Name _____ Class _____ Date _____

Skills Worksheet

Critical Thinking

ANALOGIES

In the space provided, write the letter of the pair of terms or phrases 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.** gathering information : decision-making model ::
- **a.** variable : experimental model
- **b.** experimental model : correlations
- **c.** observing : experimental model
- **d.** map : graphical model

_____ **2.** mathematical formula : mathematical model ::
- **a.** mass = density/volume : equation
- **b.** flow chart : conceptual model
- **c.** risk : probability
- **d.** statistics : probability

_____ **3.** curiosity : imagination ::
- **a.** sample size : number of objects
- **b.** ability : inability
- **c.** creativity : art
- **d.** creativity : intellectual honesty

_____ **4.** values : principles ::
- **a.** models : representations
- **b.** noise : airplanes
- **c.** silence : noise
- **d.** airplanes : models

_____ **5.** positive short-term consequence : slowing of habitat destruction ::
- **a.** positive long-term consequence : population increase
- **b.** geology : environmental science
- **c.** slowing of habitat destruction : no consequence
- **d.** short-term consequence : negative short-termconsequence

_____ **6.** good scientists : scientific habits of mind ::
- **a.** hypothesis : prediction
- **b.** bad experiments : one variable and a control
- **c.** good experiments : one variable and a control
- **d.** good decisions : models

_____ **7.** mean : average ::
- **a.** distribution : normal
- **b.** hypothesis : guess
- **c.** data : graph
- **d.** sample : group of individuals

_____ **8.** experimenting : correlating ::
- **a.** directly counting : estimating
- **b.** reflecting : mirror
- **c.** observing : drawing conclusions
- **d.** guessing : estimating

INTERPRETING OBSERVATIONS

Read the following paragraph, and answer the questions below.

Students noticed that, since the time that grass began to grow on a barren hillside, less soil and water seemed to wash down the slope into the school yard during a rainstorm. The students thought that the grass helped hold the soil in place on the slope. The students predicted that more soil would wash down a slope without grass than a slope covered with grass. To find out if they were correct, the students conducted an experiment with three identical rectangular pans of soil. In pan 1, they planted grass seed and allowed it to grow to several centimeters tall. The students filled pan 2 with only soil. Then they took pan 1 and pan 2, and propped up at one end of each pan 15 cm high to create a slope. Pan 3, also filled with only soil, was propped up at one end 5 cm at one end to create a slope. Students poured equal amounts of water on the raised end of each pan and the students recorded their observations.

9. What hypothesis did the students test in their experiment?

10. What prediction did the students use to test their hypothesis?

11. Which steps in the experimental method are missing from the description above?

12. Did the students conduct a good experiment? Explain your answer.

AGREE OR DISAGREE

Agree or disagree with the following statements, and support your answer.

13. You encounter or use statistics and probability often in your day-to-day life.

14. The positive long-term consequences of car pooling or taking a bus to school outweigh the negative short-term consequences of driving yourself to school.

15. In order to become a good scientist, a scientist should believe everything he or she is told by other scientists and should disregard the new ideas of nonscientists.

REFINING CONCEPTS

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

16. What impact might the increasing worldwide use of the Internet have on the final step of the experimental method?

17. Describe two ways in which you can benefit from applying scientific habits of mind in your everyday life.

18. When lawmakers consider legislation concerning environmental disasters, how might they be able to use their knowledge of "risk?"