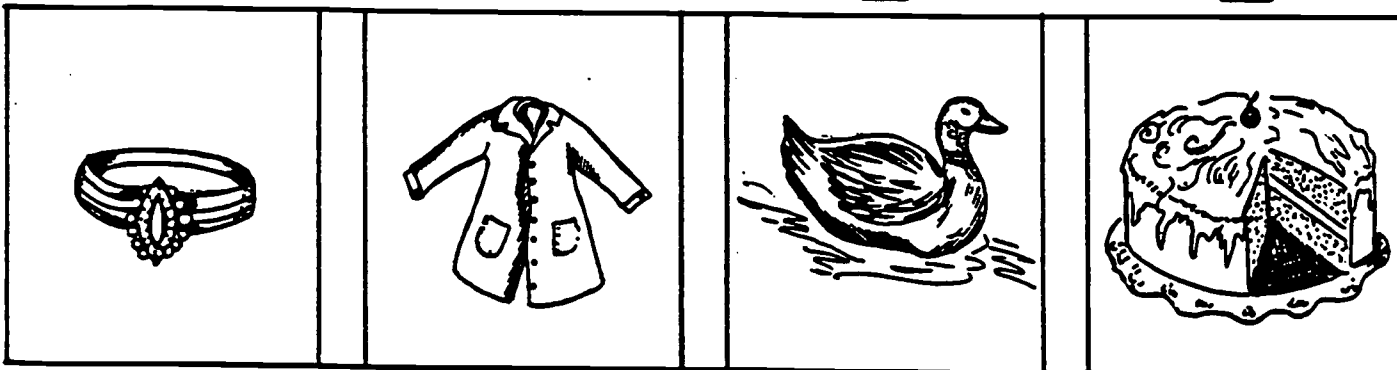


BE-

S-N

BA-KET

-REE



-ING

C-AT

DU-K

CA-E

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.



**Activity 9: Coal = Sum Difference #2 (2+9)**

**Instructions for Exercise:**

To complete this exercise, you must solve twenty-three basic addition and subtraction problems and then check your sums (adding answers) and differences (subtracting answers) on the Letter Code. Use the space below each problem for your answer and then transfer its code letter to the line of spaces that will spell a coal fact. For example, if you have an answer of 10, the Letter Code shows you that you should write an E while an answer of 12 means you should write a D. (COAL IS FOUND IN LARGE SEAMS).

**Answer:**

**A MATH CODE WORD PUZZLE**

**COAL = SUM DIFFERENCE**

2	4	10	1	3	2	4	5
+9	-3	-5	+3	-1	+6	+6	-4
11	1	5	4	2	8	10	1
4	5	8	5	2	5	12	5
+5	+1	+4	-3	+4	-1	-7	-2
9	6	12	2	6	4	5	3
7	2	5	6	7	5	1	
+7	+5	+3	+1	-2	+8	+7	
14	7	8	7	5	13	8	

**LETTER CODE**

1	2	3	4	5	6	7	8	9	10	11	12	13	14
O	I	R	L	A	N	E	S	U	F	C	D	M	G

**COAL IS FOUND IN LARGE SEAMS.**

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dashed line below, beginning with the first row of problems and the left hand side of the dashed line. When finished, you will have spelled an important coal fact.



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# COAL = SUM DIFFERENCE

$\begin{array}{r} 2 \\ +9 \end{array}$	$\begin{array}{r} 4 \\ -3 \end{array}$	$\begin{array}{r} 10 \\ -5 \end{array}$	$\begin{array}{r} 1 \\ +3 \end{array}$	$\begin{array}{r} 3 \\ -1 \end{array}$	$\begin{array}{r} 2 \\ +6 \end{array}$	$\begin{array}{r} 4 \\ +6 \end{array}$	$\begin{array}{r} 5 \\ -4 \end{array}$
$\begin{array}{r} 4 \\ +5 \end{array}$	$\begin{array}{r} 5 \\ +1 \end{array}$	$\begin{array}{r} 8 \\ +4 \end{array}$	$\begin{array}{r} 5 \\ -3 \end{array}$	$\begin{array}{r} 2 \\ +4 \end{array}$	$\begin{array}{r} 5 \\ -1 \end{array}$	$\begin{array}{r} 12 \\ -7 \end{array}$	$\begin{array}{r} 5 \\ -2 \end{array}$
$\begin{array}{r} 7 \\ +7 \end{array}$	$\begin{array}{r} 2 \\ +5 \end{array}$	$\begin{array}{r} 5 \\ +3 \end{array}$	$\begin{array}{r} 6 \\ +1 \end{array}$	$\begin{array}{r} 7 \\ -2 \end{array}$	$\begin{array}{r} 5 \\ +8 \end{array}$	$\begin{array}{r} 1 \\ +7 \end{array}$	

## LETTER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14
O	I	R	L	A	N	E	S	U	F	C	D	M	G

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.

















# Activity 10: Tri-Energy-Picture-Word Find #3 (MINE, PEAT, SEAM)

## Instructions for Exercise:

To complete this exercise, you must spell three energy words in three different puzzles. All of the enclosed spaces for each of the puzzles contains a drawing of a basic sight vocabulary word as well as its spelling below, but each word is missing one of its letters. To spell the three energy words, place the letters needed to complete the words on the small spaces below. The letters will be in correct order and will not need to be rearranged. (1) MINE (2) PEAT (3) SEAM

Answer:

### A COAL-CABULARY WORD PUZZLE TRI-ENERGY PICTURE WORD FIND

			
-AN M	G-RL I	COR- N	-GG E
			
-IG P	APPL- E	B-LL A	-OP I
			
-HEEP S	B-AR E	W-TCH A	-ONEY M

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.

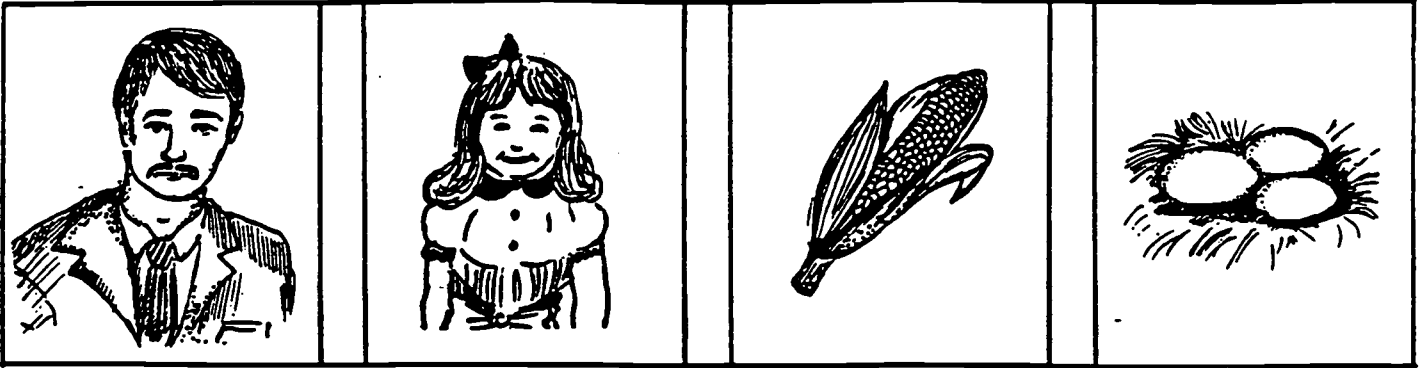


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# TRI-ENERGY PICTURE WORD FIND

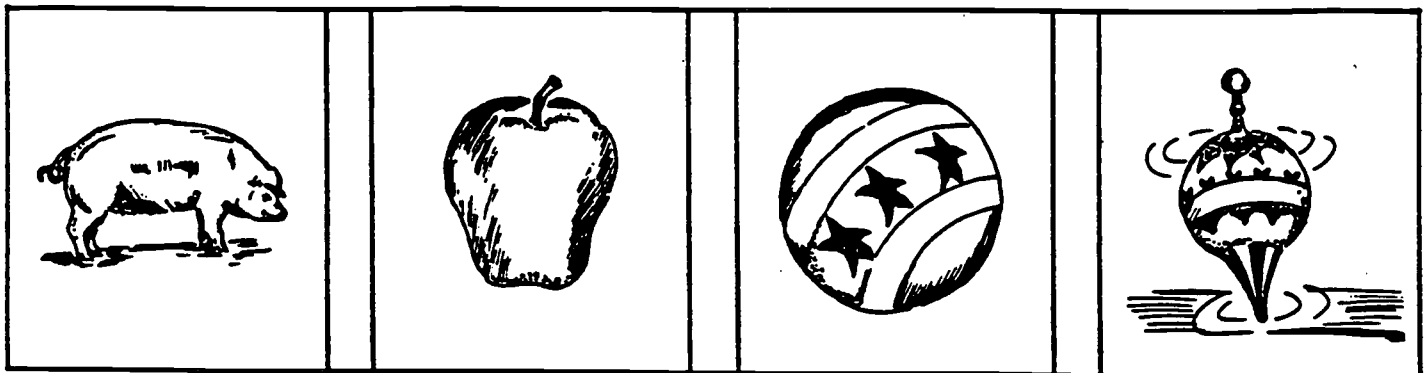


-AN

G-RL

COR-

-GGS

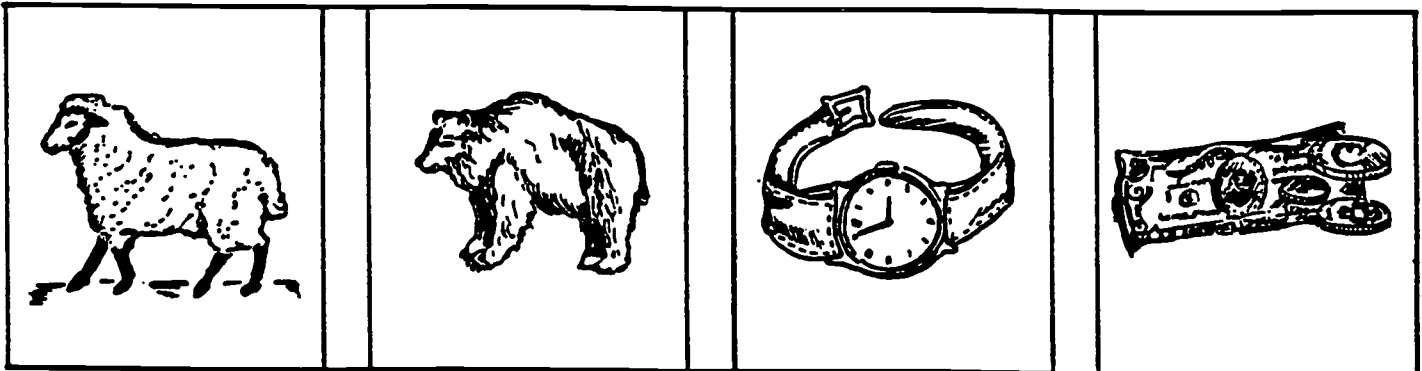


-IG

APPL-

B-LL

-OP



-HEEP

B-AR

W-TCH

-ONEY

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.



## ***Section Four: Mining and Safety***

### ***Activities:***

1. Find-An-Energy-Phrase #1 (THERE)
2. Big Lump/Little Lump Energy Trail #1 (PEOPLE)
3. Design-Two-Shape #4 (DUST)
4. Paste-N-Place #1 (SAFETY ITEMS)
5. Coal = Sum Difference #4 (1+1)
6. Mr. Alumpa Coal's Safety Search #1 (HAT)
7. Mr. Alumpa Coal's Safety Search #2 (GLASSES)
8. Mr. Alumpa Coal's Safety Search #3 (SHOES)
9. Mr. Alumpa Coal's Safety Search #4 (GLOVES)
10. Energy Spell Well #1 (YOUR, MUCH, LIVE, FIVE, THEY, THEN)

### ***Teacher Narrative:***

People who dig coal from the earth are called miners. The process of getting the coal out of the earth is called mining. Miners who work above the ground use big machines to get buried coal out of the ground. Safety is very important. Miners have special equipment to help protect them from harm. Miners wear a hard hat and shoes with steel toes to protect their feet from heavy machinery and rock. They also wear safety glasses and gloves like Mr. Alumpa Coal to protect their eyes and their hands.

