

Skills Worksheet

Critical Thinking**ANALOGIES**

Write the letter of the pair of terms or phrases in the space provided that best completes the analogy shown. An analogy is a relationship between two pairs of words or phrases written as $a : b :: c : d$. The symbol $:$ is read "is to," and the symbol $::$ is read "as."

- | | |
|--|---|
| _____ 1. element : compound ::
a. gold : sodium
b. erosion : water
c. solution : acid
d. metal : alloy | _____ 6. erosion : sedimentation ::
a. smelting : slag
b. mine collapse : subsidence
c. noise : contaminant
d. stream : arsenic |
| _____ 2. surface mining : land ecosystem ::
a. mineral : native element
b. dredging : aquatic ecosystem
c. coal : mine fire
d. reclamation: plant life | _____ 7. acid mine drainage : streams ::
a. dredging : disturbance
b. coal : acids
c. noise : blasting
d. sulfur deposits : topsoil |
| _____ 3. salt : solar evaporation ::
a. lead : galena
b. ore minerals : gangue minerals
c. sodium chloride : halite
d. limestone : quarrying | _____ 8. reclamation : SMCRA ::
a. coal : sulfur
b. water quality : Clean Water Act
c. dredging : river
d. hazard : law |
| _____ 4. metallic mineral : gold ::
a. ore : native element
b. silver : copper
c. nonmetallic mineral : gypsum
d. ores : hydrothermal solutions | |
| _____ 5. silica : glass ::
a. copper : wire
b. gold : copper
c. alloys : medicine
d. metals : gemstones | |

Critical Thinking *continued*

INTERPRETING OBSERVATIONS

Read the following passage and answer the questions that follow.

Imagine you are a manager for Surface Mining Corporation, a hypothetical coal company. You and your colleagues face a dilemma. By law, any land used for mining must be restored to the condition it was in before mining began. You have been given estimated costs for restoring the land around the fully worked Washanka Pit coal mine. The total cost of reclamation could be as high as \$12 million. On the other hand, an estimate of fines and bonded liability suggest that the cost for failing to completely restore the land would not exceed \$8 million under current law. Meanwhile, the price received for coal has been falling recently, causing a significant loss of company revenue. You want the company to be responsible to the environment, but you are also responsible to stockholders who desire that the company be profitable and to employees who want their jobs to continue.

- 9.** Should Surface Mining Corporation proceed with full reclamation or should it abandon the mine site without reclamation? What was the most important consideration in making your decision?

- 10.** How should government agencies and lawmaking bodies react when mining companies have strong incentives to abandon disturbed land without full reclamation?

Critical Thinking *continued*

AGREE OR DISAGREE

Write whether you agree or disagree with the following statements. Support your answers with detailed reasons.

- 11.** Supplies of mineral resources required for the production of metals will one day run out. However, this is not a source of serious concern.

- 12.** Lower standards of reclamation following mining activities are acceptable in areas with low human populations.

- 13.** The benefits of opening mines to obtain new minerals usually outweigh the risks of environmental damage.

Critical Thinking *continued*

REFINING CONCEPTS

The statements below challenge you to refine your understanding of concepts covered in the chapter. Think carefully, then answer the questions that follow.

- 14.** Deep-sea mining presents many technical, political, and environmental problems. Still, polymetallic sulfide deposits produced by the circulation of sea water through the hot volcanic rocks in some undersea locations has created significant mineral deposits of zinc, copper, lead, barium, silver, and gold. Some known deposits may contain several millions of tons of ore and may be comparable with the largest massive sulfide deposits currently being mined on land. What obstacles hinder mining and recovery of these minerals? What aspects of mining could lead to environmental damage when undersea mining, but not when mining on land?

- 15.** A variant of surface mining called *mountaintop removal mining* is used in regions where narrow seams of coal are embedded in mountain formations. This mining method is common in the Appalachian region of the United States. In order to reach these coal seams, the top of a mountain is first broken up and removed by blasting. Once the overburden has been blasted off, the excess rock and earth is dumped over the side of the mountain into the valleys below, often burying the streams that run through them. How might this method of mining complicate the process of land reclamation?
