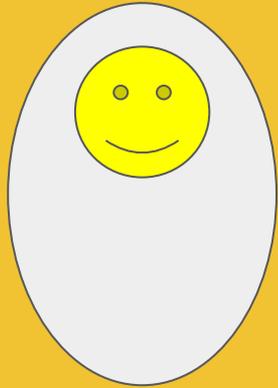


EGG DROP EXPERIMENT



**IS IT POSSIBLE TO DROP
AN EGG WITHOUT
BREAKING IT?**

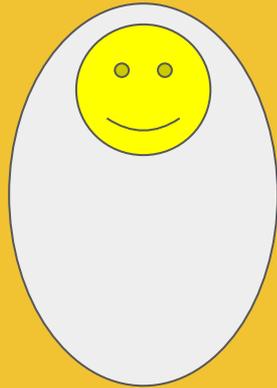
YES!

**Physics 9
Ms Barrantes**

RESEARCH REVIEW
No eggs harmed for this report.

**Austin Horner
January 20 2023**

EGG DROP EXPERIMENT



TO SAVE THE
EGG, SLOW
DOWN THE
IMPACT!

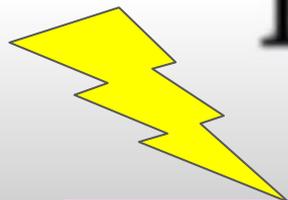
Physics 9
Ms Barrantes

Austin Horner
January 20 2023

$$F\Delta t = m\Delta v$$

The Impulse

The Change
in Momentum

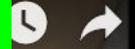


**TO SAVE EGG, SPREAD STOPPING
FORCE OUT OVER TIME**

Egg Drop Challenge- Physics Explained

<https://www.youtube.com/watch?v=IYCY6s-GmQA>