Miners who work under the ground wear safety equipment too. They wear a hard hat with a light on it, steel-toed shoes, safety glasses and ankle straps around their pants so their pant legs don't get caught in the big machinery. A mask is worn to protect underground miners from breathing bad air. Miners are always careful to think of their safety when they are mining coal.

## Activity 1: Find-An-Energy-Phrase #1 (THERE)

### Instructions for Exercise:

To complete this exercise, you must begin from the first word of the phrase "THERE ARE LARGE SUPPLIES OF COAL YET TO BE MINED" and draw a continuous line through the ten words in correct order until you reach the word MINED. Begin from one of the four THERE words on the outer edge and begin moving either forward, right or left, but never slantwise. You may have to retrace some of your moves as you work through the maze of words since there is only one correct route.

### Answer:

#### AN A-MAZE-IN PHRASE WORD PUZZLE FIND-AN-ENERGY-PHRASE

ARE	THERE	ARE	TO
LARGE	SUPPLIES	MINED	BE
SUPPLIES	LARGE	OF	SUPPLIES
OF	YET	COAL	LARGE
COAL	OF	SUPPLIES	ARE
THERE	ARE	LARGE	THERE
TO	MINED	BE	ARE
BE	SUPPLIES	TO	YET
MINED	COAL	BE	COAL
SUPPLIES	OF	SUPPLIES	OF
LARGE	COAL	LARGE	COAL
ARE	THERE	ARE	YET

THERE ARE LARGE SUPPLIES OF COAL YET TO BE MINED.

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across or straight up and down. No slant moves are allowed. There will be only one correct route.



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# AN A-MAZE-IN PHRASE WORD PUZZLE

## FIND-AN-ENERGY-PHRASE

ARE	THERE	ARE	TO
LARGE	SUPPLIES	MINED	BE
SUPPLIES	LARGE	OF	SUPPLIES
OF	YET	COAL	LARGE
COAL	OF	SUPPLIES	ARE
THERE	ARE	LARGE	THERE
TO	MINED	BE	ARE
BE	SUPPLIES	TO	YET
MINED	COAL	BE	COAL
SUPPLIES	OF	SUPPLIES	OF
LARGE	COAL	LARGE	COAL
ARE	THERE	ARE	YET

**THERE ARE LARGE SUPPLIES OF COAL YET TO BE MINED.**

**DIRECTIONS:** The first word of the above phrase can be found in several of the outside squares. To find the complete phrase you may move either straight across or straight up and down. No slant moves are allowed. There will be only one correct route.



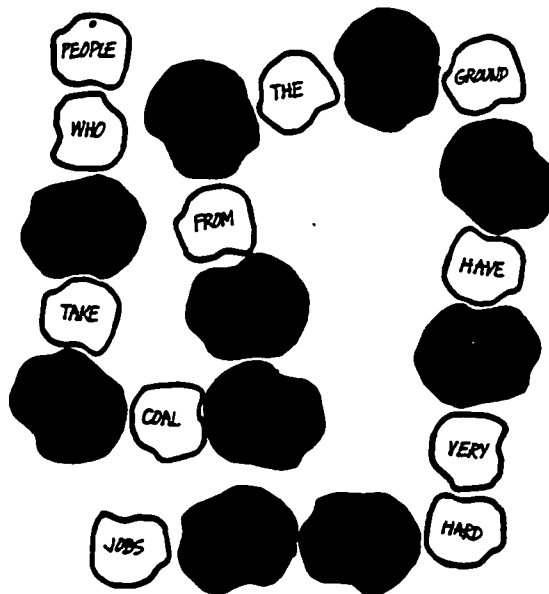
## Activity 2: Big Lump/Little Lump Energy Trail #1 (PEOPLE)

### Instructions for Exercise:

To complete this exercise you must decide which size lump of coal begins a sentence about coal and then continue with that size until you finish the phrase. Begin from either PEOPLE or ALL. The words in the lumps of coal not used in the statement are basic vocabulary words. Say to yourself the words you know and circle them. (PEOPLE WHO TAKE COAL FROM THE GROUND HAVE VERY HARD JOBS).

Answer:

### A COAL-CABULARY WORD PUZZLE BIG LUMP/LITTLE LUMP ENERGY TRAIL



**DIRECTIONS:** Begin from either the BIG LUMP or LITTLE LUMP of coal having a small dot and continue with that size following the trail, until a statement about energy is complete. Only one size lump will spell an energy phrase. The words in the lumps not used are basic vocabulary words.

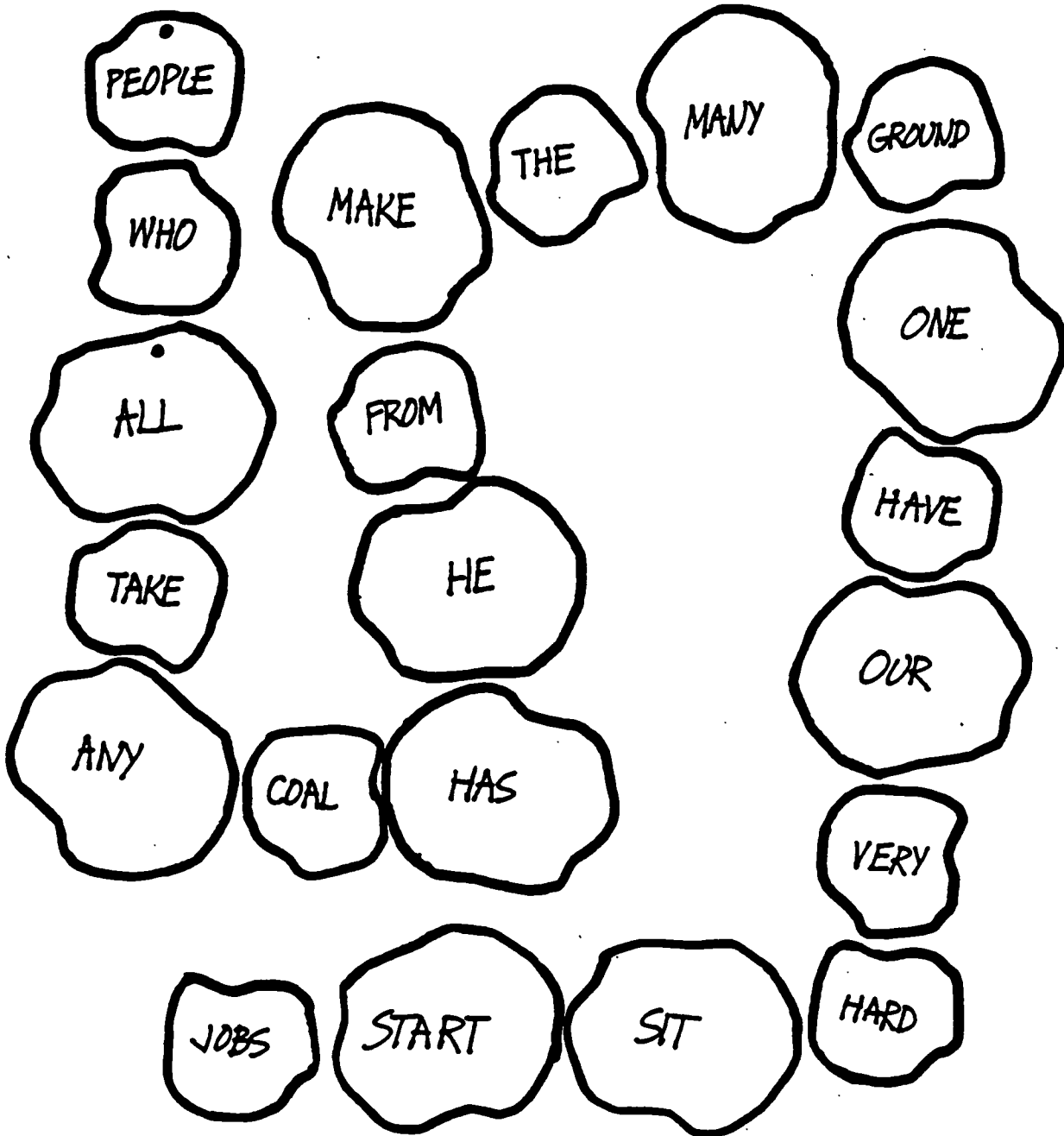


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BIG LUMP/LITTLE LUMP LUMP ENERGY TRAIL



**DIRECTIONS:** Begin from either the BIG LUMP or LITTLE LUMP of coal having a small dot and continue with that size following the trail, until a statement about energy is complete. Only one size lump will spell an energy phrase. The words in the lumps not used are basic vocabulary words.



### Activity 3: Design-Two-Shape #4 (DUST)

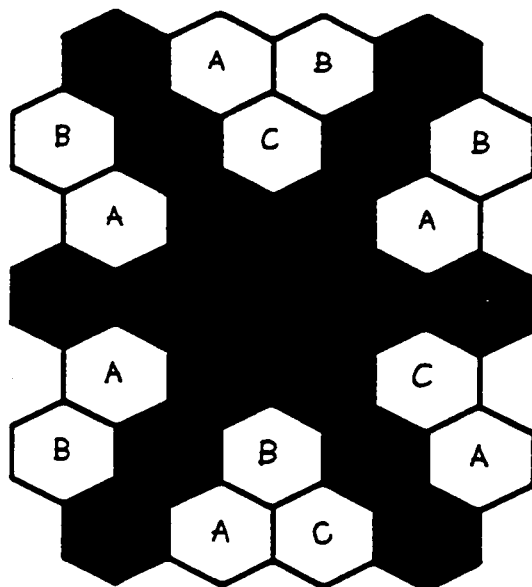
#### Instructions for Exercise:

To complete this exercise, you must color all of the six-sided shapes that have letters which are in the word DUST with one color, and then with another color, do the same in all the enclosures having letters not found in the word. The letters (D, U, S and T) do not have to be in any order. When you are finished, you will have a pleasing two-color pattern design.

(You may wish to tell younger students just to color in the enclosures containing the letters D, U, S and T and leave the other six-sided shapes blank.)

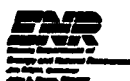
Answer:

#### A PATTERN PLAY WORD PUZZLE DESIGN-TWO-SHAPE



DUST

**DIRECTIONS:** Color or shade all the six-sided figures that have the same letters as the word listed above. They do not have to be in any order. All of the spaces having letters not in the above word can be left alone or colored another color. When finished, you will have a nice design.



