Name _____ Date

BIO SOL Review 2 - Experiments (23)

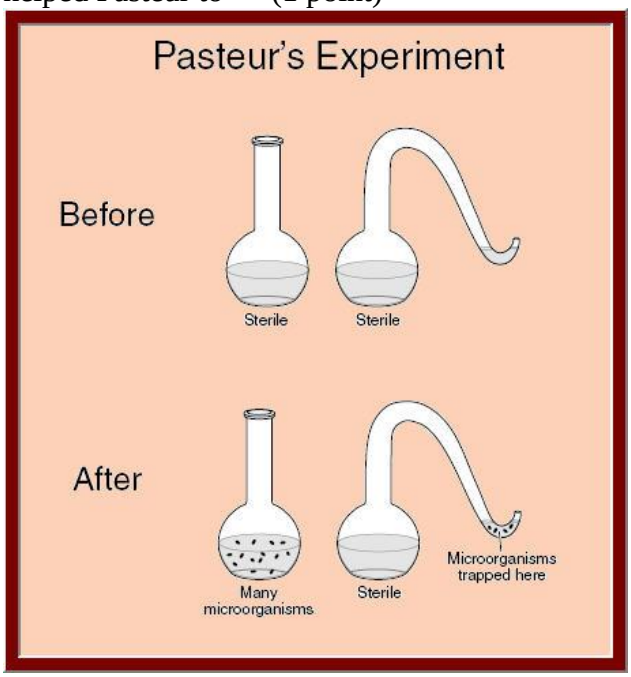
1. (2006-49) Which of these would be measured to determine the density of the polar bear population in Canada?
   - **a. The number of bears per square kilometer**
   - b. The mass of the bears at the Arctic Circle
   - c. The total number of bears minus the juvenile bears
   - d. The total number of bears seen per day

2. (2006-42) A scientist designed an experiment to test the effect of temperature on bacterial growth. He grew three different cultures of the bacterium E. coli under three heat lamps at different temperatures. What was the independent variable in this experiment?
   - a. Length of the experiment
   - b. Number of bacteria
   - c. Reproduction rate
   - **d. Temperature**

3. (2006-22) Data about the climate in an ecosystem were collected for 30 years. Which hypothesis about a population of eagles could be made based on the climate data collected
   - **a. Eagle chick survival is directly related to annual rainfall amounts.**
   - b. An outbreak of disease in 1987 killed 82% of the eagle population.
   - c. Eagles remain with the same mate throughout their lifetime.
   - d. Mortality of eagles from pesticides after 1992 was less than 5%.

4. (2006-8) In an experiment, the height of several plants was recorded daily in millimeters. Which tool would be the most accurate and appropriate for this measurement?
   - a. Yardstick
   - b. Graduated cylinder
   - c. Digital scale
   - **d. Metric ruler**