**FLORIDA EXPERIMENT:
EGG DROPPED OFF A BUILDING
In a roll of toilet paper**



▶ ⏪ 🔊 3:00 / 8:02



Egg Drop Challenge- Physics Explained



**TOILET PAPER DELIVERY
VEHICLE**

FAIL

<https://www.youtube.com/watch?v=IYCY6s-GmQA>

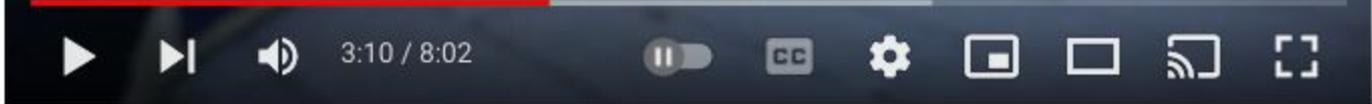
▶ ⏩ 🔊 2:48 / 8:02





In toilet paper roll

EGG CRACKED



Egg Drop Challenge- Physics Explained

 SciTeens
419 subscribers

Subscribe

 148



 Share



Egg Drop Challenge- Physics Explained

ATTEMPT #2



PAPER TOWEL VEHICLE #2

Gives more length to absorb impact

3:14 / 8:02



3:48 / 8:02

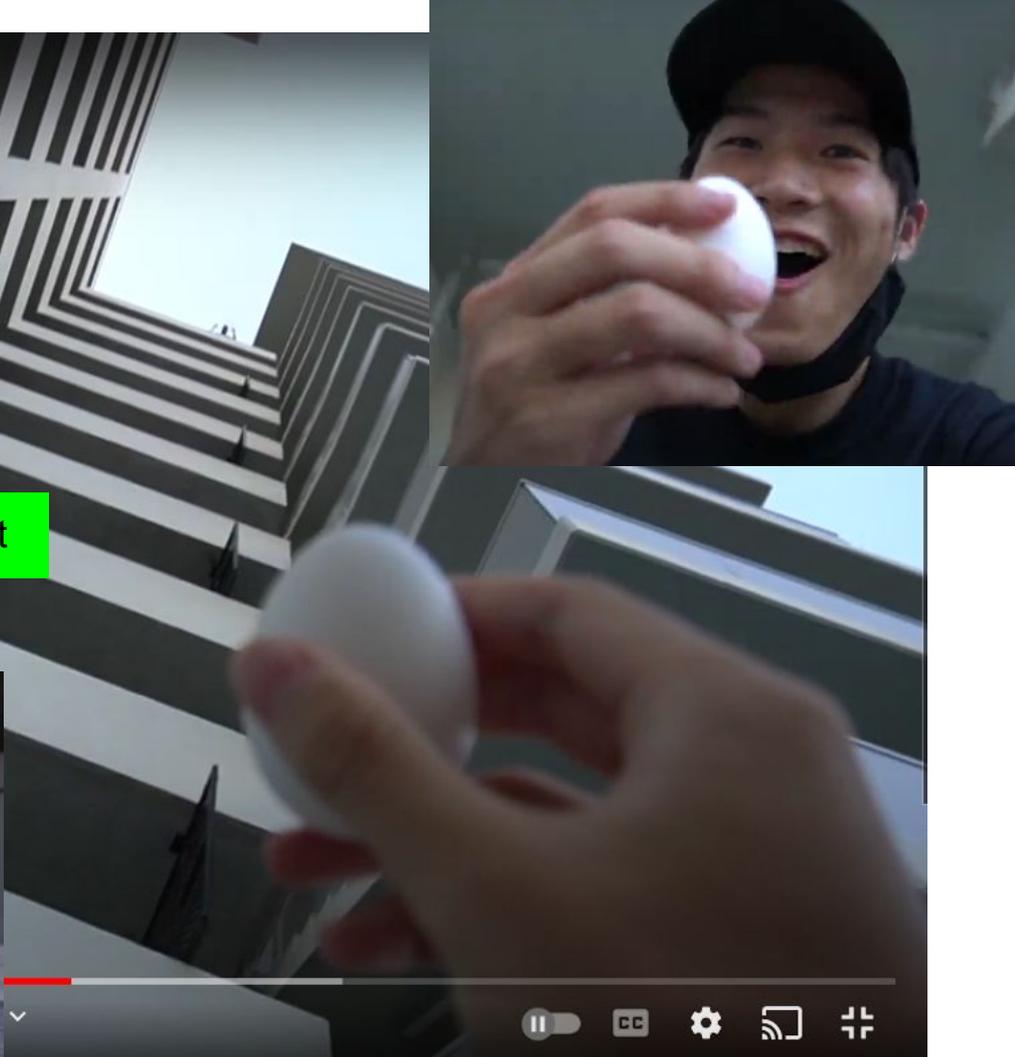


Egg Drop Challenge- Physics Explained

SUCCESS!!

