Gold Seal Lesson

Author(s):			***Lesson Title:***			
Carol D'Agostino			***Ratachange Airport***			
Grade Span			***ICLE Application Model***			
K-4	***5-8***	***9-12***	***A***	***B***	***C***	***D***
		X				***X***

Instructional Focus:

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.

Speaking
Students speak for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.

Performance Task

At the Ratachange Airport, a jet is taking off on its way to Florida. While the jet is building altitude it is climbing 300 feet every 5 seconds. Fifteen minutes later another plane is making its approach to land at the Ratachange Airport. It is descending 100 yards every 5 seconds.

Students will:

1. Graph the two airplanes' flight pattern simultaneously on a piece of graph paper. (Remember to label your graph.) In written form explain your graph, describing the decisions you made when organizing your data and why you organized it the way you did. Mathematically, compare and contrast the planes' flight patterns. (Ex. slopes, point of intersection etc.)

2. Determine the equations for both lines of flight, showing how you got them and explaining the terms in your equations.

3. Label your graph where the two flight patterns intersect, and explain what this point of intersection represents.

4. Estimate the altitude of the plane taking off 10 seconds into the flight. Explain how you arrived at your answer.

5. Present your graph and written entries to a group of 4 – 6 students.

ICLE Essential Skills

Understand the use of variables in expressions such as 4x, x + 2, and 2x – 1, solve for the variable, and know how to represent expressions such as "twice the number" or "four more than the number" using variables. (m7)
Use technique of dimensional analysis to convert units of measure (e.g., convert km/hr to m/min) 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. (m 33)
Understand the characteristics of parallel, perpendicular, and intersecting lines. (m 2)
Know how to express a linear function (e.g., y = 1/2x + 5) using functional notation f (x) = 1/3x + 5, and determine the ordered pair. (m 64)
Know the equation for the slope of a line and compute slope given the coordinates of two points. (m 34)
Know the equation of a line and interpret graphically using the slope-intercept form (i.e., y = mx + b), and the point-slope form (i.e., y-b = m(x-a)). (m 45)
Know the components and properties of the rectangular coordinate system. (m23)

ICLE Essential Skills continued…

Know how to find the graphic solution of systems of linear equations. (m71)
Use writing as a tool for learning in formats such as learning logs, laboratory reports, note-taking, journals and portfolios. (ela40)
Understand and use a variety of organizational formats such as compare/contrast, cause/effect, inductive/deductive, most important to least important, and least important to most important. (ela50)
Present information in well-organized fashion that will be clear to the target audience. (ela11)
Understand and use graphics such as graphs, charts, visual aids, white space, bold print, headers and other graphics to enhance meaning. (ela56)
Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling. (ela1)
Organize supporting detail in logical and convincing patterns. (ela54)

Scoring Guide

GRAPH/POINT OF INTERSECTION

4 Points = The graph contains the flight patterns of both planes. Point of intersection is labeled correctly. The labels of the graph are clear, complete and logical. No mechanical errors are found (punctuation, capitals, grammar or spelling) and the content is easily understood. The final product is neat with careful attention to details. Illustrations/diagrams are attractive.

3 Points = The graph contains the flight patterns of both planes. Point of intersection is labeled correctly. The labels are clear and complete but could be more organized. Few mechanical errors are found and the content is easily understood. The final product is neat. Illustrations/diagrams are clear.

2 Points = The graph is missing a major component. Point of intersection is wrong. The labels of the graph are unclear, incomplete, with errors. Numerous mechanical errors are found and mistakes are found in the content. The final product is legible. Illustrations/diagrams need more attention to details.

1 Point = The graph is incomplete with numerous errors. Point of intersection is wrong. The labels are not clear or logical. There are numerous mechanical errors and the content is incomplete and inaccurate. Illustrations/diagrams are unrelated to the project.

EQUATIONS/ESTIMATE

4 Points = The equations are correct. Estimate is correct. The explanation is correct. No mechanical errors are found.

3 Points = The equations are correct. Estimate is correct. The explanations are incomplete. There are few mechanical errors.

2 Points = One equations is correct. Estimate is incorrect. The explanations have errors. There are some mechanical errors.

1 Points = There are errors in both equations. Estimate is incorrect. The explanations do not support the equations. There are many mechanical errors.

GROUP PRESENTATION

4 Points = The oral presentation is clear and organized.

3 Points = The oral presentation is clear with some disorganization.

2 Points = The oral presentation is unclear with many examples of disorganization.

1 Points = The oral presentation is confusing and incomplete. Little organization.

Keywords

English Language Arts	Mathematics	Science
Reading	**Algebra** **Algebraic Operations** **Direct Variation** **Equations** **Graphs** **Linear Patterns** **Linear Systems** **Math in Daily Life** **Slope**	**Earth Science**
Writing **Compare/Contrast** **Conventions** **Elements of Writing** **Grammar** **Mechanics** **Narrative** **Organization** **Punctuation** **Spelling** **Integration**	**Geometry** **Perpendicular lines** **Relationships** **Problem Solving**	**Life Science**
Communications **Audience** **Discussion** **Communication** **Oral Presentation**	**Statistics** **Data Display** **Predictions**	**Chemistry**
Literature	**Calculus**	**Physics**
Other	**Trigonometry**	**Other**
	Other	