

**Reporting
Category 2:
Force, Motion,
and Energy**

Reporting Category 2: 8th Grade Science Readiness Standards

Name _____

Date _____

Class/Grade _____

1 Expectation: 8.6(A)

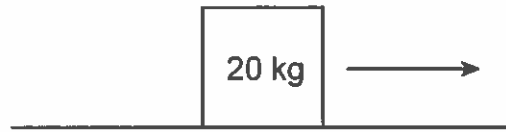
A skateboarder who weighs 70 kilograms is standing still on top of his skateboard. Suddenly, a second skateboarder bumps into him with a force of approximately 80 newtons. What is the expected acceleration in meters per second squared (m/s^2) of the skateboarder who had been standing still, to the nearest hundred?

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

Reporting Category 2: 8th Grade Science Readiness Standards

2 Expectation: 8.6(A)

The box shown below is resting on a smooth, horizontal floor.



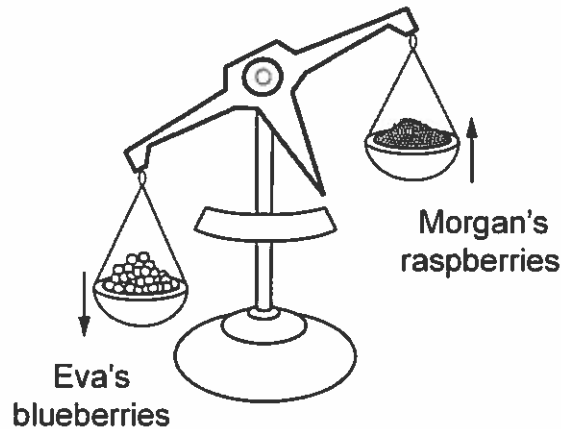
If a force of 10 newtons is used to push the box along the floor, at what rate, in m/s^2 , would the box accelerate?

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

Reporting Category 2: 8th Grade Science Readiness Standards

3 Expectation: 8.6(A)

Eva and Morgan are comparing the weights of their blueberries and raspberries on the balance shown below.



Eva's blueberries weigh slightly more than Morgan's raspberries. As a result, the left pan is moving downward and the right pan is moving upward. Three blueberries fall from the left pan as it is moving. As a result, the right pan now weighs more than the left pan. How does the motion of the balance change immediately after the blueberries fall from the left pan?

- A The right pan continues to move upward, but more quickly.
- B The left pan starts to move upward, slowly.
- C The right pan starts to move downward, quickly.
- D The left pan continues to move downward, but more slowly.

4 Expectation: 8.6(C)

A boat with a jet engine demonstrates Newton's law of action-reaction. Why is this true?

- F As the boat expels exhaust backward and forward, the boat remains stationary.
- G As the boat expels exhaust backward, the boat moves forward.
- H As the boat expels exhaust forward, the boat moves forward.
- J As the boat expels exhaust forward, the boat remains stationary.

Reporting Category 2: 8th Grade Science Readiness Standards

5 Expectation: 8.6(A)

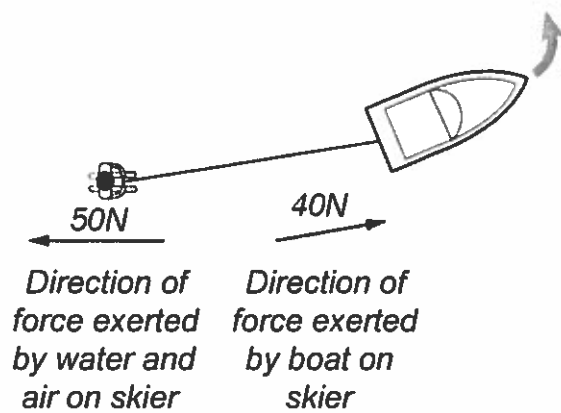
A man is running with a tennis ball in his hand. On his left is a bullseye target painted on the ground. As the man passes the target, he tries to drop the ball on it. The ball falls to the side of the target, missing the target. The ball did not drop straight down under the force of gravity because —

- A** the man also acted on the ball with a backward force.
- B** the man also acted on the ball with a downward force.
- C** the man also acted on the ball with an upward force.
- D** the man also acted on the ball with a horizontal force.

Reporting Category 2: 8th Grade Science Readiness Standards

6 Expectation: 8.6(A)

The diagram below shows a skier being pulled by a boat. The skier is holding on to a slightly elastic rope.

