

Title: New Technologies

Level: Primary, Intermediate

Time: 4-5 Days

KERA Goals: 5.1

Objective: Students will learn how technology has benefited coal production while practicing math and language skills.

Materials: Worksheets (below)

Background Information: How does coal effect the environment?

Over the past several years, scientists, coal companies and others have become concerned about the air we breathe. They want to make sure that the harmful chemicals that are released into the air when coal is burned do not harm the environment. Therefore, technologies were developed to remove these chemicals from coal before, during and after it is burned. These technologies are called clean coal technologies. Today scientists are continuing to find ways that will enable coal to be burned cleaner. As a result, we will have a cleaner and healthier environment.

VOCABULARY: scientist, environment, technology, research.

Activities:

1. MULTI-MATH COAL FACTS

Coal is crushed and washed after it is mined to make it cleaner and better for burning.

2. COAL PHRASE-OUT

Technologies today have been developed by scientists to remove various harmful chemicals from the coal before, during and after it is burned.

3. THIRD LETTER SQUARE PHRASE

Scientists carry on research to find cheaper methods of using coal.

4. ANIMAL ENERGY PHRASE

Coal is washed and crushed after it is mined to make it cleaner and better for burning.

5. ZIG-ZAG ENERGY PHRASE

Burning coal cleanly will help keep or air fresh and improve our environment.

6. LETTER FIND ANIMALS

Coal

7. COLOR - N - LEARN

Coal is cool

1. A Math Magic Word Puzzle

MULTI-MATH COAL FACTS

chapter 6 - new technologies - primary

DIRECTIONS: Search for the coal fact. Begin with the letter C in the middle of the puzzle and fill in the first blank. Follow the multiples of 4 beginning with the answer to 4×1 . You will find the box with the number 4 and the letter O. The letter O will be used to fill in the next blank in the sentence. Continue multiplying the facts for 4's and placing the letters on the dotted letters. After reaching $4 \times 9 = 36$, start over with $4 \times 1 = 4$ and continue until all the spaces are filled and you have completed the mystery sentence.

22 R	24 G	34 B	10 I	14 N	20 R	16 E	12 T	26 E	30 T	34 T
26 E	20 N	26 R	22 U	18 R	24 F	10 B	8 T	4 E	36 B	26 E
30 N	16 I	18 G	36 B	32 R	28 O	30 R	34 B	30 T	32 D	22 T
34 A	12 N	8 R	4 U	22 A	26 R	16 E	20 R	24 A	28 N	18 T
14 E	22 L	18 C	14 A	4 E	8 A	12 N	14 A	18 S	28 R	32 U
12 A	16 K	28 T	32 C	36 L	C	4 O	8 A	14 H	24 C	36 S
8 M	20 E	24 I	8 I	4 T	36 I	10 D	12 L	16 I	20 S	4 H
4 O	10 E	14 D	12 S	18 M	32 R	28 E	26 R	4 H	36 S	8 E
36 T	24 N	20 I	16 M	10 K	26 I	24 T	34 I	8 E	32 A	12 D
32 D	28 E	18 D	22 K	26 A	30 T	20 F	16 A	12 D	28 W	16 A
22 T	26 D	30 T	34 O	10 M	14 I	18 S	22 M	26 A	24 D	20 N

C _

Answers for Multi-Math Coal Facts:

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

22	24	34	10	14	20	16	12	26	30	34
R	Q	B	I	N	K	E		E	T	T
26	20	26	22	18	24	10	8	4	36	26
E	N	R	U	R	F	B	I	E	B	E
30	16	18	36	32	28	30	34	30	32	22
N		G	S	K	O	R	B	T	D	T
34	12	8	4	22	26	16	20	24	28	18
A	N	R	U	A	R	E	R	A	N	T
14	22	18	14	4	8	12	14	18	28	32
E	L	C	A	E	A	N	A	S	R	U
12	16	28	32	36	C	4	8	14	24	36
A	K		C	L		O	A	H	C	S
8	20	24	8	4	36	10	12	16	20	4
M	E	I	T		D	L	I	S		H
4	10	14	12	18	32	28	26	4	36	8
O	E	D	S	M	R	E	R	H	S	E
36	24	20	16	10	26	24	34	8	32	12
T	N	I	M	K	I	T	I	E	A	D
32	28	18	22	26	30	20	16	12	28	16
D	E	D	K	A	T	F	A	D	W	A
22	26	30	34	10	14	18	22	26	24	20
T	D	T	O	M	I	S	M	A	D	N

2. A Phrase-Out Word Puzzle

COAL PHRASE - OUT

DIRECTIONS: Search for all the words in the energy sentence. You will find them across, down or slantwise. Four of the words have already been found. As each word is found, cross it out in the sentence. All of the spaces not used for words in the sentence are filled with the letters in the word ENERGY. There is also an additional energy word in the puzzle that is not in the sentence, CARBON. Can you find it?

