5th Grade Forces and Motion Assessment

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A student observes that leaves appear on neighborhood trees every spring. What is the first step needed to scientifically investigate this phenomena?

A. Gather measurement tools

B. Generate questions

C. Make a graph or table

D. Record data

2. When students plucked guitar strings of different widths, each string created a different pitch. The string with the smallest width produced the highest pitch. The string with the largest width produced the lowest pitch.

What would be an appropriate scientific question based on this observation?

A. How does changing material affect sound?

B. What happens when sound hits a barrier?

C. Which objects will produce sound waves?

D. Why doesn’t sound travel through a vacuum?

3. A student is conducting a scientific investigation examining how temperature affects the growth rate of bean plants. All variables except for temperature were controlled. The charts below represent the data collected.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Plant A | Day 1 | Day5 | Day 10 | Day 15 | Day 20 |
| Degrees Celsius  | 25 | 25 | 25 | 25 | 25 |
| Growth | 6cm | 10cm | 16cm | 22cm | 30cm |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Plant B | Day 1 | Day5 | Day 10 | Day 15 | Day 20 |
| Degrees Celsius | 20 | 20 | 20 | 20 | 20 |
| Growth | 6cm | 8cm | 13cm | 17cm | 23cm |

What conclusion is supported by this data?

A. Temperature change does not affect the growth rate of bean plants.

B. A temperature of 25 degrees Celsius in Plant A produces an increased growth rate over Plant B.

C. A temperature of 20 degrees Celsius in Plant B produces an increased growth rate over Plant A.

D. Both bean plants increased in length so temperature does not affect the growth rate of plants.

4. A student is conducting a scientific investigation examining how temperature affects the growth rate of bean plants. The student decides the following factors (sunlight, nutrients, temperature, water) are necessary to conduct the investigation. Which variables should the student control in order to get accurate results?

A. Sunlight and water

B. Nutrients and temperature

C. Nutrients, temperature, water

D. Sunlight, nutrients, water

5. Which process do scientists begin with first in a scientific investigation?

A. Data

B. Conclusion

C. Prediction

D. Question

6. A student uses a toy car and ramp to investigate how surface affects the speed of a rolling object. What should the student intentionally change when doing this experiment?

A. The color of the toy car

B. The distance the toy car travels

C. The material on which the toy car rolls

D. The weight of the toy car

7. What statement would make a good hypothesis for a scientific experiment?

A. Do dogs run faster than cats?

B. Salt water boils quicker than tap water.

C. I think apples are the healthiest snack.

D. Why are there so many different trees?

8. A student is designing an experiment to find out which type of ball will roll the fastest, a golf ball or a basketball. What variable should be controlled and not allowed to vary in this experiment?

A. Brand of the golf ball or basketball

B. Color of the ball

C. Direction the ball is being rolled

D. Texture of the rolling surface

9. Which two tools should be used together to measure speed?

A. Balance and measuring tape

B. Clock and a scale

C. Meter stick and stopwatch

D. Ruler and graduated cylinder

10. Which tool measures mass?

A. Balance

B. Measuring Tape

C. Spring Scale

D. Stopwatch

11. You have planted three trees in your backyard. One tree is in full sun, one in partial sun, and one completely in a shaded area. To track what tree is growing the fastest, what unit will you use to measure the height of the trees?

A. Centimeter

B. Kilogram

C. Kilometer

D. Seconds

12. The chart shows the number of days needed to sprout a bean seed in different temperatures.

|  |  |
| --- | --- |
| Temperature in Fahrenheit  | Number of Days to Sprout |
| 60 | 12 |
| 65 | 9 |
| 70 | 5 |

Use the data from the table to make the following prediction: How many days will it take for a bean seed to sprout in 75 degrees Fahrenheit?

A. 5 days

B. 9 days

C. Less than 5 days

D. More than 12 days

13. Your class has been investigating the effects of physical activity on the body’s pulse rate. The following findings were the result of your investigation:

|  |  |
| --- | --- |
| Minutes of Exercise: | Pulse Rate: |
| 1 | 50 |
| 5 | 72 |
| 10 | 94 |

Which line graph represents this information?

A.

Time (min)

Pulse rate

B.

Pulse rate

Time (min)

C.