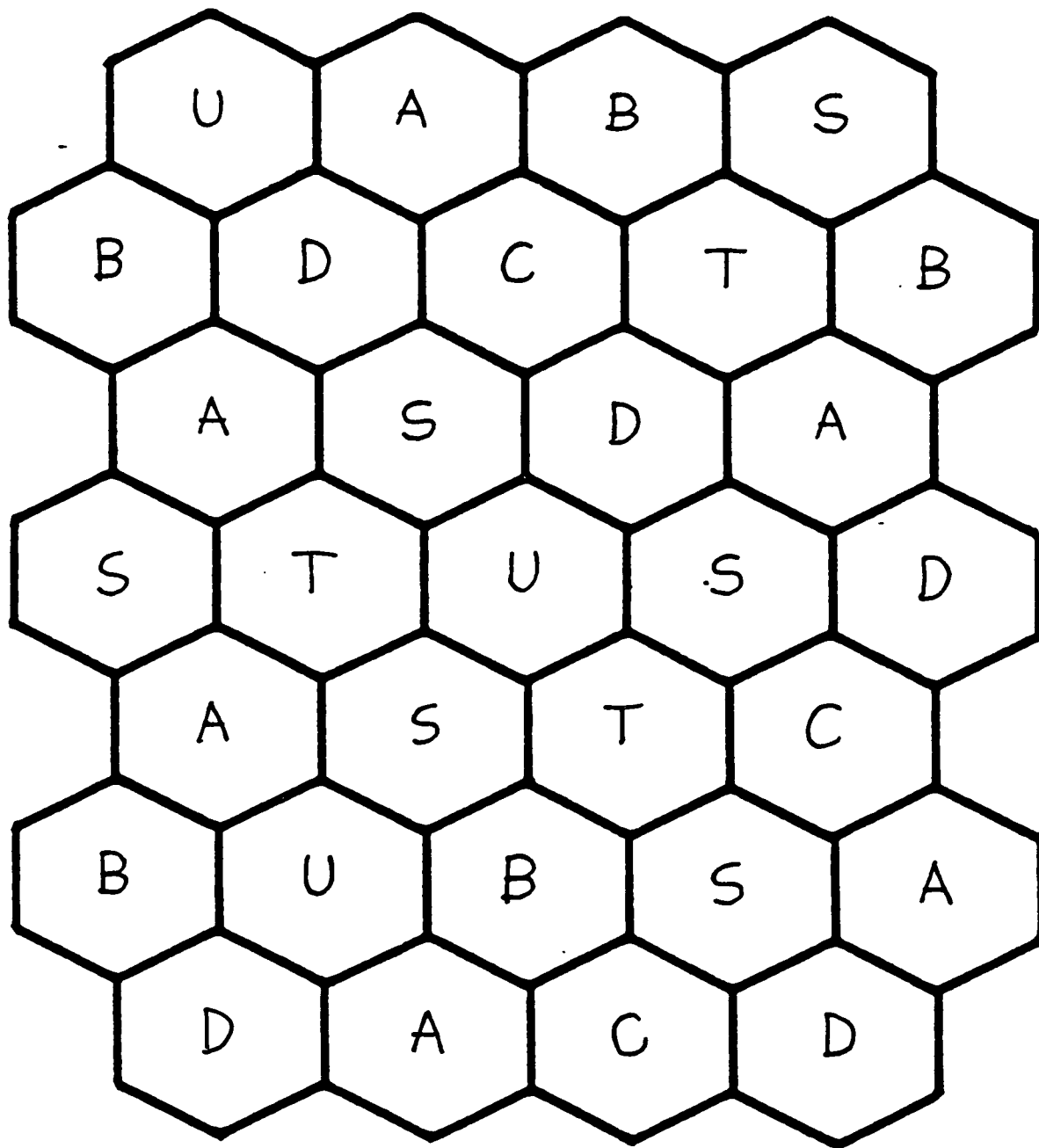
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# DESIGN-TWO-SHAPE



## DUST

**DIRECTIONS:** Color or shade all the six-sided figures that have the same letters as the word listed above. They do not have to be in any order. All of the spaces having letters not in the above word can be left alone or colored another color. When finished, you will have a nice design.



## Activity 4: Paste-N-Place #1 (SAFETY ITEMS)

### Instructions for Exercise:

To complete this exercise, review the coal statement with your class. Then cut out each safety item (hard hat, safety glasses, gloves and shoes) and Mr. Alumpa Coal. Paste each safety item in its place along the dotted lines. When finished, color if desired.

Answer:

### PASTE -N- PLACE



**MANY SAFETY ITEMS ARE WORN BY MINERS.**

**DIRECTIONS:** Cut out each safety item from hard hat, gloves, safety glasses and shoes and Mr. Alumpa Coal. Then paste each safety item in its correct place along the dotted lines. When finished, color if desired.



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# PASTE -N- PLACE



**MANY SAFETY ITEMS ARE WORN BY MINERS.**

**DIRECTIONS:** Cut out each safety item (hard hat, gloves, safety glasses and shoes) and Mr. Alumpa Coal. Then paste each safety item in its correct place along the dotted lines. When finished, color if desired.



**Activity 5: Coal = Sum Difference #4 (1+1)**

**Instructions for Exercise:**

To complete this exercise, you must solve twenty-three basic addition and subtraction problems and then check your sums (adding answers) and differences (subtracting answers) on the Letter Code. Use the space below each problem for your answer and then transfer its code letter to the line of spaces that will spell a coal fact. For example, if you have an answer of 10, the Letter Code shows you that you should write an L while an answer of 12 means you should write an F. (MINERS WEAR SAFETY GLASSES).

**Answer:**

**A MATH CODE WORD PUZZLE**

**COAL = SUM DIFFERENCE**

1	2	5	11	5	8	4	3
+1	+7	+6	-6	+2	-5	+4	+2
2	9	11	5	7	3	8	5
3	11	7	2	9	1	8	6
+1	-4	-4	+2	+3	+4	-7	+7
4	7	3	4	12	5	1	13
11	9	7	2	6	4	11	
-5	+1	-3	+1	-3	+1	-8	
6	10	4	3	3	5	3	

**LETTER CODE**

1	2	3	4	5	6	7	8	9	10	11	12	13
T	M	S	A	E	G	R	W	I	L	N	F	Y

**M I N E R S W E A R S A F E E T Y G L A S S E S .**

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answers. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



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# COAL = SUM DIFFERENCE

$1$ $+1$	$2$ $+7$	$5$ $+6$	$11$ $-6$	$5$ $+2$	$8$ $-5$	$4$ $+4$	$3$ $+2$
$3$ $+1$	$11$ $-4$	$7$ $-4$	$2$ $+2$	$9$ $+3$	$1$ $+4$	$8$ $-7$	$6$ $+7$

$11$ $-5$	$9$ $+1$	$7$ $-3$	$2$ $+1$	$6$ $-3$	$4$ $+1$	$11$ $-8$

## LETTER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13
T	M	S	A	E	G	R	W	I	L	N	F	Y

**DIRECTIONS:** Add and subtract the above math problems. Use the space below the problems for your answer. Then check your sums and differences on the letter code. Place each letter that corresponds with your answer on the dotted line below, beginning with the first row of problems and the left hand side of the dotted line. When finished, you will have spelled an important coal fact.



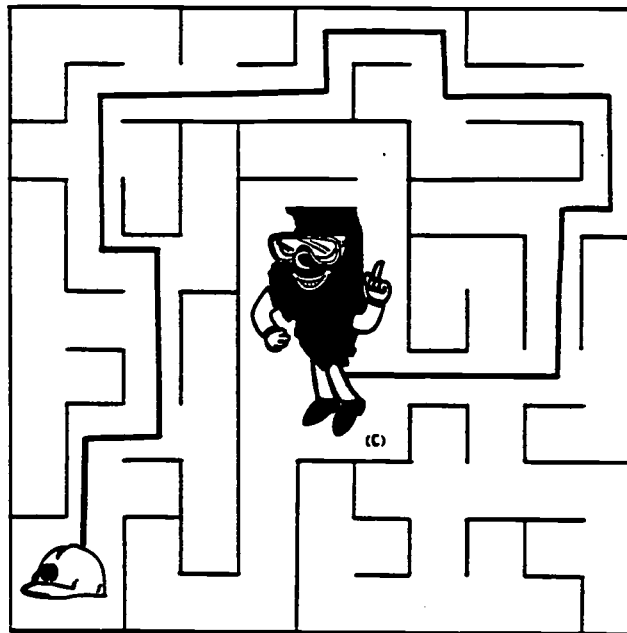
## Activity 6: Mr. Alumpa Coal's Safety Search #1 (HAT)

### Instructions for Exercise:

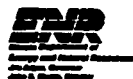
A coal miner wears four safety items in his work - a hard hat, a pair of safety glasses, a pair of steel-toed shoes and a pair of gloves. In this exercise, Mr. Alumpa Coal has lost his hard hat and is trying to locate it. Begin from his location and travel through the maze until you find the hard hat. There is only one route to take to reach it. If you make a wrong turn and can't go any farther, just turn around and begin in another direction until you finally reach the lost item.

### Answer:

#### AN A-MAZE-IN SEARCH PUZZLE MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing - his safety glasses, his hard hat, his special steel-toed shoes or his gloves.

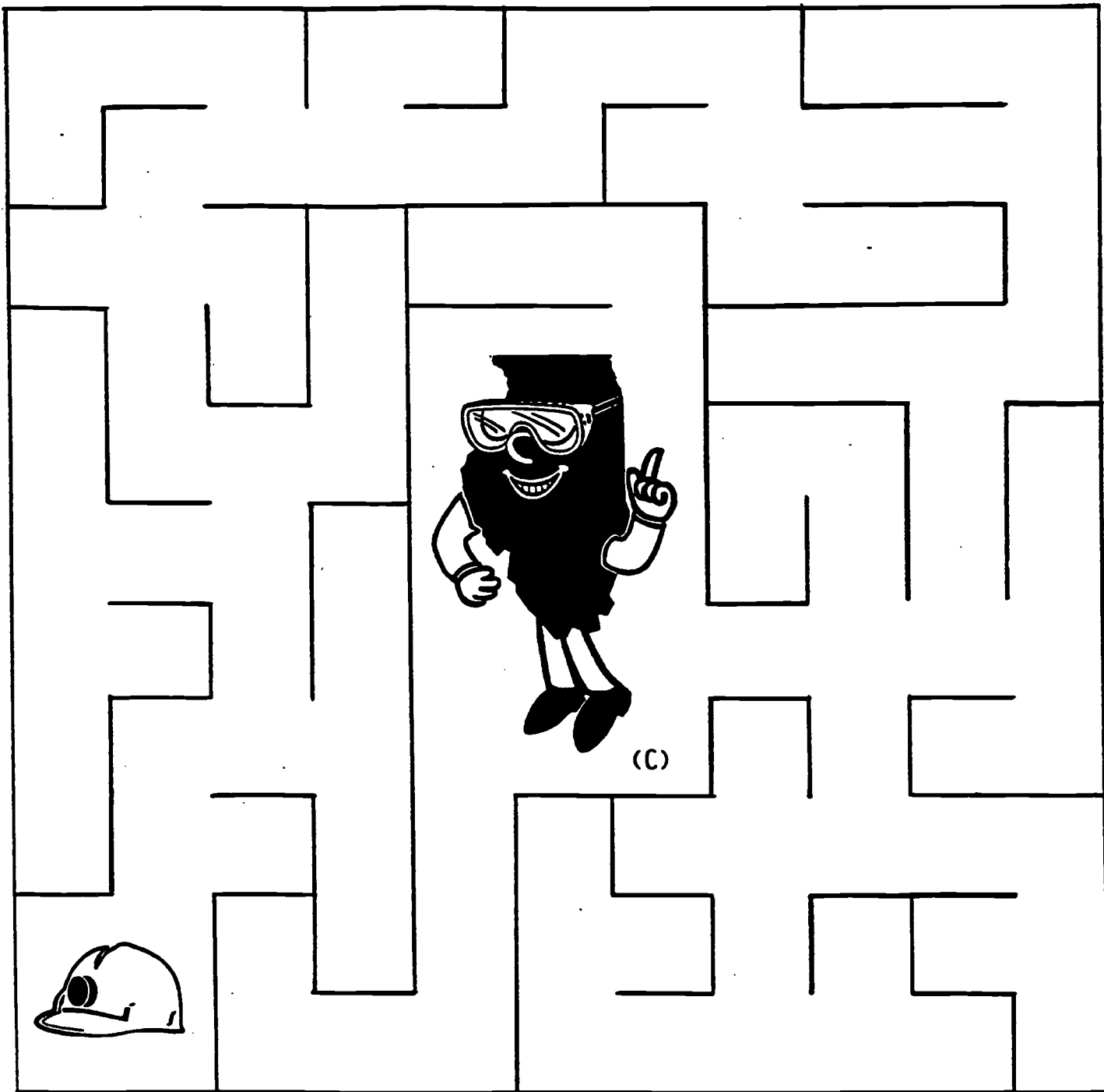


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# MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



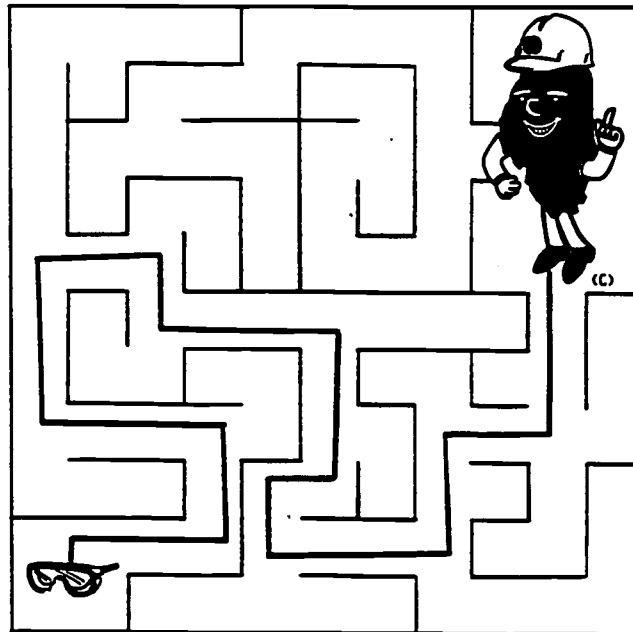
## Activity 7: Mr. Alumpa Coal's Safety Search #2 (GLASSES)

### Instructions for Exercise:

A coal miner wears four safety items in his work - a hard hat, a pair of safety glasses, a pair of steel-toed shoes and a pair of gloves. In this exercise, Mr. Alumpa Coal has lost his safety glasses and is trying to locate them. Begin from his location and travel through the maze until you find the safety glasses. There is only one route to take to reach them. If you make a wrong turn and can't go any farther, just turn around and begin in another direction until you finally reach the lost item.

