

Egg Drop Dare

Grade 7

▶ **Next Generation Science Standard: MS-ETS1-1**

The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful.

Application: Challenge your students to design containers that will protect eggs when you drop them from different heights. Then examine the science behind these containers and find examples in everyday objects. Discuss the important role that technology plays in reducing food waste.

Teacher Preparation:

Gather a variety of household items, including drinking straws, plastic bags, packing material, cardboard, and so forth. You'll also need glue, tape, rubber bands, and similar items. Purchase several dozen eggs for the experiment and keep cleaning materials handy.

Introducing the lesson:

Farmers around the world grow the food we enjoy every day. There are three basic steps to get food from the farm to the dinner table:

- ▶ *Production* involves growing the food on a farm.
- ▶ *Processing* is what happens to the food once it is ready to be picked. This could involve packaging, canning, freezing, or drying it.
- ▶ *Transportation* involves taking the food to the store. Foods must be carefully packaged to ensure that they can be transported safely.

Lesson:

1. Have students ever gone to the grocery store to buy a carton of eggs? If so, did they examine the eggs to make sure none were broken? Egg cartons are really quite amazing; these simple containers are lightweight and inexpensive to manufacture, yet they provide lots of protection for delicate eggs as they travel via truck and train from the farm to your grocery store.
2. Divide students into small groups. Explain that each group will use the materials provided to design a container for one egg. Here's the trick: groups will then drop their protected eggs from various heights.
3. If possible, give the groups two to three class periods to work. During the first period, have students examine the materials and brainstorm possible designs. Then, as homework, have students study containers around them to see what works. (Hint: cell phone cases are a great place to start!)



© Can Stock Photo Inc. / CrackerClips

Did you know? Newspaper editor Joseph Coyle invented the egg carton in 1911. Recently a Hungarian design student named Eva Valicsek noticed that smaller eggs slide around in the carton. So she proposed a new design that uses recycled cardboard and cut-out slots that each side of the egg fit into. The cardboard is folded into a *W* shape and the eggs are held in with a rubber band. Who knows, some day you may see this new design in grocery stores!



4. During the next class period, have students modify their designs and build them. Select several areas of the classroom to use as testing spots. For example, students might first drop their containers from the tops of their desks (two to three feet). Examine the eggs to see which broke and which did not. If you have enough eggs on hand, invite the groups whose eggs broke to modify their designs and try again.
5. Next choose a higher point such as a countertop. Again, see which eggs broke and which did not. Again allow students to modify their designs.
6. Finally, choose a higher point, such as the top of a cabinet. Drop the eggs in their containers and see which broke and which did not.
7. Bring the groups back together and examine the different containers.

Ask students:

- For the containers that didn't protect the eggs, what did they have in common? How could they be modified to provide more protection for the eggs?
- For the containers that did protect the eggs, what did they have in common? Which of these traits do you notice in containers around your house or school? What's the scientific principle behind why these containers work?

Did you know?

- In 2012 about 223.7 million cases of eggs were produced in the United States.
- The average American eats about 250 eggs in different forms each year.
- The average hen lays over 250 eggs per year.
- An egg has about 70 calories and contains protein, vitamin A, vitamin D, riboflavin, phosphorus, and other essential nutrients.

