

Name: _____

Research Methods – Study Guide

A crossword puzzle grid is shown, consisting of a large square area with a grid of small squares. Some squares are shaded gray, indicating they are not part of the puzzle. The grid contains 20 numbered starting points for words:

- 1: Top row, starting at the 4th square from the left.
- 2: Top row, starting at the 14th square from the left.
- 3: 3rd row, starting at the 3rd square from the left.
- 4: 4th row, starting at the 1st square from the left.
- 5: 5th row, starting at the 5th square from the left.
- 6: 6th row, starting at the 1st square from the left.
- 7: 6th row, starting at the 2nd square from the left.
- 8: 7th row, starting at the 1st square from the left.
- 9: 7th row, starting at the 2nd square from the left.
- 10: 10th row, starting at the 12th square from the left.
- 11: 11th row, starting at the 1st square from the left.
- 12: 12th row, starting at the 3rd square from the left.
- 13: 13th row, starting at the 13th square from the left.
- 14: 14th row, starting at the 4th square from the left.
- 15: 15th row, starting at the 15th square from the left.
- 16: 16th row, starting at the 10th square from the left.
- 17: 17th row, starting at the 4th square from the left.
- 18: 18th row, starting at the 12th square from the left.
- 19: 19th row, starting at the 1st square from the left.
- 20: 20th row, starting at the 1st square from the left.

Across

1. type of data that uses specific numbers or amounts
4. comes after a hypothesis and is used to determine whether the hypothesis is correct
6. a set of chemical reactions within an organism
8. the study of life
14. a signal to which an organism responds
16. scientist who experimented using meat and flies
17. system of measurement, uses multiples of 10
18. information gathered through observations
19. a well-tested explanation that unifies a broad range of observations
20. where life arises from nonliving matter; ___ generation

Down

2. measure the amount of space an object takes up; ex: liter
3. organized way of using evidence to learn about the natural world; scientific _____
5. a proposed scientific explanation that can be tested
7. the ability of organisms to change over time
9. logical interpretation based on prior experience
10. variable that changes during an experiment
11. the maintaining of constant internal conditions or balance
12. scientist who used S-shaped flasks
13. type of reproduction that only requires one parent
15. a device that produces a magnified image

Taking a Standardized Test

Test Taking Tip: Watch for Clue Words

When you read a test question, watch for the clue words *except*, *always*, and *mostly*. When a question has the word *except*, you are looking for the answer that is not correct. When you see *always* in a question, it means the answer is true in every situation. *Mostly* suggests that the correct answer generally applies, but there are exceptions.

Read the following questions and answer choices.

Living things show all of the characteristics except

- A. growth and development.
- B. ability to respond to the environment.
- C. ability to dissolve.
- D. reproduction.

Step 1 What is the question asking? This question asks you to spot the characteristic that is NOT true of living things.

Step 2 Look for clue words. This question includes the word *except*. You are looking for the answer that is not correct.

Step 3 Read each answer choice carefully. Cross out choices you know are true. You may remember that living things grow and develop and they respond to the environment, so you can cross out A and B.

Step 4 Choose one of the answers left. You know that the correct answer is either C or D. You may remember that living things reproduce. The only characteristic that is NOT true of all living things is C, ability to dissolve.

Self-Test

Practice what you have learned by answering the following questions. Before you choose your answer, underline the clue word. Then circle the correct answer.

1. In research, a scientist must always consider
 - A. plants.
 - B. evidence.
 - C. photographs.
 - D. theories.
2. A bias is mostly due to
 - A. the study of life.
 - B. controlled experiments.
 - C. experimental data.
 - D. a personal point of view.

- 3. Topics studied in biology include all of the following except
 - A. the biosphere.
 - B. rocks and minerals.
 - C. changes in groups of organisms.
 - D. reproduction and growth.
- 4. All of the features are true of science except
 - A. deals with the natural world
 - B. collects and organizes information
 - C. explores the supernatural
 - D. proposes explanations based on evidence
- 5. All of the following are characteristics of all living things except the ability to
 - A. grow and develop.
 - B. maintain a stable internal environment.
 - C. change over time.
 - D. reproduce asexually.
- 6. All of the following are big ideas in biology except living things are
 - A. unable to adapt to their surroundings.
 - B. based on an universal genetic code.
 - C. made up of cells.
 - D. diverse.
- 7. When working in a lab you should always
 - A. follow safe practices.
 - B. work with a partner.
 - C. use a microscope.
 - D. design your own experiment.

Short-Response Question

Answer the following question in at least two or three sentences.

- 8. You wonder whether plants that are exposed to music grow faster than those that are not. Describe a controlled experiment you can do to help you find out.

Match Column A to Column B	
Answer	Column A
1	Scientific Theory
2	Scientific Law
3	Scientific Fact
4	Scientific Principle
5	Research Question
6	Direct Observation
7	Indirect Observation
8	Independent Variable
9	Dependent Variable
10	Control Variable

Column B
a Variable that is manipulated
b Purpose or question of the experiment
c Scientist relies on the observation of others
d Based on scientific experiments that always have the same outcome
e Rules or laws concerning the operation of natural processes
f Predicts future occurrences or observations
g Variable that is measured
h Scientist observes a behavior or occurrence
i Support certain ideas but are not established truths
j Variable that does not change

- ① _____
- ② _____
- ③ _____
- ④ _____
- ⑤ _____
- ⑥ _____
- ⑦ _____
- ⑧ _____
- ⑨ _____
- ⑩ _____