The longer padded tube cushioned the impact

Egg Drop Challenge- Physics Explained

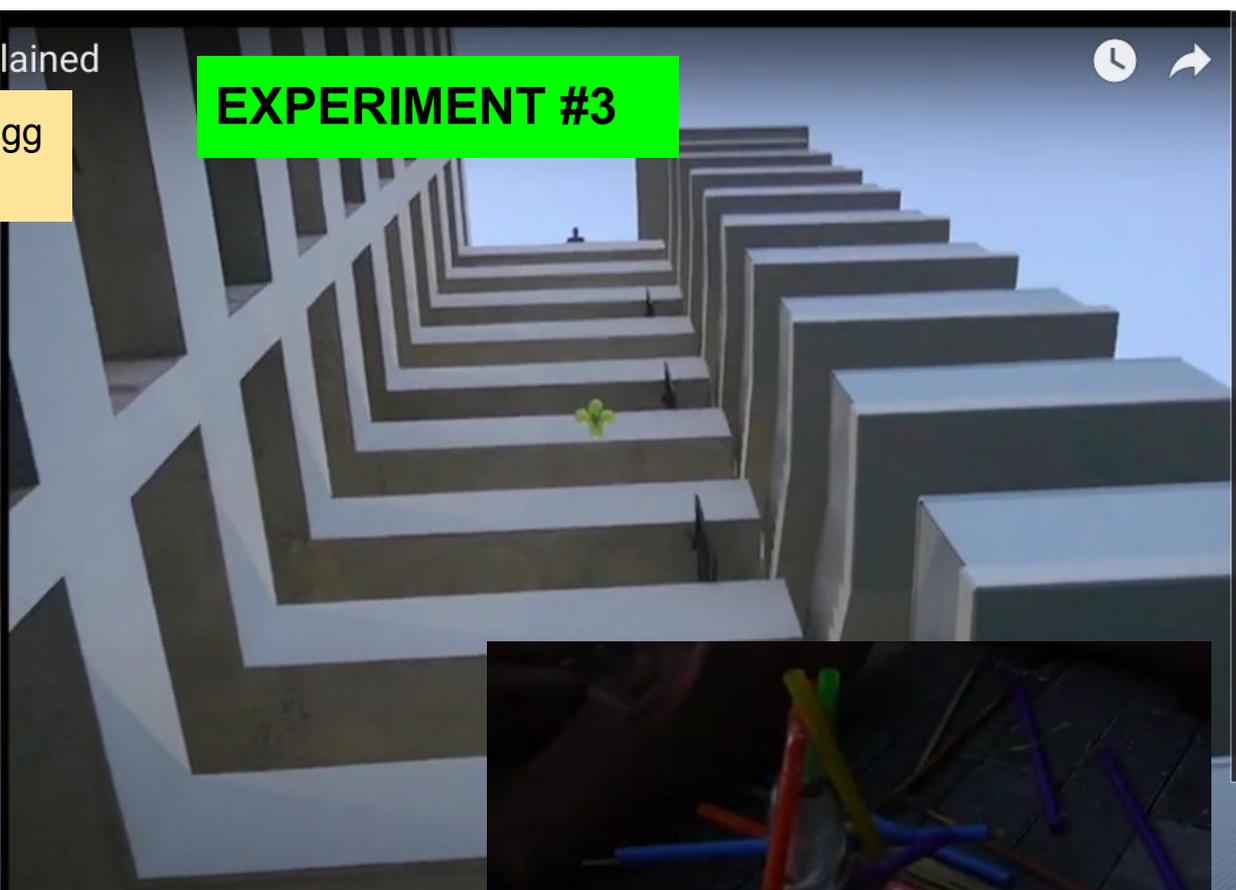
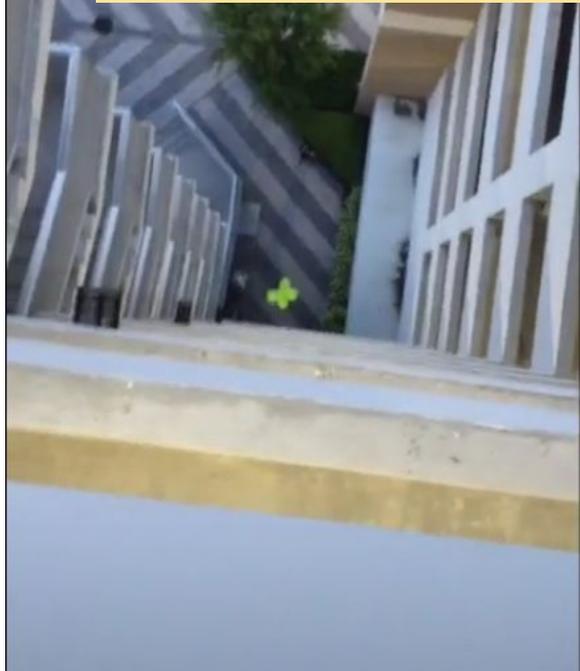


Egg Drop Challenge- Physics Explained



Is it possible to protect the egg with straws?

EXPERIMENT #3



TIPI-shape force deflector with balloons for air drag



Egg Drop Challenge- Physics Explained

LANDED - How's the egg?



6:24 / 8:02



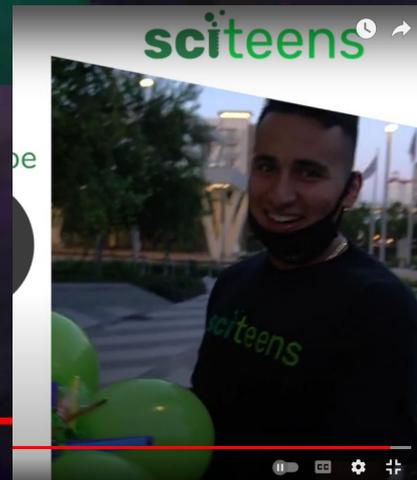
Egg Drop Challenge- Physics Explained

ge- Physics Explained

EGG OK!