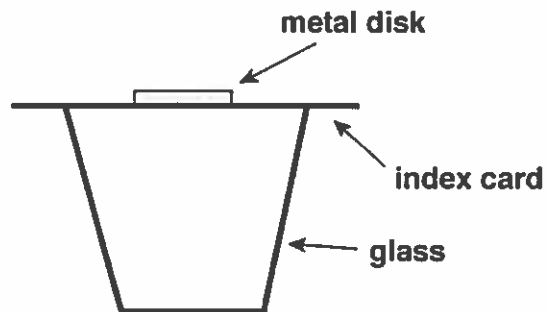


The force exerted by water and air on the skier is 50 newtons (N) in the direction indicated by the arrow on the left. The force exerted by the boat on the skier is 40 newtons (N) in the direction indicated by the arrow on the right. How will the unbalanced forces change the motion of the skier?

- F** The skier will accelerate backward to his right.
- G** The skier will accelerate backward to his left.
- H** The skier will accelerate forward to his right.
- J** The skier will accelerate forward to his left.

Reporting Category 2: 8th Grade Science Readiness Standards

Directions: The diagram below shows a metal disk resting on top of an index card. The index card is laid across the top of a glass. Use the diagram and your knowledge of science to answer any questions that follow.



7 Expectation: 8.6(A)

What will happen if a student slowly pulls the index card to the right?

- A The metal disk will fall down into the glass.
- B The metal disk will bounce up off the index card.
- C The metal disk will move to the left.
- D The metal disk will move to the right.

8 Expectation: 8.6(A)

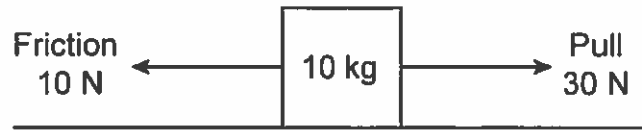
What will happen if a student quickly pulls the index card to the left?

- F The metal disk will move to the right.
- G The metal disk will move to the left.
- H The metal disk will bounce up off the index card.
- J The metal disk will fall down into the glass.

Reporting Category 2: 8th Grade Science Readiness Standards

9 Expectation: 8.6(A)

The diagram shows a block that is being pulled along the floor.



What is the acceleration of the block in m/s^2 ?

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

10 Expectation: 8.6(A)

An airplane is traveling at cruising speed where the thrust of its engines is equal to the drag on the airplane. If the engine sputters, what will happen?

- F** The airplane will gain altitude.
- G** The airplane will maintain the same speed.
- H** The airplane will slow down.
- J** The airplane will speed up.

Reporting Category 2: 8th Grade Science Readiness Standards

11 Expectation: 8.6(C)

A jeep is coming to a stop at a red light. According to Newton's law of action-reaction, which of the following is true?

- A** Two actions take place, because the brakes apply a force to the wheels, and the wheels apply a force to the brakes.
 - B** No actions take place, because the brakes do not apply a force to the wheels, and the wheels do not apply a force to the brakes.
 - C** Only one action takes place, because the brakes do not apply a force to the wheels, but the wheels apply a force to the brakes.
 - D** Only one action takes place, because the brakes apply a force to the wheels, but the wheels do not apply a force to the brakes.
-

12 Expectation: 8.6(C)

How does a continental plate demonstrate Newton's law of inertia?

- F** A continental plate will continue to move until it crashes into or slides against another continental plate.
- G** A continental plate will continue to move until it melts into molten rock from the heat of the sun.
- H** A continental plate will continue to move until it cracks from the pressure applied by Earth's atmosphere.
- J** A continental plate will continue to move until it travels back to its original location on Earth's surface.

Reporting Category 2: 8th Grade Science Readiness Standards

13 Expectation: 8.6(A)

A rubber ball between two blocks of unequal mass is shown below.



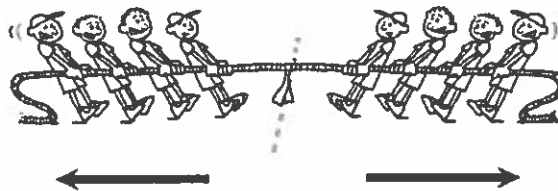
Dusty plans to squeeze the ball between the two blocks. If Dusty applies equal amounts of force to both blocks at the same time, the rubber ball is likely to –

- A** keep its shape and not lean to either direction.
- B** become deformed and lean to the left.
- C** keep its shape and sink downward.
- D** become deformed and lean to the right.

Reporting Category 2: 8th Grade Science Readiness Standards

14 Expectation: 8.6(A)

Two teams are competing in a game of tug-of-war in the diagram below.



Both teams are pulling with a force of 2300 newtons. What will happen if the team on the left makes an extra effort and pulls the rope with a force of 2330 newtons?

