

Egg Drop Challenge

(Drop Date: _____)

In this assignment, you will work with a partner to design and construct an egg protection device using everyday materials. You will then test your device, gather and transform data, and report your findings.

Finally, you will reflect on your project and connect your approach to a real-world application.

Planning

Employ your understanding of the physics principles we've learned in class to design your device. Identify some fragile real-world objects that need protection from impacts. Research the strategies employed to protect them and use that information to inform your own design.

Design and Construction

You will have 1.5 class periods to research, design and construct an egg protection device *no larger than 6 inches (15cm) tall, wide, and deep* with your partner. You will have access to basic supplies in class but should bring your own as well. Consider paper, straws, cardboard, and masking tape. Be thoughtful about your design process. What methods can be used to protect a fragile object from an impact? What physics concepts are involved?

Testing

Place the provided egg in your egg protection device and collect any necessary data (mass _____). In the testing location confirm the test drop height _____. Drop and time each device! Remember to record your observations - you will need this information later.

Data Collection and Calculations

Collect the following data: mass, height and time (avg all times recorded).

The following equations will help in your calculations (Δ = final - initial):

$W = mg$	$p = mv$
$v_f = 2\Delta d/t$ (assuming constant acceleration)	$J = \Delta mv = Ft$
$a = \Delta v/\Delta t$	$F = ma$

Using the data you collected, complete calculations to address the following:

Calculate the **force of gravity** on your device (including the egg).

Calculate the **final speed** of your device (in the instant before impact).

Calculate the **final momentum** of your device (in the instant before impact).

Calculate the **acceleration** of the device (it's not 9.8 m/s^2).

Reporting

Use ***Piktochart***, ***Canva***, ***Google Docs***, ***Google Slides***, or another tool of your choice to create an infographic. An Infographic is a visual image to represent information or data. If you use Google Docs, consider using add-ons.

Explain your egg drop device

Explain the physics concepts you used to design your egg drop device. Include a diagram of your device.

Data & Calculations

Report your raw data and show the completed calculations listed in your egg drop assignment sheet.

Improvements

Describe and analyze the success of your egg protection device. Describe possible improvements or extensions to your device, and explain how they would help.

Connect the science of your egg drop device to a real world application

Identify and discuss the science behind a real world application where a fragile object has to be protected during an impact. Include an image of the real world device and evaluate the implications of this device on human society.