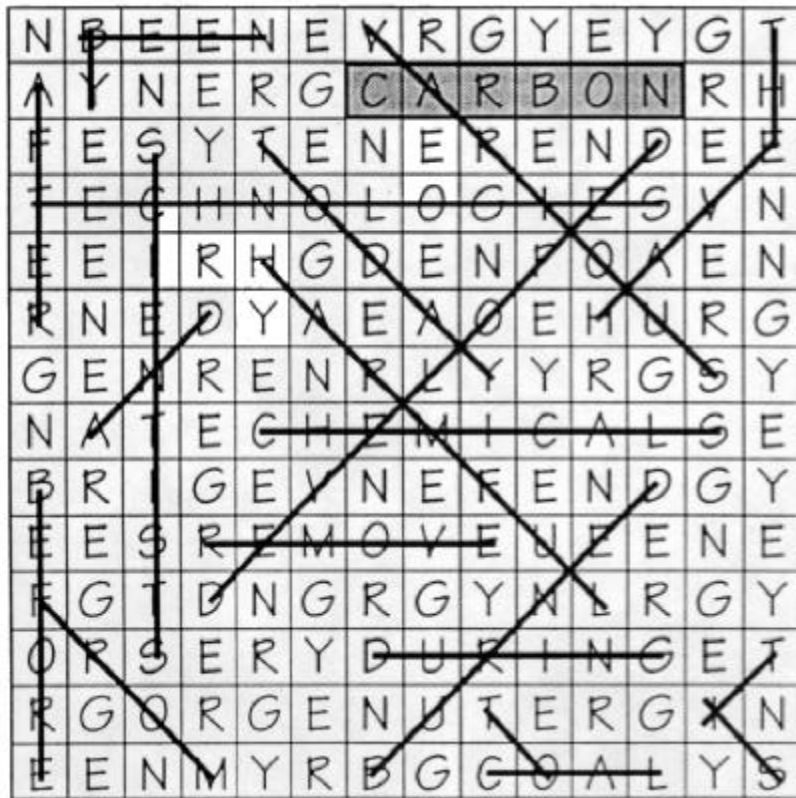
N	B	E	E	N	E	V	R	G	Y	E	Y	G	T
A	Y	N	E	R	G	C	A	R	B	O	N	R	H
F	E	S	Y	T	E	N	E	R	E	N	D	E	E
T	E	C	H	N	O	L	O	G	I	E	S	V	N
E	E	I	R	H	G	D	E	N	P	O	A	E	N
R	N	E	D	Y	A	E	A	O	E	H	U	R	G
G	E	N	R	E	N	R	L	Y	Y	R	G	S	Y
N	A	T	E	C	H	E	M	I	C	A	L	S	E
B	R	I	G	E	V	N	E	F	E	N	D	G	Y

E	E	S	R	E	M	O	V	E	U	E	E	N	E
F	G	T	D	N	G	R	G	Y	N	L	R	G	Y
O	R	S	E	R	Y	D	U	R	I	N	G	E	T
R	G	O	R	G	E	N	U	T	E	R	G	I	N
E	E	N	M	Y	R	B	G	C	O	A	L	Y	S

TECHNOLOGIES TODAY HAVE BEEN DEVELOPED BY SCIENTISTS TO REMOVE VARIOUS HARMFUL CHEMICALS FROM THE COAL BEFORE, DURING AND AFTER IT IS BURNED.

