Technology Lesson Plan

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Title of Lesson: Adventures in Cereal Land

Subject: Honors Algebra II

Grade(s): 9th-11th grades

Description of Project or Narrative:

Students will create a "new" cereal by combining two cereals already produced by Kellogg's®. The new cereal has to meet certain nutritional requirements and be cost efficient. To do this they will have to research the iron and potassium content and the cost of the cereals produced by Kellogg's®. Students will then convert the information they discovered into mathematical statements, graph these equations, find the point of intersection and use this point to derive the cost per serving of their new cereal. Students will have to use higher order thinking skills to analyze their findings and reach logical conclusions.

Associated Curriculum Standard(s):

Standard Number: 3.0 Patterns, Functions, and Algebraic Thinking
3.11 interpret results of algebraic procedures;
3.12 apply the concept of variable in simplifying algebraic expressions, solving equations, and solving inequalities;
3.13 interpret graphs that depict real-world phenomena;
3.14 model real-world phenomena using functions and graphs;
3.15 describe the domain and range of functions and articulate restrictions imposed wither by the operations or by the real-life situations which the functions represent;
3.16 use linear programming to solve real-world problems.

Hardware and Software Required:
Laptop computers
TI-83+ graphing calculators
File folder for each group
Graph paper
Overhead transparency and markers

Timeline:

2-3 days before introducing the project, discuss linear programming and its applications. Assign homework, which allows students to find minimum and maximum values given an objective equation and the constraints. Also, assign homework and classwork in which the student must write the constraints and the objective equations derived from word problems.

The day the project begins, divide the class into groups. Each group will receive a file folder containing all worksheets, a sheet of graph paper, and an overhead transparency. On day 1, groups are to complete the "Organizing your Information" worksheet, using the Internet.

On the next day (or two if necessary), groups will draw graphs, find the point of intersection, write the objective statement and figure the cost per serving of their new cereal.

Groups will need part of a class to decide on a name for their new cereal and discuss the information to be included in their presentation. They will also need to create an overhead transparency with the information needed to "sell" their cereal.

The following day, groups will give their presentations before the entire class.

Teacher Preparation:

Other than teaching the prerequisites needed for the project, the teacher will need to prepare a folder for each group. In this folder, there should be graph paper, a copy of each worksheet to be completed, an overhead transparency, and a copy of the rubric which will be used to evaluate the project.(The teacher needs a good understanding of the project in order to be able to answer the many and various questions the students will have as they begin to reach conclusions about their new cereal.)

Prerequisite Skills Needed:

The student will need an understanding of systems of equations and inequalities.
The student should know and be able to apply different methods for solving these systems.
The student will need to be able to translate from written sentences to algebraic expressions.
The student must know how to graph lines.
The student must have an understanding of constraints when applying mathematics to real-world applications.

Activities and Procedures:

Students will complete the web-search and complete the "Organizing your Information" worksheet. They will then choose two cereals and create a system of linear inequalities based on the constraints they have written on the "Constraints" worksheet. Students will then graph their systems of inequalities and find the point of intersection. Using the cost equation they created on the "Constraints" worksheet, the students will then approximate the cost per serving of their newly created cereal.

Students will complete the "Summation" worksheet and prepare a presentation for the class on why their cereal should be produced. This presentation will require an overhead transparency, which will highlight the justifications as to why their new cereal would be the best choice.

Sample(s) of Student Work:

(see attached folder)

Assessment and Evaluation:

Students are to be evaluated by the established rubric. They will have a copy of this rubric before turning in the completed project.

Follow-up Activities:

After the projects are presented, there should be time for a class discussion on topics mentioned in the "Summation" worksheet, such as target groups and advertisement ploys used by manufacturers. Other topics could be how does the appearance of the cereal or the taste would affect the feasibility of producing this cereal.