1. **Technology has influenced scientific research in the past and present. Which of these BEST describes how technology has made a difference in the way scientific research is conducted today as compared with the past**?
2. Scientists are now based in more countries than they were in the past.
3. Scientists were more curious and worked harder in the past than they do today.
4. Scientists today have access to more information than past scientists because of computers.
5. Scientists used to conduct more complex experiments than scientists do today because of better schools.

**2. Mr. Bell drove his car up a hill at a constant velocity. How did the potential and kinetic energies of the car change as he drove up the hill?**

1. Potential energy increased, but kinetic energy remained the same.
2. Kinetic energy increased, but potential energy remained the same.
3. Potential energy decreased, but kinetic energy remained the same.
4. Kinetic energy decreased, but potential energy remained the same.

**3. A chemist is developing a new ink. Which test result MOST LIKELY would cause the chemist to recommend that the formula of the ink be completely redesigned?**

1. The ink is toxic.
2. The ink dries slowly.
3. The ink stains the skin.
4. The ink dissolves in water.

**4. Man-made systems can transform energy from one form to another as they perform functions. Which system transforms electric energy into kinetic and potential energy?**

1. Toaster
2. Solar cell
3. Moving fan
4. Glowing bulb

**5. Shira was riding in a car at night for several hours. When the car finally stopped, Shira touched the hood of the car and noticed it was very hot. Which statement BEST explains why the hood of the car was hot.**

1. The energy of the fuel for the car turned into heat.
2. The friction of the wheels caused the hood to heat up.
3. The heat from the Moon was absorbed by the hood of the car.
4. The friction between the hood of the car and the air heated the car.

**6. Simon is studying the effect of different media on the speed of sound. Which of these describes the BEST design for Simone’s experiment?**

1. Measure the speed of sound from the same source through different media.
2. Measure the speed of sound from different sources through different media.
3. Measure the speed of sound from the same source through the same medium.
4. Measure the speed of sound from different sources through the same medium.

**7. Mario conducted an experiment to see which type of paper makes the best paper airplane. He made the following notes in his science journal.**

1. The construction paper works best.
2. The computer paper flew 20 feet.
3. The red paper looked best.

d) The tissue paper landed in 10 seconds.

**8. Zach wants to test his hypothesis that tropical plants grow faster at higher temperatures. Which method is the BEST way to conduct this experiment?**

1. Grow four plants of the same variety at the same temperature.
2. Grow four plants of different varieties at the same temperature.
3. Grow four plants of the same variety at four different temperatures.
4. Grow four plants of different varieties at four different temperatures.

**9. A scientist developed an idea that explained how people became sick with a new disease. At first, his idea fit all the data available. Later, more was learned about this disease, and his idea no longer fit the data. What should the scientist do?**

1. Try to come up with a new idea that fits all the data.
2. Ignore the new data because it does not fit with his idea.
3. Do more experiments and publish only the results that agree with his idea.
4. Argue that the scientists who published the new data must be wrong because their new data does not fit his idea.

**10. The middle school science teacher organized a game teaching her students to follow directions. These are the instructions:**

**Walk at a 90-degree angle from the front door of the school until you come to a big pine tree. Ten meters from the pine tree you will find a box containing the next instruction.**

**What additional information do the students need to find the box?**

1. The size of the box
2. The distance to the tree
3. The velocity at which to walk
4. The direction to walk from the tree

**11. A company conducted an experiment to determine if one of its products is safe. Its study found that the product was safe, but a group of scientists repeated the study anyway. What is the MAIN reason that scientists would want to repeat the study?**

1. They think that the company may have shown bias in its study.
2. They think the company is unable to make healthy products.
3. They think that companies are unable to conduct studies correctly.
4. They think that they can get results they want if they repeat the study enough times.

**12. A rock falls from the top of a cliff. What happens to most of the rock’s energy when it lands?**

1. It is destroyed.
2. It turns into matter.
3. It is transferred to the air.
4. It is transferred to the ground.

**13. The map below shows the relative locations of points A, B, and C. Mr. Lee walked 5 units east and 1 unit south.**



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | B  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | C  |  |  |
|  |  |  |  |  |  |  |  |  |  |

Mr. Lee could have walked from

1. Point A to point B
2. Point B to point A
3. Point B to point C
4. Point C to point B

**14. Andrew runs a mile on a cool autumn morning. At the end of his run, he is hot and sweating. Which statement BEST explains why he feels hot soon after he stops running?**

1. His body is absorbing heat from the environment.
2. His body is absorbing heat reflected from the sidewalk.
3. Some chemical energy of his body is converted to heat.
4. Some electrical energy of his body is converted to heat.

