

5E LESSON PLAN TEMPLATE

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TITLE OF THE LESSON: Linear functions in real life models

TECHNOLOGY LESSON: No / YES: Elmo, Doc cam, and smart board

DATE OF LESSON: November 11- November 12, 2015

LENGTH OF LESSON: 2 days (45 Mins each day)

NAME OF COURSE: 8th grad Algebra 1

SOURCE OF THE LESSON:

TEKS ADDRESSED:

- (1) **Mathematical process standards. The students use mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
 - (A) **Apply mathematics to problems arising in everyday life, society, and the workplace;**
- (3) **Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and system of equations. The student is expected to:**
 - (B) **Calculate the rate of change of linear function represented tabulary, graphically, or algebraically in context of mathematical and real-world problems.**

ELPS ADDRESSED:

c2G: Understand general meaning, main points, and details.

c4F: use visual and contextual supports to read to read text.

c3F: Ask and give information using high- frequency and content area vocabulary.

CCRS ADDRESSED:

II. Algebraic Reasoning

C. Solving equations, inequalities, and systems of equations

- 1. Recognize and use algebraic (field) properties, concepts, procedures, and algorithms to solve equations, inequalities, and systems of linear equations.**
- 2. Explain the difference between the solution set of an equation and the solution set of an inequality.**

CONCEPT STATEMENT:

Linear functions are important for not only solving the linear problems but for drawing and locating the lines on a graph, and real world problems. Linear functions will be used in all the students' math classes that remain. This lesson is important to the students because the students need to understand the angles of the routes, steps, and plays that are critical for success in everyday life.

PERFORMANCE OBJECTIVES:

The students will be able to take real world situations and relate them to linear functions, graphically, tabularly, and algebraically.

ACCOMMODATIONS:

Allow students to use graphing calculator to better assess the word problem

MODIFICATIONS

For those students who are not understanding I will have a copy of my notes that I give to them and that I will break down into steps, I will also let the student's graph the function that we came up with in there calculates that is provided by Boulder middle school.

EXTENSIONS:

Ask the students to come up with a real life situation that represents a linear function that means something to them and represent it using a table, graph or function.

RESOURCES, SUPPLIES, HANDOUTS:

Paper (200 pieces)

String 4 spools

Stapler

Tape

Small skate boards (15)

Elaboration worksheet (4)

PowerPoint

Rulers (15)

Worksheet1 (25)

SAFETY CONSIDERATIONS:

Making sure students act appropriate with the string and stapler that is used to build the ramp.

ENGAGEMENT

Est. Time: 15 mins

What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
Put up PowerPoint. Ask questions Call on all students who have something to relate these pictures to	Can anyone tell me how these pictures relate to something they have done? Did anyone know that all these things have something to do with math? What math term if any could you relate some of these pictures on the PowerPoint?	Answering questions.
place skate board ramp on the table and slide the skate board up and down the ramp	What if I told you that sliding this skate board on this ramp is related to all those pictures we just seen.	

T: Well today we are going to relate all these things with something we are all very familiar with.

EXPLORATION		Est. Time: 25 mins
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
Ask students to get into groups of two		move into groups
Put up instructions on Elmo and read them allowed.		sit quietly and wait for instructions
Instructed the students with their shoulder partner to build there on skateboard ramp, making it as long or tall as the paper allows you to make them. I will not explain to them how to build the ramp. Then each student must build a ramp and time how fast a skate board goes down the ramp		The students will build skate board ramps out of the materials provided by the teacher. Slide the skate board down the ramp and time it.
Walking around make sure the students are following the safety concerns asking questions	If I wanted to find out how steep this ramp is how would I do that? Can you use a number to describe the steepness of your ramp?	Answer questions work on ramp.

T:

On tomorrow we will compare everybody's times and see how these things relate.