### Answer:

#### AN A-MAZE-IN SEARCH PUZZLE MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing - his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



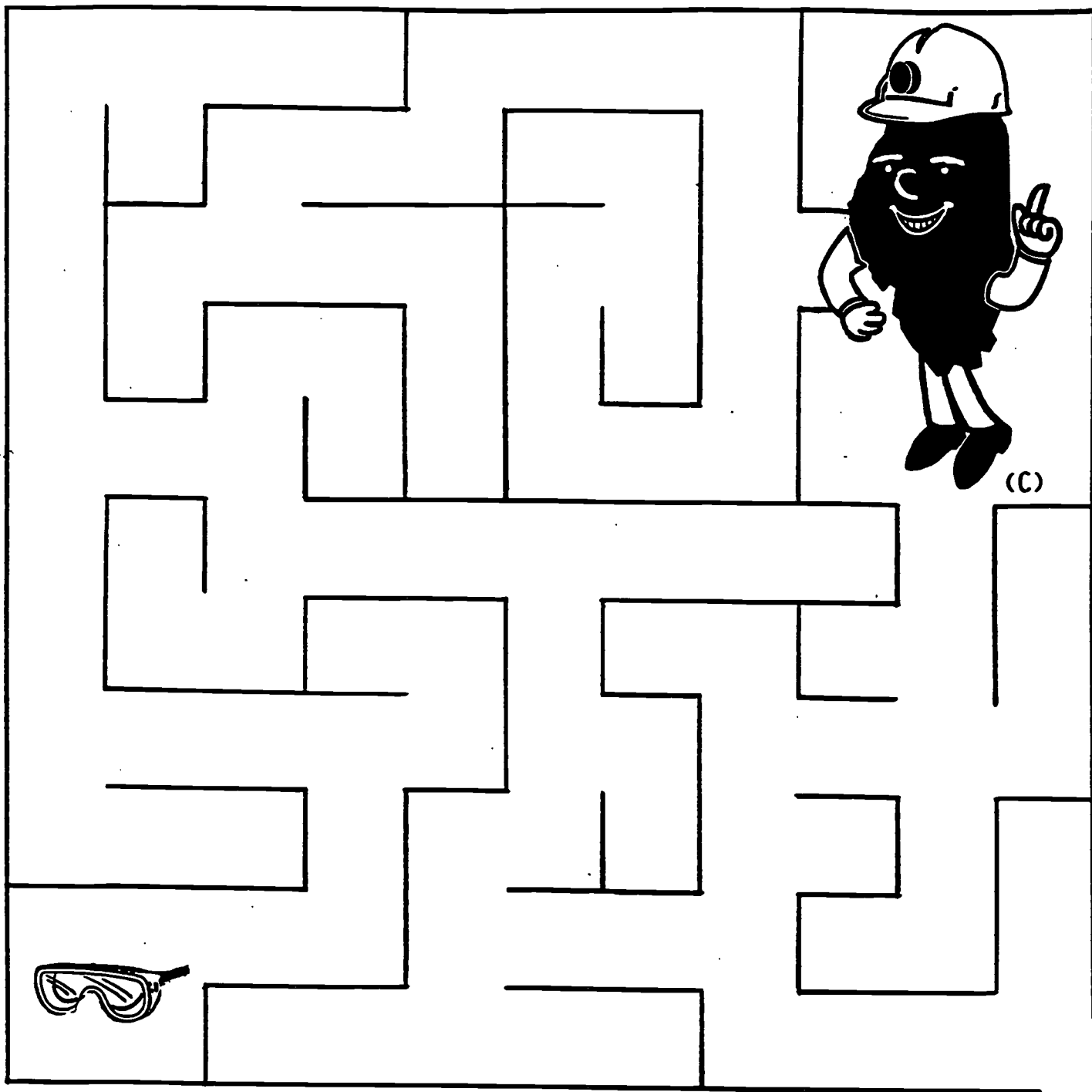
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# MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



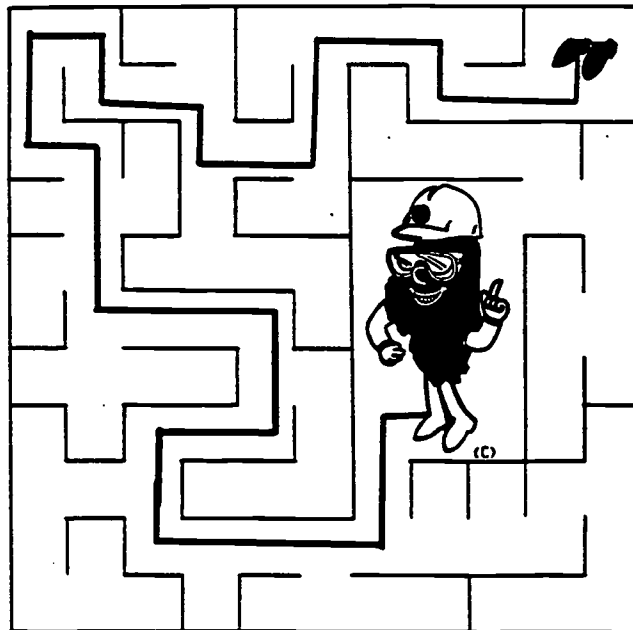
## Activity 8: Mr. Alumpa Coal's Safety Search #3 (SHOES)

### Instructions for Exercise:

A coal miner wears four safety items in his work - a hard hat, a pair of safety glasses, a pair of steel-toed shoes and a pair of gloves. In this exercise, Mr. Alumpa Coal has lost his steel-toed shoes and is trying to locate them. Begin from his location and travel through the maze until you find the steel-toed shoes. There is only one route to take to reach them. If you make a wrong turn and can't go any farther, just turn around and begin in another direction until you finally reach the lost item.

Answer:

### AN A-MAZE-IN SEARCH PUZZLE MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



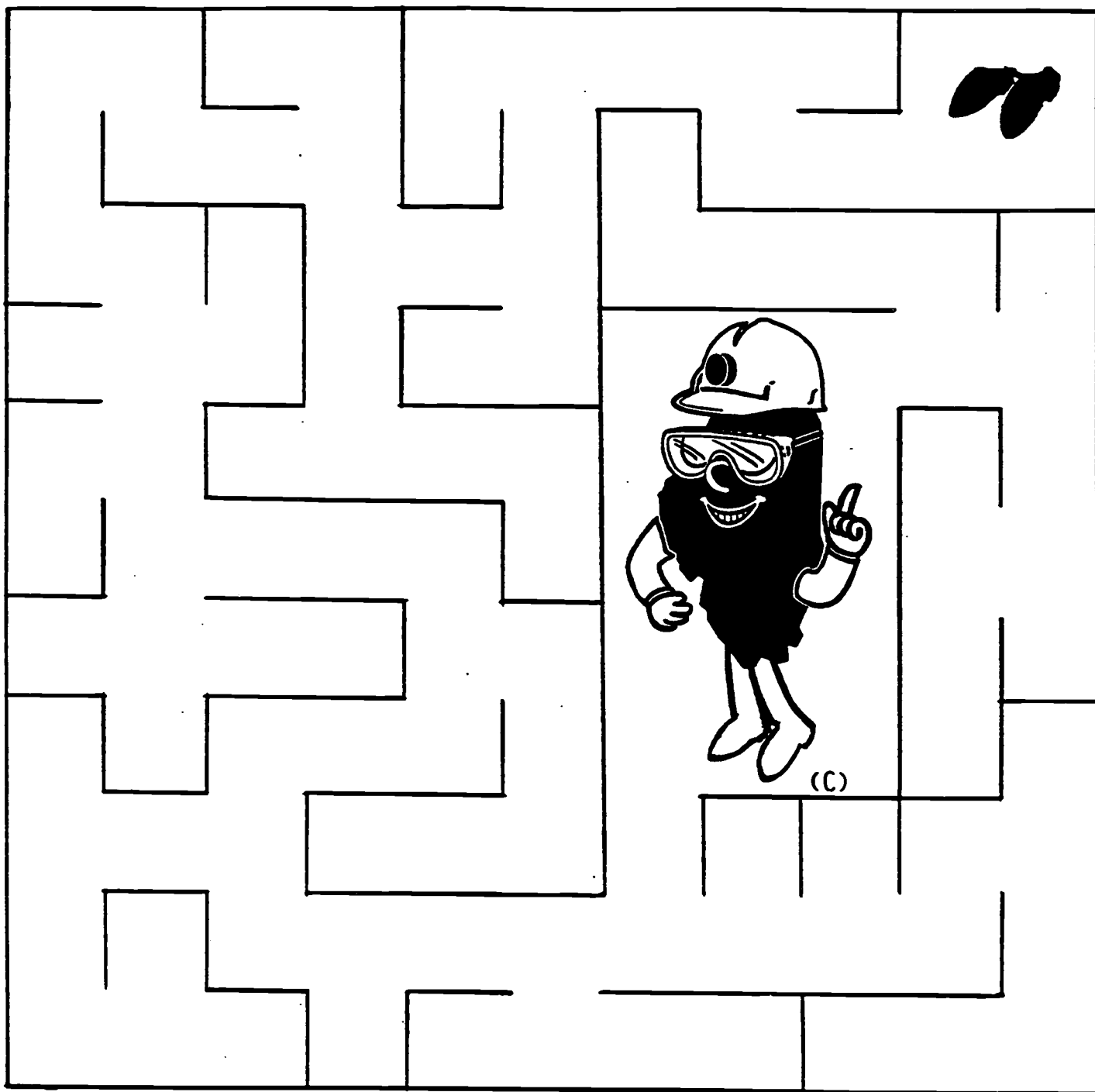
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# AN A-MAZE-IN SEARCH PUZZLE

## MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



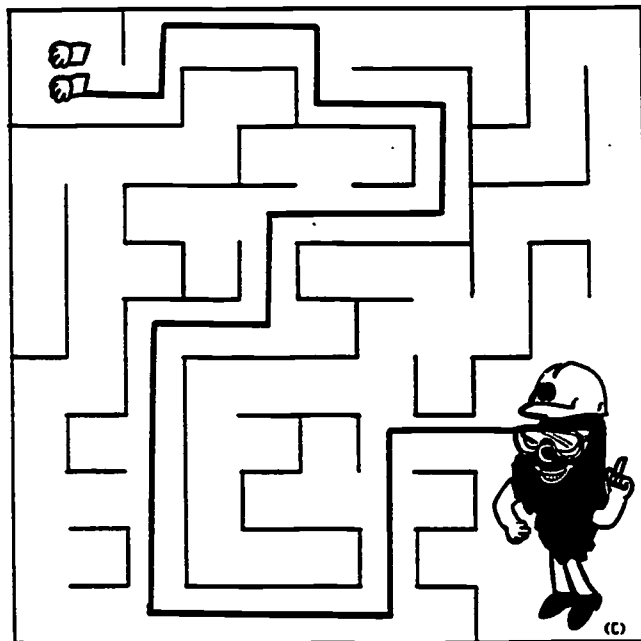
## Activity 9: Mr. Alumpa Coal's Safety Search #4 (GLOVES)

### Instructions for Exercise:

A coal miner wears four safety items in his work - a hard hat, a pair of safety glasses, a pair of steel-toed shoes and a pair of gloves. In this exercise, Mr. Alumpa Coal has lost his gloves and is trying to locate them. Begin from his location and travel through the maze until you find the gloves. There is only one route to take to reach them. If you make a wrong turn and can't go any farther, just turn around and begin in another direction until you finally reach the lost item.

