

## Warm-Up: Design Experiments

Questions 1-5: Write the letter of the correct answer on the line at the left.

- \_\_\_\_\_ 1. *If water contains sugar, then it will freeze at a lower temperature than fresh water does.* This is an example of a(n)
- scientific question.
  - hypothesis.
  - operational definition.
  - procedure.
- \_\_\_\_\_ 2. Measurements gathered during an experiment are an example of
- operational definitions.
  - inferences.
  - variables.
  - observations.
- \_\_\_\_\_ 3. What is the manipulated variable in an experiment to determine whether the distance a skateboard rolls is affected by the size of the skateboard's wheels?
- the surface on which the skateboard rolls
  - the force with which the skateboard is pushed
  - the size of the skateboard's wheels
  - the distance the skateboard rolls
- \_\_\_\_\_ 4. Which of the following is a detailed list of the steps in an experiment?
- conclusion
  - operational definition
  - procedure
  - observations
- \_\_\_\_\_ 5. During an experiment, what do you record in a data table?
- the observations
  - the procedure
  - the conclusion
  - the hypothesis

### Skills Test C: Design Experiments (*continued*)

Questions 6-12: Write the letter of the correct answer on the line at the left.

- \_\_\_\_\_ 6. Which statement about scientific questions is true?  
a. Scientific questions should avoid bias.  
b. Scientific questions should be as general as possible.
- \_\_\_\_\_ 7. Which statement about the variables in an experiment is true?  
a. Controlled variables can change during the experiment.  
b. The manipulated variable is changed intentionally during the experiment.
- \_\_\_\_\_ 8. Which of the following is a scientific question?  
a. Which kinds of metal are attracted by a magnet?  
b. Which kinds of metal make the most attractive jewelry?
- \_\_\_\_\_ 9. Which of these terms, when used in an experiment, would require an operational definition?  
a. a steep ramp  
b. a ramp at a 45° angle
- \_\_\_\_\_ 10. Which of these would be most useful for the process of interpreting data?  
a. a microscope  
b. a graph
- \_\_\_\_\_ 11. What is the manipulated variable in an experiment to determine whether the use of antibacterial soap changes the average number of student absences from school?  
a. use of regular or antibacterial soap  
b. number of student absences from school
- \_\_\_\_\_ 12. What is the purpose of a control group in an experiment?  
a. to serve as a standard of comparison  
b. to be the group exposed to changes in the manipulated variable

**Skills Test C: Design Experiments** (*continued*)

Questions 13-20: Column 1 lists the key components of an experiment. Column 2 presents examples of these components. Match each term in Column 1 with the correct statement from Column 2. Write the letter of the correct answer on the line at the left.

**Column 1**

- \_\_\_\_\_ 13. controlled variables
- \_\_\_\_\_ 14. hypothesis
- \_\_\_\_\_ 15. scientific question
- \_\_\_\_\_ 16. operational definition
- \_\_\_\_\_ 17. conclusion
- \_\_\_\_\_ 18. data
- \_\_\_\_\_ 19. manipulated variable
- \_\_\_\_\_ 20. responding variable

**Column 2**

- a. If plants receive fertilizer, they will make more beautiful bouquets.
- b. If a box is pushed with a greater force, then it will move a greater distance.
- c. Does hot water freeze more quickly than cold water?
- d. The pulse rates measured were 72, 68, and 83 beats per minute.
- e. Water was considered cold when it was 10°C or less.
- f. Plants received 2 g, 4 g, 6 g, or 8 g of fertilizer weekly.
- g. All of the toy cars were rolled over the same surface and were pushed with the same amount of force.
- h. The rate of plant growth in an experiment to measure the affect of watering on rate of growth.
- i. Plants that received Fertilizer A grew 2 cm per week more than plants with no fertilizer. Fertilizer A makes plants grow faster.

**Skills Test C: Design Experiments** (*continued*)

Questions 21-25. Read the description of the experiment. Then write the letter of the terms from the list under the correct description.

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●	We did an experiment to see if the distance a toy car rolled was affected by the size of the car's wheels. First, we set up a ramp at 45°. Each of the toy cars was rolled down the same ramp. At the bottom of the ramp, the cars rolled onto the classroom floor. We used a metric ruler to measure the distance each car rolled. The cars we used all had the same mass, but the wheels on each car were a different diameter. Our hypothesis was: If a toy car has larger wheels, then it will roll a greater distance.
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- a. masses of the toy cars
- b. distance traveled by the toy cars
- c. height of the ramp
- d. surface at the bottom of the ramp
- e. size of the toy car's wheels

Controlled Variables	Manipulated Variable	Responding Variable
21. _____	24. _____	25. _____
22. _____		
23. _____		
_____		