

How much energy do you need to dribble a basketball?

Michael Kavanagh

Notre Dame School

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Acknowledgements

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Purpose:

The purpose of my investigation is to see which surface enables the basketball to bounce the highest.

Hypothesis:

If I bounce a basketball on carpet, wood, and cement, then the ball will consistently bounce higher on cement because it's the hardest surface and the reason why we don't play on cement is because you could get injured worse if you fell.

The only big American sport with an evidently recognizable founder is basketball. At the Young Men 's Christian Association (YMCA) training school in Springfield , Massachusetts, James Naismith wrote the sport's original 13 rules as part of a class assignment. Naismith, who was born and raised in Canada, went south to pursue his interests in physical education and Christian ministry. He extended an assignment to develop a game that could be played during the winter at YMCA gyms. (The Staff of Science Buddies, 2020)

College teacher James Naismith had an issue in December 1891. His students had become rowdy, being pushed indoors because of winter. They had a lot of steam, but they had no means of burning it away. It was too cold for football and baseball to play, and too dangerous for the gym to play those sports. Naismith was asked by the school to create a new indoor sport. Naismith recalled a rock-throwing game that he had played as a kid. How about a game where players strike a goal with a ball? The team that tossed the most balls into the target would win. Naismith dubbed "basketball" his latest game and wrote up 13 rules. The equipment was two peach baskets and a soccer ball. Naismith placed the baskets, nailed 10 feet above the floor, at either end of the gym. The teams each had nine players. (The Staff of Science Buddies, 2020)

For the first tipoff, Naismith threw the ball in the air. The new sport rose in popularity rapidly. The students of Naismith went on to become educators and coaches, spreading the game.

Teams at high schools and universities have emerged. Boys and girls started playing basketball throughout the country.

Modifications to the rules made the game more interesting. Dribbling was tolerated. In order to make scoring easier, backboards were introduced. The peach basket was replaced with a net that made it possible for the ball to go through, accelerating play. A new ball, one which was easier to dribble and shoot, was introduced. There were fans flocking to see this exciting new sport. Professional leagues were soon founded. Knight, Randall Dewey. *Physics for scientists and engineers with modern physics: a strategic approach*. San Francisco: Pearson/Addison-Wesley, 2003. Print.

Pro teams like the Original Celtics and the Harlem Rens attracted massive crowds on national tours in the 1920's. The match extended to every corner of the globe. In 1936, basketball became an Olympic sport. Naismith tossed the ball for a tipoff for the first Olympic basketball game. He distributed the awards to the players after the championship game. This winter distraction had developed into a global sport.

When a basketball is bounced, it has two different types of energy: kinetic energy and potential energy. Kinetic energy is the energy an object has due to motion. Any object that is moving has kinetic energy. A fast-moving basketball has more kinetic energy than a slow-moving basketball. And a basketball that is not moving at all has no kinetic energy.

Potential energy is the energy stored in an object due to its height above the ground. A basketball resting on the floor has no potential energy. (Compton, 2015)

wikiHow. 2017. *How To Write A Risk Assessment*. [online] Available at: <<http://www.wikihow.com/Write-a-Risk-Assessment>> [Accessed 19 March 2017].

When a player holds up a basketball, potential energy is built up. As the ball is at a higher height, the potential energy increases. When the ball is dribbled, it transforms potential energy into kinetic energy by applying power to the ball. This applied force causes the basketball court to collide with the ball. Newton's 3rd law takes place after this collision, by producing an equal and opposite force against the court, and repels back up to the side of the player. (Tetzlof, n.d.)

To shoot a basketball a person should place their dominant hand on the side of the ball with the laces side going up and down and the non-dominant hand on the opposite center side. The elbow is held at a 90 degree angle and the index finger should face the basket. When a player shoots the ball, he has to follow through in the shot and his index finger should appear as if it is in the basket. Then when the ball is released the dominant hand should be followed through and look like it's in the rim of the basket.(McDowell, n.d.)

