

## Teacher Tips: *Penny Wars*

These are just our ideas. This isn't the only or maybe even the best way to implement the activity.

We consider this activity a "three-act-task."

You might start the activity by showing the picture of the jars of pennies. Simply ask students what questions they have. Take down questions for class to see and consider. "Which container holds the most money" should come up spontaneously from the students. Focus on this question for the activity. You might also focus on how much money is in each jar.

Allow students some time to individually think about how they might determine which jar has the most money. After some individual brainstorming you might take ideas from students as a class or have kids get in groups of two to discuss their ideas.

Allow students time in groups of two (maybe three) to work on the problem. As students work in groups consider circulating to help students and to take note of different solution methods. You might have a class sharing of the solutions by having two or three different groups show unique solution methods (use posters, a document camera, overhead). You might decide to highlight a group that worked through a common misconception or had a more sophisticated approach. As you have a few groups share you might have the class discuss what is similar or different in the solution strategies. You might also ask students to re-voice what they heard a group do or ask a question of the group.

A common strategy for this problem should be to assume each jar is a cylinder, holding nothing but pennies. Students would estimate a height of the pennies and the diameter of each jar. One can then apply the volume formula to each "cylinder" to find the greatest volume and thus the jar worth the most.

A big idea here is the difference between increasing the radius and the height of a cylinder. Students should see that increasing the radius leads to a greater increase in volume than increasing the height. This could be a good topic for discussion during or at the end of the lesson.