Answer:

### AN A-MAZE-IN SEARCH PUZZLE MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.

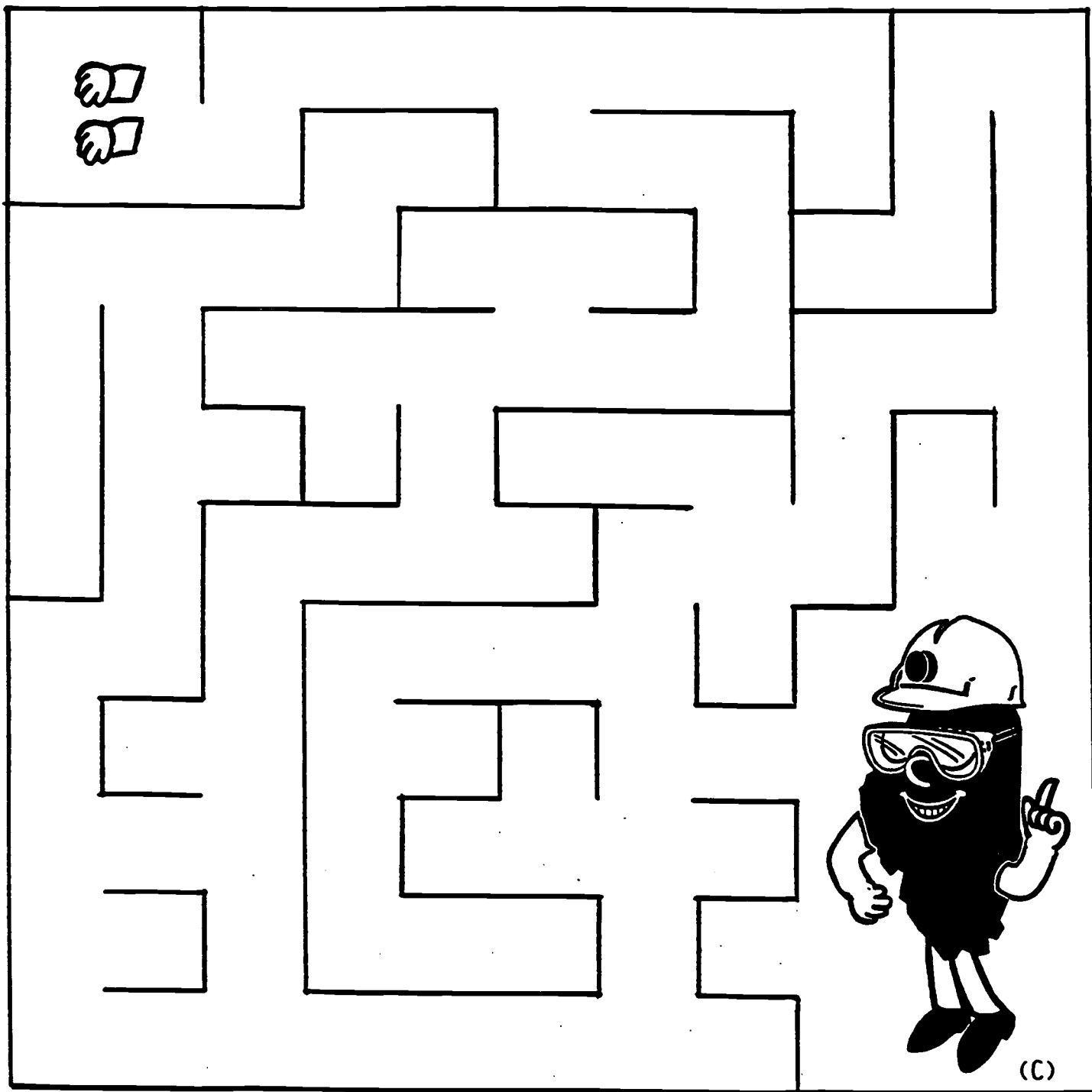


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# MR. ALUMPA COAL'S SAFETY SEARCH



**DIRECTIONS:** Starting from Mr. Alumpa Coal, try to travel through the maze and locate the safety item missing -- his safety glasses, his hard hat, his special steel-toed shoes or his gloves.



**Activity 10: Energy Spell Well #1 (COAL MINERS HAVE VERY DIFFICULT JOBS)**

**Instructions for Exercise:**

To complete this exercise, you must try to find all the letters that spell the ten basic vocabulary words in the phrase "COAL MINERS HAVE VERY DIFFICULT JOBS." The word EVERY is already done with lines drawn to the letters in the phrase. E is in VERY, V is in HAVE, E is in MINERS, R is in MINERS, and Y is in VERY. Actually, there are three E's, two V's, two R's and one Y, but you need to only find a letter each time the letter is in the word. Circle all the words for which you can find all their letters in the phrase. (YOUR, MUCH, LIVE, FIVE, THEY and THEN)

**Answer:**

**ENERGY                      A COAL-CABULARY WORD PUZZLE  
SPELL WELL**

EVERY  
COAL MINERS HAVE VERY  
DIFFICULT JOBS.

FIVE

YOUR

GIVE

MUCH

MAKE

LIVE

THEY

FUNNY

THEN

**COAL MINERS HAVE VERY DIFFICULT JOBS.**

DIRECTIONS: Use how many of the basic vocabulary words you can find in the above energy statement and circle them. For example, you would circle E V E R Y since the letter E (twice) in the word is in MINERS, VERY and HAVE, V is in HAVE and VERY, R is in MINERS and VERY and Y is in VERY. Remember, you must find all the letters in the word before you circle it.



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**ENERGY**

**A COAL-CABULARY WORD PUZZLE  
SPELL WELL**

**EVERY**

**COAL MINERS HAVE VERY  
DIFFICULT JOBS.**

**FIVE**

**YOUR**

**GIVE**

**MUCH**

**MAKE**

**LIVE**

**THEY**

**FUNNY**

**THEN**

**COAL MINERS HAVE VERY DIFFICULT JOBS.**

**DIRECTIONS:** See how many of the basic vocabulary words you can spell in the above energy statement and circle them. For example, you would circle **EVERY** since the letter **E** (twice in the word) is in **MINERS**, **VERY** and **HAVE**, **V** is in **HAVE** and **VERY**, **R** is in **MINERS** and **VERY** and **Y** is in **VERY**. Remember, you must find all the letters in the word before you circle it.



## ***Section Five: Additional Activities:***

1. Letter Find Animals #1 (COAL)
2. Tri-Energy Picture Word Find #4 (POWER, SHAFT, ENERGY)
3. Dinosaur Letter Search #2 (MINE)
4. Dinosaur Letter Search #3 (FUEL)
5. Sum Energy Words #3 (9)
6. Fill-In Energy Facts #3 (INTO)
7. Energy Phrase Out #4 (MINE)
8. Color-N-Learn #4 (COVER)
9. Energy Tri-A-Design #2 (ROCK/FUEL)
10. Tri-N-Find Energy Rhymes #2 (POWER, MINE, ENERGY)



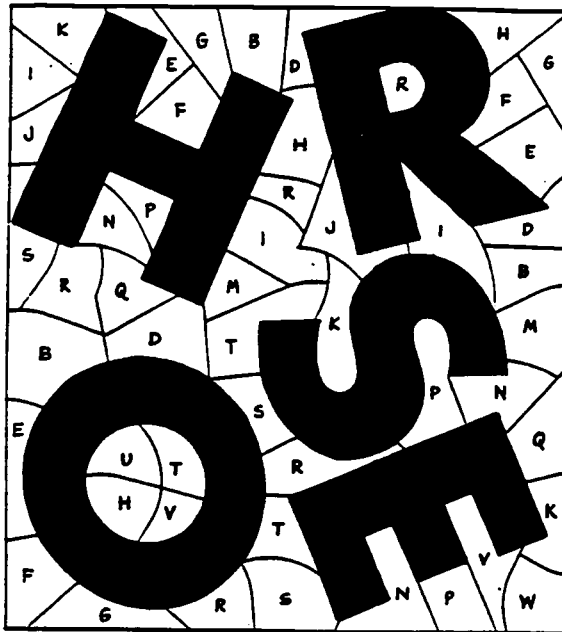
**Activity 1: Letter Find Animals #1 (COAL)**

**Instructions for Exercise:**

To complete this exercise, you must shade or color each shape in the grid which has a letter that is in the energy word COAL. Five large letters will appear when you shade or color them correctly. When arranged in order, the letters will spell the name of an animal. What is it? Write your answer under the directions. (HORSE)

**Answer:**

**AN OUTLINE TO FIND WORD PUZZLE  
LETTER FIND ANIMALS**



**COAL**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. Correct letters will appear if you shade them in correctly. When the shaded or colored letters are arranged in order, they will spell the name of an animal. What is it?

Horse

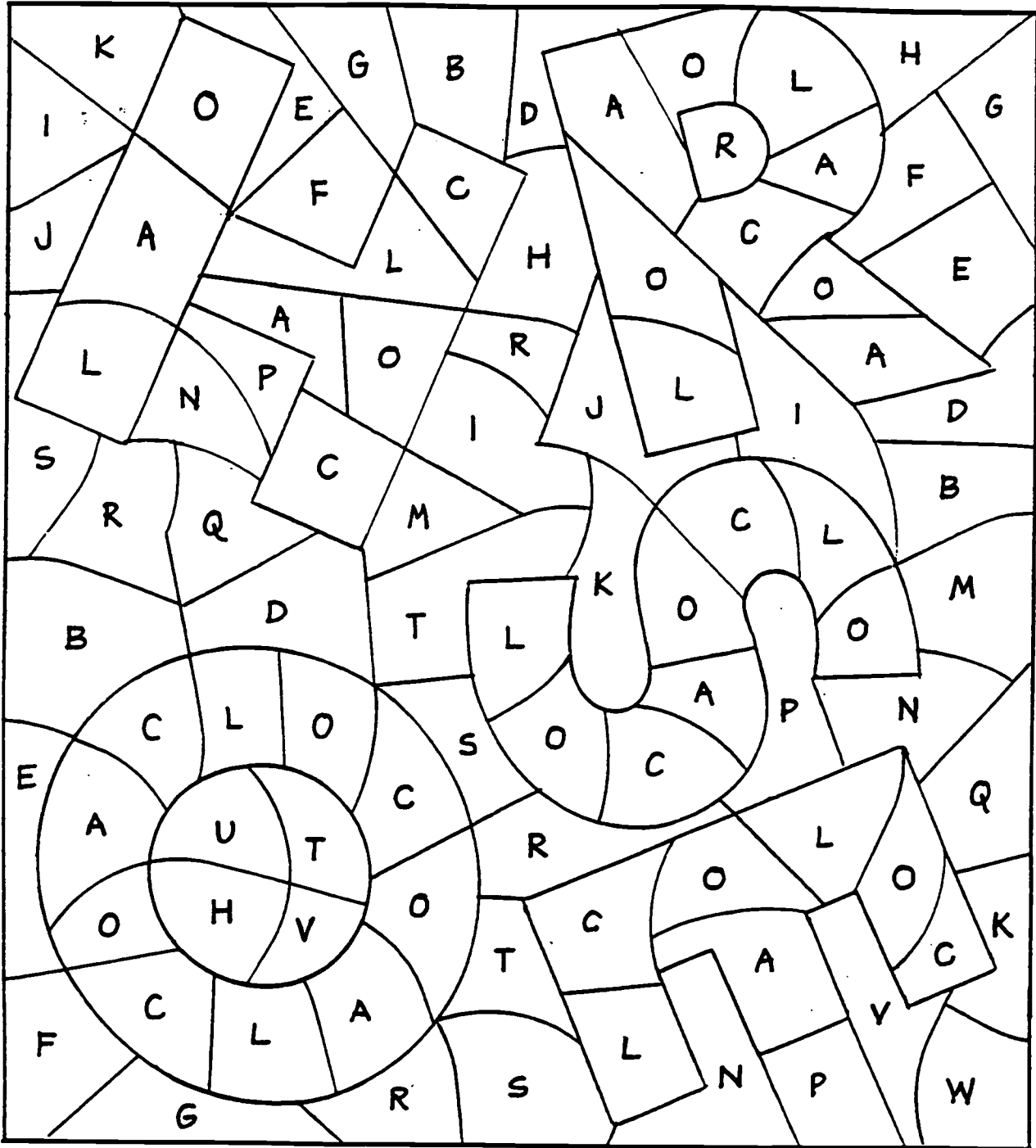


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# AN OUTLINE TO FIND WORD PUZZLE LETTER FIND ANIMALS



**COAL**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. Certain letters will appear if you shade them in correctly. When the shaded or colored letters are arranged in order, they will spell the name of an animal. What is it?