When basketball is played in an arena, it is most likely to be played on a wooden court. Ideally, these are the best basketball floors to play on, and if one goes to any of the various arenas in the NBA, they'll find that the games are played on a wood court. Overall, these are the perfect surfaces for basketball dribbling. Some older wooden boards, however, have sustained water damage and a basketball can be very hard to dribble on. This is because of "dead spots" on the floor in multiple places.(science buddies staff 2020)

All elements found in forms of movement that relate to forces are work, strength, energy and society. Work refers to a force's intensity and direction of motion, energy is the ability to do work, and power is the rate at which energy is converted or the rate at which work is performed.

In basketball, most movements involving a force can be articulated by work, strength, and/or energy.(how much energy...n.d.)

1. Prepare the wall, or other vertical panel, next to the first surface you want to test so that you can measure the height of the basketball's bounce.
 1. On the wall next to the surface, use a tape measure and the blue painter's tape to mark every 20 centimeters (cm), starting from the floor and going up to 100 cm. You should end up with five tape marks, as shown in Figure 3.
 2. *Note:* You can make the tape marks longer than the ones in Figure 3, so they will be easier to see in the video recording. Remember to put the *top edge* of the tape at the every 20 cm mark.
 - 3.
2. Set up the video camera so that all of the marked measurements and the floor are in view. It is best to record the bounce as straight on, or as evenly framed in the viewfinder, as possible. You can either have a volunteer run the camera for you, or set the camera up on a tripod.
 1. *Tip:* If you use a mini tripod, you need a raised surface nearby, such as a chair, to set the tripod and camera on.
3. Test the basketball on the surface:
 1. Either ask your volunteer to start the video camera or, if you do not have a volunteer, begin recording with the video camera on its tripod.
 2. If you are using note cards to visually keep track of your trials, show a note card with the trial number written on it in front of the camera briefly, before you do the experiment. Alternatively, you can just say the trial number so you can hear it later on the recording. (The first trial you do will be Trial 1.)
 3. Hold the basketball so that the bottom of it is lined up with the top edge of the highest tape mark you made, as shown in Figure 4. Also hold the ball close to the wall, not more than about 5 cm away
4. Drop the basketball. (Do *not* push it down.)

5. Let the basketball bounce back up and then hit the ground a second time before you catch it in your hands and stop recording it.

Knight, Randall Dewey. *Physics for scientists and engineers with modern physics: a strategic approach*. San Francisco: Pearson/Addison-Wesley, 2003. Print.

Science Buddies Staff. (2020, November 20). *Bouncing Basketballs: How Much Energy Does Dribbling Take?* Retrieved from

https://www.sciencebuddies.org/science-fair-projects/project-ideas/Sports_p037/sports-science/basketball-dribbling-energy

Tetzloff, . (n.d.). *Physics of basketball*. <https://leenaphysicsbasketball.weebly.com>. Retrieved December 3, 2020, from <https://leenaphysicsbasketball.weebly.com>

<https://leenaphysicsbasketball.weebly.com/>

<https://www.stack.com/a/how-to-dribble-a-basketball>. (n.d.). <https://www.stack.com/a/how-to-dribble-a-basketball>. Retrieved December 3, 2020, from

<https://www.stack.com/a/how-to-dribble-a-basketball>

how-to-dribble-a-basketball

<https://science.blurtit.com/3939168/how-much-energy-does-dribbling-take>.

Retrieved December 3,

2020

<https://study.com/academy/answer/how-much-energy-does-dribbling-a-basketball-take.html>.

<https://study.com/academy/answer/how-much-energy-does-dribbling-a-basketball-take.html>.

Retrieved December 3, 2020, from <https://study.com/academy/answer/how-much-energy-does-dribbling-a-basketball-take.html>

how-much-energy-does-dribbling-a-basketball-take.html

<https://study.com/academy/answer/how-much-energy-does-dribbling-a-basketball-take.html>