Student Name: _____ Date: _____

Module Test: Forces and Motion

1) Knowing an object's position requires which of the following?

- **A)** speed
- **B)** time
- **C)** displacement
- **D)** reference point

2) Two people are pulling on a chain in opposite directions with forces of 500 N and 600 N. The forces would best be described as _____.

- **A)** balanced forces
- **B)** unbalanced forces
- **C)** action-reaction forces
- **D)** gravitational forces

3) If someone is walking on a moving bus, name two reasonable reference points you might use to describe his or her motion.

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Module Test: Forces and Motion

4) You push on a crate with a force of 10 N to the right, and your friend pushes on the crate with a force of 25 N to the left. Describe and explain the motion of the crate.

5) During a game of bowling, which of the following describe the ball's motion?

- ☐ **A)** The ball is accelerated while it is pushed by the student's hand due to an unbalanced force.
- ☐ **B)** The ball slows down as it rolls because friction exerts an unbalanced force.
- ☐ **C)** The ball is accelerated while it is held in the student's hand due to balanced forces.
- ☐ **D)** The ball does not change its motion as it rolls because of the balanced force provided by friction.
- ☐ **E)** The ball does not change its motion while it is held in the student's hand due to balanced forces.

6) A test booklet is sitting at rest on a desk. Compared to the force of the booklet on the desk, the force of the desk on the booklet is the same. _____

- ○ True
- ○ False

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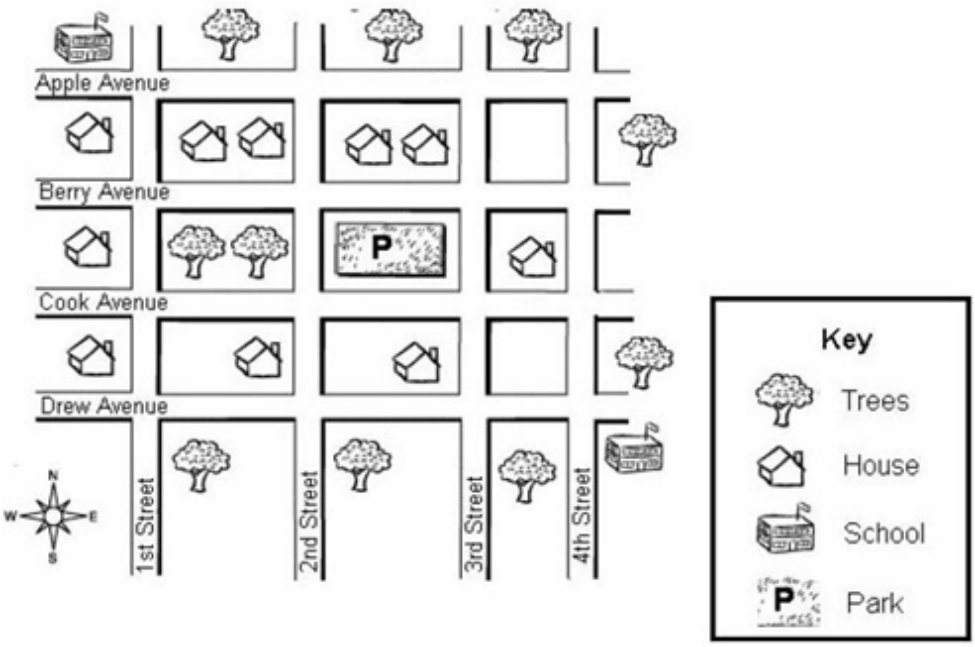
7) The _____ can change when describing motion. It is just the chosen starting point.

- **A)** displacement
- **B)** distance
- **C)** reference point
- **D)** speed

8) When two objects interact through the gravitational force between them, the more massive one has a lower _____ than the less massive object.

9) *Use the image shown below.*



What is shown two blocks west of the park?

- **A)** two trees
- **B)** a house
- **C)** a school
- **D)** nothing

Module Test: Forces and Motion

10) The acceleration of an object is always in the direction of the net force acting on it.
_____

- ○ True
- ○ False

11) Which of the following is NOT true of gravitational force?

- ○ **A)** noncontact
- ○ **B)** depends on mass
- ○ **C)** depends on speed
- ○ **D)** distance

12) A swimmer swims 20 m in 40 s. The swimmer's average speed is _____ m/s.

13) A student walks 20 m north, 10 m south, and 3 m north. To have a displacement of 0 m, the student should walk _____ m toward the _____.

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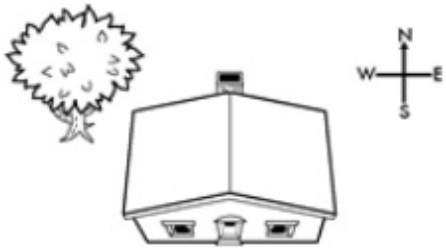
14) A dog buried a bone in the yard just north of the house. Where is the bone located with respect to the tree?