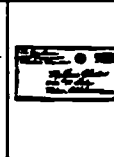





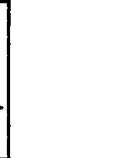
**Activity 2: Tri-Energy Picture Word Find #4 (POWER, SHAFT, ENERGY)**

**Instructions for Exercise:**

To complete this exercise, you must spell three energy words in three different puzzles. All of the enclosed spaces for each of the puzzles contain a drawing of a basic sight vocabulary word as well as its spelling below, but each word is missing one of its letters. To spell the three energy words, place the letters needed to complete the words on the small spaces below. The letters will be in correct order and will not need to be rearranged. (1) POWER (2) SHAFT (3) ENERGY

**Answer:**

**A COAL-CABULARY WORD PUZZLE  
TRI-ENERGY PICTURE WORD FIND**

					
CA- P	B-X Q	-AGON W	KITT-N E	BI-D R	
					
-HOR S	-ORSE H	B-BY A	-IRE E	LE-TER I	
					
B-LL E	BO-Y N	EY- E	DOO- R	DO- G	BO- Y

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.



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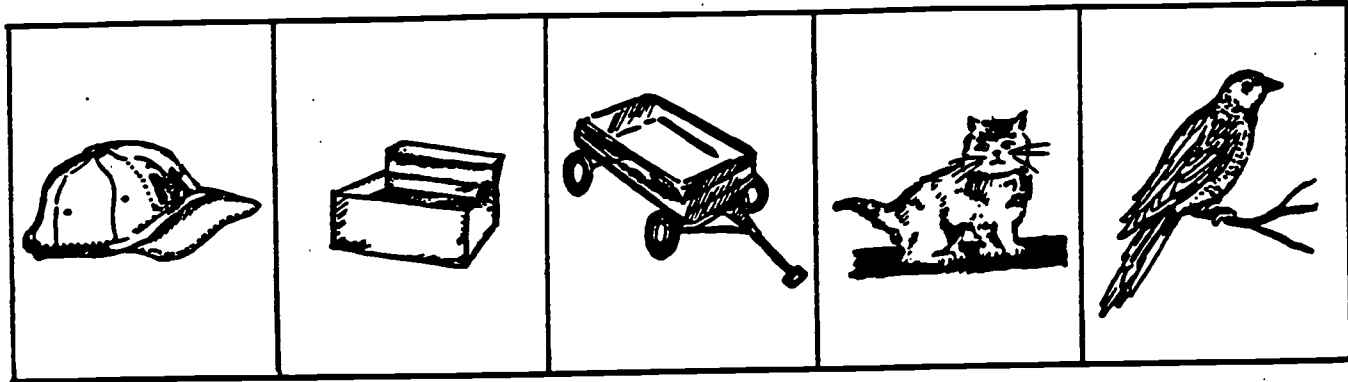


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# A COAL-CABULARY WORD PUZZLE

## TRI-ENERGY PICTURE WORD FIND



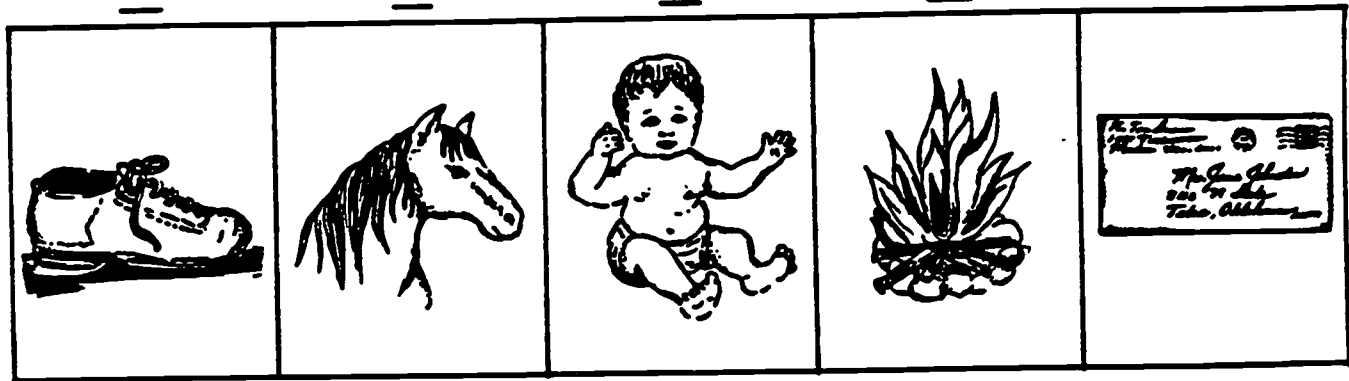
**CA-**

**B-X**

**-AGON**

**KITT-N**

**BI-D**



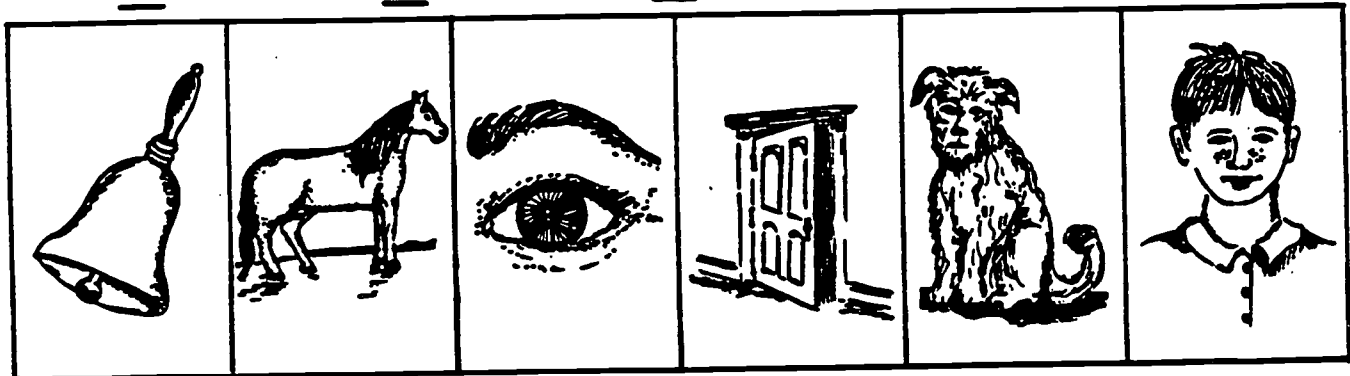
**-HOE**

**-ORSE**

**B-BY**

**-IRE**

**LE-TER**



**B-LL**

**PO-Y**

**EY-**

**DOO-**

**DO-**

**BO-**

**DIRECTIONS:** Try to spell the energy words in the three puzzles above. Each of the squares contains a drawing of a basic vocabulary word with the spelling of the word below it minus one of its letters. Place the missing letter on the small space below the word. When you finish, you will have spelled the energy word. You must spell all three words to complete the puzzle.



### Activity 3: Dinosaur Letter Search #2 (MINE)

#### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a letter that is in the energy word MINE. When you are finished coloring or shading, you will have a shape of one of the many kinds of dinosaurs that roamed Earth millions of years ago. You might want to look in a book about dinosaurs to see if you can learn what kind it is. Many of the plants and trees were compressed into coal during this period.

Answer:

#### AN OUTLINE TO FIND WORD PUZZLE DINOSAUR LETTER SEARCH



**MINE**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.



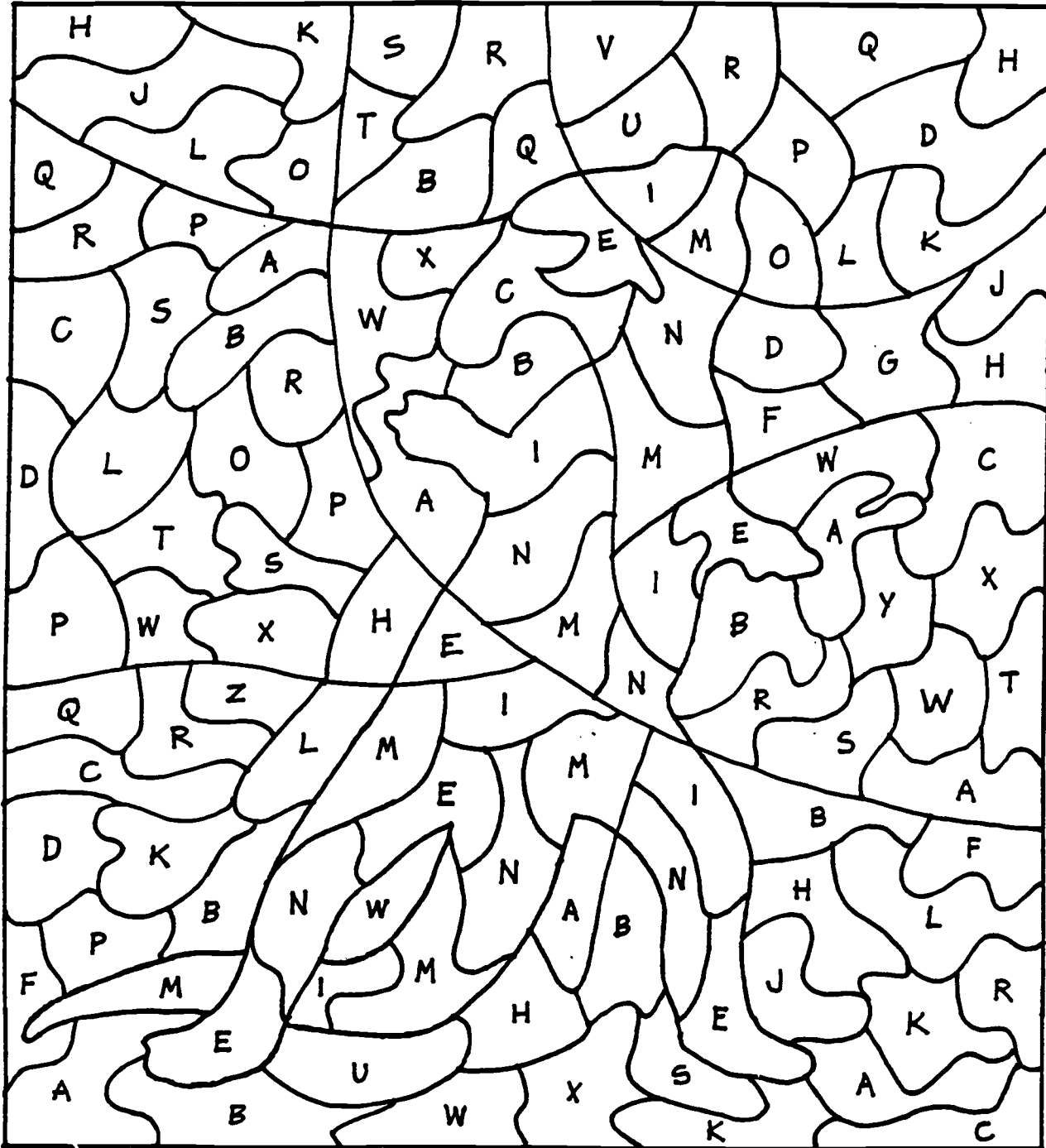
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# AN OUTLINE TO FIND WORD PUZZLE

# DINOSAUR LETTER SEARCH



## MINE

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.



