

## Scientific Method Quiz

### Multiple Choice

1. A hypothesis that has been accepted by scientists after it has been subjected to proper testing and validation is said to be
  - A. a theory
  - B. a fact
  - C. a law
  - D. a controlled variable
  - E. a constant
  
2. Usually, the first step in solving a scientific problem is to
  - A. perform an experiment
  - B. identify the problem
  - C. form a hypothesis
  - D. create a graph
  - E. test a variable
  
3. When conducting an experiment using the scientific method, which of the following steps reports data that has not been interpreted?
  - I. Problem
  - II. Hypothesis
  - III. Experiment
  - IV. Results
  - V. Conclusion
  - A. I only
  - B. II only
  - C. IV only
  - D. I, II, and III only
  - E. III, IV, and V only

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**Questions 4 – 6** refer to the following passage and answer choices.

Scientists and nutritionists have long suspected that high-fructose corn syrup, used to sweeten soft drinks, is one of the causes of childhood obesity. In a recent study, at the University of Cincinnati, researchers found that mice that drank water with added fructose ate less solid food, gained more weight and put on 90% more body fat than mice that drank only water. Scientists concluded that fructose may affect metabolism in a way that favors fat storage.

- A. The presence of fructose in their diet.
  - B. The mice that drank only water
  - C. The weight gained by the mice
  - D. The quantity of water provided
  - E. The quantity of food eaten
4. What is the independent variable in this experiment?
5. What is the dependent variable in this experiment?
6. What is the control used in this experiment?
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7. The variable that is manipulated (or changed on purpose) by the experimenter is called the
- A. independent variable
  - B. control variable
  - C. dependent variable
  - D. constant variable
  - E. responding variable

**Questions 8 – 9** refer to the following passage.

Like most students, Megan really enjoyed doing labs in science class. One day her teacher allowed the class to design their own experiment. Megan was excited and couldn't wait to get started. Her task was to see if she could blow up a balloon using chemicals. Megan knew that baking soda and vinegar would fizz and produce a gas. However, her teacher didn't give her any vinegar to use, only dilute hydrochloric acid (HCl). Megan thought she could use the HCl in place of the vinegar, and wanted to see if mixing them would cause the balloon to inflate. Megan got on her safety gloves and got to work. She put HCl in an Erlenmeyer flask and baking soda in a balloon. She stretched the opening of the balloon over the top of the flask and held the balloon to the side so the baking soda didn't spill out. Megan then lifted the balloon and the two chemicals mixed as the baking soda fell into the flask. Megan was all smiles when she saw the balloon inflating. It worked just like she had expected.

8. Megan forgot to do all of the following EXCEPT
- A. write a hypothesis
  - B. get teacher approval
  - C. gather materials
  - D. wear all safety gear
  - E. state a problem
9. Based on the above reading, which hypothesis would be supported by the experiment?
- A. If I add baking soda to the acid, then nothing will happen.
  - B. The mixture will fizz.
  - C. If I add baking soda to the acid, then my balloon will not inflate.
  - D. If I add baking soda to the acid, then my balloon will inflate.
  - E. The acid and base will react and inflate the balloon.

## Free Response

Use the article on how Penicillin was discovered to answer the following questions.

### **28 Scientific American**

In 1928, Sir Alexander Fleming was studying *Staphylococcus* bacteria growing in culture dishes. He noticed that a mold called *Penicillium* was also growing in some of the dishes. A clear area existed around the mold because all the bacteria that had grown in this area had died. In the culture dishes without the mold, no clear areas were present.

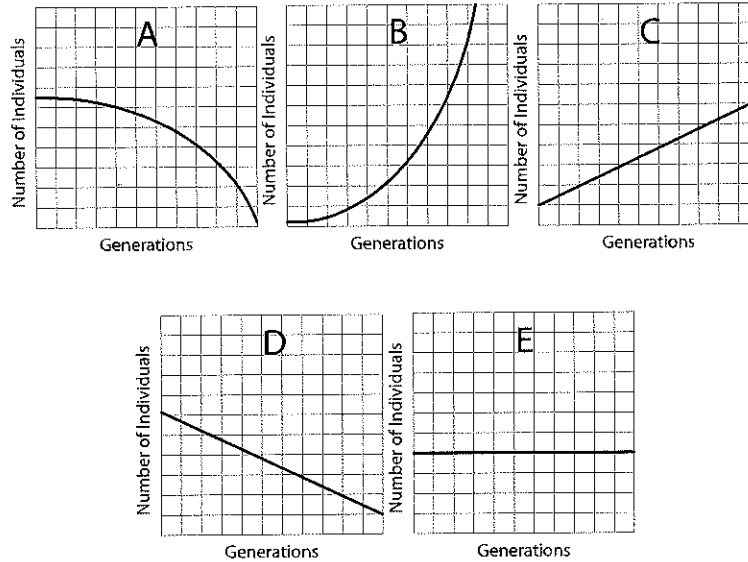
Fleming thought that the mold must be producing a chemical that killed the bacteria. He decided to isolate this substance and test it to see if it would kill bacteria. Fleming transferred the mold to a nutrient broth solution. This nutrient solution contained all the materials the mold needed to grow. After the mold grew in the broth, he separated the broth from the mold. Fleming then added the separated broth solution to a culture of bacteria. He observed that the bacteria

- A. What would an appropriate hypothesis be for Fleming's experiment?
- B. Explain why Fleming's hypothesis was either supported or rejected?
- C. What should Fleming have used as a control?
- D. What was the independent variable in Fleming's experiment?
- E. What was the dependent variable in Fleming's experiment?

## Baby Dice Island Quiz

### Multiple Choice

Questions 1-4 refer to the following graphs of Number of Individuals vs. Generations



1. A population whose birth and death rates are equal.
2. A population experiencing arithmetic growth.
3. A population experiencing exponential growth.
4. Best describes the world population trend over the last 500 years

**Questions 5-7** Refer to the following data table regarding the number of births and deaths in a fictitious population.

Generation	Initial Population	Births	Deaths
1	100	40	20
2	120	60	30
3	150	50	25
4	175	80	40
5	<b>Q</b>	100	<b>Z</b>

5. What is the value of Q?
  6. A reasonable prediction for the value Z in the table would be
  7. The ratio of births to deaths in this population is
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8. Which of the following equations could be used to calculate the growth rate of a population?
    - A.  $growth\ rate = \frac{number\ of\ births}{number\ of\ deaths}$
    - B.  $growth\ rate = \frac{number\ of\ births}{total\ population}$
    - C.  $growth\ rate = population + births - deaths$
    - D.  $growth\ rate = \frac{(births - deaths)}{total\ population}$
    - E.  $growth\ rate = number\ of\ births - number\ of\ deaths$
  9. All of the following serve to limit the population growth in a population of field mice EXCEPT
    - A. food sources
    - B. decreased predation
    - C. disease
    - D. snakes
    - E. water sources