

Inventions: Protect An Egg

Dropping a raw egg off of a height is guaranteed to produce a scrambled egg unless something is done to protect it. This lab is based on a well known activity that is undertaken every year at MIT. The students there have to produce designs that will withstand a drop from a five story building. The design specifications are extraordinary rigid. This modified activity is intended for much younger learners.

NCSCOS Grade 1

COMPETENCY GOAL 3: The learner will build an understanding of the properties and relationship of objects.

Objectives

3.01 Determine the many ways in which objects can be grouped or classified.

3.02 Classify solids according to their properties:

- Color.
- Texture.
- Shape (ability to roll or stack).
- Weight (float or sink).

3.03 Determine the properties of liquids:

- Color.
- Ability to float or sink in water (buoyancy).

COMPETENCY GOAL 4: The learner will build an understanding of the actions of objects.

Objectives

4.01 Observe the ways in which things move:

- Straight.
- Zigzag.
- Round and round.
- Back and forth.
- Fast and slow.

4.02 Describe motion of objects by tracing and measuring movement over time.

4.03 Observe that movement can be affected by pushing or pulling.

4.04 Observe that objects can move steadily or change direction.

Process Skills Highlighted:

- Observing: the experiment asks students to use their senses to perceive differences and similarities in objects, materials and events.
- Communicating: by working in pairs and making a simple drawing of their planned structure students will practice asking questions, explaining to each other, and reporting results.
- Inferring: the experiment will ask students to draw conclusions and suggest reasons from the observations they make.
- Predicting: the experiment will provide students an opportunity to suggest future events and results based on their observations and results.
- Using space/time relationships: students will describe the changes that occur in the egg over time as it moves (and stops moving) through space.

Materials:

Per pair of students
1 raw egg, in a zip lock bag
scissors
pencils
Inventor's worksheet

Supply Table (these are only suggestions. Use whatever available)

plain paper	plastic cups
newspaper	tissue tubes
marshmallows	soda bottle bottoms
glue	packing peanuts
tape	popped popcorn
string	Styrofoam
wire	scrap fabric
baggies	
egg crates	

Set Up:

Before class, scout out a high place from which you can drop the eggs when they are ready. I've used a counter top in a pinch; just let the kids climb up there and bombs away. Otherwise, a place on the playground or from the top of a ladder is great.

Have long tables set up with all the available materials that students will be able to choose from. Other tables will be used as work stations.

Place an egg for each pair of students in a zip lock bags. To keep the potential mess down, establish this hard and fast rule: **nothing can be placed in the bag with the egg and the egg cannot be removed from the bag.** Students do not get access to their egg until their preliminary design is done.

Procedure:

As students come in explain that they may look at the supplies on the supply table but that they **MAY NOT TOUCH** the materials. Have them sit down on the floor and then describe the design task. Tell students that they and a partner will be able to make a structure out the materials on the table that will protect an egg from breaking when it is dropped from a height. First, however, they must make a plan.

1. Ask students to gather round the supply table. Describe for them the materials on the table. These are the materials available for their structures.
2. Have students sit at their workstation and draw up their plan. The plan needs to include a drawing of the structure. It should be as detailed as possible with labels if students are capable. (Older students must include labeled parts as well as a materials list. During construction, any changes in the plan must be noted on the written plan.)
3. When students are finished their plans, hand each pair of students a plastic egg in a zip lock bag. Reiterate to students that nothing can be placed in the bag with the egg and the egg cannot be removed from the bag.
4. Have students assemble structures. (Each egg should be in its a sealed plastic baggie in case of breakage.) Have them check for the following things:
 - If they can feel any part of their egg, it is likely to break.
 - If they can SEE any part of their egg, it is likely to break.
 - if it is only protected on one side, it is likely to break.
5. With a large trash bag in hand, take students out to playground or the designated drop zone and drop the structures off highest point on the equipment. As an alternative, go to a place where students can toss their structures up in the air. Have students go one at a time, one throwing or tossing, one retrieving. Carefully open structures to assess damage.
6. Return to class. Failed structures should be modified and tried again. Successful students can design and test another structure. For a real challenge, have students try to create a structure without using a container, for example: taping index cards together or wrapping in fabric. Retest structures.

Wrap Up

Discuss with students the strategies that worked and those that didn't. What real world applications could the students think of that might be similar to the egg drop? Talk about the role of failure in design as well as the role of test, modification and retest.

Names: _____

Inventor's Worksheet

Draw a picture showing how you are going to protect your egg from breaking.