## Relationship between Potential and Kinetic Energy

The Ball Drop Investigation

| Starting <br> Height | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Average <br> Bounce <br> Height |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 21 inches | 12 in. | 17 in. | 16 in. | 14 in. | 13 in. |
| 42 inches | 24 in. | 25 in. | 28 in. | 31 in. | 24 in. | 26 |
| 64 inches | 43 in. | 44 in. | 41 in. | 42 in. | 42 in. | 42 |

What patterns or relationships do you see in the data? The higher the starting height of the ball, the higher the ball bounces.

The ball has more gravitational potential energy the higher the starting height, therefore it has more stored energy. When the ball is dropped, this stored energy or potential energy converts to kinetic energy. It exerts more kinetic energy once it is released because it had more potential energy. Since it has more kinetic energy, it will bounce with more force and therefore bounce higher.

When did the ball have the most potential energy in this investigation? Explain your answer. The ball had the most potential energy when it was held in the position of 64 inches above the ground. As explained in the answer above, the higher the starting position, the more potential energy the ball has.

How is the potential energy in the ball changed to kinetic energy this investigation? Potential energy changed to kinetic energy every time we dropped the ball.

How is the kinetic energy in the ball changed back to potential energy? Kinetic energy converted back to potential energy every time we picked up the ball and raised it to a starting position.

Not all of the ball's potential energy was converted into kinetic energy. Where did this energy go? As with all energy, some energy was lost to unusable heat. In this case, heat was given off in response to air friction and gravity pushing and pulling against the ball as the ball dropped and bounced. Some of the ball's energy was also converted to sound energy as we heard it bounce on the ground.

A basketball player throws a ball into the air and catches it before it hits the ground. Label where the ball has potential energy, kinetic energy, and two different energy conversions.