**15. Benji wants to evaluate the effectiveness of a new type of towel at wiping up spills. Which factors would be the MOST relevant for him to consider?**

1. Price per towel and softness of the towels
2. Number of towels per roll and the decorations on the towels
3. Size of each towel and the ease of tearing each towel off the roll
4. Absorbency of each towel and the tendency to fall apart when wet

**16. A drug company made a lot of money selling a certain medicine. Some people claimed that the medication had dangerous side effects. The drug company conducted a study and published results asserting that the medicine is safe. Which event would BEST contribute to the safe use of the medication?**

1. People continue taking the medication because the study has proven it to be safe.
2. People stop taking the medication because the drug company is lying about its being safe.
3. Other scientists find out if the scientists at the drug company are reliable, honest people.
4. Other scientists independently review the study procedures and data to see if they come to the same conclusions.

**17. A boat is off the coast from King Harbor. Each of the statements below contains accurate information about the boat’s position. Which statement BEST defines the position of the boat?**

1. ½ hour west of the harbor
2. ½ hour west of the California coastline
3. 12 kilometers west of the harbor
4. 12 kilometers west of the California coastline

**18. Jose likes to paddle his canoe on a river that runs through the state park. How does Newton’s third law of motion apply as he paddles the canoe?**

1. The canoe moves forward because of the gravitational force.
2. The canoe moves forward because of the buoyancy of the boat.
3. The canoe moves forward when the water is pushed forward.
4. The canoe moves forward when the water is pushed backward.

**19. A scientist’s experiment tested the effect of pollution on the water quality of a lake. After the experiment was completed, the scientist made the following statement:**

**“The water quality of the lake will be improved by at least 23% after the new water treatment plant is constructed”**

**Which term BEST describes this type of statement?**

1. Inference
2. Observation
3. Prediction
4. Summary

**20. In the early 19th century, atoms were thought to be the smallest physical particles. Advancements in technology have shown that atoms contain smaller particles, such as electrons. Which of these is the BEST conclusion about scientific theories?**

1. New scientific theories can improve on existing theories.
2. Scientific theories generally take hundreds of years to become correct.
3. Scientific theories are always misunderstood when they are first made.
4. New scientific discoveries always prove that existing theories are incorrect.

**21. A 1-kg object is lying on the ground. A force of 1 N is applied to the side of the object. How will the motion of the object change?**

1. The object will not move by a 1-N force.
2. The object will move then return to the same spot.
3. The object will accelerate in the direction of the applied force.
4. The object will decelerate in the direction of the applied force.

**22. Jamie is making a list of different systems that can convert mechanical energy into electrical energy. Which system should be included?**

1. Motor
2. Windmill
3. Battery charger
4. Incandescent bulb

**23. When a train nears the station, the engineer applies the brake to stop the train. What happens to MOST of the train’s energy as it comes to a stop?**

1. It turns into sound energy
2. It turns into thermal energy
3. It turns into chemical energy
4. It turns into mechanical energy

**24. A ball is thrown up into the air. It reaches its highest point, B, and then comes back to the ground.**

**If air resistance is not considered, which of these correctly represents the relationships among the energies at point A, B, and C along the path of the ball?**

 B

AC

1. Kinetic energy at A 🡪 potential energy at B 🡪 kinetic energy at C
2. Potential energy at A 🡪 kinetic energy at B 🡪 potential energy at C
3. potential energy at A 🡪 mechanical energy at B 🡪 kinetic energy at C
4. potential energy at B 🡪 mechanical energy at C 🡪 kinetic energy at A

**25. An engineer in the United States needs a new type of plastic for her project. It was suggested that she contact several different scientists from all over the world and ask them if they can assist with the project. What is the MOST LIKELY reason this suggestion was made?**

1. Scientists will solve problems only when asked by engineers.
2. Scientists have to work in groups to solve engineering problems.
3. Scientists can solve problems only if they work in teams of four or more.
4. Scientists from different backgrounds contribute to solve scientific problems.

**26. As part of a study of tadpole behavior, Cindy wants to see how the water temperature of a pond changes during the day. When should Cindy measure the water temperature to get the MOST useful set of data?**

1. At random times during the day.
2. Once an hour from sunrise to sunset
3. One time each at sunrise, noon, and sunset
4. Every five minutes during the hottest part of the day

**27. A moth is traveling west when a sudden breeze comes from the north, as shown in the diagram below. What MOST LIKELY will happen to the moth?**

Wind from North

1. The moth will stop
2. The moth will slow down
3. The moth will change direction
4. The moth will fall to the ground

Direction of Travel

**28. An electronics company has designed a new type of MP3 player. Before the company can release the player, the aesthetic value of the player must be reviewed. Which part of the player would the company MOST want to see designed with aesthetics in mind?**

1. The case
2. The battery
3. The hard drive
4. The memory chip

**29. Describing an environment based on the five senses is BEST defined by which term?**

1. Hypothesis
2. Inference
3. Observation
4. Prediction

**30. During an archery competition, an archer releases an arrow from a stretched bow. Which energy transformation takes place during this action?**

1. Kinetic energy changes to potential energy
2. Potential energy changes to kinetic energy
3. Electrical energy changes to potential energy
4. Mechanical energy changes to kinetic energy