Scientific Method and Experiment Design

Choose one answer per question. Circle A, B, C, or D.

1. Which lab note records quantitative data?
   A. The spinner turned 18 times.
   B. The paper looked glossy.
   C. The spinner made a faint hum.
   D. The air smelled smoky.

2. Which idea can a class test by measuring salt dissolving in water?
   A. Salt is the best material in science.
   B. Warm water has the most beautiful color.
   C. Salt dissolves faster in warmer water.
   D. Dissolving salt looks more interesting than ice.

3. A student changes the height of a ramp and records how far a toy car rolls past its end. What is the dependent variable?
   A. Height of the ramp
   B. Distance the car rolls
   C. Type of toy car
   D. Surface below the ramp

4. A group tests a flower preservative by adding it to the water for one set of identical cut flowers. What should the comparison flowers receive?
   A. Preservative in warmer water
   B. Preservative at double strength
   C. Plain water in a much smaller vase
   D. The same amount of plain water

5. Which note reports an observation from a paper towel test without explaining why it happened?
   A. Towel A absorbed more because its fibers were thicker.
   B. Towel A absorbed 14 mL of water.
   C. Towel A performed worse because it had fewer pores.
   D. Towel A must have been more expensive to make.

6. A team asks whether adding a paper clip changes how long a paper helicopter stays in the air. Which test isolates the clip?

A. Drop matching models with and without a clip from the same height.
B. Drop a clipped model from a higher shelf than an unclipped model.
C. Drop a clipped wide model and an unclipped narrow model from the same height.
D. Drop a clipped model indoors and an unclipped model outside.

7. Three timed drops of an identical model take 1.9, 2.1 and 2.3 seconds. What can the three times show that the middle time alone cannot?

A. Which design would always finish first
B. How the model would fall outdoors
C. Whether the stopwatch read exactly right
D. How much the times varied

8. A survey finds students who own binoculars report seeing more bird species. Which claim fits this evidence?

A. More species in an area always cause students to buy binoculars.
B. Buying binoculars will make every student see more species.
C. Binocular ownership and reported sightings were associated.
D. Time outdoors cannot affect the number of species seen.

9. A museum tests two signs for the same exhibit. Which procedure randomly assigns visitors to the signs?

A. Use a random number to choose which sign each visitor sees.
B. Let visitors pick the sign they prefer.
C. Show one sign to everyone before noon and the other after noon.
D. Choose the sign according to the visitor’s age.

10. Batter A is baked in a metal pan and batter B in a glass pan. The cakes rise to different heights. What makes the cause unclear?

A. The cooks measured both cakes.
B. The groups each had a pan.
C. Cake height was the outcome.
D. Batter recipe and pan material changed together.

11. Judges score photos produced by two camera settings. Which step reduces the chance that expected results influence a judge’s score?

A. Ask each photographer to rate only their own pictures.
B. Show the judges which setting the team expects to win.
C. Label the photos with codes that hide the settings.
D. Give each judge photos from only the setting they favor.

12. A 100 g reference mass gives readings of 104.9 g, 105.0 g and 105.1 g. How should those readings be described?

A. Accurate but imprecise
B. Precise but inaccurate
C. Both accurate and precise
D. Neither accurate nor precise

13. A class reports that one wheel design rolls farther. Which follow-up is an independent replication attempt?

A. The authors publish a copy of their original data table.
B. A classmate recalculates the average using the original measurements.
C. A teacher redraws the original graph at a different scale.
D. Another class builds comparable wheels and gathers its own measurements.

14. A teacher recruits volunteers from one science club, then randomly assigns them to two study methods. Which limitation remains?

A. The volunteers may not represent all students.
B. Students chose which study method they received.
C. The two groups cannot be compared at all.
D. The volunteers must represent every school equally.

15. Identical water bowls are randomly assigned to be covered or uncovered. After a week in the same room, covered bowls have more water left on average. What conclusion fits best?

A. The experiment established that room temperature never affects water loss.
B. Covers prevent all water loss in every room.
C. The result supports an effect of the cover in this setup.
D. The result shows that each bowl lost the same amount of water.