

# Fill it to Capacity

## Summary

Students will rotate through six estimating and measuring centers.

## Materials

- *Room for Ripley*  
, by Stuart J. Murphy  
Measuring cups for each center  
Funnels for each center  
Water for each center  
1 pint cottage cheese container  
1 quart pickle jar  
Gallon milk carton  
½ gallon orange juice container  
1 quart mayonnaise jar  
1 pint pickle jar
- [\*Filled to Capacity\*](#)

## Additional Resources

### Books

- *Room for Ripley*  
, by Stuart J. Murphy; ISBN 0064467244

## Background for Teachers

The capacity of an object is the maximum amount that can be contained by the object. It often refers to the measurement of a liquid. Students need to be familiar with the customary units of capacity-- cups, pints, quarts, and gallons.

## Intended Learning Outcomes

4. Communicate mathematically.

## Instructional Procedures

### Invitation to Learn

Read the book, *Room for Ripley*, to your class. After Carlos adds one cup of water to the bowl, stop reading. In their journals, have students predict how much more water they think Carlos will need to fill the fish bowl. Finish reading the book and discuss how much water it actually took to fill the bowl. Have students write in their journal if their predictions were correct.

### Instructional Procedures

Divide the class into six groups.

At each of the six centers, have a measuring cup, funnel, water, and the container labeled gallon, ½ gallon, quart, or pint as indicated below.

Have them rotate through the following centers:

#### Center 1

Have students estimate how many cups it will take to fill a cottage cheese container (one pint). Have them write their estimates in their journals. Using the measuring cup and funnel, fill the cottage cheese container with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

#### Center 2

Have students estimate how many cups it will take to fill a one-quart pickle jar. Have them write their estimates in their journals. Using the measuring cup and funnel, fill the pickle jar with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

#### Center 3

Have students estimate how many cups it will take to fill a one-gallon milk jug. Have them write their estimates in their journals. Using the measuring cup and funnel, fill the gallon milk jug with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

#### Center 4

Have students estimate how many cups it will take to fill a half-gallon orange juice container. Have them write their estimates in their journals. Using the measuring cup and funnel, fill the orange juice container with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

#### Center 5

Have students estimate how many cups it will take to fill a one-quart mayonnaise jar. Have them write their estimates in their journals. Using the measuring cup and funnel, fill the mayonnaise jar with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

#### Center 6

Have students estimate how many cups it will take to fill a one-pint pickle jar. Have them write their estimates in their journals. Using the measuring cup and funnel, fill the pickle jar with water until it is full. Have them write in their journals if their estimates were accurate, or how they could have improved on their estimates.

Discuss the centers, and how many cups of water it took to fill each item.

Hand out worksheet, [Filled to Capacity](#), and have students complete it based on what they learned from the centers.

Discuss the worksheet as a class.

Create a ["G" gallon graphic](#) as a visual reminder to keep in their math journals.

### Extensions

#### Curriculum Extensions/Adaptations/Integration

Use this lesson as a framework to have students use the metric system for capacity - milliliters and liters.

#### Family Connections

Have students look in their kitchen or at a grocery store and identify items that come in containers of different capacities. Have them write down what comes in cups, pints, quarts, and gallons. At home, have students fill a one-quart container with water. Then have them find three other containers that they think will hold the same amount of water. Pour the water from the quart container into the other containers to see if they do have the same capacity.

### Assessment Plan

Informal Assessment is class discussions and journal entries.

Formal Assessment is the worksheet, *Filled to Capacity*

### Bibliography

Hinzman, K.P. (1997). *Use of Manipulatives in Mathematics at the Middle School Level and Their Effects on Students' Grades and Attitudes*. ERIC # ED411150. Retrieved December 10, 2005, from

<http://www.eric.ed.gov>

This paper reports on a study that examines mathematics scores when hands on manipulatives and group activities are used in the classroom. Results indicate that student performance is enhanced by the use of manipulative materials; and students' attitudes toward mathematics are significantly more positive than those in previous years when manipulatives were not used.

Sowell, E.J. (1989). Effects of manipulative materials in mathematics instruction. *Journal for Research in Mathematics Education*, 20 (4), 498-50

This review of research sums up the result of sixty studies addressing the effectiveness of manipulatives on student learning and attitudes in mathematics teaching. Sowell concludes that the more concrete the manipulatives, and the longer time spent using them, the better instructional outcomes.

Authors

[Utah LessonPlans](#)