



## Curiosity Guide #304

### Football Science

Accompanies Curious Crew, Season 3, Episode 4 (#304)

#### Football Flight

Investigation #5

#### Description

The challenge in this investigation is to find the most effective ways to throw a football!

#### Materials

- Football
- Measuring reel
- Video camera
- 2 friends, one to video you, and the other to catch the ball and help with measuring and recording the flight of the football

#### Procedure

- 1) Extend the measuring reel as far as the tape can go.
- 2) Stand at the starting end of the reel.
- 3) Ask a friend to record you throwing the football, but keep the camera on you, the quarterback.
- 4) Try throwing the ball in a forward pass, but throw the ball high.
- 5) Measure how far the ball traveled.
- 6) Try throwing the ball from different angles. Measure the distance.
- 7) What angle gives the best distance?
- 8) Throw the ball again, but this time keep your feet planted on the ground.
- 9) How far can you throw the ball using just your upper body?

- 10) This time turn your body sideways so that you can push off your back leg and step into the throw as you release the ball.
- 11) Did the distance traveled change?
- 12) Try whipping your hips forward as you step forward and roll the ball off your fingertips.

### My Results

### Explanation

The motion mechanics of throwing a football is thought to be one of the most complex skills to perfect in sports. As the ball leaves a quarterback's hand or a kicker's foot, the ball is referred to as a projectile, a launched object that travels in the shape of a parabola over a certain distance or range. The ball's overall distance traveled depends on the ball's initial speed, the launch angle, and the starting height.

If the throw is too steep, the ball won't travel as far. If the ball is thrown too low, the ball could be easily blocked. So, finding the right throwing angle is important.

To increase the throwing distance, it is important to use the lower body along with the upper body. Stepping into the throw and twisting your hips increases the ball's velocity and makes the ball travel further. Moving the energy through the body from the legs, to the trunk and back, to the shoulders, elbow, wrist, and follow-through acts as a kinetic chain that increases power and propels the ball further. The body's sequential movement almost acts like a growing wave traveling through the body.

**Investigate further:** Search the internet, using the phrase, "How to throw a football." Several websites have clear directions. You can also find videos that instruct you. In Images, see if you can find diagrams or illustrations that show angles and trajectories of throw.

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