

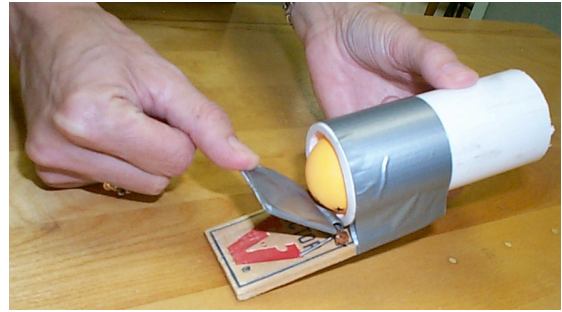
Launch Angle for a Homer

What is this about?

If you want to hit a homerun, you certainly want to hit the ball as hard as possible, but what angle should you launch it for the greatest distance? Do you think the best launch angle for the baseball is 45° ? Is it more or less? What about a ping-pong ball? Here is an experiment you can do with a ping-pong ball to see what happens.

What do I need?

You need a device to launch ping-pong balls at the same speed no matter the angle. If you don't have one, you can build the one shown at the right. It is made from a mousetrap, a 4" long piece of 2" diameter PVC pipe, and some duct tape. You also need a protractor to measure the launch angle and a meter stick to measure the distance.



What will I be doing?

You will launch ping-pong balls at different angles, but the same speed, to find out what angle makes them go the farthest.

What do I think will happen?

Take a minute and write down a description of what you think will happen and why you think it. What is the best launch angle?

What really happened?

Launch ping-pong balls at different angles and record the distance they go. Make sure that:

1. They are launched at the same speed every time.
2. They land at the same height they are launched from.
3. Launch several shots from the same angle to check the consistency of the shots.

Write a description of your results. What was the best launch angle?

What did I learn?

Have you noticed that a gentle stream of water from a hose travels furthest if the hose is aimed at 45° above the horizontal? What happens if you open up the tap and speed up the water? Give it a try! You'll probably notice that angle for the water to go the furthest gets smaller as the water goes faster. When a projectile feels the effects of the air, the best launch angle is less than 45° .

What else should I think about?

A ping-pong ball is affected by air, but what about a well hit baseball? The air around us feels very thin, but to a baseball in flight, the air feels very differently. You can test this by putting your hand out the window of a car moving at highway speeds. The air feels surprisingly thick and exerts strong forces on your hand. The same force acts on the speeding baseball. It is called "air resistance" or "air drag" and it acts opposite to the motion of the ball.

Go look at the video of some homers. You'll notice that they are almost always hit at angles less than 45° .



Catch it in the Web!



Anatomy of a Home Run

(<http://www.kqed.org/quest/television/anatomy-of-a-home-run-web-only>)

When you look at the physical breakdown of a home run, it's hard to believe it can ever happen. In fact some noted physicists have said that, on paper, hitting a home run is impossible. This video looks at what it takes to hit a “big fly.”



Hit Tracker by Greg Rybarczyk

(<http://www.hittrackeronline.com/>)

This site offers information on every home run hit in the major leagues including the distance sorted by hitter, pitcher, ballpark, etc. Also, there are links to video for each homer.