

Data Analysis



Data Analysis

**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

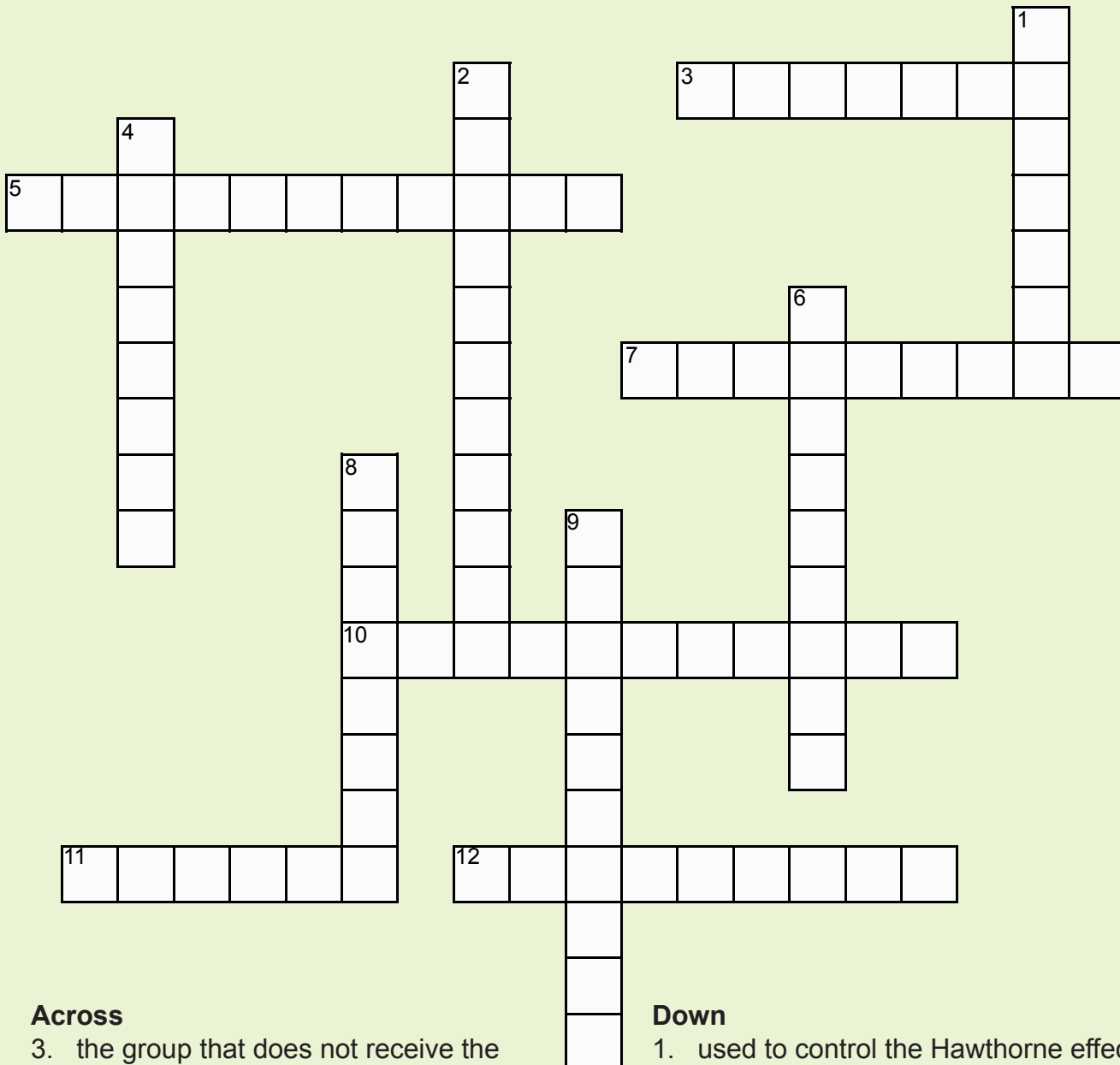
Start learning right now about how you can analyze data to determine experimental effects and to predict trends. Take the following brief quiz to see how much you already know about data analysis. See the bottom of page 4 to check your answers.

1. Which industry “invented” the statistical tool called the Student’s t-test?
 - a. beer making
 - b. fertilizer manufacturing
 - c. chicken egg producing
 - d. home building
2. The mathematical average or mean was known about and used for data analysis around 500 B.C. by Greeks such as Pythagoras.
 - a. true
 - b. false
3. What is the meaning of the Latin root “*var*”?
 - a. different
 - b. same
 - c. above
 - d. below
4. The Student’s t-test is used to determine if a real statistical difference exists between:
 - a. three or more groups’ averages.
 - b. four groups’ modes.
 - c. three or more groups’ medians.
 - d. two groups’ means.
5. As of 2012, what was the median annual salary of statisticians in the United States?
 - a. \$35,000
 - b. \$55,000
 - c. \$65,000
 - d. \$75,000



Experimenting: Quite a Puzzle

Complete the following crossword puzzle using terms associated with experimental design. After completing the puzzle, view the bottom of page 4 to check your answers.



Across

3. the group that does not receive the independent variable
5. the definition of the dependent variable
7. another name for the control variable
10. the variable modified by the researcher
11. subjects or objects in a study
12. the group receiving both independent and dependent variables

Down

1. used to control the Hawthorne effect
2. another name for the independent variable
4. another name for the dependent variable
6. the variable of interest
8. a quantity that can have different values
9. testable prediction based on prior information

Data Analysis

Sad, But True

In the past, some researchers conducted experiments on animals, including people that today are deemed unethical. The short-term gains in information from these studies rarely equaled the long-term negative effects on the individuals that were tested. In many cases, the results of the experiments gave answers that were very obvious, leading to the question of, why put these animals through such painful experiences to gather useless data? A few of these studies are synopsized below.

A baby was taught to associate the presence of an animal with fear by the researcher making a loud noise every time the animal was shown to the baby. Eventually, the sight of only the animal caused fear and screaming by the baby even when the loud sound was removed.

People thought they were applying a strong electrical shock to another person who incorrectly answered a question. In reality, no shock was being applied. The study was trying to find out how far people would go in following directions given by another person. The people who thought they were applying the shock in many cases blindly followed the directions even when they heard loud screams that they thought were due to their application of the shocks.

Monkeys were given unlimited amounts of dangerous drugs. Researchers found that the monkeys soon ignored food, water, and sleep to take the drugs. Many died within two weeks from the start of the study.

The good news is that researchers now must abide by strict guidelines that ensure the health and well-being of all subjects taking part in a study. Written consent of participants and detailed outcomes of the purpose of the study must be secured by the researcher prior to the start of any data collection.

Please visit our site for more helpful information:
STEMsims.com

Answers: Page 2 Answers: 1) a, 2) a, 3) a, 4) d, 5) d. Page 3 Answers: Across – 3) control, 5) operational, 7) moderator, 10) independent, 11) sample, 12) treatment. Down 1) placebo, 2) manipulated, 4) response, 6) dependent, 8) variable, 9) hypothesis.

The Green Engineering Magnet (GEM) project was funded in part under the National Science Foundation grant contract #IIP-1127544. Its contents are solely the responsibilities of the authors and do not necessarily represent the official views of the National Science Foundation.

© 2015 STEM Sims. All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable, and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent or other industrial or intellectual property rights.