

Activity3 Questions Key

Question #1: Is the height of the ramp or the length of the ramp more important in determining the speed the ball when it reaches the bottom of the ramp? What evidence do you have to support your claim?

Answer: It is the height of the ramp that is more important in determining the speed of the ball when it reaches the end. The length of the ramp does not change as you increase the height of the ramp system. Some students may think that the actual length of the ramp decreases as one end is elevated. An advantage of using a ruler for a ramp is that it should be obvious that its length is not changing. We want to point out that the length of the ramp has no effect on the outcome.

Question #2: Using your graph, how far would you predict the cup would slide if you raised the height of the ramp by one more block?

Answer: Answers will vary according to the student's original data. The prediction should show the student recognizing a pattern in the data and then projecting that pattern forward one more block on their plots.

Question #3: Compare your two graphs. Where does the golf ball have its greatest gravitational potential energy? What evidence are you using to support your decision?

Answer: The ball has its greatest gravitational potential energy at its highest point. Student data should show that the greatest speed and greatest energy transfer to the cup came with the greatest number of blocks elevating the ramp.

Question #4: For the same ramp height, which has more gravitational potential energy, the solid golf ball or the hollow golf ball? What evidence is there to support your decision?"

Answer: At the same release height, the solid golf ball must have more gravitational potential energy because the "change" produced by the hollow ball is not as significant as the "change" produced by the solid ball. The "change" in this case is the movement of the cup. The cup moves further when it is struck by the solid ball, meaning that more energy was transferred from the ball to the cup. This question reinforces the idea that gravitational potential energy, like kinetic energy, is dependent upon the mass of the object.

Question # 5:Talk to your lab partners and describe what happens to the energy that you gave the golf ball when you lifted it to the top of the ramp. Trace what became of this energy as the ball was placed on the ramp, released and finally rolled to rest with the cup.

Lift to ramp (chemical energy from your body to KE of arm)

CE body → KE Arm → GPE on ramp → KE rolling Ball →

KE sliding cup + TE Thermal Energy (heat) in table cup slides across