

# CHOKE UP ON THAT BAT!

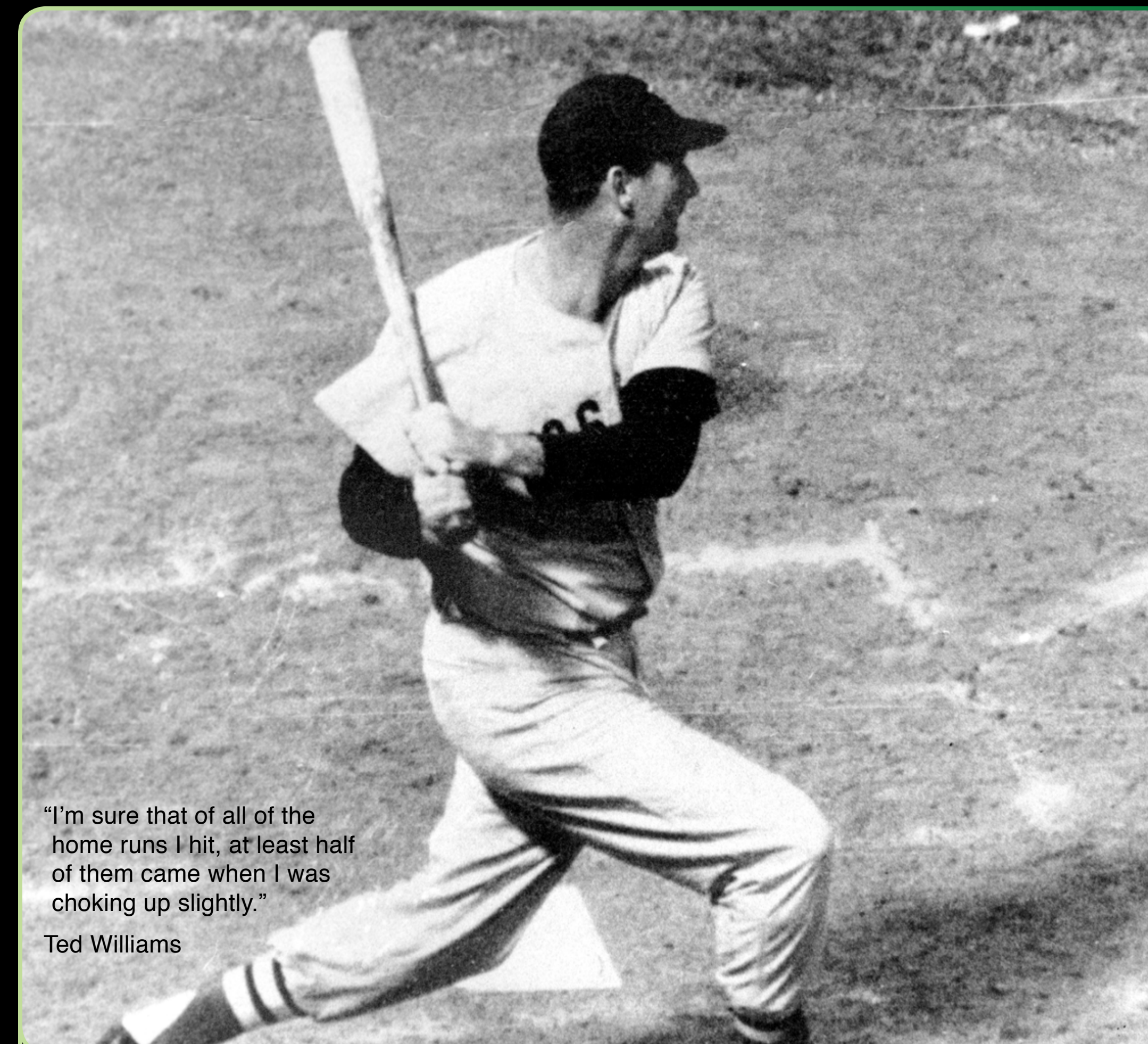
## WHY DO WE NEED TO PUSH THINGS TO GET THEM TO MOVE?

Things don't start moving by themselves. If something is at rest, you have to push it to get it going. For a push of a given size, some objects will move more easily than others. Inertia is a measure of how much something resists being put into motion. Mass is a measure of **inertia**. The more massive an object is, the harder you have to push to get it moving.

## WHAT ABOUT MAKING SOMETHING ROTATE?



To get something to rotate, a twisting force has to be used. But it is more than just the mass that determines how hard it is to rotate something. It also matters how far that mass is from the point around which you are trying to rotate. If most of the mass is close to the center of rotation, it is easier to make it rotate. For example, **a disk will roll more easily than a ring** with the same mass and size.