Day 2

Now that all the groups are done let's start by letting each group explain what they when building there ramp and how fast each skateboard went down the ramp

EXPLANATION		Est. Time: 20 mins
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
As we seen from everybody a lot of	Do you think that how steep your	Answer questions

EXPLANATION		
Est. Time: 20 mins		
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
us got different times. Ask questions	ramp is plays apart in how fast each skateboard went down?	
How fast each skateboard went down has a lot to do with the steepness of your ramps. The ramp and these pictures represent slope of real world models.		
Ask questions Draw popsicles sticks out of a can	What are some other names we know for slope? (m, rise over run) in the skateboard activity what would be the rise?(how tall the ramp is) In the skateboard activity what would be the run? (how long the bottom of the ramp is) Can we know put a number on the steepness of our skateboard ramps? (Yes)	Answer questions
Notes: We can use learn functions to help model things like: flying planes, skateboarding, football, building houses etc. (put up power point) We know how to find the slope given two points on a graph (remind them $(y_2 - y_1) / (x_2 - x_1)$.) and the linear equation $y = mx + b$. When modeling slope in real life situations slope cannot be negative. slide 2 The slope of the line tells us how steep something is for example. every one of these lines have the same y-intercept but different slope the higher the line gives us a steeper slope and the lower the line gives us a smaller slope slide 3 the y-intercept of the line shows gives us how high the line is for example slide 4 So say for instance you wanted to	Can anybody tell me which axis represents our independent variable? can anybody tell me which axis represents our dependent variable	Taking notes and answering questions.

EXPLANATION		Est. Time: 20 mins
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
<p>get the car of your dreams and you have to save money to get this car. Let's say the car of your dreams cost 70,000. So let our x axis be our time to save the money and our y axis represent the money we save.</p> <p>Ask questions</p> <p>Let's suppose we want to purchase this car in 10 years from now, we can mark this point on the graph.</p> <p>Using this graph we are going to create a model to show how much money I would need to save each year.</p> <p>We need to know to pieces of information. We need to know the slope and y-intercept</p> <p>knowing that we start with 0\$ gives us our y-intercept our starting point is (0,0)</p> <p>Now need to find the slope of the equation. Using the slope formula we have already found two points in our model so we can plug them into it.</p> <p>$m = (70000-0)/(10-0)$</p> <p>$m = 7000$ or 70 on our graph</p> <p>now that we have these two things we can plug them into our equation $y = 7000x+0$, $y = 7000x$</p> <p>Plot the rest of the points.</p>		
<p>Ask question</p> <p>Draw name from popsicle sticks</p> <p>slide 5</p> <p>similarly using a table</p>	<p>How much is each point increasing by? (7000)</p> <p>How much money do we need to save each year?</p> <p>What is our slope?</p>	<p>Answering questions</p> <p>taking notes</p>

T:

Now that we have seen how something in real life can be modeled using slope and y-intercept let's get into those groups work on a similar problems

ELABORATION		Est. Time: 20 mins
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
<p>Instruct the students to get in three</p>		<p>Moving from each station and</p>

ELABORATION		
Est. Time: 20 mins		
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
<p>groups same. And explain that we will be using stations to allow us to represent real life situations using equations Graphs, and tables.</p> <p>Each group will be given worksheet number 2 with a problem on it. They will move from station to where they will represent the problem graphically tabularly and as an equation</p>		<p>discussing possible methods of solving the problem with their groups. Ask questions (if any)</p>
<p>Station 1 (graphically) there will be a huge graph provided to allow the group members to come up with a model of the class problem</p> <p>Station 2 (tabularly) there will be a huge table provided to allow the group members to come up with a model of the class problem</p> <p>Station 3 (equation) students will come up with a function to represent the class problem</p> <p>-each group will be given 6 mins at each stage and after that move counter clock wise to the next station</p> <p>When the groups are done we will take about 3 mins to select a group member to explain one of the three stations.</p>		
Walking around observing		

T:

Now for the last 10 mins of class were going to work on a few problems independently

EVALUATION		
Est. Time: 10 mins		
What the Teacher Will Do	Probing Questions and Answers	What the Student Will Do
<p>Explain that we can use our knowledge of functions and slope in many real-world problems. Ask Students to complete the worksheet 1</p>		<p>Complete worksheet 1 without assistance.</p>

