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Lesson Title: Mathematically Modeling a Business

Date: April/May

Text: FA 2014 pg 103 - 107

Lesson 2-8 Length:

Domain: Numbers: Quantities Algebra: Creating Equations, Reasoning with equations and inequalities. Functions: Interpreting Functions; Linear, Quadratic and Exponential models	
Big Idea (Cluster): Reason quantitatively and use units to solve problems. Create equations that describe numbers or relationships. Solve systems of equations. Represent and solve equations and inequalities graphically. Analyze functions using different representations. Construct and compare linear, quadratic, and exponential models and solve problems.	
Common Core State Standards: Algebra: N Q1,2 A-CED2, 3;REI4b, 7, 10, 11; Functions IF 7a, 8; LE4	
Mathematical Practice(s): All	
Content Objectives: Recognize the transitive property of dependence as it is used in a business model. Use multiple pieces of information, equations, and methodologies to model a new business.	Language Objectives: Interpreting data through the use a visual representations using mathematics and quadratic equations. Creating data for oral presentations
Vocabulary: Dependence, Transitive property of dependence	Connections Prior to Learning 2.1 - 2.7: quadratic equations: revenue (income) expense break-even points, profit.
Questions to Develop Mathematical Thinking: Using the math skills you have acquired, how would you predict/forecast the probability of success or failure of any prospective business, yours or anyone else's?	Common Misconceptions: Businesses can succeed without mathematical models. What good does it do to know them?

Assessment (Formative and Summative):

Formative: Exit slip: Development of a business plan using profit/loss break-even points

Summative: Artifact Business Model (Business Plan)

Materials:

graphs, excel (spreadsheets), formulae, data

Instruction Plan:

Launch: Warmup exercise: Find the points at which the graphs of the following equations intersect:

$y = -x^2 + 4$  and  $y = x + 2$

Explore: Read the definition of dependence and transitive property of dependent on page 103. Turn and talk to your group about the uses and contexts of dependence and the transitive property of dependence.

Look at the samples problems on pages 104 - 5. Let's work on these together  
\_\_\_\_\_ will lead example 1 and \_\_\_\_\_ you lead example 2

Student facilitated discussion

Direct instruction and discussion on exercises 1 - 3

Student individual practice on exercises 4 - 20

So using this information we should all be able to formulate a business model.

Project. Using xyz business and the following variables (start up cost, cost per unit, revenue projected per unit) model this business for a presentations you will give between 1 - ?May.

When I observe students: They will be working through the exercises asking questions of each other and the teacher, making inferences and predictions using mathematical models to determine net zero difference, profit and loss in order to show viability or loss leader.

Questions to Develop Mathematical Thinking as you observe: How does the math back up your assumptions and/or hypotheses? What did you learn about math that you can use to create and sustain a business model? What information (data) do you need to predict whether or not a business model if viable (will it make profits or loss).

Answers: Ummmmm.....

Summarize: Students will perform a partner talk describing/comparing their answers to the exercise and how the exercises met/did not meet the goals for the day.

Career Application(s):

Profit/Loss, Viability, Financial assessment and trends in business practices

21<sup>st</sup> Century Skills and Interdisciplinary Themes:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

Global Awareness

Financial/Economic/Business/Entrepreneurial Literacy

Civic Literacy

Health/Safety Literacy

Environmental Literacy

<p><b>LEARNING AND INNOVATION</b></p> <p><u>Creativity and Innovation</u> Think Creatively Work Creatively with Others Implement Innovations</p> <p><u>Critical Thinking and Problem Solving</u> Reason Effectively Use Systems Thinking Make Judgments and Decisions Solve Problems</p> <p><u>Communication and Collaboration</u> Communicate Clearly Collaborate with Others</p>	<p><b>INFORMATION, MEDIA &amp; TECHNOLOGY SKILLS</b></p> <p><u>Information Literacy</u> Access and Evaluate Information Use and manage Information</p> <p><u>Information, Communications and Technology (ICT Literacy)</u> Apply Technology Effectively</p>	<p><b>LIFE &amp; CAREER SKILLS</b></p> <p><u>Flexibility and Adaptability</u> Adapt to Change Be Flexible</p> <p><u>Initiative and Self-Direction</u> Manage Goals and Time Work Independently Be Self-Directed</p> <p>Learners</p> <p><u>Social and Cross-Cultural</u> Interact Effectively with Others Work Effectively in Diverse Teams</p>	<p><b><u>Productivity and Accountability</u></b> Produce Results</p> <p><b><u>Leadership and Responsibility</u></b> Guide and Lead Others Be Responsible to others</p>
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WAMC Lesson Plan

WAMC Lesson Form Revised 2/23/13

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