SUCCESS!!

▶ ⏪ 🔊 7:12 / 8:02





1st place Egg Drop project ideas- using SCIENCE



Watch later



Share

Distributing the force around and away from the egg is the key to protecting it.

MORE VIDEOS

Play (k)

https://www.youtube.com/search?q=egg+drop+experiment&rlz=1CAUPQT_enUS961&oc=egg+drop+experiment&ads=chrome..69i57j0i512i6i69i60i6086j0i7&source=chrome&te=UTF-8&safe=active&suui=en#fostate=live&vid=cid:c1dfa8b9_vid:nsnvl8llfH4



4:57 / 9:48

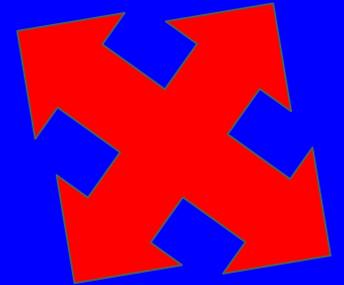


YouTube





Direct force AWAY from egg



WRONG! THIS HAS PUNCTURE LOAD.



1st place Egg Drop project ideas- using SCIENCE

Press **Esc** to exit full screen



Watch later



Share

Two layers of balloons protect the egg



MORE VIDEOS

6:36 / 9:48

CC Settings YouTube Full Screen

SUCCESS

WAYS TO PROTECT AN EGG

PARACHUTE - Slows down fall. Minimizes final momentum and impact.

BUBBLE WRAP -

TETRAHEDRON - Force deflector

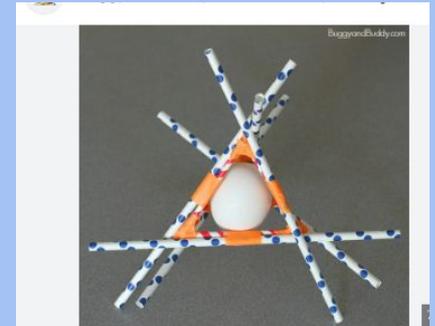
AIR BAG

SHAVING CREAM - Effective at 1 meter

ORANGE PEEL - Egg inside hollowed-out orange, inside inflated surgical glove, inside a paper cone (Mythbusters video) dropped from building roof.



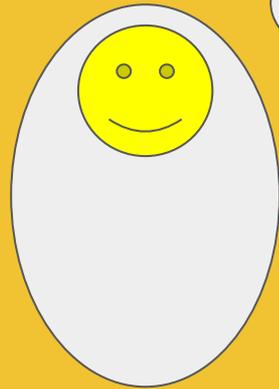
AIRBAG on MARS LANDER



STEM for Kids: Egg Drop Project -
Buggy and Buddy

Visi

EGG DROP EXPERIMENT



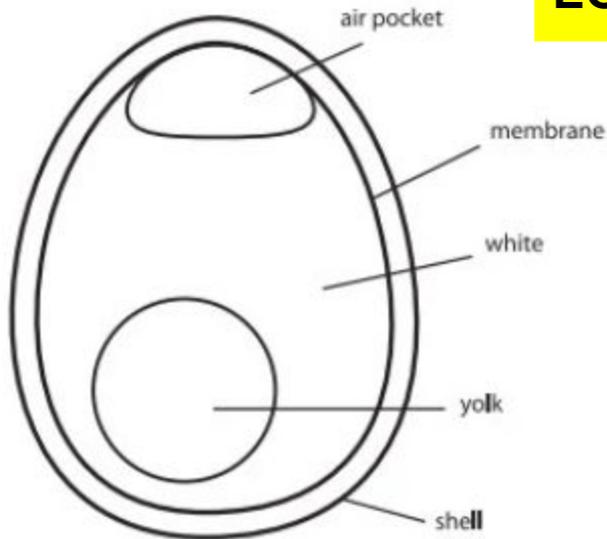
**EGGS ARE
STRONG**

*That's why a hen
can sit on eggs
without breaking
them!!*

**Physics 9
Ms Barrantes**

**Austin Horner
January 20 2023**

EGG SURVIVES DROP FROM HELICOPTER



oto: helicopter, easter eggs, easter, dropping |

The Challenge:

