



## Unit 3

Third-Class Levers:  
Going Third Class

## BACKGROUND

## CONCEPTS

- In a first-class lever, the fulcrum is in the middle.
- In a second-class lever, the load is in the middle.
- In a third-class lever, the force is in the middle.

## IDEAS &amp; SUGGESTIONS

Using the demonstration, set up a third-class lever. This setup will help students compare the positions of the fulcrum, load, and effort force among the three types of levers.

Will this lever make lifting easier? Ask a student volunteer to lift the ruler in the middle using one finger. It's not so easy—at least not as easy as using a first- or second-class lever! In fact, lots of heavy objects might be too weighty to lift with this kind of system.

If reducing the amount of force needed isn't the reason to use a third-class lever, what is? List third-class levers on the board: golf clubs, hockey sticks, tennis rackets, baseball bats, fishing rods, pitchforks, spoons, brooms, rakes, and catapults. Discuss what jobs these levers do. (They're all designed to move loads over a distance—make balls fly farther, for example.)

For the Real-World Problem, brainstorm variables that might affect how far a baseball bat can make a baseball fly: length, width, weight, material, speed at which it is swung, and so on.

## STUDENT BACKGROUND

After experimenting with the three types of levers, students are ready to identify and classify levers by type. First-class levers (seesaws) have a fulcrum in the middle, second-class levers (wheelbarrows) have a load in the middle, and **third-class levers** (hockey sticks) have the applied force in the middle.

The levers in the demonstrations are horizontal. Some, such as hockey sticks and rakes, are vertical levers. Make sure that students can adjust their point of view when comparing the parts of these levers.

## TEACHER BACKGROUND

A third-class lever allows you to move a load farther and/or faster. Baseball bats and hockey sticks are examples of single third-class levers.

Double third-class levers include tongs and tweezers. Students will explore these variations in the second experiment.

## VOCABULARY

third-class lever

## Real-World Problem



## Home Run Time

Not all baseball bats are created equal. At a sporting goods store, look for aluminum bats and wooden bats, long bats and short bats, heavy bats and light bats, bats with fat ends and bats with skinny ends, bats with rubber grips on the handle and bats without grips. Suppose your students were bat girls and bat boys. Which bat would they give a player to help him or her hit the ball farther? That's this unit's challenge to explore. (See page 34 for solution.)

