

WAMC Lesson Plan

Name(s): Tim Ostrander

Lesson Title: Linear Automobile Depreciation

Date:

Text: Financial Algebra 5-5

Lesson Length: 3 days

Domain: Creating equations, Interpreting functions, Linear, quadratic and exponential models

Big Idea (Cluster): Creating equations that describe numbers or relationships, Interpret functions that arise in applications in terms of the context, Analyze functions using different representations, Construct and compare linear and exponential models and solve problems

Common Core State Standards: A-CED2, A-CED3, F-IF6, F-IF7a, F-IF9, F-LE1b, F-LE5

Mathematical Practice(s): 1, 3

Content Objectives: Write, interpret, and graph a straight line depreciation equation

Language Objectives: Students will understand key vocabulary

Vocabulary: depreciate, appreciate, straight line depreciation, slope, straight line depreciation equation

Connections Prior to Learning: Find and interpret slope, intercepts and slope-intercept form of an equation

Questions to Develop Mathematical Thinking:

- CCSS Warm-up pg. 245
- What are some items that appreciate or depreciate over time? What costs are involved with buying a car?

Common Misconceptions:

- I can afford a nice car
- The value of my car

Assessment (Formative and Summative):

- Ch. Application questions, teacher questioning during work time, quiz

Materials:

- Textbook, graph paper, graphing calculators

Instruction Plan:

Launch: Discuss items that increase or decrease in value over time and why. Then, guide discussion specific to automobiles.

Explore: work out example problems together as a class. Students take notes and work out check your understanding questions.

When I observe students: probing questions, check for understanding

Questions to Develop Mathematical Thinking as you observe: What do the x and y intercepts mean? What does the slope mean? Why does the graph go down? Can you use the same equation to solve for the initial value/year/rate?

Answers: The x intercept represents the time when car's value is 0. The y intercept represents the original value of the car. The slope is the amount of depreciation per year. The graph goes down (negative slope) because the car is losing value. Yes, you can use the same equation, but it would need to be manipulated and solved for the different variables.

Summarize: A vehicle loses value over time, beginning with the moment you purchase it. Although it does not necessarily follow a linear pattern, this lesson gives a model to start the

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discussion on depreciation and leads into exponential decay. It also provides a review of slope, intercepts and slope-intercept form of an equation.

Career Application(s):

- Accounting, used car sales

21st Century Skills and Interdisciplinary Themes:

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

- | | | |
|---|--|---|
| <input type="checkbox"/> Global Awareness | <input checked="" 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

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information

Use and manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others

- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

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1. Mary purchased a car for \$21,750. This model depreciates to zero after 15 years.
 - a. Identify the coordinates of the x and y intercepts for the depreciation equation.
 - b. Determine the slope.
 - c. Write the equation that models this situation
 - d. Graph the equation.
2. The straight line depreciation equation for a car is $y = -2340x + 42,120$.
 - a. What is the car worth after 6 years?
 - b. What is the car worth after 18 years?
3. A car is originally worth \$37,400. It takes 11 years for the car to fully depreciate.
 - a. Write a straight line depreciation equation to model this situation.
 - b. How long will it take for the car to be worth half its original value?
 - c. How long will it take for the car to be worth \$5,000? Round to the nearest tenth.

Answer Key

1. a. x-int (15, 0) y-int (0, 21750)
b. -1450
c. $y = -1450x + 21750$
d.

2. a. \$28,080
b. \$0

3. a. $y = -3400x + 37400$
b. 5.5 years
c. 9.5 years