Time (min)

Pulse rate

14. The table below contains results of an experiment testing which object would travel the farthest when sliding down a ramp.

|  |  |
| --- | --- |
| Object | Distance (cm) |
| Calculator | 62cm |
| Checker | 53 cm |
| Pop cap | 49 cm |
| Quarter | 88 cm |

Which object had the least amount of friction while sliding down the ramp?

A. Calculator

B. Checker

C. Pop cap

D. Quarter

15. A group was testing how sail size on their toy boat affected the distance it travelled. Their results are below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sail | Area of Sail (in sq cm) | DistanceTrial 1 (cm) | DistanceTrial 2 (cm) | DistanceTrial 3 (cm) | Average Distance (cm) |
| Sail 1 | 56 | 28 | 34 | 30 | 31 |
| Sail 2 | 104 | 112 | 205 | 157 | 158 |
| Sail 3 | 168 | 10 | 11 | 10 | 10 |

What conclusion can be drawn from the group’s data?

A. A mid-sized sail will travel the greatest distance.

B. Small sails travel the greatest distance

C. The larger the sail, the greater the distance

D. Different forces were applied to the sails

16. Which describes a non-contact force?

A. A foot kicking a soccer ball

B. Bat hitting a baseball

C. Friction between tires and road

D. Magnetic train tracks

17. A class planted bean seeds and green pepper seeds in a fair experiment. The plants were observed for two weeks. The growth of the two plants was measured. The chart below includes the data gathered during this experiment.

|  |  |  |
| --- | --- | --- |
| Day | Bean Height (cm) | Green Pepper Height (cm) |
| 2 | .25 | .02 |
| 4 | .50 | .05 |
| 6 | .75 | .10 |
| 8 | 1 | .25 |
| 10 | 1.75 | .50 |
| 12 | 2 | .65 |
| 14 | 2.25 | .75 |

What can be concluded from this data?

A. Bean seeds grow taller than green pepper seeds.

B. Bean seeds will keep growing until they are 10 cm tall.

C. Green pepper seeds will be too small to plant outside.

D. Green pepper seeds need to be planted earlier.

18. Which describes a contact force?

A. A magnet pulling a paper clip towards it

B. Air pushing a sailboat

C. An electrical field

D. Gravity pulling down a baseball

19. Which of the following is an example of movement caused by a non-contact force?

A. A foot kicking a soccer ball

B. Paperclips being pulled toward a magnet

C. Shoes rubbing against the floor

D. Wind pushing against a kite

20. A student shoots a basketball. Which non-contact force drags the ball down as it arches towards the basket?

A. Friction between the ball and the air

B. Gravity pulling the ball towards Earth

C. The ball hitting the rim before bouncing in

D. The student pushing the ball into the air

21. A teacher asks her students to move paperclips across a flat surface using a non-contact force. Which of the following tools should students use to complete the task?

A. Blow toy

B. Magnet

C. Ruler

D. Vegetable Oil

22. A class is testing how a small flat-bottomed sailboat moves across a smooth tile floor. The diagram below represents two identical fans positioned at opposite ends of the test path.

B

A

D

C

Fan 2

Fan 1

If the sailboat starts at location B and both fans are turned on high at exactly the same time, where will the boat be located after two minutes?

A. A

B. B

C. C

D. D

23. A boy is pulling his little sister in a wagon. If his older brother comes along and they pull on the wagon together, how will this increase in force affect the motion of the wagon?

A. It will accelerate

B. It will change direction

C. It will continue unchanged

D. It will remain at rest

24. A train is moving along a track. If the forces acting on the train are balanced, how will its movement be affected?

A. Change direction

B. Continue, unchanged

C. Speed up

D. Stop

25. The diagram below represents a pulley system. There is a tennis ball attached at one end of the string and a hook that can hold washers at point A.

A

If washers, equal to the mass of the tennis ball, are attached to the hook (A), what will happen to the tennis ball?

A. It will bounce on the ground

B. It will move up

C. It will not change position

D. It will vibrate

26. The diagram below represents an “air rocket” made of a straw and a balloon. The straw is threaded through a string “track.”

Straw

String Track

Balloon

A student is testing how adding mass to the balloon will affect the rocket’s motion. He pumps the balloon four times and observes how the rocket moves, with and without an attached toy passenger. How will the rocket’s motion with the toy passenger compare to the motion without the passenger?

A. The same

B. Move faster

C. Move slower

D. Reverse direction