## BASEBALL PLAYERS ARE SCIENTISTS?

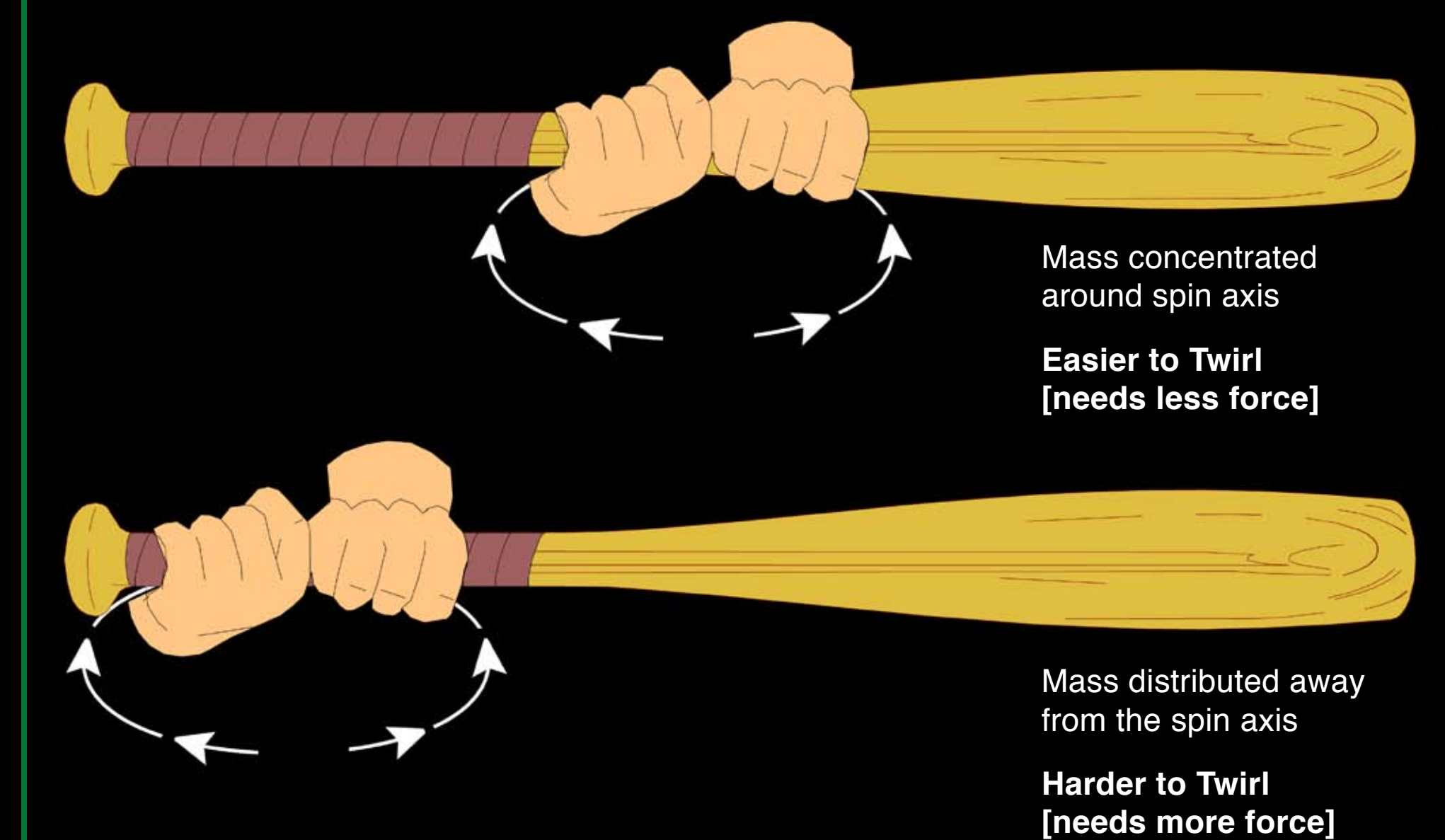
Well, some might be. But almost all of them know that it is harder to get good "bat speed" with a big, heavy bat. When a pitcher is throwing the ball at 100 miles per hour, the batter has less than a second to hit the ball, so getting the bat around fast matters! If a batter wants to be able to swing a bat more quickly, they **choke up on the bat**. This puts the heaviest part of the bat a little closer to where they are twisting the bat with their wrists.

The next time you play baseball, do an experiment. Take your favorite bat and try choking up on the grip a little. You'll find that you can swing a little faster, and that's a good thing! Tell your coach

**"it's all about rotational inertia!"**

### ROTATIONAL INERTIA

Example: Twirling a baseball bat.



### TRY IT!

Hold a bat horizontally in your hand, gripping it in the middle. Twist it back and forth to rotate it, like in the figure above. Now grip that same bat all the way at the end and try to rotate it again. It is much harder. That's because the **mass** is farther away from the **rotation axis**.