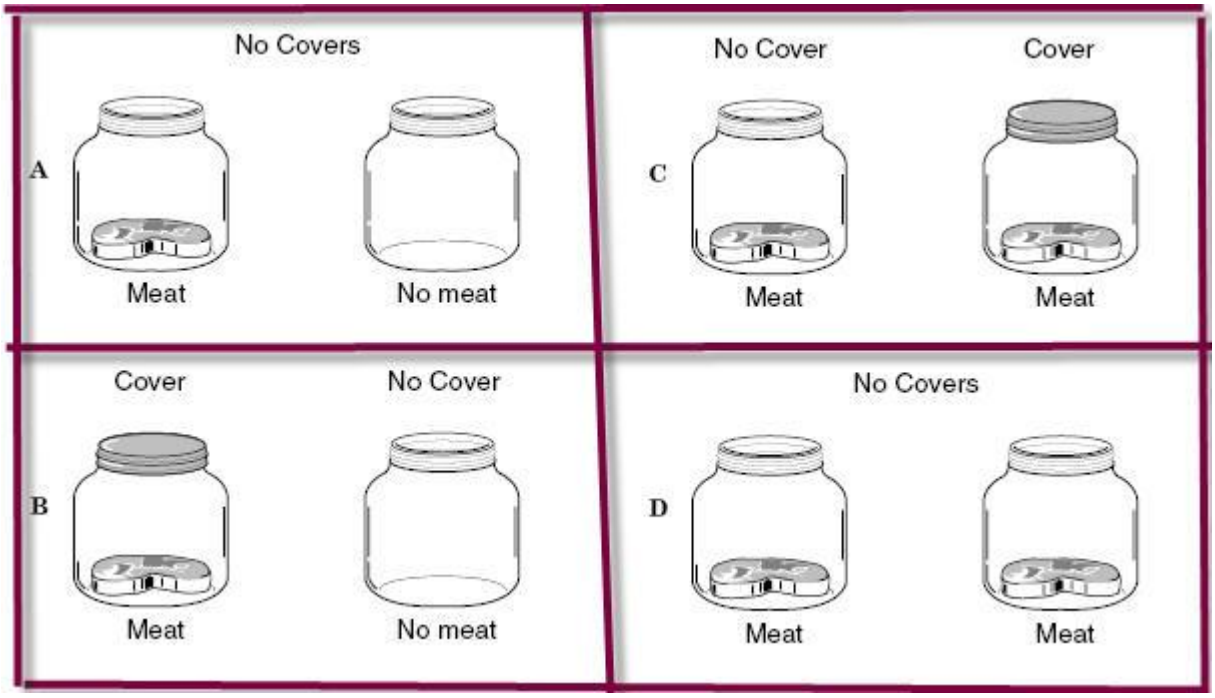
5. (2006-19) The results of Pasteur's experiment helped Pasteur to — (1 point)



   - a. isolate the virus responsible for smallpox
   - **b. reject the theory of spontaneous generation**
   - c. convince people to cover food
   - d. produce a vaccine against rabies

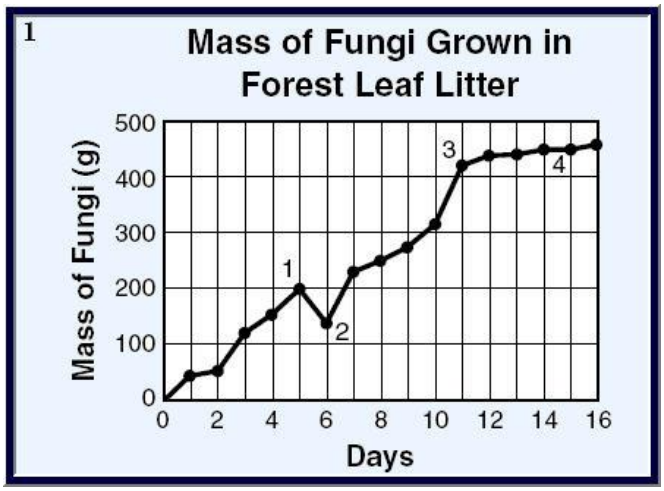
6. (2006-17) A student's experiment showed that earthworms move away from light. This statement should be classified as —
   - a. an inference
   - b. a prediction
   - c. a hypothesis
   - **d. a conclusion**

7. (2001-14) Two plant species found in a dry region of the western United States exhibit vastly different abilities to survive. Species A has very slow stem growth and few leaves but is very abundant. Species B has rapid stem growth and many leaves but is very rare. Which hypothesis is most likely supported by this information?
   - a. Flower size and color may give species B an advantage over species A.
   - b. Reduced root growth may give species A an advantage over species B.
   - c. Leaf shape may give species B an advantage over species A.
   - **d. Reduced stem growth may give species A an advantage over species B.**