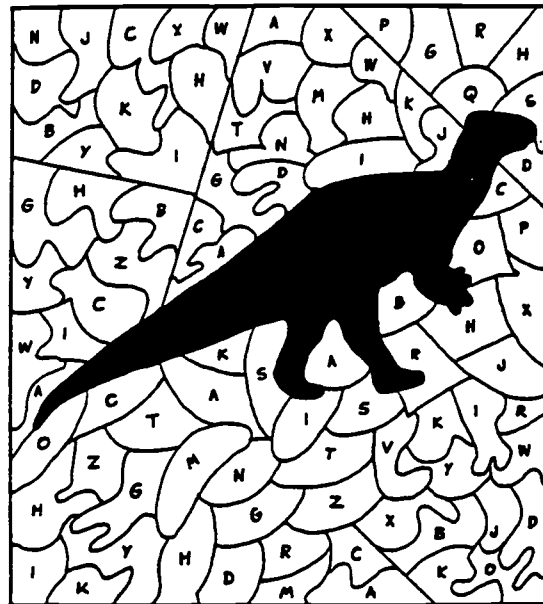
## Activity 4: Dinosaur Letter Search #3 (FUEL)

### Instructions for Exercise:

To complete this exercise, you must shade or color each shape in the grid which has a letter that is in the energy word **FUEL**. When you are finished coloring or shading, you will have a shape of one of the many kinds of dinosaurs that roamed Earth millions of years ago. You might want to look in a book about dinosaurs to see if you can learn what kind it is. Many of the plants and trees were compressed into coal during this period.

Answer:

### AN OUTLINE TO FIND WORD PUZZLE DINOSAUR LETTER SEARCH



**FUEL**

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.

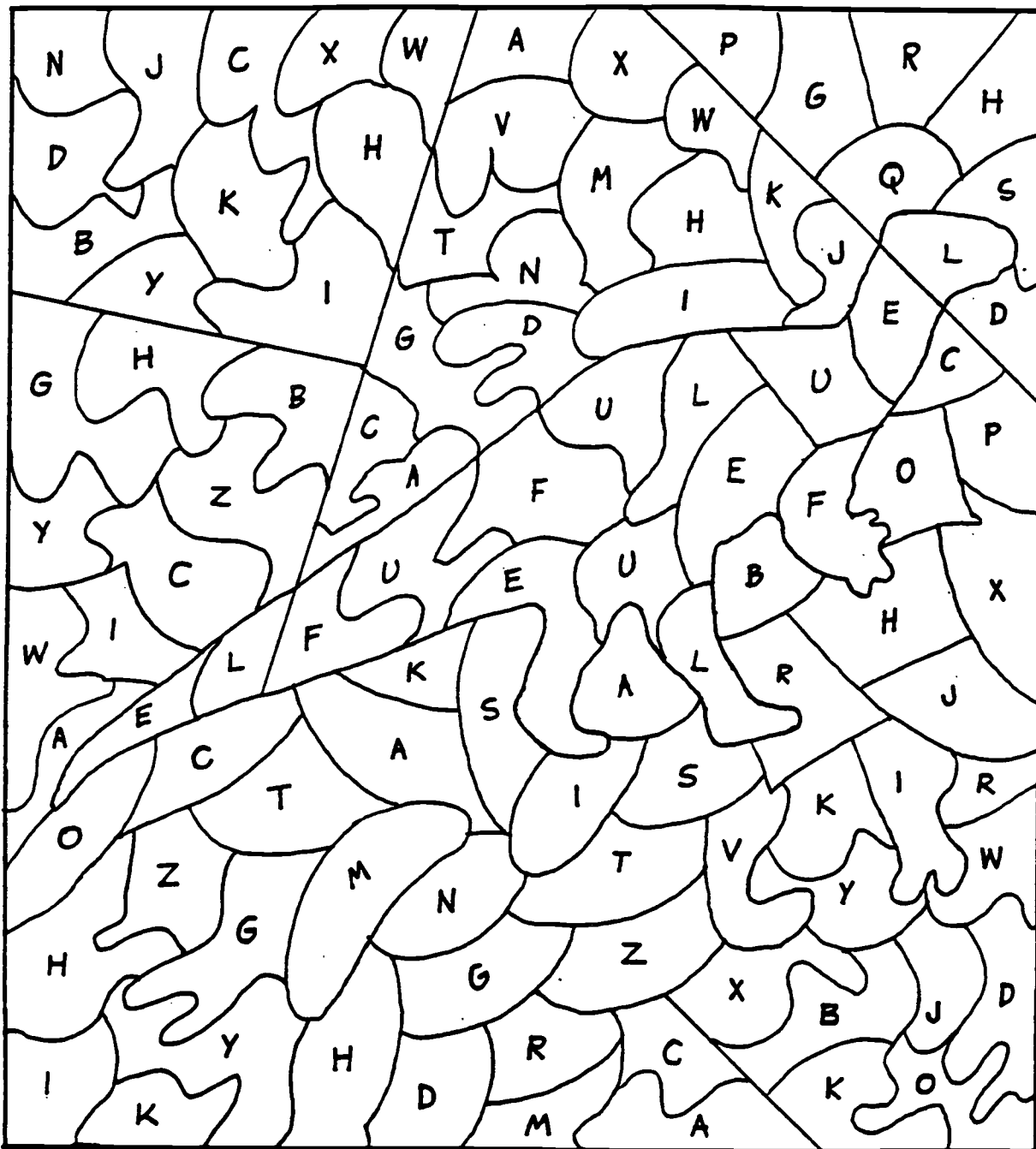


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# DINOSAUR LETTER SEARCH



## FUEL

**DIRECTIONS:** Shade or color all the shapes in the grid which have letters that are in the above word. An outline of a dinosaur will appear if you shade them in correctly. See if you can determine the kind of dinosaur it is.







# SUM ENERGY WORDS

9

**DIRECTIONS:** Shade or color all the shapes in the grid which have two numbers that total the same sum as the number shown above. Certain letters will appear if you shade them in correctly. When the shaded or colored letters are arranged in order, they will spell a common energy word.



## Activity 6: Fill-In Energy Facts #3 (INTO)

### Instructions for Exercise:

To complete this exercise, you must fill in all of the pre-arranged vertical words from the list of basic vocabulary words just above the directions. The first letter of each word spells the energy fact "ILLINOIS HAS A LOT OF COAL." The first word INTO is done for you. In addition, say to yourself the twenty-one basic vocabulary words, circling all of those you know. (INTO, LAUGH, LET, ITS, NEW, OR, IF, SEVEN) (HELP, AGAIN, SOME) (AWAY) (LIKE, ONE, THOSE) (ONLY, FOUR) (CAME, OPENS, ASK, LITTLE)

### Answer:

#### A COAL-CABULARY WORD PUZZLE FILL-IN ENERGY FACTS

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

**DIRECTIONS:** Using the pre-arranged vertical letters that spell an energy fact, choose from the basic vocabulary words listed above and place them in their correct places. All of the words will be used. The first one is done for you.



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# A COAL-CABULARY WORD PUZZLE

## FILL-IN ENERGY FACTS

I	N	T	O	
L				
L				
I				
N				
O				
I				
S				

A			
---	--	--	--

L			
O			
T			

O			
F			

H			
A			
S			

C			
O			
A			
L			

A	G	A	I	N
A	S	K		
A	W	A	Y	
C	A	M	E	
F	O	U	R	
H	E	L	P	
I	F			

I	N	T	O		
I	T	S			
L	A	U	G	H	
L	E	T			
L	I	K	E		
L	I	T	T	L	E
N	E	W			

O	N	E		
O	N	L	Y	
O	P	E	N	S
O	R			
S	E	V	E	N
S	O	M	E	
T	H	O	S	E

**DIRECTIONS:** Using the pre-arranged vertical letters that spell an energy fact, choose from the basic vocabulary words listed above and place them in their correct place. All of the words will be used. The first one is done for you.



## Activity 7: Energy Phrase Out #4 (MINE)

### Instructions for Exercise:

All of the words in the phrase "COAL IS USED IN THE MAKING OF SUCH COMMON PRODUCTS AS PAINT, PERFUME, BATTERIES AND PENCILS" can be found either straight across or straight down as the arrows at the top of the page show. As you find each word in the puzzle, also mark it on the phrase. Two words, COAL and PAINT, are lined out on the puzzle, as well as on the phrase. All of the squares not used for letters are filled with lumps of coal. There is also an additional energy word in the puzzle that is not in the phrase. If you can find it, print it under the directions. (MINE)

Answer:

A TWO WAY WORD PUZZLE

**ENERGY PHRASE OUTS**

•	•	P	•	•	•	•	•	•	P	•
P	E	R	F	U	M	E	•	•	A	•
E	•	•	•	•	•	B	•	•	I	•
B	•	D	•	T	M	A	•	K	I	•
C	•	•	C	•	•	•	•	•	T	•
I	•	C	•	E	•	•	•	•	•	C
I	•	T	•	U	•	S	•	D	M	•
F	•	•	•	•	•	R	•	I	•	M
•	•	C	•	O	•	A	•	L	•	M
B	•	•	•	•	•	E	•	E	•	•
T	•	•	•	•	•	•	•	•	•	•

~~COAL IS USED IN THE MAKING OF SUCH COMMON PRODUCTS AS PAINT, PERFUME, BATTERIES AND PENCILS.~~

**DIRECTIONS:** Try to locate all of the words in the energy phrase above either straight across or straight down. A word in each direction is already lined out. As you find each word in the puzzle, line it out on the phrase. All the squares not used for needed words are filled with lumps of coal. An extra energy word has been placed in the puzzle. Can you find it?

**MINE**



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# ENERGY PHRASE OUTS

●	●	P	●	●	●	●	●	●	P	●
P	E	R	F	U	M	E	●	●	A	●
E	●	O	●	●	●	B	●	●	I	●
N	●	D	●	T	M	A	K	I	N	G
C	S	U	C	H	●	T	●	●	T	●
I	●	C	●	E	●	T	●	●	●	C
L	●	T	●	U	S	E	D	M	●	O
S	●	S	●	●	●	R	●	I	●	M
●	●	C	●	A	L	I	A	N	D	M
●	A	●	F	●	●	E	●	E	●	O
I	S	●	●	●	●	S	●	●	I	N

**COAL IS USED IN THE MAKING OF SUCH COMMON PRODUCTS AS PAINT, PERFUME, BATTERIES AND PENCILS.**

**DIRECTIONS:** Try to locate all of the words in the energy phrase above either straight across or straight down. A word in each direction is already lined out. As you find each word in the puzzle, line it out on the phrase. All the spaces not used for needed words are filled with lumps of coal. An extra energy word has been placed in the puzzle. See if you can find it.



## Activity 8: Color-N-Learn #4 (COVER)

### Instructions for Exercise:

To complete this exercise, color all shapes and figures. When finished, you will have a pleasing picture.

Answer:



**DIRECTIONS:** Color the shapes and figures shown above. When finished, you will have a pleasing picture.

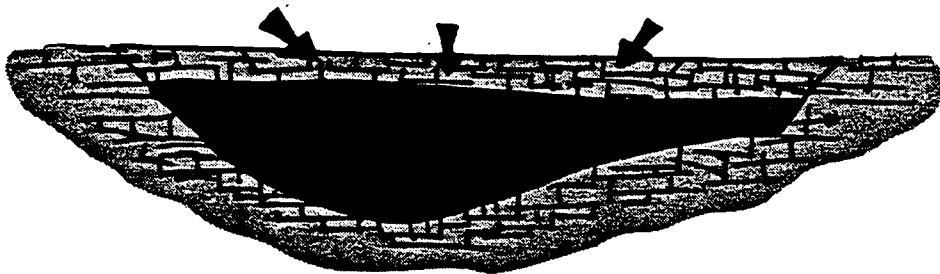
**ENR**  
Energy and Natural Resources  
John G. Stover, Director

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# COLOR -N- LEARN



**DIRECTIONS:** Color the shapes and figures shown above. When finished, you will have a pleasing picture.





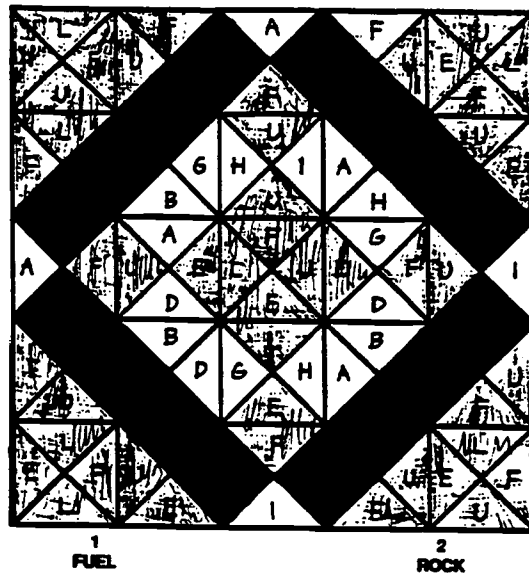
**Activity 9: Energy Tri-A-Design #2 (ROCK/FUEL)**

**Instructions for Exercise:**

To complete this exercise, you must color all of the triangle shapes that have letters in the word ROCK with one color, and then with another color, do the same in all the triangle shapes having letters in the word FUEL. The uncolored spaces may be left blank or colored with a third color. When finished, you will have a pleasing three-color pattern design.