- F** The team on the left will be able to pull the other team to the left at an increasing speed.
- G** The team on the right will be able to pull the other team to the right at an increasing speed.
- H** The team on the left will be able to pull the other team to the left at a constant speed.
- J** The team on the right will be able to pull the other team to the left at a constant speed.

15 Expectation: 8.6(C)

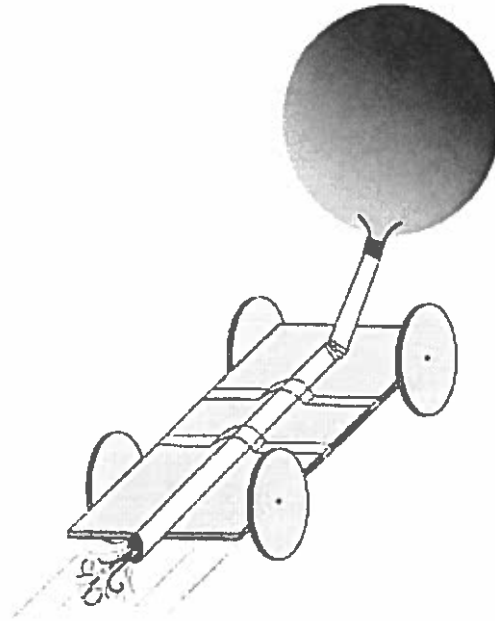
An airplane demonstrates the law of action-reaction because —

- A** its wings deflect air downward, and the air pushes the plane upward.
- B** its forward force is balanced by wind resistance while it is cruising.
- C** the force of its rudder moving to the right turns the plane to the right.
- D** when it lands, the ground pushes against the plane and slows it down.

Reporting Category 2: 8th Grade Science Readiness Standards

16 Expectation: 8.6(C)

A group of science students made a balloon rocket car, shown in the diagram below.



Courtesy of NASA. 2011. Roger Storm. NASA Glenn Research Center.

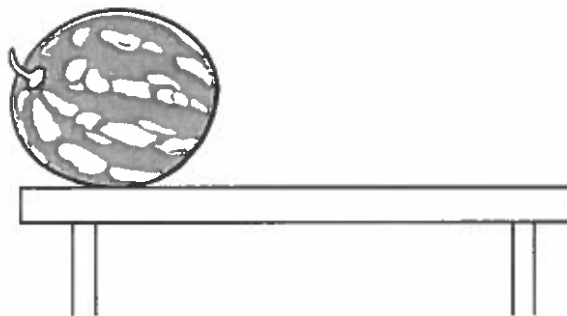
They inflated the balloon, set the car on a smooth surface, and watched the car travel forward. In keeping with Newton's law of action-reaction, the force that caused the car to move forward is associated with a balancing force that caused —

- F** air to rush from the balloon's opening.
- G** the front of the car to tip backward.
- H** the wheels of the car to spin clockwise.
- J** air to expand the balloon's volume.

Reporting Category 2: 8th Grade Science Readiness Standards

17 Expectation: 8.6(A)

A melon on a table is pictured below.



Gravity exerts a force to hold down the melon that is perfectly equal to the force that the table exerts to pull down on the melon. If there were no wind, and the force of gravity were suspended, the melon would —

- A** sink down into the table.
- B** roll to the middle of the table.
- C** float straight up.
- D** roll off the table.

Reporting Category 2: 8th Grade Science Readiness Standards

18 Expectation: 8.6(C)

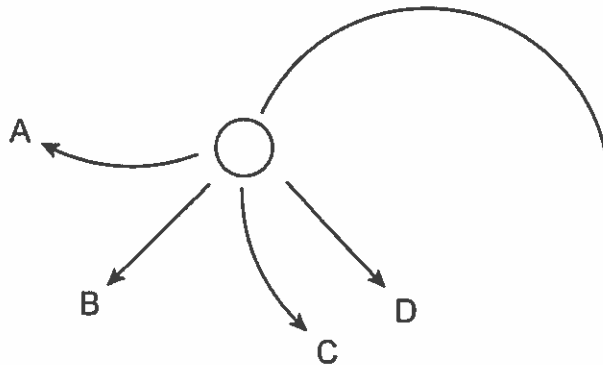
A golf cart weighing 272 kilograms broke down on the cart path. A tow truck driver decided to use a force of 1000 newtons to tow the golf cart. According to Newton's law of force and acceleration, what will the acceleration of the golf cart on a frictionless surface be, in meters per second squared, to the nearest hundredth?

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

Reporting Category 2: 8th Grade Science Readiness Standards

19 Expectation: 8.6(C)

The diagram below shows a ball on a string being spun in a circle.



