

Using Linear Models

Author: Steven Turner

Date created: 09/03/2014 9:21 AM PST ; **Date modified:** 09/19/2014 9:47 AM PST

LESSON OVERVIEW

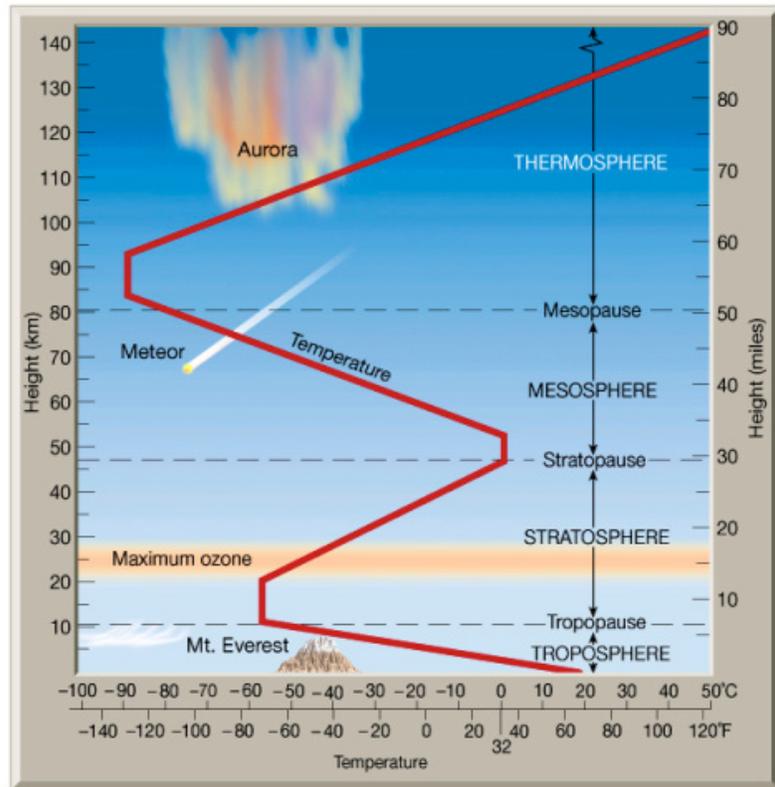
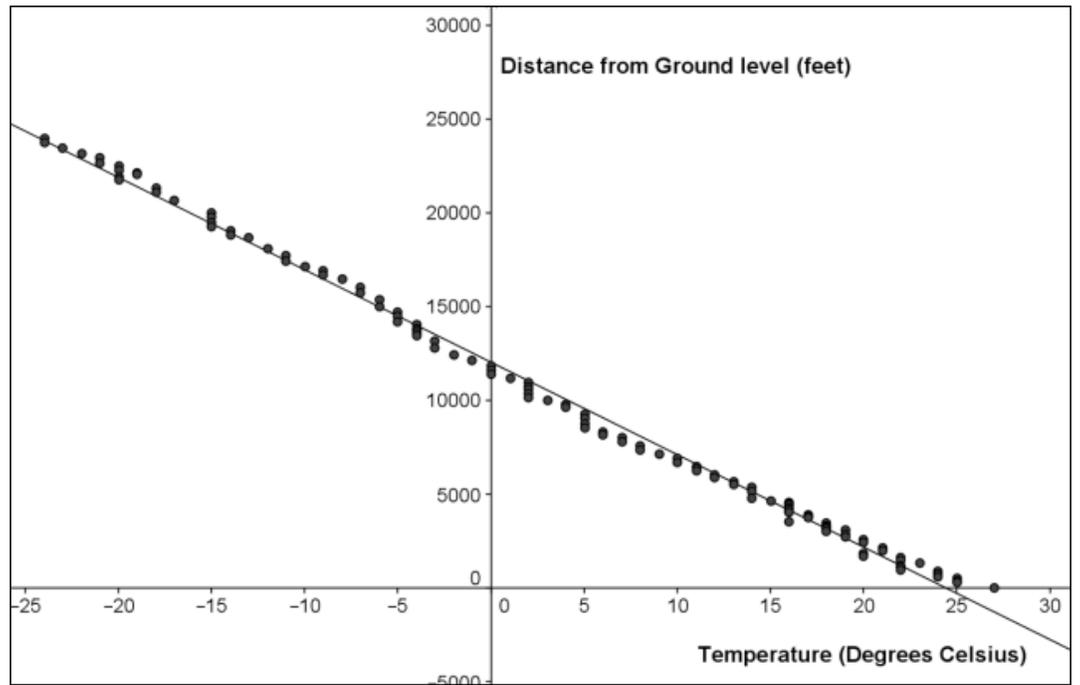
Subject(s)	Mathematics
Topic or Unit of Study	Algebra II (Honors) - Linear Models
Grade/Level	Grade 10
Objective	Given two points, a table of values, or a point and a slope, students will be able to create a linear equation (or trend line), graph the linear equation, and make a prediction based on that equation.
Summary	Students break down a word problem into math terms to create an equation and graph it based on two points. Students will be introduced to the concept utilizing data in the form of a scatter plot to create a trend line (if there is a correlation).

