

Study Island

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1. Selma hypothesizes that the mass of a sample of water will not change if it is frozen. She conducts an experiment to test her hypothesis. Her experimental steps are as follows:

1. Fill a beaker with 500 mL of water.
2. _____
3. Place the beaker in the freezer.
4. After the water freezes, place the beaker on the balance and measure its mass.

Which of the following steps is missing from Selma's experiment?

- A. Set a timer for 2 hours.
 - B. Use a thermometer to measure the water's temperature.
 - C. Place the beaker on the balance and measure its mass.
 - D. Run the water through a filter to make sure there are no impurities in it.
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2. A scientist wants to determine which fertilizer is more effective—Fertilizer X or Fertilizer Y. The best way for her to proceed would be to design an experiment with

- A. three groups of plants—a group fertilized by X, a group fertilized by Y, and a control group with no fertilizer.
- B. two groups of plants—a group fertilized by X and a control group with no fertilizer.
- C. two groups of plants—a group fertilized by Y and a control group with no fertilizer.

- three groups of plants—a group fertilized by X, a group fertilized by both X and Y, and a
- D.** control group with no fertilizer.
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3. Botanists have learned that most seeds, including bean seeds, require only moisture, oxygen, and the proper temperature range to germinate.

A science class is designing an investigation about the germination of bean seeds. Which experiment best relates to the known scientific principles of seed germination?

- A.** Measure the time it takes for seeds given different amounts of light to germinate.
 - B.** Measure the time it takes for seeds with different colors to germinate.
 - C.** Measure the time it takes for seeds to germinate at different temperatures.
 - D.** Measure the time it takes for seeds in different shapes of pots to germinate.
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4. Consider the following situation:

A skin care company has developed a new, experimental sunscreen. The scientists who developed the sunscreen are currently testing the product on 50 volunteers over a 3-month period. Each of the volunteers fully understood the experiment and gave written consent before participating in the trial.

While the trial is underway, the scientists learn that the sunscreen may cause skin rashes to certain users. Do the scientists need to notify the participants of this information during the trial?

- A.** No; each of the volunteers fully understood the experiment and gave written consent before participating.
 - B.** No; if the volunteers are given this information, they may quit the trial, which would ruin the experiment.
 - C.** Yes, but the scientists must only notify the participants who are believed to be at risk for getting a rash.
 - D.** Yes; volunteer subjects must be notified of any new information that relates to the experiment in which they are participating.
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5. Maria wants to determine which type of disinfectant kills the most bacteria.

Which of the following is the best way for Maria to determine this?

Put the same amount and species of bacteria on ten identical plates, and add a different

A. disinfectant to each plate.

Put the same amount and species of bacteria on ten identical plates, and add ten different

B. kinds of disinfectant to each plate.

C. Interview ten different people to determine which type of disinfectant they prefer.

D. Ask ten different companies that make disinfectants which type is best.

6. Hanna hypothesizes that granite is denser than sandstone. How can Hanna test her hypothesis?

A. Melt each rock down inside a high-temperature furnace, and then measure the volume of the two liquefied rocks.

B. Weigh each rock to determine which is the heaviest, and thus the densest.

Measure the mass of the rocks with a balance and the volume of the rocks with water and

C. a graduated cylinder. Then calculate their densities.

Examine the rocks under a hand lens and determine which rock seems to have the largest

D. particles.

7. Which of the following is always true?

A scientific experiment that causes pain or distress to a subject

A. is ethical if the subject is non-human.

B. is ethical if the results of the experiment help cure a disease.

C. is ethical if the subject does not give consent.

D. is unethical if the experiment can be redesigned to eliminate the pain and distress.

8. Sarah wants to know where in her garden chamomile would grow the best. She thinks chamomile will grow best in the corner of the garden that gets the most sunlight. To test her hypothesis, she decides to plant several groups of chamomile in her garden as an experiment.

Which of the following variables will Sarah need to measure to know which group of plants grew best?

- A. the type of plants
 - B. the height of the plants
 - C. the amount of water she gives the plants
 - D. the location of the plants
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9. A herpetologist is studying the effects of a snake's diet on the quality of its skin. To further this research, the herpetologist breeds his own mice to use as food for the snakes. Do special considerations need to be made regarding the care of the mice?

- A. Yes; all animals kept in a lab must be properly cared for.
 - B. No; the mice are ultimately going to be fed to the snakes anyways.
 - C. No; unintelligent animals do not require any special consideration.
 - D. Yes; only because the health of the mice might effect the outcome of the experiment.
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10. Cory wants to do an experiment to confirm that matter is conserved during a chemical reaction. He decides to use the reaction of baking soda and vinegar. When added together, the two substances foam and bubble. Cory gathers the following equipment:

- a scale to measure masses
- a large flask in which to mix the vinegar and baking soda
- vinegar
- baking soda
- a lab book and pen

What does Cory still need in order to do his experiment?

- A. a way to measure the volume of liquids
 - B. a way to calculate how much baking soda to use
 - C. a hot plate
 - D. a way to capture and measure gas
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