Assume that the force of gravity is not operating on the ball. According to Newton's law of inertia, if the string breaks, in which direction will the ball travel?

- A** A
- B** B
- C** C
- D** D

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20 Expectation: 8.6(C)

In a series of controlled experiments, a student measures the force acting on a go-cart and the go-cart's acceleration. The student's data are shown below.

Force (N)	Acceleration (m/s^2)
10	0.5
24	1.2
30	1.5

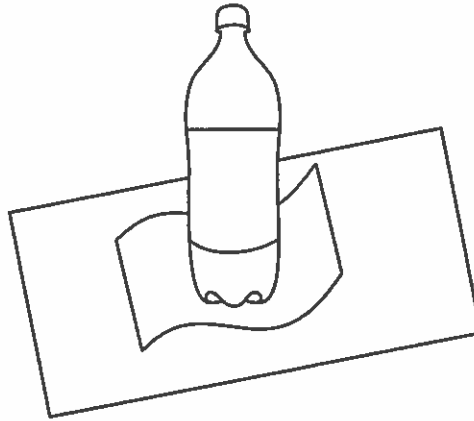
Based on the recorded observations, what is the mass of the go-cart in kilograms?

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

Reporting Category 2: 8th Grade Science Readiness Standards

21 Expectation: 8.6(A)

The diagram below shows an empty plastic soda bottle standing up on a sheet of waxed paper on a table.



Warren stands on the left side of the soda bottle. If he quickly pulls the sheet of waxed paper out from under the bottle toward him, what will happen?

- A The soda bottle will continue standing up.
- B The soda bottle will fall to the right.
- C The soda bottle will stick to the waxed paper.
- D The soda bottle will fall to the left.

22 Expectation: 8.6(A)

Which of the following is the best experimental setup to demonstrate how force can affect speed?

- F Timing water as it passes down a slide
- G Pushing a toy model car using different forces, and timing the results
- H Jumping over a rope ten times and recording the landing position each time
- J Rolling a single tennis ball with much force down a set of stairs

Reporting Category 2: 8th Grade Science Readiness Standards

23 Expectation: 8.6(C)

An elevator is being pulled up from the ground floor to the third floor by a cable. The cable is exerting 300 newtons of force on the elevator. According to Newton's law of action-reaction, what is the gravitational force on the elevator and the people in it, in newtons, if the elevator is not accelerating?

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

24 Expectation: 8.6(C)

A ball is rolled in a straight line on a smooth surface. No friction is produced, and the surface extends indefinitely. According to Newton's law of inertia, the ball will —

- F** continue to roll in a straight line and eventually slow to a stop.
- G** continue to roll in a straight line and remain at a constant speed.
- H** continue to roll in a straight line and increase, then decrease in speed.
- J** continue to roll in a straight line and gradually increase in speed.

Reporting Category 2: 8th Grade Science Readiness Standards

25 Expectation: 8.6(C)

A horse pulls on a cart with a force of 1800 newtons. The cart accelerates at the rate of 4.39 m/s^2 . According to Newton's law of force and acceleration, what is the mass of the cart to the nearest kilogram?

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

26 Expectation: 8.6(A)

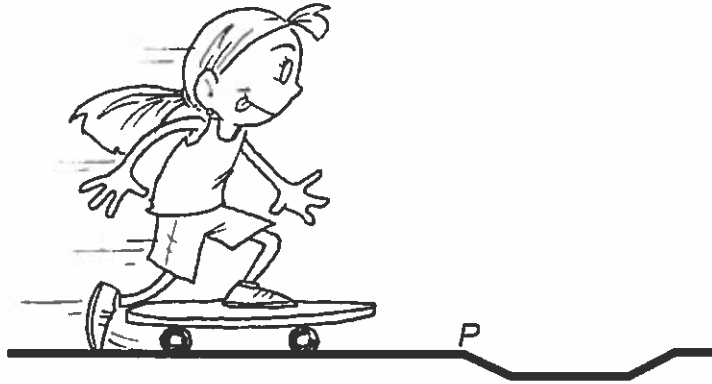
A baseball player uses a bat to hit a 0.145-kilogram stationary baseball with a force of 18,436 newtons. What is the force, in newtons, on the player's bat?

- F 2673.22 newtons
- G 18 436.145 newtons
- H 127 144.83 newtons
- J 18 436 newtons

Reporting Category 2: 8th Grade Science Readiness Standards

27 Expectation: 8.6(A)

The diagram below shows a girl on a skateboard.



The girl pushes off the ground to roll forward at a constant speed. She quickly moves across the flat blacktop at her school's playground. What will happen when the girl reaches point *P*, the location on the blacktop where a slight dip begins?

