

Lesson Plan Template

Grade: 11 th Grade		Subject: Algebra II	
Materials: Pen, Pencil, Scratch Paper, Calculator, Phone/Computer		Technology Needed: Computer; possibly geogebra	
Instructional Strategies: <input type="checkbox"/> Direct instruction <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list)		Guided Practices and Concrete Application: <input type="checkbox"/> Large group activity <input type="checkbox"/> Independent activity <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain:	
Standard(s) <ul style="list-style-type: none"> • HS.F-IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Piecewise and Step Functions • Graph square root, cube root and piecewise defined functions, including step functions and absolute value functions. 		Differentiation <p>Below Proficiency: For the class activity, I will try to pair students who are below proficiency with students that are grasping the concept well. Also, I can take the time during the group activity to work with them one-on-one.</p> <p>Above Proficiency: For students above proficiency, I will pair them with below proficiency students to be able to help them gain a better understanding. This allows me to get help for students below proficiency as I cannot work with each of them individually. This will also help students above proficiency to understand the material more in-depth.</p> <p>Approaching/Emerging Proficiency: For these students, I will have them progress as normal by doing the group activity. Also, I will make sure there are some of these students in each group to be able to help students who may need it.</p> <p>Modalities/Learning Preferences:</p> <ul style="list-style-type: none"> • Visual • Auditory • Interpersonal 	
Objective(s) <ul style="list-style-type: none"> • TLW recognize piecewise functions and step functions • TLW be able to graph piecewise and step functions • TLW solve piecewise and step functions. • TLW be able to apply these functions to real life scenarios • TLW be able to write a function based off of a given graph. <p>Bloom's Taxonomy Cognitive Level:</p> <ul style="list-style-type: none"> • Knowledge • Apply 		Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.) <ul style="list-style-type: none"> • Students will be expected to work respectfully with one another during collaboration. • Students would be expected to stay on task during the review game. 	
Classroom Management- (grouping(s), movement/transitions, etc.) <ul style="list-style-type: none"> • Students will be grouped based upon playing cards I hand to them as they enter the room. 		Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.) <ul style="list-style-type: none"> • Students will be expected to work respectfully with one another during collaboration. • Students would be expected to stay on task during the review game. 	
Minutes	Procedures		
1-2	Set-up/Prep: Have PowerPoint ready to go. Have stations ready to, there will be 6 stations to be done as a kind of review/formative assessment. Students will be grouped in groups of 2 or 3. Bell Ringer: List 1 question that you have about what we covered on Wednesday. (Piecewise and step functions)		
3	Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) Graph the following piecewise function. Work with your shoulder partner. $f(x) \begin{cases} 2x - 1, & \text{if } x \leq 1 \\ 3x + 1, & \text{if } x > 1 \end{cases}$ What are the features we should look for? (i.e. fences, etc....)		
15	Explain: (concepts, procedures, vocabulary, etc.) Continue real-life example of step functions		

Lesson Plan Template

$$f(x) \begin{cases} 1, & \text{if } 0 \leq x \leq 1 \\ 2, & \text{if } 1 < x \leq 2 \\ 3, & \text{if } 2 < x \leq 3 \\ 4, & \text{if } 3 < x \leq 4 \\ 5, & \text{if } 4 < x \leq 5 \end{cases}$$

Graph without Geogebra

Fences?

Continuous or discontinuous?

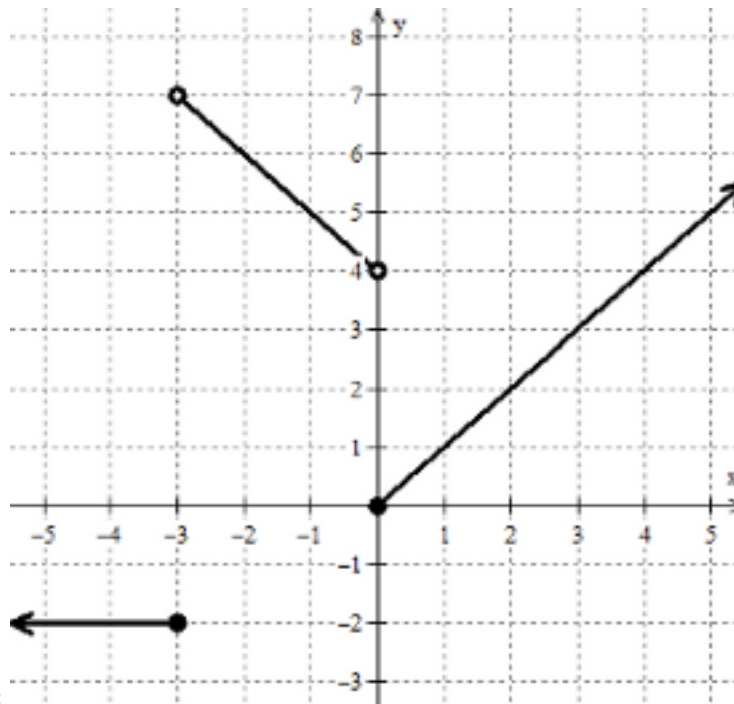
Increasing or decreasing?

What is $f(2.5)$?

$f(4.7)$

$f(1)$

Now, we will examine how to create the piecewise function if we are given a graph



1st Example:

1st function: $y = -2$ if $x \leq -3$

Find the slope and y intercept.

