Gold Seal Lesson

Author(s):			*Lesson Title:*			
Judith P. Wood			*Cookies Anyone?*			
Grade Span			*ICLE Application Model*			
K-4	*5-8*	*9-12*	*A*	*B*	*C*	*D*
	X					*X*

Instructional Focus:

Number Operation and Concepts Students use number, number sense, and number relationships in a problem-solving situation. Students communicate the reasoning used in solving these problems.
Algebraic Concepts and Relationships Students use algebraic methods to investigate, model, and interpret patterns and functions involving numbers, shapes, data, and graphs in a problem-solving situation. Students evaluate and communicate the reasoning used in solving these problems.
Measurement Students use a variety of tools and techniques of measurement in a problem-solving situation. Students communicate the reasoning used in solving these problems.
Geometry Students apply geometric concepts, properties, and relationships in a problem-solving situation. Students communicate the reasoning used in solving these problems.
Problem-Solving and Mathematical Reasoning Students apply a variety of problem-solving strategies to investigate and solve problems from across the curriculum as well as from practical applications.
Writing Students write for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.
Language Arts Integration Students synthesize individual language arts skills.

Performance Task

In this activity, students will estimate the number of circular cookies of a given size that can be cut from a given piece of rectangular cookie dough. They will then find out the actual number that can be cut and compare with their estimate.

Before beginning the activity, discuss the terms rectangles, circles, and area with the students to assess their level of knowledge of these terms. If knowledge of these terms is missing or sketchy, some teaching of the terms will be necessary. If students have a good understanding of these terms, you will be able to proceed directly to the task.

Have students explore the number of circular cookies that may be made from a rectangular piece of cookie dough. Decide upon the size of circular cookies you will consider. This will be determined by what you use to "cut" the cookies. You might use a cookie cutter, a circular drinking glass, or any circular object that you have. Show the class the rectangular piece of cookie dough and the circular object you will use to cut the cookies. Have the students work in groups of 2 or 3 students each to estimate the number of cookies that they think can be cut from the dough.

Now have each group of students simulate the activity by using the "cookie cutter" and a piece of construction paper the size of the cookie dough. The students will draw circles representing the cookies on the construction paper, maximizing the number of cookies they can "cut." Now the students should compare the actual number to their estimates and discuss their findings.

Now the group is ready to work with the real dough and the cookie cutter. Students, one at a time, will cut a cookie from the cookie dough until there is no more dough. You will, of course, have some left over dough. Ask the students to explain what that represents on their drawing.

Performance Task continued…

Students should answer the following questions.

a. How many cookies were they able to cut from the cookie dough?
b. How does this compare to the number of cookies that they drew on their " paper cookie" dough?
c. How does the area of the cookie dough compare to the total area of the cookies that were cut from the dough?
d. About what fractional part of the rectangular cookie dough does each cookie represent?

If working with grades 5-8, you can find the area of the cookie dough and the area of each circle and investigate the relationship between them, using actual measurements. You could work with fractional parts, percents, or decimal values. If you re-roll the left over dough and cut more circular cookies, continuing until all the dough has been used or is too small to make a circular cookie, the total area of the cookies should just about equal the area of the beginning rectangular cookie dough. Students could be asked to write numerical statements showing this relationship.

Now you are ready to bake the cookies. While the cookies are cooking, have each student write an essay about what they have learned.

It's now time to eat the cookies as a reward for the hard work done!

ICLE Essential Skills

Understand the properties and classification of quadrilaterals by orientation (e.g., parallelogram, rectangle, rhombus, square, and trapezoid). (m27)
Compute the perimeter and area of two-dimensional figures. (m13)
Understand the properties of circles (e.g., radius, arc, diameter, chord, secant, tangent, etc.). (m 10)
Know how to measure circle quantities (e.g. area, angle formed by two secants, circumference, length of segments, etc.). (m30)
Use the technique of dimensional analysis to convert units of measure including drawing to scale and applying ratios. Understand and use various techniques for estimating, making and converting measure; and using these to perform dimensional analysis. (m33)
Perform operations with signed numbers, including decimals, ratios, percents, and fractions. (m1)
Use writing as a tool for learning in formats such as learning logs, laboratory reports, note-taking, journals and portfolios. (ela40)

Scoring Guide:

RATE CRITERIA: 3 = Excellent, 2= Satisfactory, 1 = Unsatisfactory, 0 = Does not attempt or does not understand

CRITERIA	SCORE
Student contribution to the group	_____
Student worked seriously on the task	_____
Estimate was determined	_____
Conclusion summary was well-organized	_____
Summary was well written and grammatically correct	_____
Answers to questions a, b, c, and d	_____
Additional criteria for grades 5-8	
Computation of areas	_____
Quality of numerical statements	_____

Keywords

English Language Arts	Mathematics	Science
Reading	**Algebra** **Computation** **Equations** **Estimation** **Integration**	**Earth Science**
Writing **Organization** **Grammar**	**Geometry** **Area** **Circles** **Geometric Shapes** **Geometry in Daily** **Integration** **Problem Solving** **Quadrilaterals** **Rectangles** **Relationships**	**Life Science**
Communications	**Statistics**	**Chemistry**
Literature	**Calculus**	**Physics**
Other	**Trigonometry**	**Other**
	Other **Decimals** **Diameter** **Fractions**	