Car Crash

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Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

Start learning right now about how vehicle crashes claim lives each year. Take the following brief quiz to see how much you already know about how to keep safe during a vehicle crash. See the bottom of page 4 to check your answers.

1. Based on current statistics, which is the deadliest type of vehicle crash?
    a. front end
    b. rear end
    c. side impact
    d. rollovers

2. Talking on a cell phone while driving increases the likelihood of being in an accident by about what percentage?
    a. 10%
    b. 50%
    c. 200%
    d. 400%

3. About what percentage of fatal vehicle accidents involve alcohol?
    a. 10%
    b. 25%
    c. 40%
    d. 65%

4. On which day of the week is a fatal vehicle accident most likely to occur?
    a. Saturday
    b. Monday
    c. Wednesday
    d. Friday

5. About how many people around the world currently die each year from vehicle accidents?
    a. 50,000
    b. 150,000
    c. 560,000
    d. 1,300,000

Follow the Bouncing Ball

Materials

1 ping-pong ball   1 golf ball   meter stick   hard-surfaced floor

Procedure
1.   Hold the golf ball in one hand waist high above a hard floor.
2.   Hold the meter stick vertically in your other hand so that one end of the meter stick rests on the ground and the other end of the stick is about waist high.
3.   Drop the golf ball and use the meter stick to note about how high the ball bounces on its first bounce off the floor. Record this information in table 1.
4.   Hold the ping-pong ball in one hand waist high above a hard floor.
5.   Hold the meter stick vertically in your other hand as described in step 2.
6.   Drop the ping-pong ball and use the meter stick to note about how high the ball bounces on its first bounce off the floor. Record this information in table 1.
7.   Predict how high you think the ping-pong ball and golf ball will bounce if the ping-pong ball is placed on top of the golf ball and released at the same time.
8.   Record your prediction in table 1.
9.   Place ping-pong ball on top of golf ball and hold them with one hand at waist level.
10.   Hold the meter stick vertically in your other hand as described in step 2.
11.   Drop the two balls at the same time onto the hard-surfaced floor.
12.   Observe the drop results and record your observations in table 1.
13.   Provide an explanation for what you observed.

Table 1.

Drop	Bounce Height (centimeters)
Golf ball	
Ping-pong ball	
Prediction: Ping-pong (on top of golf ball)	
Prediction: Golf ball (with ping-pong ball on top)	
Observed: Ping-pong (on top of golf ball)	
Observed: Golf ball (with ping-pong ball on top)	

Explanation for observations:

Follow the Bouncing Ball: Explained

If you just compared the balls' dropping speeds and bounce heights you probably thought the height of the ping-pong ball's bounce would equal to the sum of the golf ball's and ping-pong ball's initial solo bounce. But as you just saw, the ping-pong ball's bounce height was much higher, so there must something else affecting the bounce height. Any inferences?

Think of the bounce as a collision between the balls and the floor. As with any collision, the speed of the object is only part of the story. The other part is the mass of the object. The product of the mass and the velocity determine the momentum of the object. Think of the momentum as the "bashing" power of the balls.

We know the total of momentum in any collision stays the same, or as the science-types stay, it is conserved. The momentum of the two balls before impact must equal the momentum of the two balls after impact. The golf ball's greater mass gives it greater momentum, which is transferred to the ping-pong ball during the collision. Because the mass of the ping-pong ball is much smaller, it has to have a much larger velocity in order for total momentum to remain the same.

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