2nd function: $y = -x + 4$, if $-3 < x < 0$

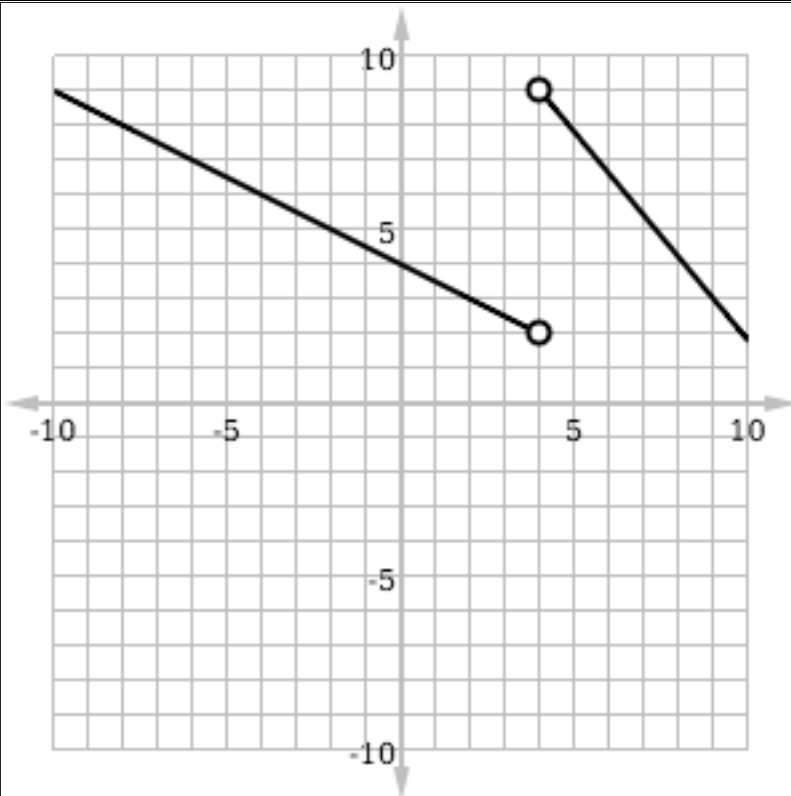
3rd function: $y = x$, if $x \geq 0$

Putting this all together we end up with

$$f(x) \begin{cases} -2, & \text{if } x \leq -3 \\ -x + 4, & \text{if } -3 < x < 0 \\ x, & \text{if } x \geq 0 \end{cases}$$

2nd Example:

Lesson Plan Template



Sometimes we will be given a graph and have to figure out the equation of a line because we do not know the y-intercept. How can we do this?? Point-slope formula

$$y - y_1 = m(x - x_1)$$

What are x_1 , y_1 , and m ??

m is slope, and x_1 and y_1 come from a point we find.

First equation: Do we need to do this? No.

$$y = -\frac{1}{2}x + 4, \text{ if } x < 4$$

Second equation: We need to use point slope form.

Slope is? Remember $\frac{\text{rise}}{\text{run}}$

Go down 6 and right 5, this means that slope is $-\frac{6}{5} = m$

Now what is a point? $(9, 3) \rightarrow (x_1, y_1)$

Plug this into the equation: $y - 3 = \frac{6}{5}(x - 9)$

$$y - 3 = -\frac{6}{5}x + 10.8$$

$$y = -\frac{6}{5}x + 13.8$$

Now, we've found our second equation, we need the constraints.

$$y = -\frac{6}{5}x + 13.8, \text{ if } x \geq 4$$

Putting all of this together yields:

$$f(x) \begin{cases} -\frac{1}{2}x + 4, & \text{if } x < 4 \\ -\frac{6}{5}x + 13.8, & \text{if } x \geq 4 \end{cases}$$

Any questions at this point??

Lesson Plan Template

25	<p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</p> <p>GRAB Calculators</p> <p>Now, we are going to break into 6 groups based off of the playing cards the students received as they walked into the room. They will be in groups of 3-4. They will be assigned to a station and each station will cover a different topic from the lesson. Groups will be given approximately 4 minutes at each station. The students will get to work collaboratively on these problems and will be asked to hand their assignment in at the end of class. This will be used as a formative assessment for the lesson on piecewise and step functions.</p>	
1-2	<p>Review (wrap up and transition to next activity):</p> <p>We will review main topics from the day, namely how to find the function of a piecewise, step function.</p> <p>Students will be asked to complete 13-18 on the homework assignment they were given on Wednesday.</p>	
	<p>Formative Assessment: (linked to objectives) Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc. The formative assessment for this lesson will be the group activity that is completed on Friday. There will be questions from both Wednesday and Friday's class on the assessment.</p> <p>Also, I will walk around the room and observe students during the activity to see what their questions are and topics they are struggling with.</p> <p>Consideration for Back-up Plan:</p> <p>A consideration for backup would be to spend more time going through examples and clarifying topics further if the students are really struggling or request it.</p>	<p>Summative Assessment (linked back to objectives) End of lesson: Questions from this lesson will be included on the summative assessment.</p> <p>If applicable- overall unit, chapter, concept, etc.:</p>
	<p>Reflection (What went well? What did the students learn? How do you know? What changes would you make?):</p> <p>Overall, I feel the lesson went pretty well. The group activity seemed to work very well for getting the students to understand the material better. The students seemed to have a much better grasp on all 3 skills that we were working on: identifying the function given a graph, evaluating certain given values, and graphing piecewise and step functions. I know this because I compared their group activities with the exit slip from class on Wednesday when we covered the same material. The students improved quite a bit. There is still a little bit of work to do, but overall the students seemed to have a much better grasp.</p> <p>I would change two things in particular. The first would be giving the students more time to work on the group activity. This is something I would consider making almost a full class period. This would allow students more time at each station to get through everything. There were a couple of stations that they did not fully finish. The second thing I would change would be to allow time at the end of class to answer questions. This would be questions from the students and also I would talk about certain topics that I noticed students seemed to struggle with the most.</p> <p>Overall, the lesson went well and is something I would definitely do again.</p>	