



Forces and Motion

Unit Test

Vocabulary and Concepts

1 A push and a pull are two examples of which of the following?

- (A) a force
- (B) a power
- (C) a law of motion
- (D) a balanced force

TEKS 5.6D

2 Which term names a force of attraction between two objects, even if they are not touching?

- (A) balanced force
- (B) gravity
- (C) friction
- (D) unbalanced force

TEKS 5.6D

3 Which of the following gives the definition of *balanced forces*?

- (A) a sudden shift in acceleration
- (B) a continuous downward force
- (C) forces on an object that are equal in size and opposite in direction
- (D) forces on an object that cause a change in motion

TEKS 5.6D

4 Which of the following terms identifies a cause of a change in motion?

- (A) weight
- (B) mass and force
- (C) balanced forces
- (D) unbalanced forces

TEKS 5.6D

5 What term identifies a force that opposes motion and acts between two objects that are touching?

- (A) balanced force
- (B) gravity
- (C) friction
- (D) unbalanced force

TEKS 5.6D

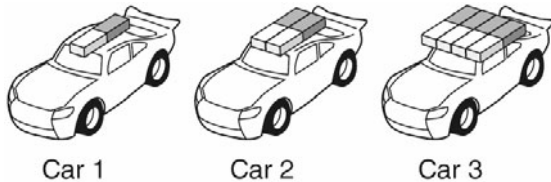
6 Four students used spring scales to measure the force needed to pull blocks made of different materials up a smooth ramp. All of the blocks moved at the same rate. The students recorded the force needed to move the different blocks: 6 N, 8 N, 7 N, and 5 N. When the students analyze this direct evidence, which of the following is a reasonable explanation they could construct for why the blocks required different amounts of force?

- (A) The blocks all had different masses.
- (B) The blocks all had the same mass but different sizes.
- (C) The blocks had the same mass, but the force of gravity changed.
- (D) Each student exerted the same force, but the friction was different.

TEKS 5.2D

Name _____ Date _____

- 7 Suri tapes batteries to three identical toy cars to give them different masses. Then, she measures how far each car rolls when she launches it from the same starting point using the same stretched rubber band. The three toy cars are pictured in the following illustration.



How will the force of the rubber band affect the cars?

- (A) Car 3 will travel the longest distance.
 (B) Car 1 will travel the shortest distance.
 (C) Car 1 will be the least affected by the force acting upon it.
 (D) Car 3 will be the least affected by the force acting upon it.

TEKS 5.2D

- 8 A spring scale measures force.



What is the force that causes the reading on the spring scale shown in the illustration?

- (A) friction (C) mass
 (B) gravity (D) weight

TEKS 5.2A

- 9 Two race cars with the same mass started moving on a race track at the same time. One car reached the finish line of the track in 15 seconds, and the other reached the finish line in 20 seconds. Why did the cars take different amounts of time to reach the finish line?

- (A) The force of gravity slowed one car, but not the other car.
 (B) The slower car did not experience any force, so it moved more slowly.
 (C) The forces on one car were balanced and on the other car unbalanced.
 (D) The engine of the faster car exerted more force than the engine of the slower car.

TEKS 5.2D

- 10 Mindy wants to investigate one variable in her experiment—the average distance that each of six friends can throw a ball. She asks friends of similar sizes and ages to throw a ball as far as possible from the same starting point. Mindy notices that one friend throws the ball much farther than the others do. She wants her results to be accurate. Which statement describes what Mindy should do?

- (A) Repeat the experiment for the person with the unusual result.
 (B) Repeat the experiment using a different friend as a replacement.
 (C) Repeat the experiment and ignore the results of the first experiment.
 (D) Repeat the experiment two more times, and find averages for each of the six throwers.

TEKS 5.2A, 5.2E

Name _____ Date _____

- 11 This spring scale is measuring the force on a block hanging from the hook.



Analyze what would happen on the scale if an identical second block were added to the hook. What would be the new reading?

