## Lesson Plan: Egg Strength

**Standards: 1st Grade Science Standard # 2-ST, A 4.2.1 & .2 & Science Standard # 3 ST 4.3.1**

**Objectives:** Students will learn about egg strength, exploring how a bird can sit on eggs without breaking them, by measuring the weight-bearing capacity of eggshells.

**Materials:**

* Access to the internet
* “Egg”-periment worksheet
* 3 egg cartons with dozen eggs each
* 3-4 heavy books (encyclopedias or dictionaries)
* Paper towels, hand sanitizer and soap and water(in case of egg break)
* Scale

**Vocabulary**: hypothesis, experiment, conclusion, bearing strength, measurement

**Background information:** The weight spreads along the curved walls of the egg to the wide base, allowing the eggshells to support more weight. The principles in this demonstration are valuable to architects who strive to design safe buildings and structures that must support thousands of tons of weight. (See YouTube clips based on this principle: [http://www.stevespanglerscience.com/experiment/walking-on-eggshells](http://www.stevespanglerscience.com/experiment/walking-on-eggshells" \o "http://www.stevespanglerscience.com/experiment/walking-on-eggshells" \t "_blank) <http://www.youtube.com/watch?v=Tjuu0fhjH24>

Read more about weight bearing: <http://www.answers.com/topic/bearing-strength#ixzz2Chi0YrWa>

**Anticipatory Set:**

1. Show your students the following video on your Smartboard: <http://pbskids.org/lions/stories/nature.html?pid=MaqUI33ev_0AOFDVZhBxvkq2x8agXoyl>
2. Ask students:

Why eggs do not break when the birds sit on them?

Is there a way to find out why birds do not break the eggs by doing an experiment in the classroom?

1. Explain to the students that the class will conduct a weigh bearing experiment with eggs that are ***not*** boiled so everyone must be careful with the eggs.

**Procedure:**

1. Ask students to write a hypothesis about whether or not egg shells can hold heavy books, and record their hypothesis on the scientific worksheet.
2. Have the students make observational notes on their scientific worksheet about the eggs such as: size, shape, color and approximate weight being careful not to break eggs.
3. Weigh books on the scale and record their weight
4. Place heavy book on 1 egg carton of eggs, recording the weight of the book on the worksheet
5. After you have experimented with the book, use a different carton of eggs (in case any of the eggs were weakened in the book experiment) and have students slowly and carefully stand on the carton, listening for any cracking sound. Weigh students and record on journal.
6. Next remove eggs from carton and have the students stand on the carton
7. Have students write a conclusion, stating whether their hypotheses were proven or not.

**Enrichment:** Take students to the Werner Wildlife Museum to see their bird specimens and discuss what type of bird has what kind of eggs and why.

## [https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQg78eKjbbhzosTL_NuKEP_X6yeP85vEKmruio3FWezX-VGAqbjLg](http://www.google.com/imgres?num=10&hl=en&tbo=d&biw=1024&bih=631&tbm=isch&tbnid=kIn0-C3ODZlFJM:&imgrefurl=http://www.strangehistory.net/2011/03/18/christ-and-an-egg-from-leeds/&docid=0aQQ9D8XbA2TSM&imgurl=http://www.strangehistory.net/blog/wp-content/uploads/2011/03/egg.jpg&w=310&h=414&ei=nZyqUIOWL-WyyAH8lIGIAQ&zoom=1&iact=hc&vpx=641&vpy=152&dur=55&hovh=260&hovw=194&tx=85&ty=127&sig=101131402481722811336&page=1&tbnh=139&tbnw=99&start=0&ndsp=18&ved=1t:429,r:4,s:0,i:151) “Egg”-periment

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What do you think?**

**Answer the following questions before beginning the experiment.**

**Your Hypotheses**: Can the eggs hold heavy book on top?

If so, how much weight before they break?

Can a student stand on the egg carton and not break the eggs?

**Observation: Describe the eggs**

|  |  |
| --- | --- |
| **Book Weights:** | **Did eggs break?** |
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Did the eggs break when a student stood on the carton?

Write a conclusion on the back of this paper, stating whether your hypotheses were proven or not.