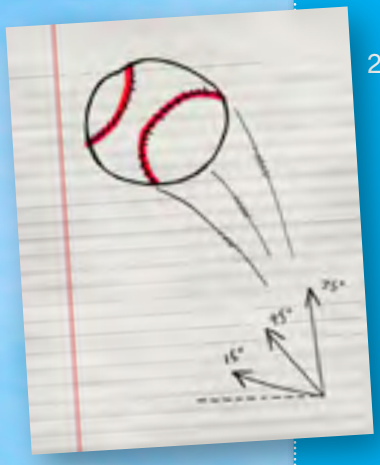
How Far Can You Throw?

Have you ever wondered how a baseball player knows how to throw a ball so far? There is some science behind these throws, and sometimes it is all about the angle. What type of angle do you think will get the farthest distance – shallow, steep or medium? Try this sports science project to find out!

What you need:

- A ball of your choice (baseball, tennis ball, football, etc.)
- Large open area to throw the ball
- Three each of three different objects to mark where the ball lands on the ground. *Ex: three sticks, three rocks AND three golf balls)*
- Someone to help mark your throws

How to:



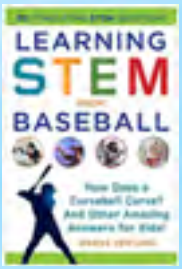
1. Pick a place to stand in a large, open area. Mark a place on the ground so you know to always throw the ball from that location.
2. Make your throws, throwing three times total at each angle. Remember to try and consistently throw the ball as hard as possible.
    a. Throw your ball at a "shallow" angle, about 15 degrees – as parallel to the ground as you can. Have your helper mark where the ball lands (with a rock, for example) and repeat this step two more times.
    b. Repeat the procedure for a "medium" angle (outward and upward) of about 45 degrees three times. Again, have your helper mark where the ball lands, but this time with a different object.
    c. Finally, repeat the steps at a "steep" angle (up in the air and slightly forward but not straight up) of about 75 degrees three times. Have your helper mark where the ball lands with your final object.
3. Now, analyze the results of your experiment by looking at the markers. Which throws went farthest? What angle do you think is best if you want to throw the ball as far as possible? Try the experiment using different types of balls. Did you get different results?

What's happening?

An object that is thrown, kicked or otherwise launched through the air is called a projectile. The study of how projectiles move through the air is called projectile motion. When a projectile is moving through the air, it is subject to the force of gravity, which causes it to move down toward Earth. It is also subject to the force of air resistance, which slows the projectile down.

Related Books:

The Innings and Outs of Baseball
by Jordan D. Brown



Learning STEM from Baseball
by Marne Ventura

The Science of Baseball with Max Axiom, Super Scientist
by David L. Dreier

Fun Fact

Baseball teams and their fans use the science of sabermetrics to study baseball. SABR is short for The Society for American Baseball Research. It's a group of over 6,000 baseball fans from around the world. Metrics is a method of measuring performance by using numbers.