

Activity 2 Questions Key

Question #1: This is a review question from Activity 1. As the release height of the golf ball is increased, how does the speed of the ball at the bottom of the ramp change?

Answer: As the release height of the golf ball increases, the speed at the bottom of the ramp also increases.

Question #2: Based on your graph, what effect does the speed of the golf ball have on the number of cards it knocks down?

Answer: Students should conclude that the greater the speed, the greater the number of cards knocked over by the ball. The greater speed enables the golf ball to create a greater change.

Question #3: By replacing a solid golf ball with a hollow golf ball and repeating the experiment of Part A, what variables will be changed, and what variables will be kept the same?

Answer: Students should respond that the only variable change is the mass of the golf ball. Since gravity speeds up all objects equally, both the solid and hollow golf balls will leave the ramp with approximately the same speed. Students may want to say that the solid ball will roll faster down the ramp. The “Investigating Further” section may help with this question. All other variables are kept the same.

Question #4: What effect did changing the mass of the ball (substituting the hollow ball for the solid ball) have on the resulting number of cards knocked down?

Answer: The hollow golf ball is much less effective at the task of knocking over the index cards. The difference in the solid and hollow balls is their mass, so students should arrive at the conclusion that mass (like speed) is a variable that affects the amount of energy an object possesses.

Question #5: Look at the results of your experiments and identify in which case the golf ball had the greatest kinetic energy.

Answer: The solid ball released from 5 blocks height would have the greatest kinetic energy, since more cards were knocked over.

Question #6: Considering the entire motion of the golf ball, from its release at the top of the ramp to the point where it comes to rest. At what point in its motion does the ball have its greatest kinetic energy?

Answer: The ball would have its greatest kinetic energy at the bottom of the ramp before it begins rolling on the table or knocking cards over.

Question #7: In the question above, you identified the solid golf ball as having the greatest kinetic energy. Describe how you could give the hollow golf ball this same amount of kinetic energy.

Answer: If the hollow ball were greatly accelerated it would have the same energy as the solid ball. The amount of energy possessed is determined by a relationship between the speed of the ball and its mass.