

In Stitches

What is this about?

The most “striking” feature of a baseball is the interesting stitch pattern. The stitches have two important uses for pitchers. First, they provide a place to get a better grip on the ball. Secondly, they interact with the air as the ball moves. The stitches slightly affect the air drag, but they strongly affect the Magnus force. Here you will get to learn the how stitches make a difference in the flight of a thrown ball.



What do I need?

You need Styrofoam ball about the size of a baseball and a box of quilting pins.

What will I be doing?

You will put different “stitch patterns” on the Styrofoam ball and study the effect on your rising fastball. Make sure you have practiced the rising fastball in the “Itch to Pitch” activity. You will start by using the quilting pins to make a stitch around the midline of the ball.

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. Do you think your rising fastball will be more or less effective with stitches around the midline of the ball? Will it depend on the direction of the stitches as you release the ball?

What really happened?

1. Put a line of quilting pins around the midline of the ball.
2. Throw your rising fastball with the line of pins starting between your middle and ring fingers.
3. Now, throw your rising fastball starting with the line of pins across your fingers.
4. Design other stitch patterns with the pins and study the effect on your rising fastball.




Write a description of your results. Compare your rising fastball without stitches to your fastball with different stitch patterns held different directions.

What did I learn?

The Magnus force on a moving baseball depends upon the stitch pattern. This is because the air interacts strongly with the raised stitches on the ball.

What else should I think about?

Pitchers often talk about the difference between their two-seam fastball and their four-seam fastball. Looking at the stitch pattern on a baseball, can you find a way to spin the ball so that only two seams collide with the air for each rotation of the ball? Can you find the orientation of the ball so that four seams cut through the air on each rotation?

 Catch it in the Web!



108 Stitches: The Physics in Baseball

(<http://www.pbs4549.org/baseball/baseball1.htm>)

“The Pitch” takes a look at gravity, air drag and the Magnus force (three forces controlling trajectory once the pitcher releases the ball) and how the pitcher can use these forces to manipulate the path of the ball.