On August 22, 1994, David Donoghue threw an egg out of a helicopter onto a golf course in the UK, from a height of 213 meters (700 feet). He now has the record for the longest egg drop without breaking in the world (all without an outside structure for added protection!).





CAN'T CRUSH an egg with one hand!

ARCH-SHAPE: STRONGER THAN YOU'D THINK!





Short communication | [Free Access](#)

A rare mineral, vaterite, acts as a shock absorber in the eggshell of a communally nesting bird

Steven J. Portugal, James Bowen, Christina Riehl

First published: 18 August 2017 | <https://doi.org/10.1111/ibi.12527> | Citations: 13

Associate Editor: Jesus Martinez-Padilla.

Abstract

Birds' eggshells are primarily composed of calcium carbonate (CaCO₃). However, the eggshell also contains vaterite, a rare and thermodynamically unstable mineral phase which remains unknown. We experimentally investigated the effects of the vaterite coating on eggshells of the Greater Ani *Crotophaga major*, a tropical cuckoo. Vaterite removal did not affect vapour conductance rates across the eggshell, indicating that the vaterite coating does not influence gas exchange during embryonic development. However, nanoindentation revealed that the hardness and elasticity of vaterite is similar to that of calcite, and white light interferometry showed that the vaterite layer increased the total thickness of the shell cuticle by up to 10%. Furthermore, calculations of contact mechanics found that when two eggs come into contact, the depth of the surface deformation caused by the contact is far less than the thickness of the vaterite coating. These results suggest that the layer of vaterite spherules may act as a shock absorber for the underlying calcite shell, protecting it from mechanical damage caused by collision with other eggs in the nest and reducing the risk of eggshell fracture during incubation.

A layer of spherules acts as a shock absorber in an egg

More secrets of egg strength

SHOCK ABSORBERS IN THE BODY

BONE TISSUE

BABY AMNIOTIC FLUID

Muscles and tendons'

EGGS ARE PRETTY STRONG!!

Language
English

Print

1. Slow down the descent speed.

Parachutes are an obvious method for slowing the decent speed, as long as the design includes a way to keep the parachute open.

2. Cushion the egg so that something other than the egg itself absorbs the impact of landing.

The largest end of the egg has an area of air trapped between the egg's two membranes. This air space forms when the contents of the egg cool and contract after the egg is laid. It accounts for the crater you often see at the end of a hard-cooked egg. Upon impact the heavier spherical yolk continues moving towards the ground. The compression of the airspace acts like an air bag for the eggs' valuable contents.

Building an artificial cushioning device will also help absorb the impact of landing.

The largest end of the egg has an area of air trapped between the egg's two membranes. This air space forms when the contents of the egg cool and contract after the egg is laid. It accounts for the crater you often see at the end of a hard-cooked egg. Upon impact the heavier spherical yolk continues moving towards the ground. The compression of the airspace acts like an air bag for the eggs' valuable contents.

Building an artificial cushioning device will also help absorb the impact of landing.

3. Orient the egg so that it lands on the strongest part of the shell.



Mantis-shrimp
hammer blow
can break glass.

