

## The Classic Egg Drop Competition

### Materials

(per group):

- 6 tongue depressors
- 6 paper clips
- A plastic bag
- 2 pipe cleaners
- 6 styrofoam chips (or cotton balls)
- 6 popsicle sticks
- 4 straws
- 4 rubber bands
- Some string
- A bottle of glue
- 2 eggs (1 for a practice run, and 1 for final test!)

(for Class):

- Garbage bag
- Clorox wipes

### Introduction:

1. What do scientists do?
2. Where do you find scientists?
3. What is a scientist? What is a physicist?
4. How does this type of science affect your life? What about other types?

### What's the Egg Drop?

1. Explain to students that they will get some random materials and they have to make a structure that will protect their egg from a drop at about shoulder-height (we suggest letting them drop their creations).

### Packaging Considerations:

1. Anything that is moving has kinetic energy. We need energy to be able to move in the first place, so you can ask students if they know where that energy comes from? *Food*.
2. The key is to design a structure that can absorb that kinetic energy and protect the egg.

### **Your Materials:**

1. Just a note that we didn't wind up giving students a "practice egg". We told them they only had one egg, and if they broke it they would not get another (we stuck with this for the older groups in particular). We suggested that we hold onto the eggs until they were ready for it or to build around it... Most of them accepted this idea.

### **Build Away!**

1. Don't let them go longer than 20 minutes (although many will want to!) because the glue will not have time to dry.

### **As the glue dries...**

1. Why are these sorts of experiments important in science? *Test materials, hypotheses, designs.*
  - a. Can talk about crash test dummies here and the valuable role they play.
  - b. Packaging in general; why do we need to test it? *Packaging protects, preserves, gives information on it, contains and is often recyclable.*
2. What are some other types of packaging you would have liked to use? *Often get balloons or pillows.*

### **The DROP!**

1. One by one, ask groups to come up to the front while keeping everyone else seated. Try to ask groups who used less/no glue first.
2. Lay out a garbage bag on the floor at the drop site, and keep an open one handy for the messy structures.
3. If the student takes a long time to open their structure and check the egg, have them sit at their desk until they do so that you may continue.
4. Make sure you have all students throw out their eggs afterwards, broken or not.

### **Finals?**

1. If you have time, come up with a tie-breaker with the group.

### **Results:**

1. Congratulate the successful groups and discuss what worked well for their structures.
2. What are the forces acting on the egg as it falls? *Gravity*
3. What are the forces acting on the structure when it hits the ground? *Contact or Normal force.*

4. How can you control the forces that cause the egg to break? *Lessen the contact force by cushioning it, or spread out the force.*
5. Does layering materials play a role? *Cushioning materials certainly could.*

**What Type of Problem is This?**

1. Is this a “shock absorption” or a “springing problem”? *Both; absorbing the shock will prevent much bounce-back of the egg.*
2. What is a “well-distributed” force? *A force that is spread over an area.*
3. What is a “pin-point” force? *A force that is localised and intense on one spot.*