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Forces in Sports

Benchmark EDUCATION

by Kathy Furgang

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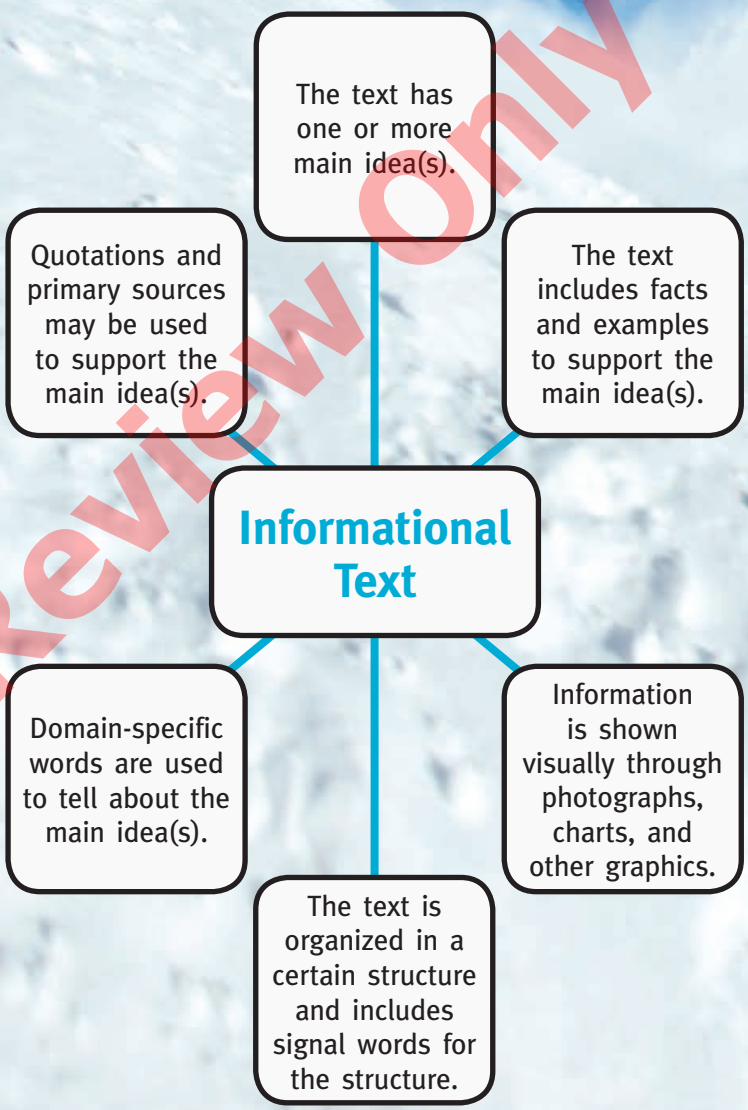

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Forces Everywhere

What does it take to move something? It takes a **force**. A force is a push or a pull. A force is what causes motion to happen. A push is moving an object away from you. A pull is moving an object toward you. Every movement requires a pushing or pulling force.

Some forces are gentle, like the force needed to pull socks up. Some forces are powerful, like the force needed to push a heavy cart.

▼ A pushing force makes this bike move.

▲ A gentle force will pull up these socks.

◀ A push is used to score a goal in soccer.

▼ Swimmers push as they dive into a pool.

We use forces to play our favorite sports. Read on to find out how these pushes and pulls work in your favorite sport.

CHAPTER 1

Games of Pushes and Pulls

Every sport in the world—with or without a ball—depends on forces. Basketball, football, soccer, skating, and biking are all "games of force." That is because all movement is caused by forces. All of these sports require pushes and pulls.

▲ All of these sports use pushes and pulls.

Pushes in Sports

Energy is the ability to do work, such as make a movement or a change. Energy is required to push or pull something. This means that all forces have energy.

There are many ways to apply a force in sports. Kicking a soccer ball lightly makes it roll. Kicking the soccer ball with more force can make it soar through the air. A baseball moves when it is hit with a bat. A hockey puck moves when it is pushed with a stick.

▲ A small kick won't move this ball far. But a big kick might send it to the other side of the field for a goal.

Not all objects are the same **mass**. Mass is the measure of the amount of matter in an object. The greater the mass of an object, the greater the push is needed to move it. For example, it takes more force to move a bowling ball 3 meters (10 feet) than it takes to move a table tennis ball the same distance. A table tennis ball has a mass of less than 3 grams (0.1 ounce). A bowling ball can have a mass of 7 kilograms (15 pounds).

◀ The greater an object's mass, the greater the force needed to move it.

Pulls in Sports

Pulls in sports help move objects, too. A gymnast can move his or her own body by pulling it. The gymnast uses her arms to pull herself high on the bar. A rock climber pulls his or her body up a rock wall. A rower pulls the oar through the water to move the boat across the lake. All of these pulls require strength. The greater the mass of the object, the greater the pulling force that is needed to move it.

The greater the pull on an object, the farther it will move. Two teams in a tug-of-war may have the same mass. The side with the greater pulling force on the rope will pull the other team toward them and win the competition.

▲ Ropes are used to help this rock climber pull himself up a rock wall.

The team that pulls the hardest will win a tug-of-war. ▼