



POPCORN SCIENCE

Grade Level

4-6

Length of Lesson

45 minutes

Objective

By the end of this lesson, students will have a better understanding of the scientific concepts of volume and physical change.

Materials Needed

- Popcorn kernels
- 32oz. Mason jars*
- Microwave
- Scales
- Masking tape
- Marker
- Copies of the student worksheet

Standards

Common Core

CCSS.ELA-Literacy.W.4.8; W.5.2A; W.6.1A-B; RST.6-8.3; RST.6-8.7

NGSS

MS-PS1-4

Lesson Summary

This lesson is a fun, hands-on activity designed to introduce students to the concept of volume and physical change while strengthening their understanding of weight.

*Any clear container will work, just adjust the amount of popcorn/kernels you're using.

Suggested Sequence of Events:

1. Set Up: Pop enough popcorn so that each group of students has 100 popped popcorn pieces.
2. Read through the IAITC Corn Ag Mag to learn more about other products that come from corn! Interactive online versions can be found on our website.
3. Complete the activity following the procedures:
 - Give each group two Mason jars. Have them use the masking tape and marker to label one jar "A" and the other jar "B".
 - Give each student a copy of the student worksheet and read through the background information and the directions together.
 - Have them weigh each jar using a scale and record the weight on their student worksheet.
 - Give students a cup of un-popped popcorn kernels and have them count out 100 kernels and add all 100 kernels to jar "A".
 - Re-weigh jar "A" and record the weight.
 - Give each group a bunch of popped popcorn and have them count out 100 pieces. Have them add those 100 pieces to jar "B".
 - Have them re-weigh jar "B" and record the weight.
 - Once they are done recording the weights, have them answer the questions at the bottom of the sheet.
4. Whole class discussion and reflection of activity. Was there a difference in weight between the kernels and the popcorn (#3 on their student worksheets)? Why would the kernels weigh slightly more if the popped popcorn pieces are bigger and have more volume?

TEACHER RESOURCES

Background information:

There is a little bit of water in every kernel of popcorn. When the kernel is heated, the water heats up and builds up pressure. The pressure causes the water to take up all the available space inside the kernel. When enough pressure builds up, the kernel pops and turns inside out, releasing the water as evaporation. Even though it is a tiny amount of water in each kernel, the popped popcorn piece will weigh slightly less than the kernel it changed from.

Extension Ideas:

- Learn about what it is that makes popcorn 'pop'.
- Talk about the differences between a physical change and a chemical change. Have students come up with examples of permanent/nonpermanent physical change and examples of chemical change.
- Talk about the similarities and differences between popcorn, sweet corn, and field corn.
- Read "[Popcorn Country: The Story of America's Favorite Snack](#)" by Cris Peterson and learn about the history and science of popcorn.
- We grow a lot of corn here in Illinois, but where does it all go and what is it all used for? Have students do a mini-research project that answers these questions.
- Use our "Indoor BINGO" activity to help students become aware of the common products they have in their homes that come from a commodity like corn. Indoor BINGO is available on our website at www.agintheclassroom.org.
- Have students write sentences using a variety of literary devices.
- Find a local corn farmer who also grows popcorn and take a field trip to their fields or invite them into your classroom!
- Have students research what makes popcorn kettle corn.
- Have students bring in their favorite popcorn recipes.
- Have a movie day with your students and make your own 'movie theater' popcorn. Where do salt and butter come from?
 - You could even make your own butter using our "Butter in a Jar" recipe that is available at <https://beyondthebarndoor.files.wordpress.com/2021/06/recipes-pdf.pdf>
- Have students make art with popcorn.
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!





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STUDENT WORKSHEET

Background Information: A physical change is when a substance changes its physical state. This means that the substance will look different (size, shape, color, etc.) than before the change occurred. Sometimes a substance can return to its original state, like blowing up a balloon and then letting out the air. But other times, the physical change is permanent, like turning bread to toast.

Directions: Use popcorn kernels to observe physical change and other changes that also might occur! Record your data and then answer the questions! Make sure to include the unit of measurement in your data and answers.

JAR A

JAR B

Weight of jar

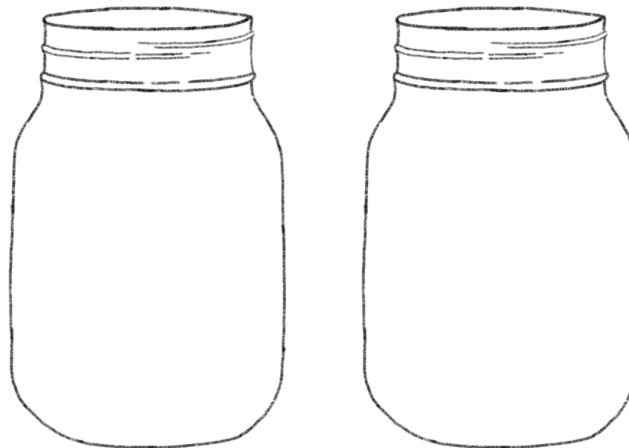
Weight of jar

Number of kernels

Number of popcorn pieces

Weight of jar with kernels

Weight of jar with popcorn



1. In the empty jars above, draw what you see in each of your jars.
2. In the space below, calculate the weight of the kernels and the weight of the popcorn without the weight of the jars.
3. Using a complete sentence, explain which is heavier in weight: the kernels or the popcorn?
4. **Volume** is the amount of space an object takes up. Which has more volume, the kernels or the popcorn? Use evidence from your observations to explain.