IMPLEMENTATION

Learning Context	Students have learned about linear equations, dependent and independent variables, x- and y-intercepts, the different ways to write an equation (point-slope, slope-intercept, and standard forms), and the slope formula. The contact day before this lesson was a lab where students modeled the results of the lab and created a line-of-best-fit for the plot.
Teaching Strategies	Direct instruction
Time Allotment	1 class periods. 50 Mins. per class.
Sample Student Products	
Author's Comments & Reflections	The day before this lesson, the students completed a ball drop experiment which introduced students to scatter plots and a line-of-best-fit. This experiment provided a great reference for explaining the concepts in this lesson as well as the steps that should be taken to find the line-of-best-fit and graph the data points on a scatter plot.

PROCEDURE

Anticipatory Set	<p><u>Introduction</u></p> <p>Teacher talks about an experience on an airplane with a outside temperature monitor available. An example would be about how bored I was playing on the screen and then decided to check the trip monitor.</p> <p><u>Interest Fact of the Day</u></p> <p>The relationship between air temperature and elevation is roughly a linear relationship. Between the two variables, distance from ground level and air temperature, there is a pattern.</p>
-------------------------	--



<http://danpearcymaths.wordpress.com/2011/12/02/real-life-linear-relationships/>

Modeling

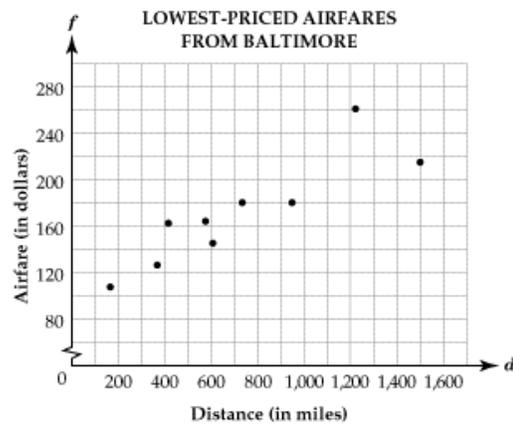
Complete the two scenarios below with the following information.

The table below shows the distances, in miles, and the lowest-priced airfares, in dollars, of flights from Baltimore to various destinations.

LOWEST-PRICED AIRFARES FROM BALTIMORE

Destination	Distance (in miles)	Airfare
Atlanta	576	\$164
Boston	370	\$124
Chicago	612	\$143
Dallas	1,216	\$260
Detroit	409	\$161
Denver	1,502	\$216
Miami	946	\$180
New York	189	\$108
St. Louis	737	\$180

The data from the table is graphed on the scatter plot below.



http://mdk12.org/instruction/clg/public_release/algebra_data_analysis/G3_E2_I2.html

Steps when given two points or a point and a slope

- 1.) Write the given
- 2.) Find slope (If not already given)
- 3.) Write in point-slope form
- 4.) Convert to slope-intercept form (Final Form)
- 5.) What if...?

Steps for a Scatter Plot

- 1.) Write table of values (given)
- 2.) Plot the points on a graph
- 3.) Draw a trend line (same number above and below the line)
- 4.) Write the equation
- 5.) What if...?

Guided Practice

Students complete the handout to take notes and copy down modeled/guided practice problems as

the teacher writes. After the teacher has finished modeling, the teacher will ask students to complete one problem and then will go over the steps/answer. Students are to find the the predicted cost of flying from Baltimore to San Francisco which is 2454 miles away.

Independent Practice

Classwork/Homework: Geometry textbook pages 83-85, problems 3-5, 7-9, 11, 21, 27

Closure

Teacher will review the 5 steps learned today briefly. The teacher will write the steps out one by one with students providing answers.

Follow-Up

Students will complete a warm-up on the steps next class.

MATERIALS AND RESOURCES**Instructional Materials****Resources**

- Materials and resources:
Algebra II textbook, front whiteboard, whiteboard markers and erasers, document camera
- The number of computers required is 1.

STANDARDS & ASSESSMENT**Standards**

Display: Collapse All Expand All

▼ **CA- California Common Core State Standards (2012)**

▼ **Subject:** Mathematics

▼ **Grade:** High School

▼ **Content Area:** Algebra

▼ **Domain:**

Reasoning with Equations and Inequalities A-REI

▼ **Area:** Represent and solve equations and inequalities graphically

Standard:

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

Assessment Plan

Homework is out of 20 points. The teacher will check 5 questions and grade *each* question (worth 4 points). The 5 questions will be from different sections of the assignment to avoid grading 5 questions that are the same problem-type (example: 5 problems asking to plot a linear equation) which may not adequately represent the student's progress towards the lesson's learning goal/standard.

Assessment/Rubrics**Rubrics:**

1. [Textbook Homework Rubric](#)