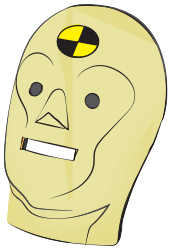
DISCUSSION QUESTIONS

Name: _____ Class: _____ Date: _____

"UNDERSTANDING CAR CRASHES: IT'S BASIC PHYSICS"



Part III: After the Video

Directions: *After viewing the video, work alone, in pairs, or in small groups to answer the questions assigned by your instructor in 2-3 sentences each.*

1. Ever tried to stop a 150-pound (68 kg) cannonball fired towards you at 30 mph (48 km/hr.)? No, probably not. But you may have tried to brace yourself in a car collision. How are the two situations similar?

2. Show mathematically why an 80,000-pound (36,000 kg) big rig traveling 2 mph (0.89 m/s) has the SAME MOMENTUM as a 4,000-pound (1,800 kg) sport utility vehicle traveling 40 mph (18 m/s).

3. During the Egg-Throwing Demonstration, the wall stopped one egg and the bed sheet stopped the other egg.
   A. Explain why one egg broke but not the other.
   B. Explain why BOTH eggs experienced the same impulse

4. Explain why the fortunate race car drivers survived their high speed crashes.

5. Describe 2 or more examples where momentum is reduced by applying a smaller collision force over a longer impact time (in other words, where things "give way" during a collision to lessen the impact force).

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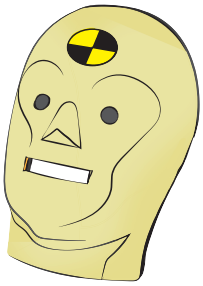

6. Which would be more damaging to your car: A. having a head-on collision with an identical car traveling at an identical speed OR B. driving head-on into the Vehicle Research Center's 320,000 pound (145,455 kg) deformable crash barrier? Explain.

7. Show mathematically why a small increase in your vehicle's speed results in a tremendous increase in your vehicle's kinetic energy. For example: doubling your speed from 30 mph to 60 mph (48 km/hr. to 97 km/hr.) results in a quadrupling of your kinetic energy.

8. The Law of Conservation of Energy states: Energy cannot be created or destroyed; it can be transformed from one form to another but the total amount of energy never changes. Car crashes can involve huge amounts of energy. How does the crashworthiness of the car affect the transfer and transformations of energy and, ultimately, protect the occupants?

9. In the video's "shipping box analogy," which safety feature in a car is analogous to the:
   A. Cardboard shipping box
   B. Packing foam in the box
   Explain how each feature functions differently to protect the occupants.