

## aUDL Lesson Plan Template

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 Learning Domain: Geometry Grade: 12

Lesson Objective/s: Students will identify parallel and perpendicular lines given an equation or graph. Students will write equations for parallel and perpendicular lines given an equation for a line and a point.
Assessment/s: Post test; Feedback from “Parallel, Perpendicular, Neither” activity, Completion of “Parallel & Perpendicular Lines Chain”
State Standards Correlation: M.1HS.CPC.1, M.1HS.CAG.2, M.O.A2.2.1

### UDL Applications Key: **Representation** **Engagement** **Expression**

Pre-planning Activities : Materials will be collected: Pre/Post Test, Discovery/guided notes (by Math Giraffe), Equations of Parallel & Perpendicular lines foldable, index cards, cards for “Parallel Perpendicular or Neither” index card activity, Parallel & Perpendicular Lines Chain (by Mrs. E Teaches Math) , and SMART Board/Projector to show video  
 Partners will be selected for “Chain” activity based on personalities and ability levels, pairing struggling students with stronger students while ensuring that groups will be productive together.

Lesson Element	Procedures	Time	What is the teacher doing?	What are the students doing?	Materials
<b>Lesson Setup &amp; Lesson Opening</b>	Students will be given the “pre test” as the daily warm up. <i>“You will be completing a pretest so that I can determine your prior knowledge. