Name_____
Period_____

The Egg Drop

DESCRIPTION
Your goal is to design and build a craft that will carry your egg from the top of the bleachers (approximately 7½ m) to the ground intact.

LIMITATIONS
1. I will provide the egg on the day of the drop.
2. Craft cannot weigh more that 250 g, without egg. (Heavy craft will be penalized 10%)
3. Use of parachutes or other devices designed to the slow the rate of descent are NOT allowed. (Eggs taking longer than 1.5s to drop will be penalized 5%)

PRE-EGG DROP QUESTIONS:
Do the following activities designed to refresh your understanding of impulse. These questions are to be turned in with the Lab Report portion of the lab.
Remember:

$$p = mv$$
$$\Delta p = mv_f - mv_i$$
$$F\Delta t = \Delta p$$

1. The average mass of a chicken egg is approximately 57.0 g (0.0570 kg). If each team were to drop the egg, without their craft, from 5.00 meters, what would the velocity of the egg be just before hitting the ground? (Hint, use the following chapter 2 equation: $v_f^2 = v_i^2 + 2a\Delta y$, or conservation of energy).

2. What will be the egg's momentum just before hitting the ground?

3. What is the egg's change in momentum?

4. What is the egg's impulse?

5. If 25.0 N of force is required to break your egg, what is the minimum time needed for the impulse of your craft to save your egg?

DIRECTIONS FOR SUBMITTAL ON DAY OF THE EGG DROP LAB:

1. Cleared for launch! This means your craft has been weighed on the scale whether it was pass or fail. No egg craft may be dropped unless weighed. (Preferably, your craft was officially weighed in the day before the drop.)
2. Team Member Assignments (Names):

    a. Presenter/s: _____

    b. Egg Dropper: _____

    c. Landing Crew: _____

    d. Disposal/Clean up: _____`
3. Assignment Descriptions:
    a. Presenter: The presenter, on the day of the drop, will describe their teams design and express a unique feature of their design that makes their craft most likely to protect their egg.
    b. The Egg Dropper: This should be a taller person. This person will have to reach over the back of the bleacher lowering their craft to exactly five meters in order to ensure all craft fall from the same altitude.
    c. Landing Crew: This person/s is responsible for the removal of the egg from the craft so that Mr. Miles can check the condition of the egg after falling.
    d. Disposal/Clean Up: This person/s are to clean any mess that might be made in the egg drop. Any unwanted items are to be disposed of. Any items to be retained are not left behind!

REPORT

You must turn in this completed sheet along with a neat, well-written report that discusses how you engineered your device and how it works in terms of **impulse** and **momentum.** Don't tell me, for example, that your craft will "soften" the landing. That isn't physics! A clearly labeled diagram of your device is also required. This analysis should be at least one paragraph.

GRADING

To earn an A, you must show up with an egg drop craft on the assigned day and all the requirements listed under Report must be met. To earn an A+, all the requirements to earn an A must be met and the egg must land unbroken. Grade will be reduced by the amounts listed under Limitations for egg craft designs that don't meet requirements. Extra credit will be given to the craft with the least mass that delivers the egg intact to the ground.