1. Eddie wants to compare the weather in Minnesota over the last five years to the weather in Minnesota over the last 50 years. Which kind of investigation should he use?

   - **A.** a review of existing work
   - **B.** a field study
   - **C.** development of a model
   - **D.** a controlled experiment

2. A scientist conducted an experiment to determine how acids affect a newly discovered metal. The scientist was careful to record the steps of her experiment, as well as her observations and results. What should the scientist do next?

   - **A.** Hide her results from other scientists so that they won’t steal her idea.
   - **B.** Ask the local newspaper to publish her results.
   - **C.** Report her results to the scientific community.
   - **D.** Come up with a new hypothesis that she can test on the newly discovered metal.

3. Nicolas has completed the experimental portion of the lab. Which of these should he do while he works on the analysis questions?

   - **A.** talk to his friends who are still collecting data
   - **B.** work on a new experiment he thought of
   - **C.** keep his safety goggles on
   - **D.** keep his gloves on

4. Which of the following is a lab safety device consisting of a fire-retardant material that can be thrown over a small fire to smother it?

   - **A.** a hot plate
5. In which of the following situations should safety gloves be used?

- A. when handling rough or sharp objects
- B. when handling corrosive chemicals
- C. when immersing all or part of a hand in a chemical
- D. all of these

6. Derek lives in a hot, humid climate. He has two rose bushes in pots in his yard. The rose bushes grow quickly and bloom with large, red roses. Derek moves to a cold, dry climate at the same altitude and notices that his rose bushes stop growing and do not have large blooms. He hypothesizes that the rose bushes are not receiving enough water because he is now in a dry climate. He waters them more often, but they do not improve.

Which of the following scientific questions should he ask next to find out what is wrong with his roses?

- A. Do rose bushes grow better in high or low altitudes?
- B. How much do rose bushes cost in his new area?
- C. Does temperature affect the growth of the rose bushes?
- D. Which rose bush has larger, more colorful blooms?

7. What is the most important laboratory procedure to follow before entering the lab area?

- A. Read the directions thoroughly and make sure you are familiar with safety issues.
- B. Make sure you know where your lab station is located and with whom you are working.
- C. Know the location of any stock solutions or general supplies that will be needed for the lab.
- D. Come prepared for lab with a pencil, paper, and a calculator, if necessary.
8. Loretta and her friends want to find out which of their pets can run the fastest. Which kind of scientific investigation should they use?

- A. a field study
- B. development of a model
- C. a review of existing work
- D. a controlled experiment

9. Scientific questions can be asked based on which of the following?

- A. previous research
- B. observations
- C. scientific investigation
- D. all of these

10. A prediction is a forecast about what may happen in some future situation. An inference is an explanation based on observations and background knowledge. Based on these definitions, which of the following statements is a prediction?

- A. The stove was hot because the kitchen light was on too long.
- B. A balloon popped because it was filled with too much air.
- C. Heat from the Sun caused bubbles to form on a pond surface.
- D. Adding heat will cause a balloon filled with air to expand.

11. Before Daniel performed his experiment, he hypothesized, "If I raise the temperature of a cup of water, then it will be able to dissolve more sugar."

Which of the following results would support the hypothesis?

- A. The cup with the warmest water dissolved the largest amount of sugar.
- B. None of these statements support the hypothesis.
- C. The cup with the coolest water dissolved the largest amount of sugar.
- D. The cup with the warmest water dissolved the least amount of sugar.

12. George is interested in insects and wants to do an experiment. Which of the following is a scientific question about insects that he could investigate with an experiment?
A. Do different food types affect the growth rate of beetles?

B. Why are there so many different kinds of insects in the world?

C. Do ants feel anxiety?

D. Are ladybugs prettier than beetles?

13. Which of the following may be considered a hazard in the laboratory?

A. long hair
B. loose-fitting clothing
C. open-toed shoes
D. all of these

14. Doyle learned that only one side of the Moon is ever visible from Earth. He wants to investigate how the moon moves around the Earth and to understand how this motion causes the phases of the moon. Which kind of scientific investigation should he use?

A. development of a model
B. a controlled experiment
C. a field study
D. a review of existing work

15. Joseph counted all of the different trees in the woods near his house. He made a graph showing his results.

Which of the following conclusions can Joseph draw from his graph?

A. Cedars are the tallest trees in the woods near his house.
B. Maple trees are not able to grow in the woods near his house.
C. There are more elms than oaks in the woods near his house.
D. There are 95 trees in the woods near his house.
16. Mr. Swanson's science class used a thermometer to measure the outside temperature each day throughout the school year.

They used their results to make the graph below.

Which month had an average daily temperature of around 69 degrees?
○ A. October
○ B. April
○ C. August
○ D. May

17. A scientist is observing elephants in Asia. He notices that a specific species of moth lands on the faces of the elephants. On closer observation, he sees that the moths irritate the eyes of the elephants and then drink the tears that emerge.

What scientific question could the scientist ask to explain this?
○ A. all of these
○ B. How can the moths be kept off the elephants' faces?
○ C. Do other species of moths also drink elephant tears?
○ D. What nutrients that moths need are in elephant tears?

18. Everyone in Mrs. Blaylock's science class must perform an experiment for the science fair this year. To begin this process, Mrs. Blaylock asks her students to brainstorm four different questions that they could study.

One of Mrs. Blaylock's students writes down the following questions.

1. How does the mass of a toy car affect its speed down a ramp?
2. How does the position of the Sun, moons, planets and stars affect a person's personality traits and daily behavior patterns?
3. Which type of pan - copper, aluminum, or glass - heats up the quickest?
4. Which type of chemicals can remove the cell wall of a plant cell?
Which of the above questions cannot be answered through a scientific investigation?

○ A. question 2
○ B. question 1
○ C. question 4
○ D. question 3

19. One winter, bears were spotted far outside their normal mountain habitat. Some of the proposed explanations included:

1. The number of bears in the local population had increased so much that the bears could not all fit in their usual range.
2. An invasive species destroyed some of the bears' food sources, forcing the bears to spread out in search of nourishment.
3. The winter was unusually cold and snowy, and the bears were leaving the cold mountain heights for the warmer, less snowy, lower surrounding areas.

Suppose that the local bear population is counted, and it has increased from the last recorded number. How does this affect the possible explanations for why bears are being found outside their usual habitat?

○ A. It supports the first and second explanations but disproves the third.
○ B. It supports the first explanation, but the other two are still possible.
○ C. This information is not useful in evaluating the proposed possible explanations.
○ D. It shows that the first explanation is the correct one, and the others are both wrong.

20. What is the most important laboratory procedure to follow before leaving the lab area?

○ A. Ask the teacher for permission to leave.
○ B. Record all of your results in your lab notebook.
○ C. Wash your hands thoroughly with soap and water.
○ D. Make sure that rulers and thermometers are put away.