Vaporizes water,
makes bubble,
pressure
collapse makes
flash of light

Egg Drop Challenge- Physics Explained

PHYSICS
Mechanics
Sound & Waves
Thermodynamics
E & M
Optics
Modern Physics

MATH
Basic
Algebra
Geometry
Trigonometry
Pre-Cal
Calculus 1, 2, 3
Differential Eqn
Linear Algebra

ASTRONOMY
The Night Sky
Motion of Moon
Light & Telescopes
The Solar System
The Sun & Stars
Life Cycle of Stars
H-R Diagram
The Big Bang

lectureonline
CHEMISTRY
Atoms and Ions
Acids and Bases
Thermochemistry
Lewis Structures
Solutions
Organic Chemistry

MECHANICAL ENG.
Equilibrium
Moments
Center of Gravity
Distributed Loads
Centroids
Trusses
Beams
Cables
KALMAN FILTER

ELECTRICAL
Basic Laws
Circuit Analysis
Op Amps
Capacitors & Inductors
RC & RL Circuits
Laplace Transform
Fourier Transform
Fourier Series



Michel van Biezen

598K subscribers

SUBSCRIBE

HOME

VIDEOS

PLAYLISTS

COMMUNITY

CHANNELS

ABOUT



Popular uploads

▶ PLAY ALL

$P_2 = ?$
 $R_1 = 2ATM$, $v_1 = 2m/s$, $h_1 = 5m$, $h_2 = 10m$
 $P_1 + \rho gh_1 + \frac{1}{2}\rho v_1^2 = P_2 + \rho gh_2 + \frac{1}{2}\rho v_2^2$

8:04

Why are Pulleys a Mechanical Advantage?
 $w = 100N$, $F = ?$

5:52

$y = ax^2 + bx + c$
 $y = x^2 - 6x + 5$
 $a = 1$, $b = -6$, $c = 5$

11:33

$a = ?$
 $N = mg \cos \theta$, $F_f = \mu N = (\mu mg \cos \theta)$
 $mg \sin \theta$, $\theta = 30^\circ$

7:01

$A = \begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix}$, $A^{-1} = ?$

14:57

Physics Fluid Flow (1 of 7)
Bernoulli's Equation

Mechanical Engineering:
Particle Equilibrium (11 of ...)

Algebra - Understanding
Quadratic Equations

Physics - Mechanics: The
Inclined Plane (2 of 2) With...

Algebra - Finding the Inverse
of a Matrix (1 of 2) A 3X3...

963K views • 7 years ago 4:49 / 8:02

222K views • 5 years ago

612K views • 7 years ago

544K views • 7 years ago

500K views • 7 years ago



Physics Resources

Newton's Laws of Motion and Car Physics

This resource, entitled Newton's Laws of Motion and Car Physics, provides a large amount of interesting educational material on each of the Three Laws.

ShareMyLesson

Hosted by ShareMyLesson, this site provides almost 2000 physics resources, including activities, worksheets, games, lesson plans, puzzles, posters, presentations, assessments and other ideas for you to use with your high school students.

PhysLink.com

The PhysLink.com is a comprehensive physics and astronomy online education, research and reference web site. In addition to providing high-quality content, PhysLink.com is a meeting place for professionals, students and other curious minds.

The Physics Classroom

The Physics Classroom Tutorial is an online physics tutorial written for high school physics students. The Tutorial covers basic physics topics using informative graphics and an easy-to-understand language. Each unit is broken up into lessons and sub-lessons.



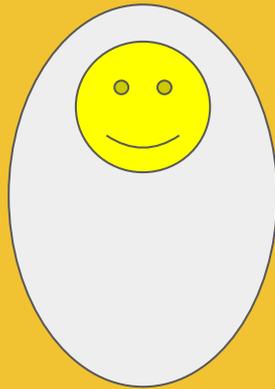
Physics Resources



4:53 / 8:02



EGG DROP EXPERIMENT



CONCLUSION

Eggs are strong.
The arch shape
resists crushing.

$$F\Delta t = m\Delta v$$

Distribute stopping force over time
and spread impact over space and
away from the egg to drop without
cracking.

Physics 9
Ms Barrantes

Austin Horner
January 20 2023

REFERENCES

ASTC Science World Society (2023)

Egg drop. [Scienceworld.ca](https://www.scienceworld.ca)

Cincinnati Museum Center (2019)

Wonderzone: Impossible egg crush. [video](#)

SciTeens.org (2021).

Egg drop challenge physics explained. [Video](#)

Rober, Mark (2015).

First place egg drop project ideas. [Video](#)

Mythbusters

Egg drop challenge. (used paper, orange, and surgical glove). Video. [dailymotion.com](https://www.dailymotion.com)