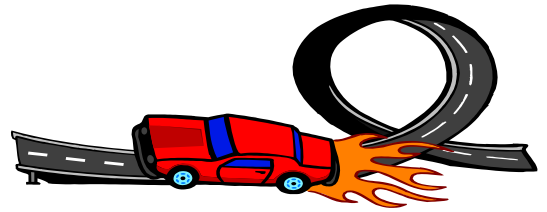


Forces Pre-Test



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. _____
2. The newton is a unit used to express force measurements. 2. _____
3. If an object is at rest, then the forces acting on it must be unbalanced. 3. _____
4. The larger the mass of an object, the larger the force needed for acceleration. 4. _____

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

5. Newton's _____ 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 _____.
7. Newton's _____ states that when an unbalanced force acts on an object, the object will accelerate in the direction that the unbalanced force points.
8. A measure of the amount of matter in an object is called _____.
9. A force that pushes or pulls an object into a circular path is called a(n) _____ force.
10. Rockets move in space due to the hot gases produced by burning _____.
11. The greater the mass of an object, the _____ the gravitational force between the object and Earth.
12. Newton's _____ states that whenever an object exerts a force on a second object, the second object exerts an equal force back on the first object.
13. The first person to identify the relationship between forces and motion was _____.
14. One newton is the force necessary to move a one _____ mass with an acceleration of one meter per second squared.
15. A barbell sitting on the floor is an example of _____ forces.

Select the answer that best completes each statement.

16. 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.
17. 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.
18. 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.

19. 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.

20. 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?

21. A small car gets better gas mileage than a big car.

22. A space shuttle is leaving the launch pad.

23. Seatbelts protect people in car accidents.



24. 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. _____ |
| b. least mass. | b. _____ |
| c. affected by gravity | c. _____ |
| d. forces acting upon it are balanced | d. _____ |

Answer the following questions in a complete sentence.

25. Summarize Newton's first law of motion.

26. What is the newton used for measuring?

27. Throwing, lifting, pushing, and pulling are kinds of _____.

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

29. A force that acts on every object on earth all of the time is _____.

30. $1 \text{ N} = 1 \text{ kg} \times 1$ _____.

Vocabulary – Match each term with its definition.

- | | |
|-----------------------------|--|
| _____ 31. inertia | a. amount of matter in an object |
| _____ 32. mass | b. will not change an object's motion |
| _____ 33. force | c. tendency to resist a change in motion |
| _____ 34. unbalanced forces | d. push or a pull that affects matter |
| _____ 35. balanced forces | e. can change an object's motion |

36. 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?

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

38. 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?

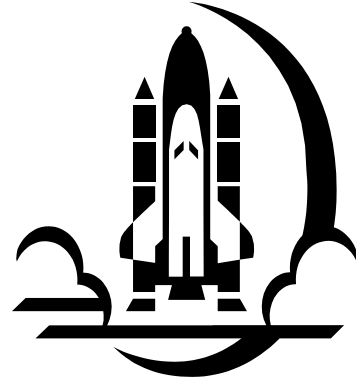
39. The space shuttle with a mass of 50,000 kg must be accelerated to 14 m/s^2 in order to move it to a new position. How much force must the rocket motors exert?

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

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

42. 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?

Study Guide Unit 5 - Forces



1. What is a force?
2. What are some examples of forces?
3. What characteristics do all forces share?
4. What unit is used to measure forces?
5. What is one Newton?
6. What tool is used to measure force?
7. What is "Net Force"?
8. What is a balanced force?
9. What does a balanced force produce?
10. What is an unbalanced force?
11. What does an unbalanced force produce?
12. Give examples of balanced and unbalanced forces on objects.
13. What forces are applied to all objects on Earth?
14. What is friction?
15. What factors can increase friction?
16. In what direction does friction always act?
17. Name and describe all four types of friction
18. Give an example of each type of friction
19. What is Newton's first law? Explain it in your own words.
20. Define inertia
21. Explain how seatbelts save people using inertia.
22. What is Newton's second law? Explain it in your own words.
23. Give an example of Newton's second law in action.
24. If a 2 kg rocket needs to be moving with an acceleration of 10 m/sec/sec to get out of the launch tube, would 15 newtons be enough force?
25. What is Newton's third law? Explain it in your own words.
26. Give an example of Newton's third law in action.
27. Use Newton's third law to describe how a rocket blasts off.