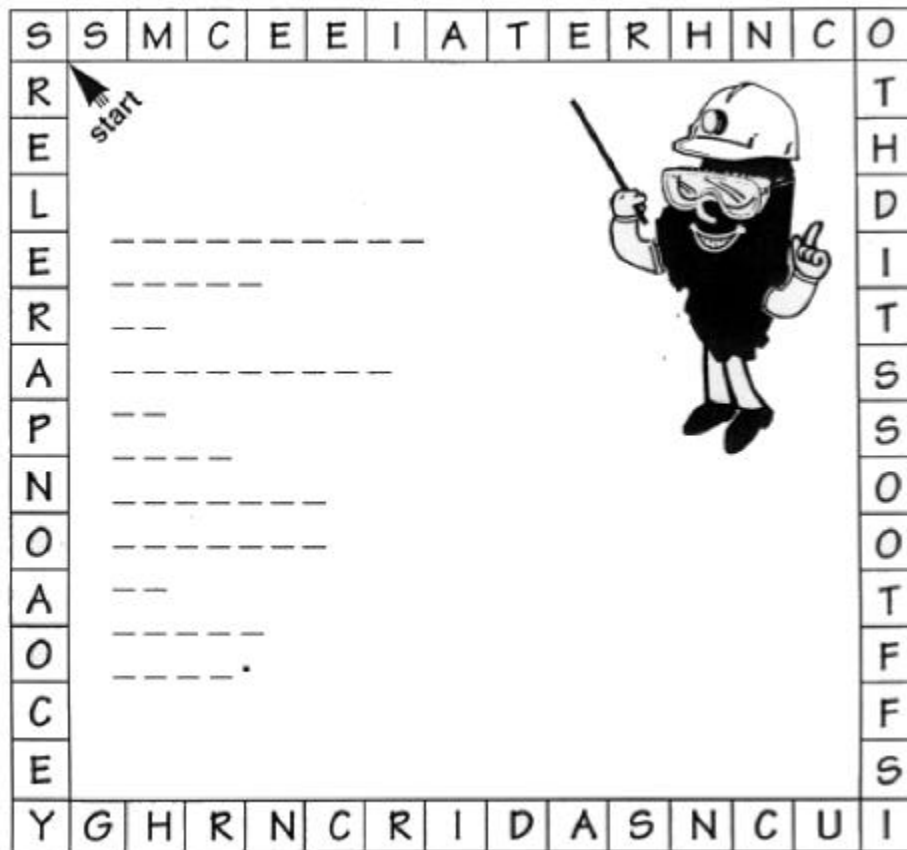
Bonus: Research the importance of Carbon, write a report.

Answers to Coal Phase - Out



3. A Skip-Letter Word Puzzle

THIRD LETTER SQUARE PHRASE



DIRECTIONS: Use every third letter to discover Mr.Alumpa Coal's hidden message. Begin with the letter in the box marked START and move around the large square clockwise, writing every third letter on the dotted lines. The arrow is pointing to the first letter S. To find the second letter, count S - 1, M - 2, C - 3, and write C on the next letter space. Continue around the large square, writing the third letter until all the spaces are filled.

Answer to Third Letter Square Phrase:

SCIENTISTS CARRY ON RESEARCH TO FIND CHEAPER METHODS OF USING COAL.

