

Name: \_\_\_\_\_

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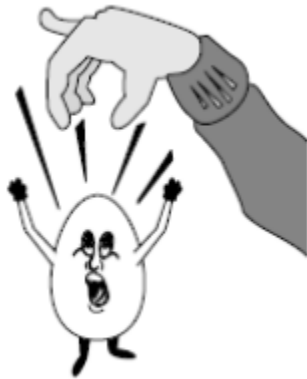
## Unit 4: Momentum and Energy

### ***Crash Course! Designing a Collision Safety Device***

Have you ever asked yourself how people survive major car collisions or how does physics explain the effectiveness of air bags? Scientists and engineers apply the law of physics to reduce damage to both cars and passengers. Hopefully, during this activity, you will discover the physics underlying some of the “EGGcellent” safety devices in a car! Your goal is to design, build, test, and evaluate a landing pad or “safety device” to protect an egg during a collision.

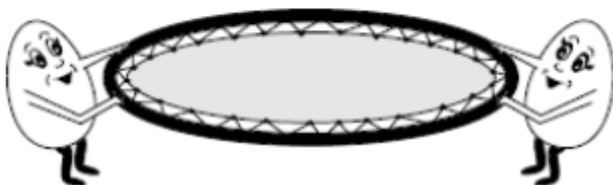
#### ***What are the rules?***

Using no more than 10 sheets of paper, one meter of masking tape and following the parameters given, design, build, and test a landing pad/“collision safety device” that will protect an egg dropped from a maximum height of 2.8 m. You will not receive your “egg dummy” until test time.



#### ***Egg “Collision Safety Device” Parameters:***

1. You may use less, but no more than 10 sheets of paper. Record the amount of paper used, so that in the event of a tie, the device constructed with the fewest sheets of paper will be declared the superior safety device.
2. Collision Safety Devices must be free-standing. You cannot support your device by holding them or taping them to another structure.
3. Nothing may be attached to the egg.
4. Dropping height is measured from the bottom of the egg, at the release point, to the landing pad of the Collision Safety Device.
5. Eggs will be dropped by a designer.
6. Eggs that miss the Collision Safety Device when dropped are eliminated.
7. Eggs will be inspected before and after drop and must not show any cracks.
8. Eggs that survive the initial impact but roll off their device and break are eliminated.
9. Designers that break their egg by accident or carelessness are eliminated.
10. Devices must be completed within a time limit of 20 minutes.



Answer the following questions:

1. Did your egg have momentum before the drop? Why or why not?
2. Did the momentum of the egg change as it fell? If so, what caused it to change?
3. Where in the fall was the momentum of the egg the greatest?
4. Does the egg have momentum after the impact with the safety device (or the floor) stopped it?
5. Why do you think that some eggs cracked while others did not when they hit the safety device (or the floor)?

