Trees Rule Lesson Plan

Courtesy of: www.usd.edu/anth/epa/lesson8.html

Purpose:
In our urban neighborhood filled with streets and concrete structures, trees are a valuable part of the environment. In New York City, for example, people who damage or destroy a tree are required by law to plant new trees as community service.

Objectives:
This lesson plan suggests two replacement rules for people who destroy trees in urban areas: the diameter rule and the area rule.

- Diameter Rule:
  The total diameter of the new tree(s) must equal the diameter of the tree(s) that were destroyed.

- Area Rule:
  The total area of the cross section of the new tree(s) must equal the area of the cross section of the tree(s) that were damaged or destroyed. Through this lesson plan, students evaluate the effects of these two rules and decide how many trees each rule would require a person to plant and which rule is fairer. This lesson also gives students a chance to use their knowledge of areas of circles to investigate a real world problem.

Plan:
Students will answer two questions based on a diagram of trees in a neighborhood or area that the teacher sets up. The diagram can be as simple or complex as the ability of your students.

A: How many trees must be planted if the diameter rule is applied?

B: How many trees must be planted if the area rule is applied?

1. Have students work on the problem and follow-up in groups of three or four. Remind each group that they must offer an explanation for their choice and give mathematical reasons why they chose one rule over the other. If groups are having trouble, suggest that they draw a picture of what it would mean to follow each of the rules.

2. Explain the answers to students after they have come up with their own solution. Using the diameter rule in the above example, only four new trees would be needed to replace the old tree because the diameter of the old tree is four times the diameter of each new tree. Students can verify this by observing that the diameter of each new tree is 3 units while the diameter of the old tree is 12 units.

3. Using the area rule, about 16 trees (113/7) trees would be needed to replace the old tree. The smaller tree has a radius of 1.5 units, so its area is about 7 square units. The larger tree has a radius of 6 units, so its area is about 113 square units.

Result:
Challenge students to offer better explanations than simply, "If you want more trees in your neighborhood, the area rule is better." Have students discuss fact that, in the given example, the area rule will provide four times as many new trees as the diameter rule.

TREE PITTSBURGH