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The study of spin effects on the bouncing trajectory of a ball

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In all sports involving a ball, spin is heavily utilized to alter the ball's course. A spinning ball has more kinetic energy of the same ball traveling with the same translational velocity. The additional energy comes from the rotation of the ball. This extra hidden energy can affect the trajectory of the ball as the ball interact with the floor or even with the air. Dimples are placed on the golf balls to increase the friction with the air making the spin effects on the trajectory more pronounced. Good pitchers can curve the trajectory of a baseball by throwing the ball with a lot of spin. In this work, we use simple tools to study of how spin affect the bouncing trajectory of a ball. The height of the ball when thrown with different spins, such as back spin, top spin, and no spin, will be investigated in this experiment. The heights of the bouncing balls were collected using a high-speed phone camera and evaluated with a video analysis software. The height ratio of basketball with spin-launching is higher than without. The height ratio of back spin launches is higher than that of top spin launches. The bouncing angle will affect back spin, whereas the angular velocity will affect top spin. By launching the basketball with spin, the height ratio of the bouncing ball can be enhanced. The changes in the bouncing angles and trajectories due to spin will also be discussed. We believe that a simple setup used in this experimental study can be applied to study the behaviors of many other movement of objects.

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