- (A) 2.2 N (C) 4.4 N
(B) 2.2 g (D) 4.4 g

TEKS 5.4A

- 12 When balanced forces act on an object, the object

- (A) speeds up
(B) slows down
(C) changes its direction of motion
(D) experiences no change in motion

TEKS 5.2D

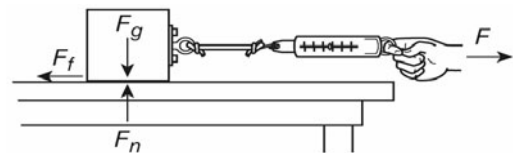
- 13 A rock is balanced on the side of a long, sloping hill. Although the rock is very heavy, a gentle push causes it to start moving down the slope. How can a small force cause a large mass to move?

- (A) The direction of the force is important but not the amount of force.
(B) The push on the rock increases the amount of friction, so the rock starts to move.
(C) The small push balances the forces that are keeping the rock in place and causes it to move.
(D) At first, the forces on the rock are balanced, but a small additional force causes them to be unbalanced.

TEKS 5.2D

- 14 Four forces are acting on the block shown in the following illustration:

- F is the applied force.
- F_f is friction.
- F_g is the gravitational force.
- F_n is the normal force—the upward push of the table on the block.



If force F is applied to the block and it does not move, which statement is true?

- (A) F and F_f are equal.
(B) F and F_g are equal.
(C) F_f is greater than F .
(D) F_g is greater than F .

TEKS 5.2D

Name _____ Date _____

- 15 The following table shows the masses of four different wooden blocks and the forces that are affecting them.

Block color	Mass (g)	Pushing force (N)	Friction (N)
red	50	24	6
green	100	24	6
blue	40	24	6
yellow	75	24	6

Which block will have the greatest acceleration?

- (A) red
- (B) blue
- (C) green
- (D) yellow

TEKS 5.2D

- 16 Which of the following is the best testable hypothesis about the effect of a force on an object's motion?

- (A) You can use a triple beam balance to measure the force applied to an object.
- (B) Objects that look heavy exert more force than other objects.
- (C) Objects will stop because of gravitational force.
- (D) The force needed to move an object decreases as the object's mass decreases.

TEKS 5.2D, 5.6D

- 17 Jane likes to play many types of sports. During the course of a week, she goes bowling and plays soccer, baseball, and volleyball. Jane thinks the bowling ball requires the most force to move. Why would it require the most force?

- (A) It has the most mass.
- (B) She has to throw it indoors.
- (C) She has to hold it in her hand.
- (D) It has the largest circumference.

TEKS 5.2D

- 18 Katie sits on the ground and rests her hands on a bowling ball in front of her. She uses all her force to push the bowling ball away from her body. Next, Katie rests her hands on a soccer ball situated in front of her at the same location. She uses all her force to push the soccer ball away from her body. How does the movement of the two balls contrast?

- (A) The soccer ball moves a greater distance because more force is acting on it.
- (B) The soccer ball moves a greater distance because it has less mass.
- (C) The bowling ball moves a greater distance because it has more mass.
- (D) The bowling ball moves a shorter distance because less force is acting on it.

TEKS 5.2D

Name _____ Date _____

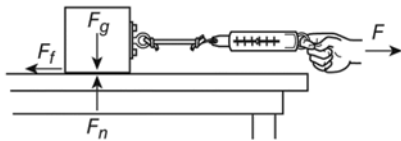
Apply Inquiry and Review the Big Idea

- 19 Explain what happens to the motion of an object when it experiences a balanced force.

- 20 Ken pulls his little brother in a wagon. Next, Ken tries to pull his dad in the wagon. He cannot move the wagon. Explain why this happens. Use the words *force* and *mass* in your answer.

TEKS 5.2D

- 21 The illustration shows an experiment Sonya is doing in which she pulls the mass to the right in the direction of the arrow labeled F .



The spring scale shows a positive reading, although the object does not move. What would be a question Sonya could ask to reach a reasonable conclusion about this experiment?

TEKS 5.2B, 5.4A

- 22 The following table shows the relationship of the forces applied to a certain object and the acceleration that results from each force. Fill in the grid to show the acceleration that is missing from column 2.

Forces (N)	Acceleration (m/sec ²)
1	0.5
2	1.0
5	
8	4.0
10	5.0

			.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	

TEKS 5.2D