4. An Outline To Find Word Puzzle

ANIMAL ENERGY PHRASE

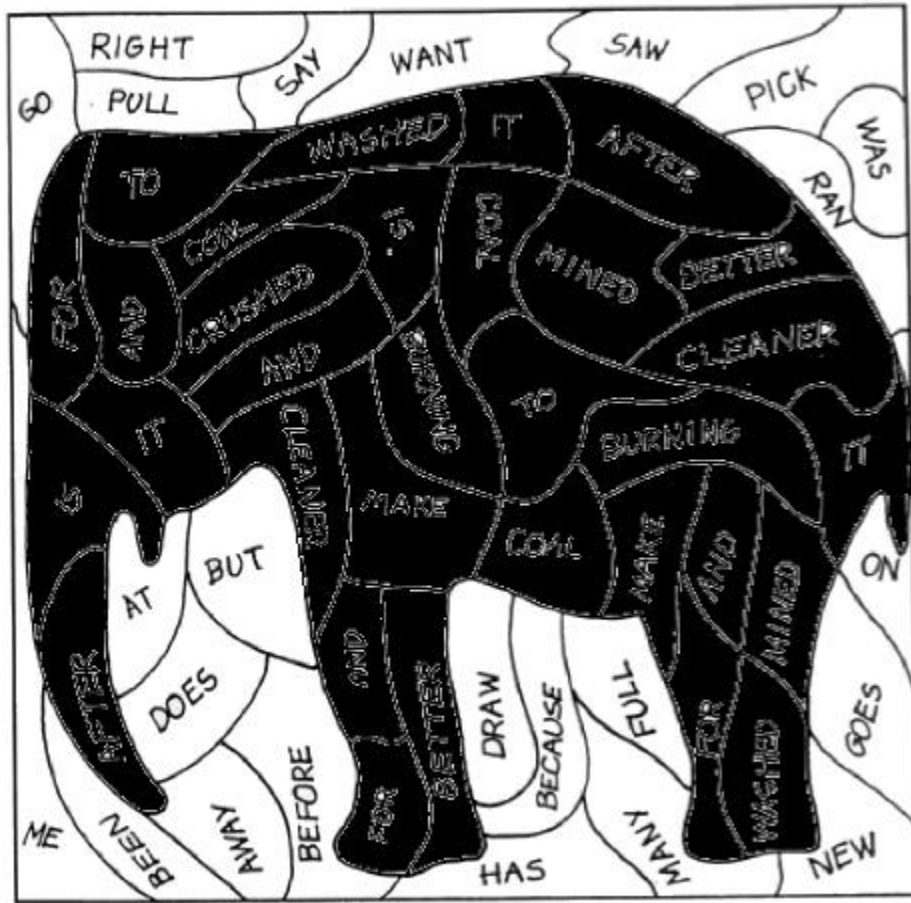


COAL IS WASHED AND CRUSHED AFTER IT IS MINED TO MAKE IT CLEANER AND BETTER FOR BURNING.

DIRECTIONS: Color all the shapes in the puzzle which have the words that are in the sentence and discover what animal is in the puzzle. Some words appear more than once.

Answer to Animal Energy Phrase

When students are finished, the shape of an elephant will appear.



5. A Six-Way Move Word Puzzle

ZIG-ZAG ENERGY PHRASE



BURNING COAL CLEANLY WILL HELP KEEP OUR AIR FRESH AND IMPROVE OUR ENVIRONMENT.

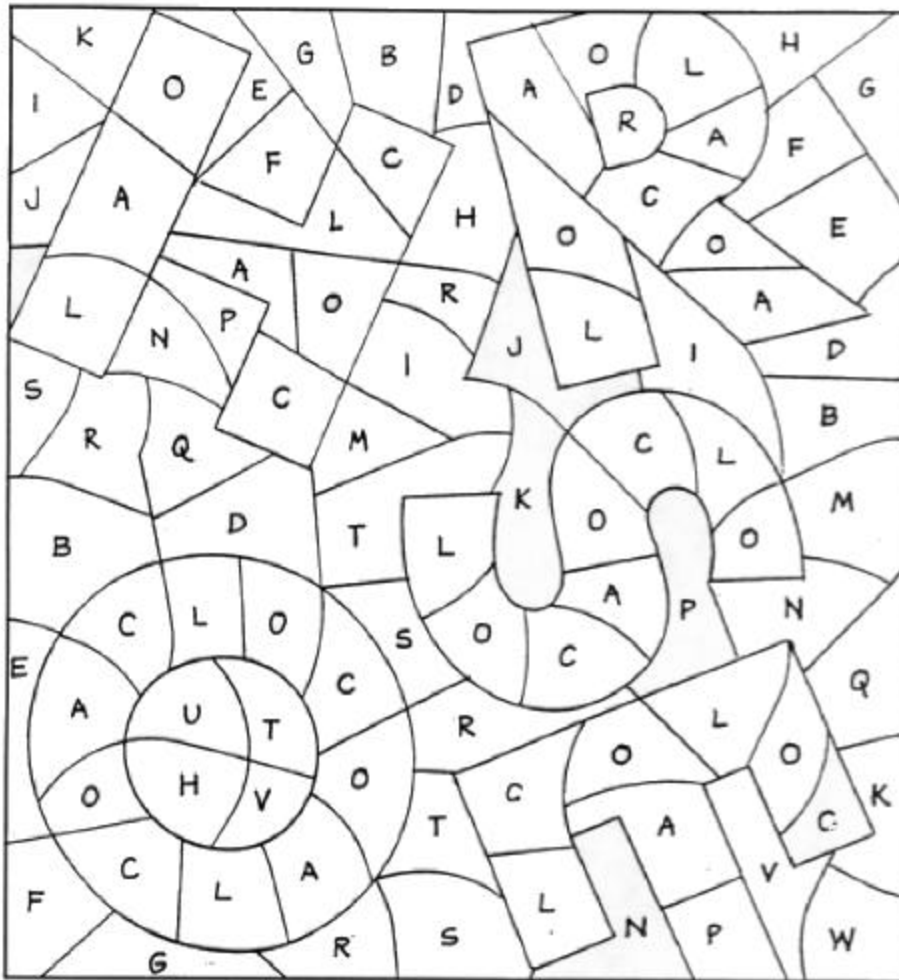
DIRECTIONS: Zig-Zag through the maze as you spell the energy sentence: BURNING COAL CLEANLY WILL HELP KEEP OUR AIR FRESH AND IMPROVE OUR ENVIRONMENT . Begin with one of the outside hexagons (six-sided shapes) to spell all of the words in the sentence. You may zig-zag in any direction.. Use one letter at a time beginning with one of the four B letters in an outside hexagon. Move in any direction to spell the sentence. As this is a maze, a wrong letter route can be followed. If this happens, retrace the route and continue locating the remainder of the sentence. There is only one correct route.

