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: Springboard learning book, Mrs.Hanks

TEKS ADDRESSED:

(1) Mathematical process standards. The students uses 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 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 steps that are critical by using the slope- intercept form to represent linear equations for everyday life.

PERFORMANCE OBJECTIVES:

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

ACCOMMODATIONS:

Allow students to use graphing calculator to better asses 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 boulter 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 1 (4)

Elaboration worksheet 2 (4)

PowerPoint

Rulers (15)

Popsicles sticks

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 (Pull popsicle sticks out of can) call on student and pause .9 seconds Call on all students who have something to relate these pictures to Did anyone know that all these things have something to do with math	How do these pictures relate to something you have done? What math term if any could you relate some of these pictures on the PowerPoint? (slope, steepness, rising)	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. (slope)	

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 set timer Keep restating the instructions Walk around make sure everyone is on task. asking questions	If I wanted to find out how steep this ramp is how would I do that? (measure the height, and the width and divide them giving you a slope) Can you use a number to describe the steepness of your ramp? Yes by measuring the height and the width and divide them giving you the steepness which is the slope)	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 us got different ramp sizes. Ask questions	Why does how steep your ramp is play apart in how fast each skateboard went down? Answers may vary.	Answer questions
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 (y2-y1)/(x2-x1.) 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	what does it mean to be independent what does it mean to be independent in a function what are the labels for our axis what axis is our independent variable what axis is our dependent variable why does it matter that we know the difference (X- Axis the time it takes you to save the money.) which axis represents our dependent variable (Y- axis the money you saved) we need to know this so we know	Taking notes and answering questions.

EXPLANATION	Est. Time: 20 mins	
What the Teacher Will Do	**Probing Questions and Answers**	**What the Student Will Do**
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 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. Ask questions Let's suppose we want to purchase this car in 10 years from now, we can mark this point on the graph. Using this graph we are going to create a model to show how much money I would need to save each year. We need to know to pieces of information. We need to know the slope and y-intercept knowing that we start with 0$ gives us our y-intercept our starting point is (0,0) 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. **m = (70000-0)/(10-0)** **m = 7000 or 70 on our graph** now that we have these two things we can plug them into our equation y = 7000x+0, y = 7000x Plot the rest of the points.	which one works off of the other. Which one can't happen without the other? And which one can go on without the other.	
Ask question Draw name from popsicle sticks slide 5 similarly using a table	How much is each point increasing by? (7000) How much money do we need to save each year? (7000) What is our slope? (7000)	Answering questions taking notes

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: 24 mins	
What the Teacher Will Do	**Probing Questions and Answers**	**What the Student Will Do**
Instruct the students to get in 6 groups. And explain that we will be using stations to allow us to represent real life situations using equations, Graphs, and tables. Each group will be given worksheet number 2 and worksheet 3 with a problem on it. They will move from station to where they will represent the problem graphically tabularly and as an equation move from station to station the first station I will set a timer on the board for ten minutes and each station after that 7 mins There will be two of each station so move to the right and the group at the end will move to the beginning. in each group there will be roles -Recorder(the person who writes or draws the graph) - Manager (the person who makes sure that they have the materials needed to complete each station and make sure everyone stays on task) - Presenter (the person who explains either the table, graph or equation maybe more than 1 person depending on the group size)		Moving from each station and discussing possible methods of solving the problem with their groups. Ask questions (if any)
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 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 Station 3 (equation) students will come up with a function to represent the class problem	Graph. Which axis represents our independent? (the amount of the car) Which axis represents our dependent? (the money saved for our car) table is the table proportionally If so what is the table increasing by? (yes, and its increasing by 30) equation	

ELABORATION	Est. Time: 24 mins	
What the Teacher Will Do	**Probing Questions and Answers**	**What the Student Will Do**
-each group will be given 6 mins at each stage and after that move counter clock wise to the next station When the groups are done we will take about 3 mins to select a group member to explain one of the three stations.	What is our slope? 30	
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**
Explain that we can use our knowledge of functions and slope in many real-world problems. Ask Students to complete the worksheet 1		Complete worksheet 1 without assistance.