Name: _____

Physics Egg Drop Summary

Material List
List the materials you used in constructing YOUR egg device. If you used only 10 straws, then list that, if you did not use any paper clips, don't list them.

Description of Device
Write a detailed description of the design you made. Create a verbal picture so anyone who reads it can image your device.

Description of Fall
Write a description of way your egg device traveled as it fell to the floor and a description of how it landed and the results about your egg's survival.

Inertia Explanation
Restate Newton's 1st Law, the law of inertia, using the details about the egg drop and your egg device design.

Newton's 2nd Law Explanation
Restate Newton's 2nd law of motion using the details about the egg drop and your egg drop device in your explanation. Identify the forces that act during the drop and during the landing.

Action-Reaction Explanation
Define Newton's 3rd law of motion and list at least three action-reaction force pairs that occurred during the drop and landing of the egg device.

Final Velocity Calculation
Show how the height of the egg drop, 4.9 meters, is used to calculate the velocity of the egg device just before it hits the floor. Assume an acceleration of 9.8 m/s^2. Identify the variables, list equations, show calculations and write final answer rounded to significant digits and proper units.

Change in Momentum Calculation
Using the mass of you egg device and the velocity you calculated earlier, find the change in momentum of your egg device during its landing. Identify the variables, list equations, show calculations and write final answer rounded to significant digits and proper units.

Discussion of Impulse
Discuss the concepts of change in momentum and impulse in regards to you egg drop device. Also, specifically mention the influence of time to stop the egg and its relationship to force and impulse.

Reflections on Performance
Discuss reasons why your device successfully protected the egg from breaking or why your device failed to prevent the egg from destruction. These reasons need to specifically address properties about your device design and properties about its construction.

Improvements
Whether your device succeeded or failed to protect the egg, list improvements you could make to your design that would allow it to protect an egg if dropped multiple times from an even greater height. Describe some features you saw in other designs that you might be able to incorporate into you device. What recommendations would you make for students who do this next year?

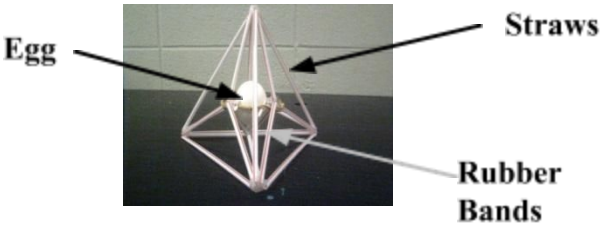
Extraterrestrial Applications
You tested your lander on Earth, but what if we wanted to use it somewhere else in the solar system? Briefly discuss how your lander would work on the Moon or on Mars and what modifications you might need to make for either of those places.

Egg Drop Report

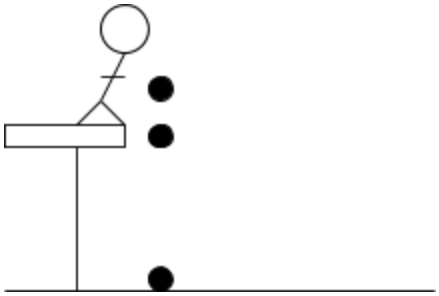
Material List

My egg drop device used the following: 22 straws, about 15 inches of string, about 2 hot glue sticks, 2 rubber bands, and 1 raw egg.

Device Design



Drop Diagram



Explanations

- Newton's Laws

Explain how Newton's laws of motion apply to this situation. Describe how some details of your design are influenced by each law of motion:
(1) the law of inertial,
(2) F = ma,
(3) action-reaction forces.

- Velocity Egg Hits Floor

Explain how the measured height of the drop is used to calculate the velocity at which the devise hits the floor. Assume $g = 9.80\ m/s^2$.

$d =$ $\qquad v_f^2 = v_i^2 + 2\,a\,d$

$v_i =$

$v_f =$

$a =$ $\qquad$ Measure the height of the drop.

$t =$

- Momentum and Impulse

Explain how the momentum and the impulse equations apply to this situation. Use equations in you explanations, and describe how some details of your design influence the magnitude of the variables. Specifically mention the designs influence on the "time" variable.

$p = m\,v$

$F\,t = m\,\Delta v$ $\qquad$ Measure the mass of the egg device.

Summary

My egg device (worked / failed) because … (list at least 3 reasons)

I could improve my design by …

3 pts.	Material List	
4 pts.	Design Picture	
3 pts.	Drop Picture	
	Newton's Laws	
4 pts.	Inertia	
3 pts.	F = m a	
3 pts.	Action/Reaction	
	Final Velocity	
6 pts.	Calculation v_f=	
	Impulse Momentum	
4 pts.	Calculation F t = m Δ v	
4 pts.	Discuss Time & Force	
	Summary	
9 pts.	3 Reasons	
4 pts.	Improvement	
3 pts.	Report Appearance	
Xtra	Egg Survival	

50 pts.	TOTAL POINTS	