

Sum It Up!

When you're done, use the answer key to check and revise your work.

Change the part of the summary in blue to make it correct.

1. Forces are pushes and pulls that increase the speed of objects.

2. Gravity is the force of attraction between a planet and another object.

3. An object moving through the air slows down because it is affected by the force of gravity.

4. When balanced forces act on an object, the object falls.

5. In order for an object to change its speed or direction, someone has to push it.

Answer Key: 1. can change the motion or shape of objects 2. any two objects 3. the force of friction 4. doesn't change its motion 5. an unbalanced force must act on it

Name _____

Word Play

1

A foreign-language teacher placed words from other languages into the following sentences. For each sentence, write the English word that means the same as the foreign word. Then use the circled letters to complete the riddle.

1. 
Italian

A push is an example of a **forza**. Another example is a pull.

— ○ — ○ —
11 3

2. 
French

The force of attraction between Earth and objects on its surface is **pesanteur**.

— ○ — — — — —
8

3. 
Russian

The force that opposes motion between two objects that are touching is **Tperne**.

○ — — — — — ○ —
4 7

4. 
German

Two forces that are equal in size but opposite in direction are **ausgegliche Kräfte**.

— — — — — ○ — — — — — ○ — ○
10 5 9

5. 
Portuguese

Two forces that are not equal in size are **Forças desequilibradas**.

○ — — — — — — — — — — — — — — — ○ —
2 6

6. 
Chinese

A **彈簧秤** is a tool that can be used to measure the size of a force.

○ — — — — — ○ — — — — — ○
1 12 13

Riddle: What conclusion did the student draw?

The o r e of the o c is the h u e, of u r .
1 2 3 4 5 6 7 8 9 10 11 12 13

Try saying that five times fast!

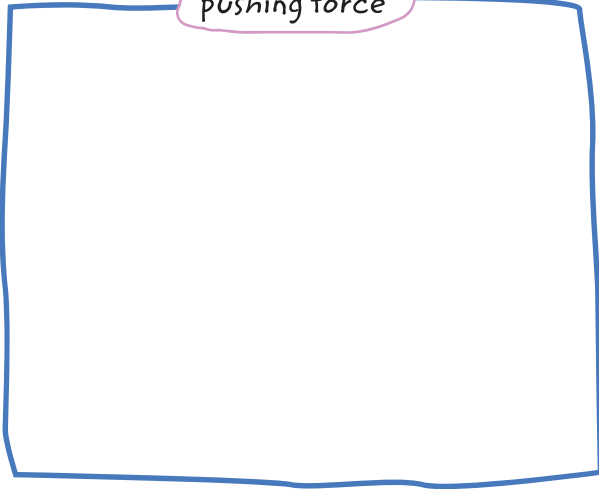


Apply Concepts

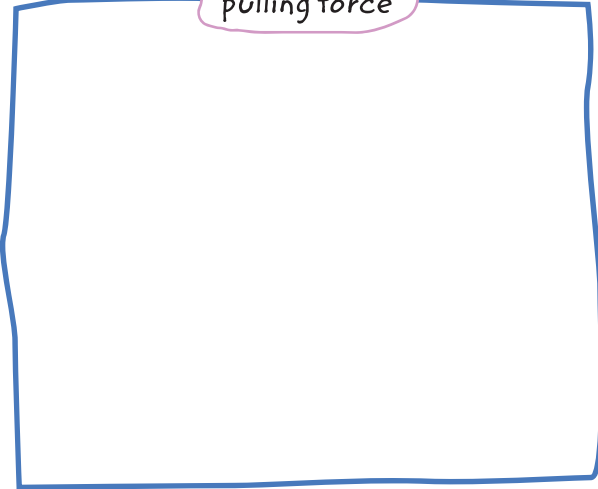
2

Draw pictures of two activities that you might do. In the first, draw a pushing force. In the second, draw a pulling force.

pushing force

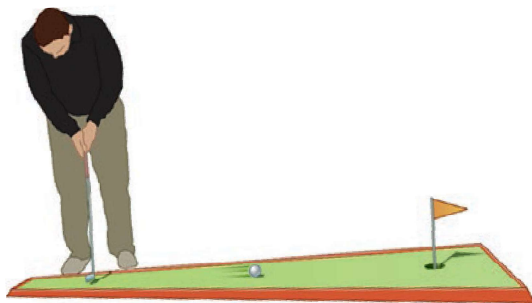


pulling force



3

The golfer applied a force when he hit the ball. Describe at least two forces acting on the ball as it rolls. Draw arrows to show the forces.



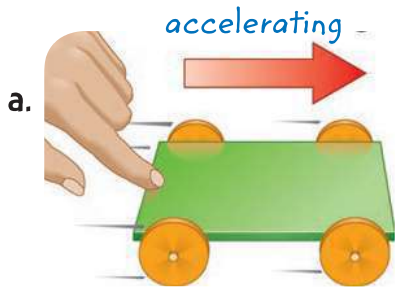
4

Two students are using a catapult to try and hit a target. The catapult has only one setting. The first time they tried, they used Rock B. Which of the remaining rocks is likely to come closer to the target? Why?



5

Use the words *balanced* and *unbalanced* as you name and describe the forces acting in each of these pictures.







6

Draw what will happen to a ball that you throw straight up into the air. Explain why this happens.

7

Explain why it is easy to slip on a floor that is wet.



8

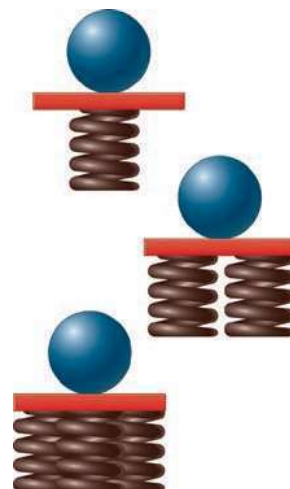
Look at the drawings to the right. Mary measured the distance each ball traveled. Draw lines to match the ball with the distance it traveled.

Explain why each ball traveled a different distance.

25 cm

15 cm

20 cm



9

Give an example of each of the following.

a. A force is applied but nothing happens.

b. A force causes an object to change shape.

c. A force causes an object to change position.

d. A force causes an object to stop moving.

10

Circle the object(s) whose velocities are not changing. Draw an up arrow next to the object(s) whose speeds are increasing. Draw a down arrow next to the object(s) whose speeds are decreasing.

A car travels 35 miles per hour around a bend in the road.

A car comes to a stop when a traffic light turns red.

A race car accelerates when a race begins.

A car is driving 45 miles per hour down a straight road.



See *ScienceSaurus*® for more information about force and motion.



Football Safety Gear

Football is a rough sport. In order to protect players from injury, designers have developed protective gear.



The first helmets were custom made out of leather by horse harness makers. Later, ear holes and padding were added. These helmets had little padding and no face guards.



Hard plastic shells, fitted foam linings, and metal facemasks now make helmets more protective. Some helmets even contain sensors that transmit signals to warn if a player's head has been hit hard enough to cause a serious injury.

Critical Thinking

How do modern materials make it possible to build a better helmet than one made of just leather?

S.T.E.M.

continued

When engineers develop new materials, it can spark new and improved designs of all sorts of familiar objects.

Choose two pieces of safety gear from your favorite sport or activity. Draw each piece of gear. Do research to find out what material makes up each piece. Label the materials. Explain how one material's properties made it a good design choice.

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List three features of this bicycle helmet.
Draw arrows to the features that are for safety.
Circle the features that are for comfort.

Build On It!



Rise to the engineering design challenge—complete **Design It: Balloon Racer** in the Inquiry Flipchart.