Gold Seal Lesson:

Copernicus Education Gateway

Author(s): Doris Quick			*Lesson Title: Water Treatment Project*			
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.

Performance Task

There are five man-made lakes on the golf course being constructed at Oak Hills Country Club. A study has been conducted to determine how to clear the sediment in the water. The decision has been made to use alum for this purpose, and to use agricultural lime for the neutralization of the drop in pH due to the alum treatment.

The cost of the alum treatment is $40 per million gallons of water, and the cost of agricultural lime is $6 per million gallons of water.

Your task is to determine how much alum and how much lime are needed for each lake, how much of each should be purchased for the overall project, and how much money should be
budgeted for this purpose.

Each lake is six feet deep, and acreage is as follows:

Lake A: 16.0 acres
Lake B: 1.6 acres
Lake C: 8.9 acres
Lake D: 8.9 acres
Lake E: 1.68 acres

Show all work and formulas used in arriving at your budgetary figures.

ICLE Essential Skills

Perform ***operations with signed*** (positive and negative) ***numbers***, including decimals, ratios, percents, and fractions. M1

Know the concepts and theories of acids and bases including pH and alkalinity. S36

Scoring Guide:

4 The student is able to complete all aspects of the task. His/her computations are accurate, and he/she knows how to use formula conversions to obtain the number of gallons of water in each lake. He/she is able to express large numbers in millions (to the nearest hundredth) using decimals. The student's work is organized and well presented.

3 The student needs some coaching to complete all aspects of the task. There are a few minor errors in his/her computations, but they have little effect on the final solution to the problem. He/she has some difficulty using formula conversions, but is able to use them with help. The student's work is fairly well-organized and presented.

2 The student needs much coaching to complete all aspects of the task. The work contains several computational errors, affecting the accuracy of the final result. The student has considerable difficulty using conversion formulas and working with large numbers. His/her work is poorly organized and poorly presented.

1 The student is unable to complete the task. His/her work lacks any organization and is very poorly presented. The work contains many computational errors. He/she is unable to use conversion formulas or to work effectively with large numbers.

Keywords

English Language Arts	Mathematics	Science
Reading	**Algebra**	**Earth Science**
Writing	**Geometry**	**Life Science**
Communications	**Statistics**	**Chemistry** ***Acids/Bases***
Literature	**Calculus**	**Physics**
Other	**Trigonometry**	**Other**
	Other ***Problem Solving*** ***Number Operations***	