Name: _____

Physical Science Chapter 12 Practice Sheet

Answer the following questions.

1. A force of 6.0 N is applied horizontally to a 3.0 kg crate initially at rest on a horizontal frictionless surface. After the crate if pushed for 1.5 seconds, it has a velocity of 3.0 m/s. Does this support Newton's second law of motion, that force equals mass times acceleration? Explain.

   a. Yes, because the acceleration of the crate is 2.0 m/s^2.
   b. Yes, because the mass and the velocity of the crate are equal.
   c. No, because the acceleration of the crate is 2.0 m/s^2.
   d. No, because the mass and the velocity of the crate are equal.

2. A man is pushing a baby stroller. Compared to the magnitude of the force exerted on the stroller by the man, the magnitude of the force exerted on the man by the stroller is

   a. larger.
   b. zero.
   c. smaller, but greater than zero.
   d. the same.

3. Three carts with different masses are pushed along a track. The results of the experiment are show below. Choose the pair of experiments that BEST support the claim that heavier objects require a greater force to accelerate.

   a. Experiments 1 and 2
   b. Experiments 1 and 3
   c. Experiments 2 and 4
   d. Experiments 3 and 4

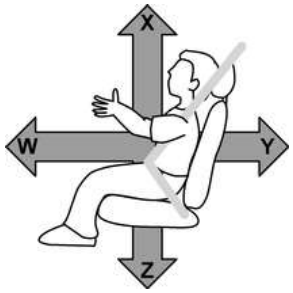
Experiment	Force (N)	Mass (kg)	Acceleration (m/s^2)
1	0.75	0.50	1.5
2	0.50	0.50	1.0
3	3.0	2.0	1.5
4	0.75	0.25	3.0

4. For two forces to be balanced, what must be true?
   a. They must be opposite in direction and equal in magnitude.
   b. They must be opposite in direction and different in magnitude.
   c. They must be acting in the same direction and equal in magnitude.
   d. They must be acting in the same direction and different in magnitude.

5. Compared to the inertia of a 0.10-kilogram steel ball, the inertia of a 0.20-kilogram Styrofoam ball is

   a. one-half as much.
   b. twice as much.
   c. the same.
   d. four times are much.

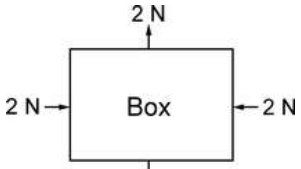
6. The diagram below shows a man fastened in a car seat while driving. Based on Newton's law of action-reaction, which arrow represents the force that the seat belt would exert on the man's body if he had to slam on the brakes?



a. W
b. X
c. Y
d. Z

7. Scientists have sent an unmanned space vehicle to Mars to investigate the properties of the planet. Mars' gravitational field is 38% the strength of Earth's gravitational field. How will the weight and mass of the vehicle change on Mars?
   a. The mass will increase, and the weight will increase.
   b. The mass will decrease, and the weight will decrease.
   c. The mass will remain the same, and the weight will decrease.
   d. The mass will increase, and the weight will remain the same.

8. Which of the following represents a box in equilibrium?

a.


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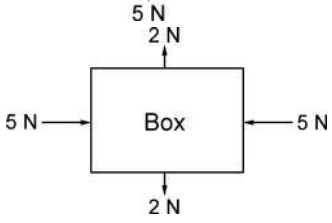

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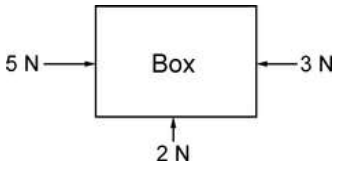
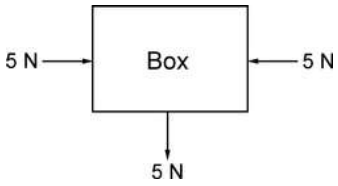
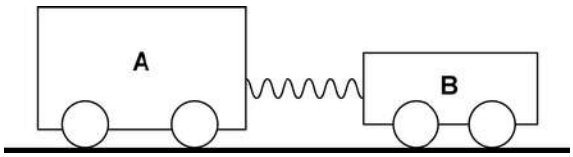


d.


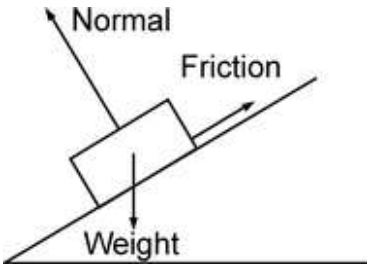
9. Two carts, A and B, are joined by a compressed spring, as shown in the diagram below. The mass of cart A is twice that of cart B. Which of the following statements BEST describes what will happen when the spring is released?



   a. Both carts will have the same change in velocity.
   b. Cart B will have the greater change in velocity.
   c. Neither cart will experience a change in velocity.
   d. Cart A will have the greater change in velocity.

10. If the net force acting on an object is double, what happens to the acceleration of the object?
    a. It is halved.
    b. It is quadrupled.
    c. It is doubled.
    d. It is unchanged.

11. Three forces act on a box on an inclined plane as shown in the diagram. If the box is at rest, the net force acting on it is equal to
    a. zero.
    b. friction.
    c. the normal force.
    d. the weight.



12. A boat with a jet engine demonstrates Newton's law of action-reaction. Why is this true?
    a. As the boat expels exhaust backward, the boat moves forward.
    b. As the boat expels exhaust backward and forward, the boat remains stationary.
    c. As the boat expels exhaust forward, the boat remains stationary.
    d. As the boat expels exhaust forward, the boat moves forward.

13. If a freely falling object were somehow equipped with a speedometer, how much would its speed reading increase each second?
    a. about 5 m/s
    b. a variable amount
    c. about 10 m/s
    d. a rate that depends on its initial speed

14. Which term refers to the tendency of an object to maintain its state of motion?
    a. acceleration
    b. velocity
    c. force
    d. inertia

15. The picture below shows two forces being applied to a box on a frictionless surface. What is the mass of the box if it is accelerating at 2 m/s^2?
    a. 2 kg
    b. 6 kg
    c. 8 kg
    d. 14 kg