Boomerang Ball

A counterintuitive exercise in spin and friction

You will need….

- ✓ A bouncy ball
- ✓ A table or similar

Background:

The spin of a ball dictates the direction of the bounce.

Follow these steps:

1. Pose the question "what will happen the ball as it is bounced downwards under the table?" Most people will assume that the ball will bounce under and though the table
2. Try bouncing the ball.

So what happened?

Due to friction the ball starts to spin forward when it strikes the lower surface. When it strikes the upper surface this becomes a back-spin and causes the direction of the ball to change. As a result the ball returns towards the starting position.

What next?

1. How can we force the ball to bounce through? A back spin can be applied on the ball at the first bounce. This results in a forward spin at the upper surface, so the ball will bounce through.
2. Alternatively if the ball is wet, the friction is reduced and the ball will bounce though.
3. For videos and animations see Dr Hugh Hunt's website at http://www2.eng.cam.ac.uk/~hemh/movies.htm