Name _____ Date _____

Ball Bounce Lab

Question: How does the drop height (gravitational potential energy) of a ball affect the bounce height (kinetic energy) of the ball?

Hypothesis: If the gravitational potential energy (drop height) of a ball is increased, then the kinetic energy (bounce height) will (increase/decrease/remain the same) because…

Experiment:

1. Tape the meter stick to the side of the lab table with the 0-cm end at the bottom and the 100-cm end at the top. Be sure that the meter stick is resting flat on the floor and is standing straight up.
2. Choose a ball type and record the ball type in the data table.
3. Use the triple beam balance to determine the mass of the ball and record the ball's mass in the data table.
4. Calculate the gravitational potential energy (GPE) for the ball at each drop height. Record GPE in data table. GPE = ball mass x drop height
5. For Trial 1, hold the ball at a height of 50 cm, drop the ball carefully and observe the bounce height. Record the bounce height in the data table. Drop the ball 4 more times from 50 cm, recording the bounce height each time, for a total of 5 drops.
6. For Trial 2, drop the ball five times from 75 cm and record the 5 bounce heights in the data table.
7. For Trial 3, drop the ball five times from 100 cm and record the 5 bounce heights in the data table. 10.
8. Repeat steps 2 through 7 for EACH type of ball.
9. Calculate the average bounce height of the 5 drops for each drop height. Record the average bounce height in the data table. Calculate the average bounce height for all Trials. a. To calculate average: Add the 5 bounce heights for a trial then divide the total by 5 drops. Example for Trial 1: drop1 + drop2 + drop3 + drop4 + drop5 = total; total divided by 5 = average.

Bouncy Ball	GPE	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Average
50 cm							
75 cm							
100 cm							

Racquetball	GPE	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Average
50 cm							
75 cm							
100 cm							

Golf Ball	GPE	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Average
50 cm							
75 cm							
100 cm							

Analysis/Conclusions:

1. Describe the relationship between drop height and bounce height.

2. Compare the gravitational potential energy and the bounce height of each ball. Describe the relationship between GPE and bounce height.

3. Why did the balls not bounce back to their original release height?

Part II: Transfer of Energy

Question: Why did the balls not bounce back to their original release height?

1. Rewrite the average bounce height for each ball from 50 cm, 75 cm, and 100 cm.
2. Calculate the percentage of the bounce height in comparison to the release height. You may use a calculator. Percent = 100 * (Average / Release Height)

	Bouncy Ball Average	Percent	Racquetball Average	Percent	Golf Ball Average	Percent
50 cm						
75 cm						
100 cm						

Analysis/Conclusions (continued):

1. When did the ball have the most potential energy in this investigation? Explain your answer.

2. How were you able to increase the amount of potential the ball had?

3. Explain another way to increase the amount of potential energy in an object.

4. How is the potential energy in the ball changed to kinetic energy in this investigation?

5. How is kinetic energy in the ball changed back to potential energy in this investigation?

6. Not all of the ball's potential energy was converted into kinetic energy. Where did this energy go?

7. A father and his son are sledding down a hill on their own slides and decided to have a competition to see who can land on top of the finish line. On their first attempt the father went several yards past the finish line, and the son stopped several yards short of the finish line. What would you need to adjust to have both land on the finish line?