

# Egg Drop Challenge



**SOCIAL-EMOTIONAL CONNECTION:** Insulation    **GRADES:** 5<sup>th</sup>    **TIME:** 90 Minutes

**INSTRUCTOR EXPERIENCE:** Beginner

**OBJECTIVES:** Understanding how we can protect and preserve our community through positive actions and words. Design and construct a container out of recycled materials to safely protect an egg.

**ESSENTIAL QUESTION:** Can I engineer a structure that will protect my egg when it is dropped?

**MATERIALS:**

- Book- Forces
- Egg Drop Challenge Guide
- Computer
- Projector
- 1 small egg per group
- Various recycled materials: magazines, cardboard, newspaper, plastic containers, bottles, packing material, tissue paper
- Adhesive material: glue, scotch tape, heavy duty tape, sticky putty
- 1 ping pong ball per group
- Small Ziplock bags
- Tape measure
- Ruler
- Plastic container
- Bottles of water
- Poster paper
- Markers

**STANDARDS:**            [VA STEM](#)  
                                  [5.1a-f;5.2b](#)

*Lesson delivery note: This lesson is designed to take approximately 90 minutes. Adapt the lesson to fit the amount of available.*

## INSTRUCTIONS

1. Ask (5 minutes)

Introduce the activity to students by having the following question posted on the whiteboard as students walk into class. Have students write their thoughts down on a piece of notebook paper:

How do companies decide which packaging to use for their products?

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Provide time for students to write down their thoughts and then have several students share what they have written down.

## 2. Research (15 minutes)

Read the book titled, "Forces."

Hold up Forces and ask students to join you for a whole group read aloud.

- Preview the book by showing the cover and a few images.
- Ask students how they think the characters in the book will solve problems.
- Tell students that they'll learn about forces and how energy moves from potential to kinetic.
- How do the people around you impact your attitude, thoughts, and behavior?
- How can you help others make positive choices?

## 3. Connect to Careers (10 minutes)

Tell students today they will be acting as packaging engineers. Explain that a packaging engineer is involved in the designing and testing of items such as boxes, containers, and bottles to meet certain specifications set forth by federal guidelines or companies.

Ask students to think about what kind of skills or qualifications might a person need for this career? Allow some time for students to share their thoughts. After some discussion, tell students that a packaging engineer must use aspects of engineering, chemistry, math, and physics when creating packaging.

- If students are interested in other careers associated with this activity, have them check out the following career paths:
  - Consumer behavior analyst, product tester, food scientist
  - Poultry or animal care-related careers include: avian biologist, hatchery manager, laboratory research and development, quality assurance manager, feed inspector, animal pharmaceuticals

Next, hold up a Styrofoam egg carton and propose the following scenario to students:

- New regulations have been passed and a material used to make many egg cartons called polystyrene, commonly called Styrofoam, is now illegal due to its inability to be recycled. Egg packagers across the nation need to use a new material to make their egg cartons. You are a product packaging engineer and can make a lot of money if you come up with the new packaging. One of the major egg farms has approached you and asked for you to design their new egg cartons using only recycled materials.
- We need to design, create, and test our egg cartons before presenting our ideas to the company. But first, we need to understand how eggs get from the farm to the table!

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## 4. Explore Egg Transportation (10 minutes)

Introduce how eggs are transported from the farm where they are raised, to grocery stores, farmer's markets, etc. Play the [Eggs 101 Video](#) and ask students to pay attention to:

- how eggs are packaged in the video
- the shape of the eggs
- how eggs are transported from farm to the grocery store.

After the video, ask students: **What do you think needs to be the biggest considerations when designing an egg carton?**

Have students share their thoughts and write a collective list on the whiteboard.

## 5. Build a Prototype (15 minutes)

Explain the challenge to students by telling them they are going to create new packaging for eggs that will be tested for size, egg security, and water resistance.

Students should use the Egg Drop Challenge Guide to help design their carton.

- Divide students into groups of five.
- Set a 15-minute time limit for students to use the design and build their egg package containers and ensure the egg fits inside of the container.
- After time is up, have students clean their areas and safely store their containers.

## 6. Test & Improve (25 minutes)

Have stations set up around the room to test the containers and assist students in testing their package design. Each station groups should use their Egg Drop Challenge guide to record the results of their test.

Tell students to perform tests in this order:

- 1) Record the dimensions of created package
- 2) Perform a drop test of the created package
- 3) Perform a water test of the created package

Set a timer for 10 minutes. Have students test their package and record the results on their instruction sheet as well as the large chart paper set at each station.

Set another timer for 15 minutes for students to review their results, make improvements and retest their designs.

## 7. Discuss and Reflect (10 minutes)

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After the tests, have students review the data from each test and how their package performed. Have a class discussion by talking about the following questions:

- Which design performed best in each test and why? Consider material, size, design.
- What materials worked best to protect the egg & use the least amount of material?
- Which package worked the best and why?
- Vote: if you oversaw packaging eggs, which design would you choose?

## EXTENSION ACTIVITIES

- Have students verbally present their designs, explain the materials chosen, and provide justification for why each material was utilized.
- Each group examines another group's egg carton design. Take notes on two outstanding components and two possible improvements to the other group's design.
- Each group reflects upon their design and identifies the components that worked well or that could be improved. Everyone then collaborates to redesign a new package container to withstand the tests which includes the most successful components of each model.