MATH

TITLE: Paper and Popcorn tells Volumes, adapted from *Figure This! Math Challenges for Families* http://www.figurethis.org/
SUBJECT: Math
GRADE LEVEL: 3-6
MATERIAL(S): 2 sheets of paper 8 ½ x 11, tape, popcorn

OBJECTIVE(S): To determine volume of a cylinder

OVERVIEW:

1. Take one sheet of paper, holding it on the long side and loosely roll it into a tall cylinder until the edges overlap just enough to stick a bit of tape on to hold it together.
2. Hold the other piece of paper on the short side and loosely roll it into a tall cylinder until the edges overlap just enough to stick a bit of tape on to hold it together.
3. Take popcorn and ask students which cylinder they believe would hold more popcorn. Why do they think so?
4. On a flat surface, put the tall cylinder into the short cylinder. Fill the tall cylinder to the top with popcorn.
5. Slowly remove the tall cylinder so that the popcorn spills into the short cylinder. Discuss the results.

This activity shows that the short cylinder holds more than the tall cylinder. In other words, the short cylinder has a larger volume. Now roll the short cylinder tighter and see what happens. Let the students roll the cylinders tighter and looser, inserting one into the other, filling with popcorn, withdrawing, and seeing what happens. Does the diameter (how wide the cylinder is) make a difference? Can they figure out a way to make both cylinders hold the same amount of popcorn? *Cylinder*, *volume*, and *diameter* are all labels used in mathematics.

This can also be paired with experiments regarding size and shape of containers and estimating how many popped or unpopped kernels will fit into various containers. It is very interesting to students how a container that looks bigger may actually be the same size or smaller.

For more advanced grade levels, determine the answer mathematically by finding the volume of each cylinder (area of the base times the height).