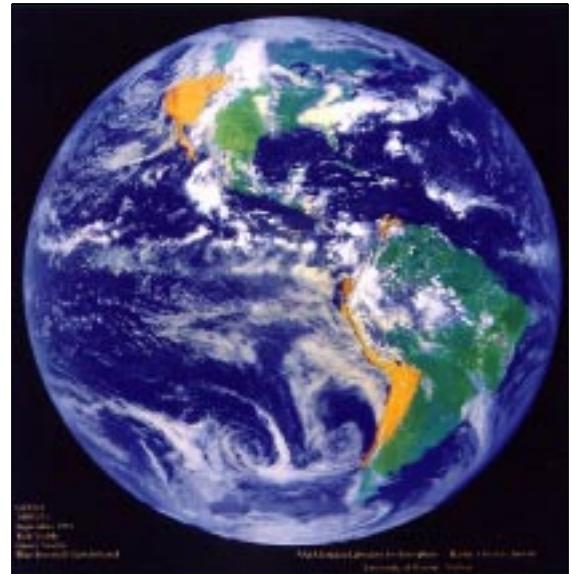


How does coal affect the environment?

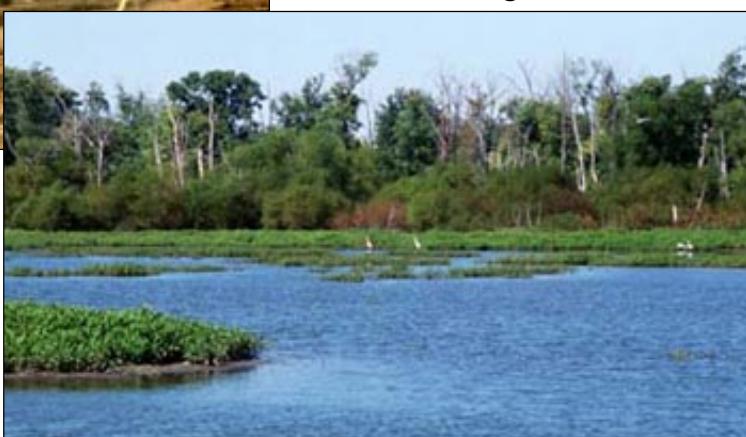
Earth is a closed system. Anything that is changed on Earth causes a series of changes in the land, water and air. Forest fires, highway traffic and even parking lots cause changes in the systems on Earth. When coal seams are disturbed, changes occur in Earth's systems too.

Mining coal releases dust and gas into the air. Water is used to wash impurities from the coal. The surface of the land may be changed a lot or a little. New laws and technology help minimize effects on our environment.



Though coal mining changes the landscape, federal and state laws now require all mined land to be reclaimed. Coal companies plan the reclamation process before mining.

After reclamation the lands may be used as parks, golf courses and farmland. Some mining companies leave the land as wildlife habitat.



(See the section on Land Reclamation for more information.)

Mining companies must protect the surface water and groundwater. Water that is used in the coal washing and separating processes is cycled through sedimentation ponds.

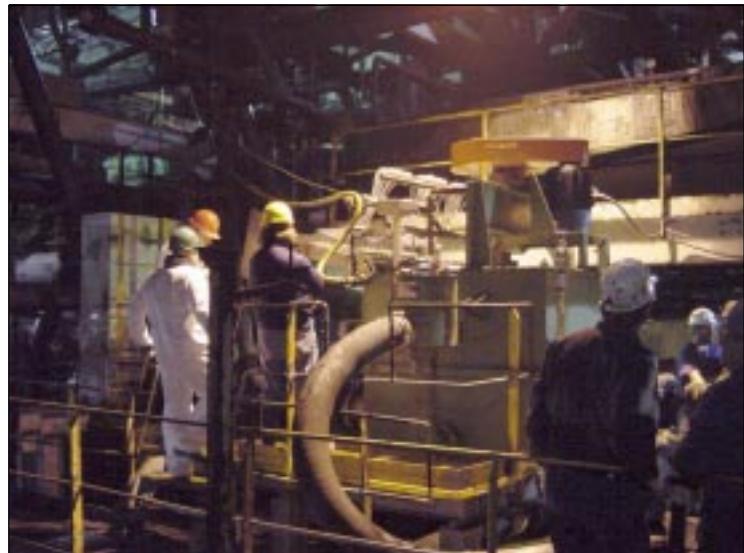
Sedimentation ponds allow the small rock particles, or sediment, to settle to the bottom of the pond. The water is pumped back to the treatment plant and used again.

Good mining practices protect and conserve water.



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.

Technologies were developed to remove these chemicals from coal before, during and after it is burned. These technologies are called **clean-coal technologies**.



Two new clean-coal technologies are **coal gasification** and **fluidized bed combustion (FBC)**. Coal gasification converts coal to gas. Fluidized Bed Combustion removes pollutants from the coal while it is being burned.

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.

Remember

The effects of coal on our environment are minimized by:

- Land Reclamation,
- Protecting and Conserving Water and
- Clean-Coal Technologies.



MULTI-MATH COAL FACTS

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

C _____

 _____.

DIRECTIONS: Search for the coal fact. Begin with the letter C in the middle of the puzzle. Multiply the 4s, beginning with 4x1 and find the box with the number 4. The letter O will be used to fill in the next blank. Continue to multiply the 4s using the products to find the letters needed to fill in the blanks. After you multiply 4x9, begin with 4x1 again.