**Answer:**

**A PATTERN PLAY WORD PUZZLE**  
**ENERGY TRI-A-DESIGN**



**DIRECTIONS:** Color all the spaces having the same letters as those found in the word under number 1. Then with another color shade in all the spaces having letters in the word under number 2. All of the extra spaces can be left alone or colored a third color. When you are finished, you will have a pleasing three-color design.

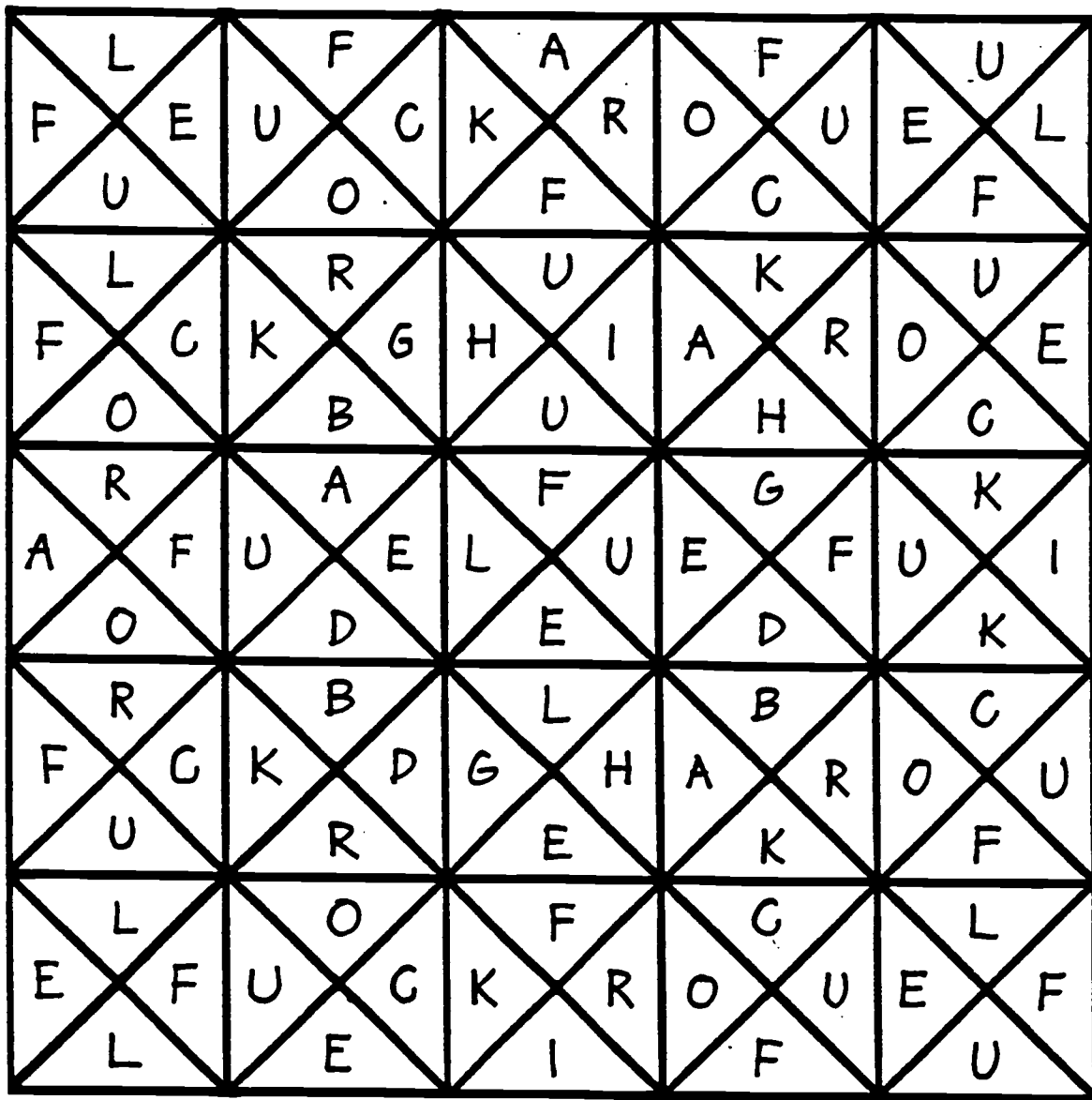


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# ENERGY TRI-A-DESIGN



1  
FUEL

2  
ROCK

**DIRECTIONS:** Color all the spaces having the same letters as those found in the word under number 1. Then with another color shade in all the spaces having letters in the word under number 2. All of the extra spaces can be left alone or colored a third color. When you are finished, you will have a pleasing three-color design.



# Activity 10: Tri-N-Find Energy Rhymes #2 (POWER, MINE, ENERGY)

## Instructions for Exercise:

This exercise contains all the words of the familiar nursery rhyme **There Was An Old Woman**, as well as three additional listings of the rhyme- all having several letters left out of certain basic vocabulary words. To complete the exercise, fill in the letters that have been left out of each listing. Then place these letters above the squares. Arranging the letters in order will spell an energy word. If you can't figure out the word, look at the seven words listed in the directions: **COAL, SEAM, FOSSIL, MINE, FUEL, ENERGY** and **POWER**. After determining the right word for each of the three listings, place them in the squares. When finished, try to say the rhyme without looking at the words under the picture. (1) **POWER** (2) **MINE** (3) **ENERGY**

Answer:

**A COAL-CABULARY WORD PUZZLE**

<b>TRI-N-FIND</b>	<b>ENERGY</b>	<b>RHYMES</b>
THERE _AS AN OLD WOMAN WHO LIVED IN A SHOE. SHE HAD S_ MANY CHILDREN SHE DIDN'T KNOW WHAT TO DO. SHE GAVE THEM SOME BROTH WITHOUT ANY B_EAD. AND THEN WHIPPED TH_R ALL SOUNDLY AND _JT THEN TO BED.	THERE WAS AN OLD WOMAN WHO LIVED _S A SHOE. SHE HAD SO _ANY CHILDREN SHE DIDN'T KNOW WHAT TO DO. SHE GAVE THEM SOM_ BROTH WITHOUT ANY BREAD. AND THEN WHIPPED THEM ALL SOUNDLY A_S PUT THEN TO BED.	THERE WAS AN OLD WOMAN WHO LIVED IN A SHO_. SHE HAD SO MANY CHILDREN SHE DIDN'T KNOW WHAT TO DO. SHE _AVE THEM SOME BROTH WITHOUT AN _BREAD. AND THE_ WHIPPED THEM ALL SOUNDLY AND PUT THEN TO BED.
<b>POWER</b> W O R E P	<b>MINE</b> I M E N	<b>ENERGY</b> E R E G Y N

### There Was An Old Woman

THERE WAS AN OLD WOMAN WHO LIVED IN A SHOE.  
SHE HAD SO MANY CHILDREN SHE DIDN'T KNOW WHAT TO DO.  
SHE GAVE THEM SOME BROTH WITHOUT ANY BREAD.  
AND THEN WHIPPED THEM ALL SOUNDLY AND PUT THEM TO BED.



**DIRECTIONS:** Each nursery rhyme above is missing certain letters. When asked and arranged in order, they will spell three energy words from the following list:  
**COAL SEAM FOSSIL MINE FUEL ENERGY POWER**  
All of the underlined words are basic vocabulary words.



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# A COAL-CABULARY WORD PUZZLE

## TRI-N-FIND

## ENERGY

## RHYMES

THERE \_AS AN OLD WOMAN  
WHO LIVED IN A SHOE.

THERE WAS AN OLD WOMAN  
WHO LIVED \_N A SHOE.

THERE WAS AN OLD WOMAN  
WHO LIVED IN A SHO\_.

SHE HAD S\_ MANY CHILDREN  
SHE DIDN'T KNOW WHAT  
TO DO.

SHE HAD SO \_ANY CHILDREN  
SHE DIDN'T KNOW WHAT  
TO DO.

SHE HAD SO MANY CHILD\_EN  
SH\_ DIDN'T KNOW WHAT  
TO DO.

SHE GAVE THEM SOME BROTH  
WITHOUT ANY B\_EAD.

SHE GAVE THEM SOM\_ BROTH  
WITHOUT ANY BREAD.

SHE \_AVE THEM SOME BROTH  
WITHOUT AN\_ BREAD.

AND THEN WHIPPED TH\_M  
ALL SOUNDLY AND \_UT  
THEM TO BED.

AND THEN WHIPPED THEM  
ALL SOUNDLY A\_D PUT  
THEM TO BED.

AND THE\_ WHIPPED THEM  
ALL SOUNDLY AND PUT  
THEM TO BED.



## There Was An Old Woman

THERE WAS AN OLD WOMAN WHO LIVED IN A SHOE.  
SHE HAD SO MANY CHILDREN SHE DIDN'T KNOW WHAT TO DO.  
SHE GAVE THEM SOME BROTH WITHOUT ANY BREAD.  
AND THEN WHIPPED THEM ALL SOUNDLY AND PUT THEM TO BED.



**DIRECTIONS:** Each nursery rhyme above is missing certain letters. When solved and arranged in order, they will spell three energy words from the following list:

**COAL SEAM FOSSIL MINE FUEL ENERGY POWER**

All of the incomplete words are basic vocabulary words.



## ***Supplement: Coal and Illinois***

Coal was discovered over three hundred years ago in the land that is now recognized as the state of Illinois. It was first used by railroads to power their steam engines. Years later many other uses for coal were discovered, and coal mining became big business for the state of Illinois. Not only did coal mining provide jobs for thousands of residents throughout the state, it also fueled local economies and created spin-off jobs related to the coal industry. At its peak in the 1920's, the Illinois mining industry employed nearly 100,000 miners.

Today, Illinois ranks fifth among coal producing states. Ninety percent of Illinois coal that is mined is purchased by electric utilities. Although many feel that coal mining and power from coal is rapidly becoming a thing of the past, Illinois is leading the country in proving that coal is, and will continue to be, a viable fuel source demanded well into the twenty-first century.

The Illinois coal industry will be the first one to admit that there have always been some problems associated with burning coal. The main problem has been the high sulfur content of Illinois coal and the possible danger this chemical can cause to the environment if released into the atmosphere. The Illinois coal industry has been working on this problem for years, long before the Clean Air Act Amendments were established in 1990. The coal industry has always felt it to be extremely important to burn coal in an environmentally responsible manner. That is why Illinois leads the way in new clean coal technologies that remove chemicals from coal such as sulfur, making sure that emissions from power plants that use coal as an energy

source will not be harmful to the environment. They also have been creating new uses for coal by-products to lessen the waste that is created when cleaning or "scrubbing" coal to remove sulfur and other chemicals. By "scrubbing" Illinois coal, we save Illinois jobs, because coal-fired power plants currently generate about half of the electricity used in Illinois.

Without coal and the energy that has been produced from coal over the past several hundred years, life would be much different than what you and I know it today. Just imagine what it would be like to live in a world that did not have electricity, heat, or many of the conventional appliances that we use every day. Coal has made our lives easier and happier since its discovery. Although many coal mines in Illinois have shut down over the past twenty years and other sources of fuel exist today, coal remains as one of our most abundant natural resources, and with help from the Illinois coal industry and others, it will remain a prime source of energy in the years to come.

**References:**

- 1. Illinois Department of Energy and Natural Resources, "Illinois Coal: The Reality," Office of Coal Development and Marketing, 1990.**
- 2. Illinois Department of Energy and Natural Resources, "Illinois Coal Fact Sheet," Office of Coal Development and Marketing, ILENR/CD-91/01, July, 1993.**



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