Bouncing ball experiment report

The results of this survey clearly show that the tennis ball bounced higher on the concrete surface, thus demonstrating the correct hypothesis. The ball bounced higher on the surface of the concrete due to how much elastic potential energy was released from it. Since the surface of the concrete is the toughest surface, it allowed more energy to be released from the ball, thus bouncing it higher than it would normally do on the grass. The ball bounced on the grass because it's a very soft, distributed surface, so the tennis ball didn't have to use as much energy as it did with the concrete surface. As noted in this experiment, different types of surfaces affect how well a tennis ball can bounce and how much potential elastic energy is released when it hits the surface. To conclude, a tennis ball will release the most elastic potential energy when it hits a harder, more confined surface rather than a distributed, soft surface. Explain what happened. The tennis ball bounced higher on the surface of the concrete followed by tiles, wood, carpet and grass. The average bounce height range was 42.33 cm.Explains why it happened. The tennis ball bounced the highest on the surface of the concrete because it was the toughest surface, forcing the tennis ball to release more elastic potential energy, and then bouncing it higher. Discuss the following:Accuracy: The experiment was quite accurate because the measuring tape was used each time to measure exactly 125 cm and the whole experiment was conducted by only one person. Validity: The experiment was valid because the only variable that changed was the type of surface on which the tennis ball was dropped, all other factors were checked and made sure to be the exact each time. Reliability: The experiment was very reliable due to the fact that it was performed twice - a test experiment and a real experiment - while both gave similar results. The experiment is also reliable due to the fact that even in the real experiment the tennis ball was dropped on each surface 3 times, and an average height was also found. Limitations: No professional equipment such as sensors or monitors could have been used to control exactly what height the ball bounced at the first bounce. Successes: The experiment was a success because, although the results obtained were not accurate at the nearest mm, they still gave measurements to the nearest cm that were used to conclude that a tennis ball will bounce the highest on the harder surface. Improvements: The experiment could have been improved using a mechanical device that could have made the tennis ball of exactly 125 cm and without any force applied. This would have made the experiment more accurate and accurate. During the early years of middle school you may be required to write a practical report for an experiment, or an extended experimental survey (an experiment that brings you a number of to be completed). I have now given an example of how a practical report is presented. Take note of the language used: third person, past, passive voice, and also note that the information written in red is side notes for you, the reader, and should not be copied into a real practical report. Simon Boman, BSc/ BEd5 September 2013 What are you trying to achieve in this experiment? To investigate the bounce efficiency of a tennis ball when dropped from various heights. If _____ then _____ because _____. To learn more about this, visit Write hypotheses and improved methods If the drop height increases, the resulting bounce height will also increase, because as the drop height increases, so does the potential gravitational energy that can be converted back into kinetic energy on the bounce. The experiment will investigate the bounce efficiency of a tennis ball when dropped from different heights. Explain what is happening in the experiment in relation to the relevant theory. In this case, the class was learning about energy transfers, transformations, and types of energy forms. To learn more about this, visit Write better presentations After it's dropped, the tennis ball bounces to some extent in relation to its original drop height. At drop height, the tennis ball has a graviational potential energy that is then transformed into kinetic energy as it falls to the ground. On impact with the ground this energy is transformed into elastic potential energy when the ball crushes, which is then transformed back into kinetic energy, sending the tennis ball back into the air. These energy transfers and transformations are shown in Figure 1. Figure 1: Energy flow chart of a tennis ball (Boman, 2013) Discuss the variables involved in this experiment. The variable to be modified in the experiment is the drop height, so the drop height will be the independent variable studied. The effect of changing the drop height will be measured by calculating the bounce efficiency of the tennis ball. This is the dependent variable because it will change in response to changes made in the bounce height due to the different amounts of gravitational potential energy involved. Some small information about any calculations you'll use, particularly if they're not as common as the one used below. The effect of changing the drop height on bounce efficiency is found by measuring the resulting bounce height using a meter ruler and displaying the bounce as close as possible to the right angles to the ruler to minimize parallas errors. The bounce efficiency is then calculated with the following formula: Bounce efficiency = bounce height / height of x 100%What do you expect to happen with your full reasoning - links to the theory. This is similar to the statement because in the hypothesis, but it is explained here for a long time. It is expected that as the fall height increases, so is the bounce height to a limited extent. Bounce bounce efficiency is expected to rebound constant despite falling from different heights, this is due to the increased gravitational potential energy that turns into greater elastic potential energy in the tennis ball as it hits the ground, which in turn will increase the bounce height accordingly. Other relevant concepts areFriction & where it applies in this experimentWork (Force applied over a Distance, Work = Force x Distance) & where it applies in this experiment EquipmentRisks involvedManagement Tennis Ball- Someone could slip on the ball- Don't throw ball- Have receivers to prevent tennis balls on the run- Situ experiment in a closed area to prevent the ball from rolling away Ruler- The ruler could hit another student- Manage carefully- Use slow , careful movements rulers from 2 x 1 meterTennis balls3 people to: fall, capture and take measurementsOn the hard surface and level Independent variable Independent variable Controlled variables - Fall height- Bounce height- Bounce efficiency- Ball type (tennis ball)- Surface- Ruler- Wind conditions Figure 2: Diagram of the apparatus (Boman, 2013) Lists as many variables as possible involved in the table above. The 1 meter ruler has been placed firmly on the ground, vertically at 90° with respect to the surface. The ball was raised at various heights; 1m, 1.5m and 2m using metro rulers. The ball was then dropped and the bounce was measured by eye about 90 degrees from the ruler to minimize parallasse errors. The experiment was repeated for a total of 3 tests per height and recorded in a table with calculated averages. Or you could write your own method like the one below, to see more on this visit how to write better assumptions and methodsThe ruler was placed firmly on the ground at 90° so that it was as vertically as possible. The tennis ball was then dropped from various heights; 1, 1.5 and 2 meters above a hard surface, using a meter ruler, before it was dropped to the ground and the resulting bounce height measured. The bounce height was measured at a viewing angle of 90 degrees relative to the ruler to minimize parallasse errors. The procedure was repeated another 2 times to take the average of the results in a table. Show the data tables here. For more information about how to create a correct table, visit Skills - Tables and Charts. Be sure to insert a chart (see how here), because the eye collects trends and patterns more easily from a diagram than a table of numbers, multiple trendlines can be drawn to extrapolate and interpolate the data.use the graph paperputare the independent variable on the x-axis and the dependent variable on the y-axisSelect an appropriate scale in that the chart covers most of the chart Drawing chart. Connect the data points in succession (for example, blade numbers 2,3,4 would be connected, but 2, 6, and 12 would not). Sample calculationsTo show the properties of results and graphs, it is important to display a sample of the calculations used in the experiment. In this case I used as well as bounce efficiency calculations. Average = Sum of tests / number of testsA mean bounce level = (0.175 m + 0.180 m + 0.205 m) / 3 = 0.187 m Bounce efficiency = bounce height / fall height x 100 % = 0.187m / 0.500m x 100% = 37.3%Note that the table and charts are labeled (Table 1, Graph 1) this is important for clarity when referring to the results found during the discussion section. Indicate the relationship you expected to find before running the experiment. You should be able to find it in your introduction. The bounce height was expected to increase as the drop height increased, but it won't be as high as the original drop height and resulting bounce efficiency will remain relatively consistent throughout the drop height range. This is because when the ball was dropped from higher heights the gravitational potential energy increased simultaneously, which could then be converted back into kinetic energy as the ball bounced back. Review your results. Use them to respond to your goal. What do the results show? Which number/length was the best for the STELR model wind turbine? (booklet STELR, Q2, p.52) The survey results indicated that bounce efficiency did not change drastically as the fall height increased, however the trend line in Chart 1 appears to show a slight decline as the fall height increases. This trend implies that shorter drop heights are more efficient than larger drop heights. This could be due to the limits of the tennis ball to store kinetic energy as elastic potential energy because it requires increasing amounts of strength is to continue to crush the ball of the same amount when it lands. For example, it is easier to crush the ball a little, than to crush the ball in the middle of its original height, due to an increase in air pressure inside the ball when crushed. How reliable do you think your results were? Discuss. How do I change the procedure to make the results more reliable? (STELR, box 6 & 7, p.54) The reliability of the experiment was limited to the method by which the bounce height was measured. Since the tennis ball reached its maximum height on high-speed bounce, it was difficult to measure with adequate accuracy only with sight. Parallasse errors were difficult to avoid as the bounce height was slightly different for each test. To improve the reliability of the results of this experiment, high-speed video captures could be used that could be slowed down to accurately measure against the background ruler. The original drop height also varied in a certain due to the nature of releasing the tennis ball by hand. This drop height could be standardized using a mechanical mechanism in which to drop the ball at constant heights, such as rolling the ball along an elevated ramp on the floor. What is a change I would make to the way you conducted the experiment, in light of your experience? (booklet STELR, Q3, p.52) Thumbs Inches It is clear from recent experience gained through this experiment that three data points are not sufficient to draw a concluding trend, since it is difficult to establish at present whether the trend is linear (straight) or perhaps curved. Future experiments should investigate bounce efficiency on more drop heights to provide more data points to map the trend. What are the implications of your results for commercial windmills? (booklet STELR, Q4, p.52) There are limited applications of these results for commercial purposes, unless you need to estimate the height at which an object would bounce from vast drop heights. This could be done by calculating the rebound efficiency of the object at smaller heights and extrapolated using efficiency to find the estimated bounce height. This could apply to Space Rover landings that use airbags to reduce the impact on planetary surfaces, where the bounce height could affect the final landing position. The conclusion summarizes the results of the experiment very briefly and brings them back to the Hypothesis. The results of the experiment support/do not support the hypothesis that as ... The objective of the investigation was to determine the bounce efficiency of a tennis ball at different heights and it was hypothesized that with the increase in the fall height, also the bounce height due to the extra gravitational potential energy added with an increase in the fall height. The results indicated subtle changes in the bounce efficiency of the tennis ball ranging from 37.3% to 32.9%, but with an overall decrease in the linear trend line chosen. The results of the experiment support the hypothesis that as the fall height increases, the bounce height due to an increase in gravitational potential energy has also increased, however the bounce efficiency has remained relatively constant. Consistent.