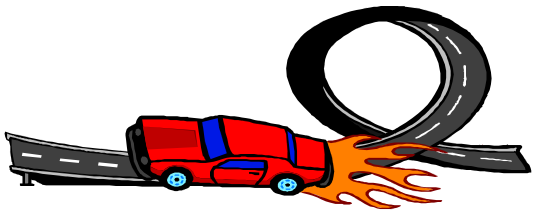
Forces Pre-Test



*Complete the following by writing **true** if the statement is correct. If the statement is false, **change** the underlined word(s) to make it correct. Write your answer on the line provided.*

1. A force is a push or pull that affects matter. — 1. ___**TRUE**_____
2. The newton is a unit used to express force measurements. — 2. ____ **TRUE** ____
3. If an object is at rest, then the forces acting on it must be unbalanced. — 3. **False/Balanced**
4. The larger the mass of an object, the larger the force needed for acceleration. — 4. __ **TRUE** _____

Complete the following statements by writing the missing word or phrase on the line provided.

5. Newton's _____**1st Law**_____ states that as long as the forces on an object balance each other, the object's motion will not change.
6. Friction causes moving objects to _____**Slow Down**_____.
7. Newton's _____**2nd Law**_____ states that force is composed of an object's mass and acceleration.
8. A measure of the amount of matter in an object is called _____**Mass** _____.
9. A force that pushes or pulls an object into a circular path is called a(n) _____**centripetal**_____ force.
10. The greater the mass of an object, the _____**Greater**_____ the gravitational force between the object and Earth.
11. Newton's _____**3rd Law** _____ states that whenever an object exerts a force on a second object, the second object exerts an equal force back on the first object.
12. The first person to identify the relationship between forces and motion was _**Sir Isaac Newton**__.
13. One newton is the force necessary to move a one _____**kilogram**_____ mass with an acceleration of one meter per second squared.
14. A barbell sitting on the floor is an example of _____**balanced**_____ forces.

Select the answer that best completes each statement.

15. An object accelerates as it falls to the ground because:
    a. no friction is present.
    b. the object is lighter than air.
    c. no force is acting on it.
    d. the force gravity is pulling on the object.
16. The amount of force acting on a moving object can be measured by determining the object's mass and:
    a. inertia.
    b. gravity.
    c. acceleration.
    d. momentum.
17. The amount of gravitational force one body exerts on another depends on the masses of the two bodies and:
    a. their state of equilibrium.
    b. their acceleration.
    c. the electric charge of the two bodies.
    d. the distance between them.

18. Which of the following statements is FALSE?
    a. Moving objects do not slow down on their own.
    b. Motion with a constant velocity is an example of balanced forces.
    c. Moving objects continue their motion until forces change.
    d. Balanced forces cause changes in motion.

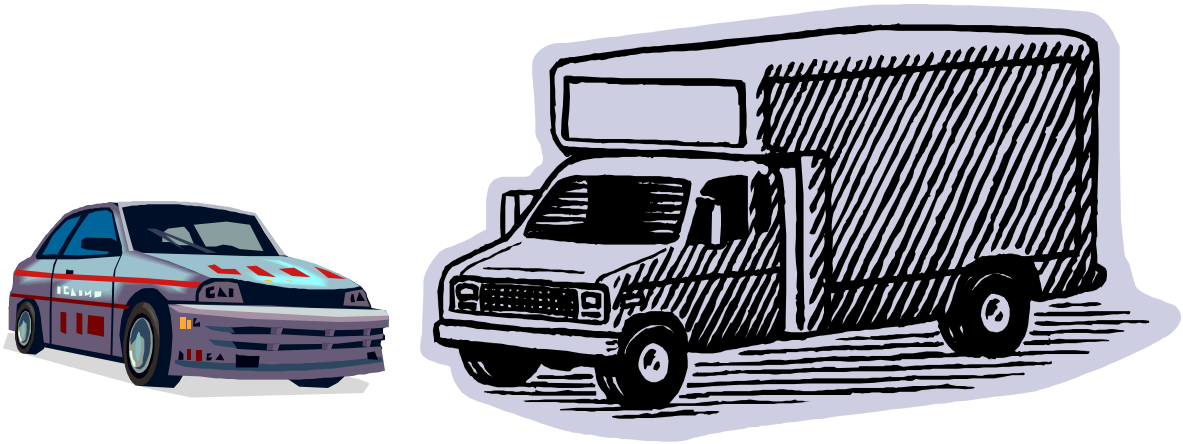
19. Friction acts:
    a. in a direction opposite to the motion of an object.
    b. to increase the speed of a moving object.
    c. to decrease the mass of a moving object.
    d. in the same direction as a moving object.

Which of Newton's Laws explains each of the following situations? Why?

20. A small car gets better gas mileage than a big car.
2nd Law, Less mass = less force necessary to accelerate

21. A space shuttle is leaving the launch pad.
3rd Law, gases push shuttle forward

22. Seatbelts protect people in car accidents.
1st law, object in motion remains in motion



23. Use the above diagram to match the following descriptions with the car, the truck, or both vehicles. Write "car", "truck", or "both" on the lines below to indicate your answer.

a. greatest mass.	a. _____**truck**_____
b. least mass.	b. _____**car**_____
c. affected by gravity	c. _____**both**_____
d. forces acting upon it are balanced	d. _____**both**_____

Answer the following questions in a complete sentence.

24. Summarize Newton's first law of motion.
Objects resist changes to their motion; An object at rest will remain at rest and an object in motion will remain in motion in a straight line and at a constant speed unless an unbalanced force affects it.

25. What is the newton used for measuring?
forces

26. Throwing, lifting, pushing, and pulling are kinds of ___**Forces**_____.

27. A force does not always make something move. An example of a force that keeps an object from moving is:
    a. a hook holding a picture in place on a wall
    b. the tracks holding a roller coaster car in a loop
    c. a bicycle rider pushing on the pedals

28. A force that acts on every object on earth all of the time is _____**gravity**_____.

29. 1 N = 1 kg x 1 __**m/sec^2**_____.

Vocabulary – Match each term with its definition.

____ 30. inertia **c**
____ 31. mass **a**
____ 32. force **d**
____ 33. unbalanced forces **e**
____ 34. balanced forces **b**

a. amount of matter in an object
b. will not change an object's motion
c. tendency to resist a change in motion
d. push or a pull that affects matter
e. can change an object's motion

35. A truck with a mass of 85 kg accelerates towards a green light at a rate of 3.5 m/s^2. What is the force applied to the truck?

297.5 N

36. A 638 kg elephant pulls a tent with a force of 1300 N. What is the acceleration of the elephant?

2.04 m/sec^2

37. A shark swims through the water with an acceleration of 3 m/s^2 and exerts a force of 230 N. What is its mass?

76.67 kg

38. The space shuttle with a mass of 50,000 kg must be accelerated to 14 m/s^2 in order to move it to a new position. How much force must the rocket motors exert?

700,000 N

39. A .8 kg bottle rocket exerts a force of 90 N when it is launched. What was its acceleration?

112.5 m/sec^2

40. How much would a 45 kg boy weigh on Earth?

441 N

41. A water balloon traveling at 2 m/s^2 hits a wall with a force of 1.25 N. What was the mass of the balloon?

0.625 kg