Answer to Zig-Zag Energy Phrase



6. An Outline To Find Word Puzzle

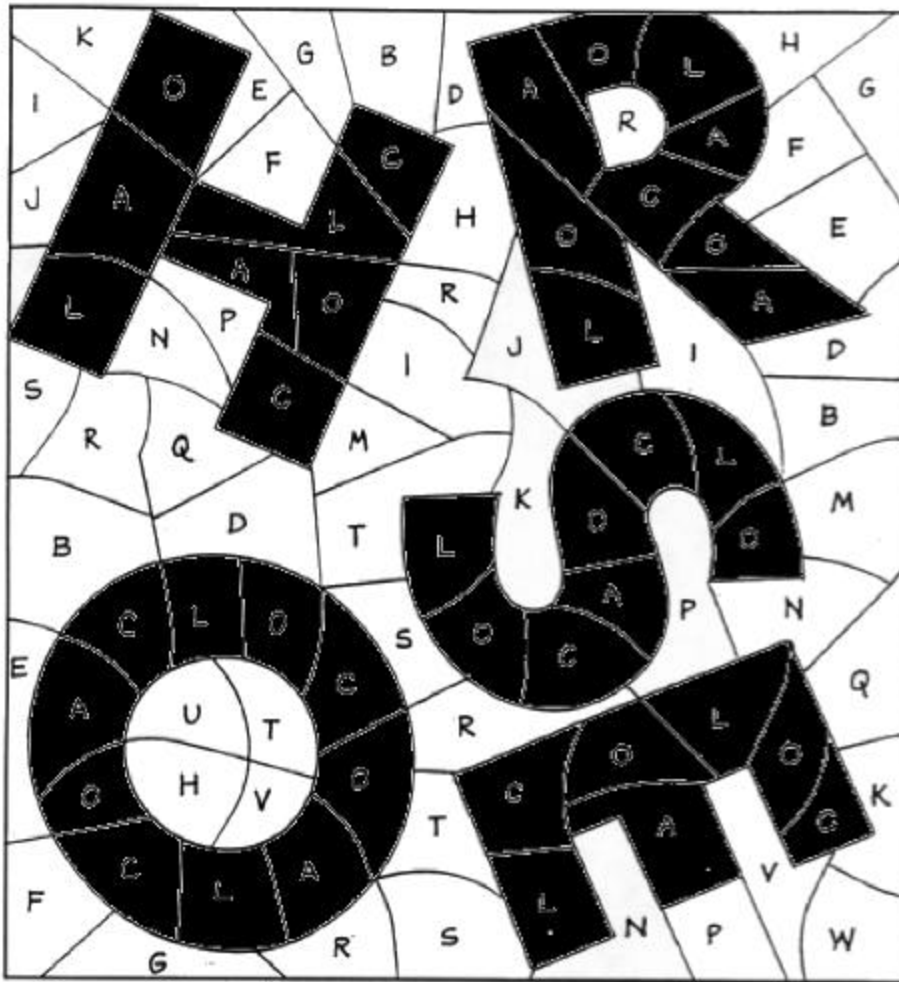
LETTER FIND ANIMALS



COAL

DIRECTIONS: The name of an animal is hidden in the puzzle. Can you find it? Color all the shapes in the puzzle which have letters that are in the word COAL.

Answer to Letter Find Animals
HORSE



7. Color - N - Learn

COLOR - N - LEARN



DIRECTIONS: Color the picture.

Answer for Color - n - learn

Instructions for Exercise:

Discussion: Point out the location of the coal in the picture. Find out students' perceptions of coal by asking them the following questions: Why is it important to us? How is it mined?

Acknowledgment: Illinois Department of Commerce & Community Affairs and Office of Coal Development & Marketing

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