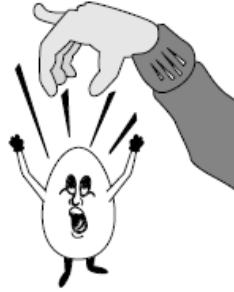# Activity – Egg Drop

Physics

Research Question

How can you work in groups to design, build, test, and evaluate a "collision safety device" (in the form of a landing pad) using no more than 10 sheets of paper to protect a raw egg during a collision with a hard surface.

Hypothesis

Predict what will happen if you drop an egg on the floor.

Predict what will happen if you drop an egg on a pillow and explain why an egg dropping onto a pillow may produce a different result.

Procedure

1. Groups may use less, but no more than 10 sheets of paper. Report to Mr. Menzella the amount of paper used to build your safety device. 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. Teams cannot support their devices by holding them or taping them to another structure.
3. Nothing may be attached to the egg.
4. Scissors may not be part of the Collision Safety Device.
5. Eggs will be dropped by a member of the Device's design team.
6. Eggs that miss the Collision Safety Device when dropped are eliminated.
7. Eggs will be inspected before and after each drop and must not show any cracks.
8. Eggs that survive the initial impact but roll off their device and break are eliminated. Teams that break their egg by accident or carelessness are eliminated.
9. In order to simulate car collisions with greater momentum the eggs will be dropped from successively greater heights (1.0 m, 2.0 m, 2.5 m). If your device protects the egg from the 2.5 m drop you are exempt from the homework tonight.
10. Your devices will be awarded points based on the survival of your egg:
    5 points: Egg survives the fall fully intact
    4 points: Egg is cracked, but intact
    3 points: Egg is broken (any white or dampness coming out of shell)
    1 point: Egg is destroyed (smashed to bits, yolk oozing out, etc.)
11. Devices must be completed within the time limit stipulated.

Name _____   Condition of the egg: _____ pts.
Mr. Menzella
Physics
Date _____
Directions: Answer the following questions in complete sentences on a separate sheet of paper. (see attached rubric for grading)

Hypothesis

Predict what will happen if you drop an egg on the floor.

Predict what will happen if you drop an egg on a pillow and explain why an egg dropping onto a pillow may produce a different result.

Analysis:

1. Why would something not break if it fell on a pillow as compared to the bare floor? (use the words force and contact time in your response)

2. List two ways you could improve your collision safety device.

3. What was the rationale behind your design (explain your reasoning).

4. If you were to do this challenge again, what would you do differently?

5. Where would you see an application of this activity in the real world?

Rubric

	(4)	(3)	(2)	(0-1)
Hypothesis	The prediction is in the format of "If-then-because" including a valid reason supported with an explanation AND physics concept(s).	The prediction lacks one of the following: --format of "If-then-because" --valid reason --explanation --physics concept(s)	The prediction lacks two of the following: -- format of "If-then-because"" --valid reason --explanation --physics concept(s)	The prediction is incomplete or not present.
Analysis	The analysis questions are answered in complete sentences and student: --list and explains design & ways to improve device --cites specific evidence --explains rationale behind design & what student would do differently --discusses the validity of the experiment in the real world	The analsysi lacks one of the following: --list and explains design & ways to improve device --cites specific evidence --explains rationale behind design & what student would do differently --discusses the validity of the experiment in the real world	The analysis lacks two of the following: --list and explains design & ways to improve device --cites specific evidence --explains rationale behind design & what student would do differently --discusses the validity of the experiment in the real world	The analysis is grossly incomplete or is not present