- **A)** north of the tree
- **B)** east of the tree
- **C)** west of the tree
- **D)** south of the tree

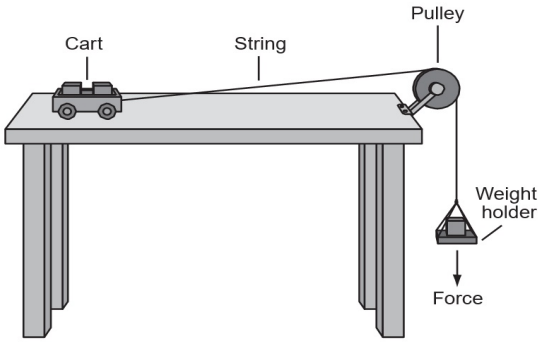
15) An engineer determines the safety of a car design by conducting a collision test. During a collision test, a car is crashed into a solid wall. Then the engineer measures the force of the collision on the car and compares that to the damage done to the car.
Compare the force of the collision on the wall with the force of the collision on the car. Use Newton's third law of motion to support your answer.

Module Test: Forces and Motion

16) Jennifer's thinking is not supported by Newton's _____ law of motion because during the collision, the force on her bumper car must be _____ in size and _____ in direction to the force on her father's bumper car.

Module Test: Forces and Motion

17) A group of students is investigating how a force applied to an object affects the motion of that object. The diagram shows the setup for the investigation. To create a force, the students add a weight to the weight holder and observe whether the cart moves. The students repeat this step five times, using a different amount of weight each time.



a. Identify the independent and dependent variables of this investigation.

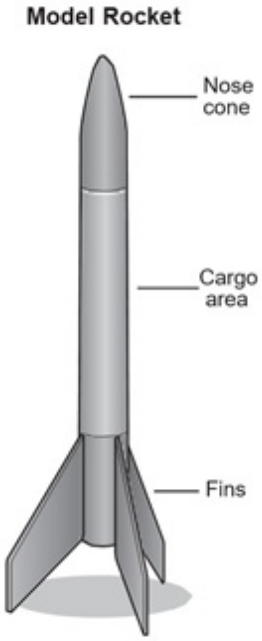
b. Describe two forces acting on the cart. Include the direction of the force in your description.

c. Make a claim about the forces on the cart when the cart does not move. Support your claim using Newton's laws of motion.

Module Test: Forces and Motion

Module Test: Forces and Motion

18) An educational-supply company developed a model rocket to sell to school districts. Science teachers use the rocket to help students investigate motion. The rocket has a cargo area designed to hold water. Water can be added to or removed from the cargo area.



When launched with a cargo area that is half-filled, the rocket is designed to reach a maximum vertical height of 10 meters. A school district wants to use rockets that can reach only 7 meters in vertical height. Which changes to the design of the rocket should be investigated to reduce the maximum height to 7 meters?

- ☐ **A)** using a rocket engine that provides more force
- ☐ **B)** using a rocket engine that provides less force
- ☐ **C)** adding more water to the cargo area
- ☐ **D)** removing water from the cargo area

Module Test: Forces and Motion

19) A customer enters a grocery store with an empty shopping cart that has a mass of 20 kg. Another customer is leaving the store with a shopping cart full of groceries that has a mass of 40 kg. The two customers accidentally bump their carts together.

Eve observes the accident. She hypothesizes that the cart full of groceries applied more force to the empty cart than the empty cart applied to the full cart.

Explain whether you agree or disagree with Eve's hypothesis. Use Newton's third law of motion to support your answer.

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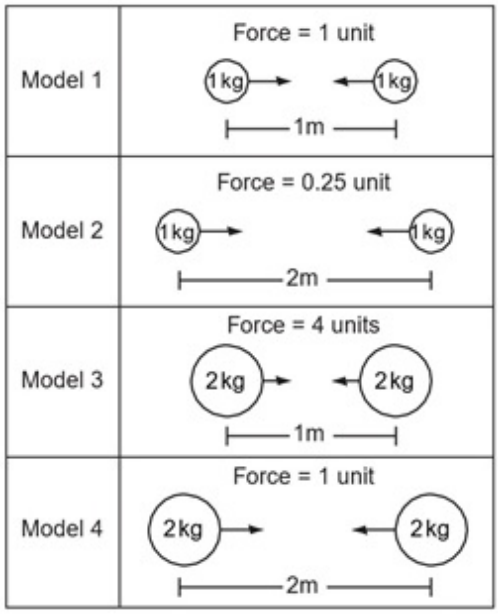
Module Test: Forces and Motion

20) Each of these four models represents the force of gravity between two objects. The masses of the objects and the distances between the objects vary. The arrows in each model indicate the direction of the force of gravity between the two objects.

Which statements provide evidence from these models to support an argument that both distance and mass affect the gravitational force between two objects?



- ☐ **A)** Models 1 and 2 provide evidence that distance affects gravitational force.
- ☐ **B)** Models 1 and 2 provide evidence that mass affects gravitational force.
- ☐ **C)** Models 1 and 3 provide evidence that mass affects gravitational force.
- ☐ **D)** Models 2 and 4 provide evidence that distance affects gravitational force.
- ☐ **E)** Models 3 and 4 provide evidence that distance affects gravitational force.
- ☐ **F)** Models 2 and 4 provide evidence that mass affects gravitational force.
- ☐ **G)** Models 2 and 3 provide evidence that mass affects gravitational force.