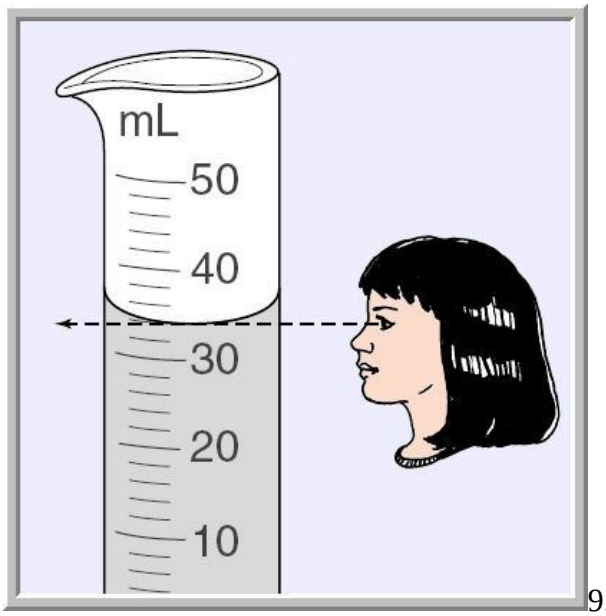
8. (2001-35) People long ago believed that maggots came from meat. In the late 1600s, Francesco Redi made the hypothesis that maggots came from flies rather than from meat. Which of these experimental designs could be used to test Redi's hypothesis? (1 point)

A B **C** D



9. (2006-1) Which data point on the graph is probably invalid?

a. 1
b. 2
c. 3
d. 4



10. 9. (2002-46) Jan consistently read the volume of liquids as shown. How would this practice impact her work? (1 point)

a. Her measurements would lack precision.
e. Her measurements would be very accurate.
b. Her measurements would be too high.
c. Her measurements would be too low for less dense liquids.

11. (2003-12) Scientists studied a flock of tundra swans that spent the winter along rivers in Virginia. The swans migrate in the spring to other locations. What would be the best way for scientists to distinguish between the birds they study in Virginia and flocks in the summer location?
    a. Capture birds in the expected summer location and dissect them to find clues that show the birds were in Virginia during the winter
    b. Take detailed photographs of winter flocks in Virginia and summer flocks in other locations and compare photographs
    c. **Capture and put coded bands on the birds in Virginia, then record the bands seen on birds in the summer location**
    d. Follow the Virginia flock by vehicle on a daily basis

12. (2003-10) An experiment was conducted to test the effectiveness of four different fertilizers on plant growth. Two grams of each fertilizer were to be diluted in 9 milliliters (mL) of water before adding to a plant. Which of the following measuring devices would introduce the least error into the measurement of the 9 mL of water?
    a. 20 mL graduated cylinder
    b. 100 mL graduated cylinder
    c. **10 mL graduated cylinder**
    d. 50 mL graduated cylinder

13. (2005-8) A biology class of 24 students decides to measure the height of each student and then calculate the average height for the class. Which of these is a possible source of error in this activity?
    a. The number of males and females in the class
    b. The difference in the ages of the students in the class
    c. The total number of students in the class
    d. **The accuracy of making and recording measurements**

14. (2002-40) A student wanted to study the effect of temperature on algae levels in a local stream. Which items are most useful for gathering data and most appropriate for communicating the results of her observations?
    a. pH strips and written observations of stream water
    b. **Test tubes, thermometers, and graphs of results**
    c. Research on the Internet and videotapes of water samples
    d. Microscopes and written descriptions of weather patterns

15. (2003-8) The picture shows some containers of different foods that were left in the open for 2 days. Which question could best be answered by this experiment? (10 points)
    a. How does a fly digest different foods?
    b. How much energy do flies get from different foods?
    c. Which food attracts flies from the greatest distance?
    d. **Which food attracts the most flies?**

16. (2003-41) A student wanted to look at plant growth in five different soil samples. He planted the same type of seeds in identical containers and left them together in full sunlight. He gave each plant the same amount of water and charted the growth of each plant stem. What is the independent variable in this experiment?
    a. Seeds
    b. **Soil**
    c. Light
    d. Container

