



Gold Seal Lesson

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

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

Perform operations with signed numbers, including decimals, ratios, percents, and fractions. (m1)

Understand the properties of circles (e.g., radius, arc, diameter, chord, secant, tangent, etc.). (m 10)

Compute the perimeter and area of two-dimensional figures. (m13)

Understand the properties and classification of quadrilaterals by orientation (e.g., parallelogram, rectangle, rhombus, square, and trapezoid). (m27)

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)

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	