



Egg Drop Demonstration

Lesson Source(s)	Caroline Buckey, Packaging Engineer, W.O.W! Wizard
Grade Level	Suggested grades 3-8, this demonstration can be modified to include parachutes
Abstract	<p>By discussing the importance of packaging and seeing various examples, students are challenged to design protective packages for an egg that can withstand a three foot drop and answer the very important question...</p> <p><i>Why do we need packaging?</i></p> <p><u>Preserve</u> – keep items from spoiling <u>Recycle</u> – reduce landfill waste and re-purposing <u>Provide Information</u> – tells what’s inside, how to use, warning labels <u>Protect</u> – keep items from breaking, temperature change, exposure to light <u>Contains</u> – holds stuff, helps in carrying <u>Utility/Use</u> – to do something i.e. pump, squeeze, pour</p>
Objectives	<ul style="list-style-type: none"> ▪ Students will examine and describe packaging . ▪ Students will explore and observe that bending and cutting packaging materials can change its properties. ▪ Students will design and construct a protective package. ▪ Students will analyze and draw conclusions based on the results of the drop. ▪ Students will use the appropriate tools to collect data. ▪ Students will communicate their results with others.
Pre-Visit	<p>_____ Complete the <i>W.O.W! Photo Release Form</i></p> <p>_____ Arrange desks/tables in small groups of 3-4 students</p>
Photos/Video	Kit Photo(s):
Post-Visit	<p>_____ Complete the brief post-visit survey</p> <p>http://www.surveymonkey.com/s/WOWDemoSurvey</p>
Best Teaching Practices	<ul style="list-style-type: none"> ▪ Learning Cycle ▪ Inquiry Approaches ▪ Hands-on/Minds-on Learning ▪ Discussion ▪ Probing Questions
Standard Alignment	<p>As a result of the demonstration, students should develop an understanding of</p> <ul style="list-style-type: none"> ▪ Properties of objects and materials ▪ Position and motion of objects ▪ Abilities necessary for scientific inquiry ▪ Understanding scientific inquiry ▪ Motions and Forces

<p>Content Knowledge</p>	<p>There are many types of packaging - some thinner than others, some larger than others and some stronger than others. The types of packaging will depend on the products that needs protecting. By dropping an egg from a height of three feet and observing the status of the egg after the drop will give the students an indication of why <i>good</i> packaging is important.</p> <p>Good packaging is used for protecting the contents from breaking – an egg carton, for example. Packaging design preserves its contents – students can relate to potato chip bags and juice boxes. Packages tell what’s inside, how to use the item, and often warns the consumer of possible safety hazards – think about any bathroom cleansers. Packages are design to hold stuff. Imagine purchasing an amount of peanut butter and having to carry it home in your hands. Often times, packages are designed with a use. Think about pump soap, squeeze toothpaste, squirt mustard, and non-stick spray. Often times, the package design serves as “the silent salesman”. The package must sell and protect the product, while maintaining an efficient, cost-effective process cycle. Most importantly, package engineers must consider all the environmental aspects. Can the package be recycled? Repurposed? Made out of post-consumer products? to name a few.</p> <p>Science to remember - as the egg drops to the ground, gravitational energy converts to kinetic energy. It is this kinetic energy that has the potential to break the egg. What the students strive to do is to convert that kinetic energy into some other form without breaking the egg. To do this the student must design a package to surround the egg that will absorb the energy when it collides with the ground, but maintains its integrity - keeping the egg protected. This is the same principle that is used in bike helmets. When the helmet strikes the ground it is designed to break, but not fall apart. Any energy used to break the helmet will not be available to break your head. This same idea can be used with the egg drop experiment. For example if you design a package with a variety of materials to surround the egg securely, when the protective package strikes the ground the materials absorb the energy - dissipating the kinetic energy that would affect the egg!</p>
<p>Safety</p>	<p>Raw eggs are used in this demonstration. Proper clean-up is imperative. Encourage students to thoroughly wash hands afterwards. All desks/tables should be wiped down at the conclusion of demonstration.</p>
<p>Applications</p>	<p>Career Fields: Packaging Engineering, Materials Engineering, Industrial Design, and Marketing Everyday: bicycle helmets, car safety, moving vans, etc.</p>
<p>Assessment</p>	<p>Observe student participation in the activity Successful completion of package Observe student participation in discussion Successful completion of the skillsheet Students evaluate package and give suggestions on improvement – Engineering Design Process</p>

Other Considerations	Additional Materials/Resources: <ul style="list-style-type: none">▪ Engineering Go For It http://teachers.egfi-k12.org/lesson-egg-drop/▪ Try Engineering - <i>Ship the Chip</i> www.tryengineering.org▪ MythBusters - <i>Penny Drop</i> – DVD▪ Materials World Module – <i>Food Packaging</i>- supplemental unit <p>Materials available from the W.O.W! Lending Library upon request</p>
Skillsheet(s)	Egg Drop Data Sheet