17. (2004-33) Orchids were studied to determine if the amount of humidity affected the flowering of these plants. Which of these was the independent variable in this study? (1 point)
    a. The amount watered
    b. **The percentage of humidity**
    c. The length of time required for flowering
    d. The number of flowers on each plant

Number of Plant Seedlings	Water (mL/week)	Temperature at Which Plants Were Grown (°C)	Number of Daylight Hours	Relative Humidity	Average Number of New Leaves per Week
50	50	19	12	85	4
50	50	20	12	85	8
50	50	21	12	85	10
50	50	22	12	85	5

18. (2004-50) Which variable appears to control leaf production in these plants? (1 point)
    a. The number of daylight hours
    b. The amount of water
    c. The temperature
    d. The relative humidity
    e.

Hypothesis: More pine seeds germinate after a forest fire.

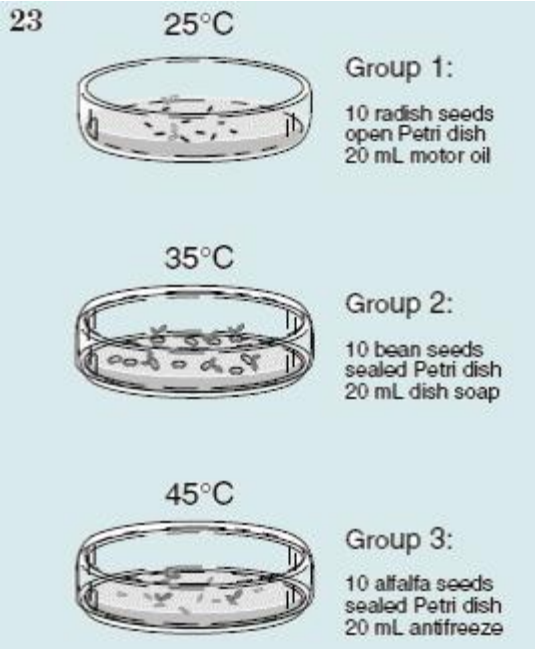
19. (2002-39) The most valid and reliable test of this hypothesis would include an experimental group of pine seeds that was recovered from a fire area and pine seeds that were — (1 point)
    a. found before a fire
    b. tolerant of fire
    c. germinated after a fire
    d. placed in a fire

20. (2001-6) A biology class wanted to develop a research project to predict the effects of a new highway on wildflower species found in the Piedmont region of Virginia. The class could best conduct such a study by sampling flowers found in the highway construction area —
    a. during the time highway construction is taking place
    b. both before and after highway construction is completed
    c. immediately after highway construction is finished
    d. one year before highway construction begins

Experimental Results

Fertilizer	Plant 1	Plant 2
1	10 mm	8 mm
2	6 mm	3 mm
3	13 mm	10 mm
4	9 mm	4 mm

21. (2002-32) The data show the growth of two bean plants over several weeks using four different fertilizers. The experimental data would be more valid if which of the following variables was included in the experiment? (1 point)
    a. Only one plant was tested.
    b. The plants were grown at variable temperatures.
    c. A fifth fertilizer was tested.
    d. A control without fertilizer was included for each plant.



22. (2004-23) In the lab setup pictured above, a student is trying to determine the effect of pollutants on the growth of three groups of seeds. The results will not be valid because the experiment has no —
    a. variable
    b. hypothesis
    c. control
    d. conclusion

23. (2001-45) Which sentence best states the importance of using control groups? (1 point)
    a. Control groups provide a method by which statistical variability can be reduced.
    b. Control groups allow comparison between subjects receiving a treatment and those receiving no treatment.
    c. Control groups eliminate the need for statistical tests and simplify calculations.
    d. Control groups eliminate the need for large sample sizes, reducing the number of measurements needed.