

WAMC Lab Template

Math Concept(s): Number Sense: Expense Function, Depreciation Function, Exponential Depreciation equation

Source / Text: Financial Algebra Chapter 5-6

Developed by: Dana Lybeck lybeck.dana@yakimaschools.org

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Attach the following documents:

Lab Instructions

Student Handout(s)

Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

Lab Plan

Lab Title: 2013 Exponential Automobile Depreciation vs. Linear Depreciation

Prerequisite skills: Completion of 5-5 and 5-6 in text

Lab objective: To compare Linear and Exponential Depreciation and identify which is closer to the information given by Kelly Blue Book.

Standards:

CCSS-M: A-CED2, A-CED3, F-IF6, F-IF7e, F-IF8b, F-IF9, F-LE1c, F-LE5, S-ID6

Standards for Mathematical Practice:

- MP1, MP2, MP3, MP4, MP5

State Standards addressed (2008 Washington State Mathematics Standards):

Reading:

Writing:

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
21st Century Skills (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<u>Leadership and Responsibility</u>
<input type="checkbox"/> Think Creatively	<input checked="" type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Work Creatively with Others	<input checked="" type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input checked="" type="checkbox"/> Produce Results
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input checked="" type="checkbox"/> Analyze Media	<input checked="" type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
<input checked="" type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input checked="" type="checkbox"/> Work Independently	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and</u>	<input checked="" type="checkbox"/> Be Self-Directed Learners	<input type="checkbox"/> Be Responsible to Others
<input checked="" type="checkbox"/> Make Judgments and Decisions		<u>Social and Cross-Cultural</u>	

Solve Problems
Communication and Collaboration
 Communicate Clearly
 Collaborate with Others

Technology (ICT Literacy)
 Apply Technology Effectively

Interact Effectively with Others
 Work Effectively in Diverse Teams

Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Calculator, graph paper, colored pens, rulers, (laptops for extension)

Set-Up Required:

- None

Lab Organization Strategies:

Grouping/Leadership/Presentation Opportunities:

- Individual Lab

Cooperative Learning:

- Pair Share

Expectations:

- Students will use the appropriate functions to create graphs to compare depreciation. They will analyze which graph is more realistic and explain why.

Timeline:

- 60 minutes or one period

Post Lab Follow-Up/conclusions:

Discuss real world application of learning from lab

- Recognizing depreciation on vehicles and importance of not owing more than your car is worth.

Career Applications

- Finance, Car Dealership

Optional or Extension Activities

- Review true car depreciation using Kelly Blue Book or NADA on new or used cars.

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Comparing Exponential and Linear Depreciation

Name _____

Pd. _____

You are going to investigate the Exponential versus Linear Depreciation on new car you purchased for \$22,300 and after two years is worth \$18,500.

Please follow the directions to calculate depreciation using the Exponential Decay Function and again using the Linear Depreciation Function on a \$22,300 car

1. Using the Exponential Decay Function, write the equation for the car's depreciation.
2. Use graph paper to graph your equation ensuring that your intervals are appropriate and all axis are labelled. (Remember time in years is on the x axis)
3. Using the Linear Depreciation Function and a rate of depreciation of \$2,000 per year, write the equation for the car's depreciation.
4. Using the same graph to plot the Linear Depreciation. Use a different colored pen.
5. Analyze the graphs and explain why you believe one line shows a more realistic depreciation.

6. Realizing that all cars will always have some value, even if it's only a hundred dollars for parts or scrap metal, rewrite your Exponential Decay Function to include this value.

Extend your learning:

7. Define Asymptote: _____
8. What is the asymptote of your new equation and can you identify and label it on your graph?

Answer Key

1. $Y = \$22,300(1-.085)^t$
2. Answers will vary and should resemble an exponential decay graph. Y intervals should have even intervals from 0 to 22,500.
3. $Y = -2,000x + \$22,300$
4. Answers graphed on same graph and starts at \$22,300 on the Y axis and has a negative slope. It should cross the x axis at 11.15 years.
5. Answers will vary, however, the goal is for students to recognize that a car should never have a zero value and realistically exponential decay is more indicative of reality.
6. $Y = \$22,300(1-.085)^t + 100$
7. Asymptote is a line that a graph approaches but never touches or intersects.
8. \$100

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