- A** The girl will start moving downward while picking up speed.
- B** The girl will continue moving horizontally while slowing down.
- C** The girl will continue moving horizontally at the same speed.
- D** The girl will start moving downward while slowing down.



Reporting Category 2: 8th Grade Science Readiness Standards

Name _____

Date _____

Class/Grade _____

DIRECTIONS FOR MARKING ANSWER SHEET

Use a #2 pencil only.

Do NOT use ink or ballpoint pens.

Make heavy black marks that fill the ovals completely.

Erase clearly any answer you wish to change.

Make no stray marks on the answer sheet.

1 Respond in Test

2 Respond in Test

3 (A) (B) (C) (D)

4 (F) (G) (H) (J)

5 (A) (B) (C) (D)

6 (F) (G) (H) (J)

7 (A) (B) (C) (D)

8 (F) (G) (H) (J)

9 Respond in Test

10 (F) (G) (H) (J)

11 (A) (B) (C) (D)

12 (F) (G) (H) (J)

13 (A) (B) (C) (D)

14 (F) (G) (H) (J)

15 (A) (B) (C) (D)

16 (F) (G) (H) (J)

17 (A) (B) (C) (D)

18 Respond in Test

19 (A) (B) (C) (D)

20 Respond in Test

21 (A) (B) (C) (D)

22 (F) (G) (H) (J)

23 Respond in Test

24 (F) (G) (H) (J)

25 Respond in Test

26 (F) (G) (H) (J)

27 (A) (B) (C) (D)

Reporting Category 2: 8th Grade Science Readiness Standards

Instructions to read aloud to your students.

When you decide what the answer to a question is, mark your answer on your answer sheet. To do so, find the row of circles with the same number as the question. Then darken in the circle with the same letter as the answer you chose. If you don't know the answer to a question, skip it. You may return to it later if you have time. If you finish the test early, you should go back and check over your work. Do **NOT** fold your answer sheet or make any stray marks.

When marking your answer sheet:

1. Make a heavy mark. The mark should be large enough to fill the circle, but it should not go outside too much. Do not waste time making very neat marks. It is more important to make very dark marks. Be sure to use a #2 pencil.
2. Be sure that your mark for every question is placed in the row with the same number as that question.
3. Make only ONE mark in a row. If you change your mind about an answer, erase your first mark as completely as you can.

1 Respond in Test

2 Respond in Test

3 (A) (B) (C) ●

4 (F) ● (H) (J)

5 (A) (B) (C) ●

6 (F) ● (H) (J)

7 (A) (B) (C) ●

8 (F) (G) (H) ●

9 Respond in Test

10 (F) (G) ● (J)

11 ● (B) (C) (D)

12 ● (G) (H) (J)

13 (A) ● (C) (D)

14 ● (G) (H) (J)

15 ● (B) (C) (D)

16 ● (G) (H) (J)

17 (A) (B) ● (D)

18 Respond in Test

19 (A) ● (C) (D)

20 Respond in Test

21 ● (B) (C) (D)

22 (F) ● (H) (J)

23 Respond in Test

24 (F) ● (H) (J)

25 Respond in Test

26 (F) (G) (H) ●

27 ● (B) (C) (D)

Reporting Category 2: 8th Grade Science Readiness Standards

Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation	Process Student Expectation	Correct Answer
1	2	Readiness	8.6(A)		1.14
2	2	Readiness	8.6(A)		0.5
3	2	Readiness	8.6(A)		D
4	2	Readiness	8.6(C)		G
5	2	Readiness	8.6(A)		D
6	2	Readiness	8.6(A)		G
7	2	Readiness	8.6(A)		D
8	2	Readiness	8.6(A)		J
9	2	Readiness	8.6(A)		2
10	2	Readiness	8.6(A)		H
11	2	Readiness	8.6(C)		A
12	2	Readiness	8.6(C)		F
13	2	Readiness	8.6(A)		B
14	2	Readiness	8.6(A)		F
15	2	Readiness	8.6(C)		A
16	2	Readiness	8.6(C)		F
17	2	Readiness	8.6(A)		C
18	2	Readiness	8.6(C)		3.68
19	2	Readiness	8.6(C)		B
20	2	Readiness	8.6(C)	8.2 (E)	20
21	2	Readiness	8.6(A)		A
22	2	Readiness	8.6(A)	8.2 (B)	G
23	2	Readiness	8.6(C)		300
24	2	Readiness	8.6(C)		G
25	2	Readiness	8.6(C)		410
26	2	Readiness	8.6(A)		J
27	2	Readiness	8.6(A)		A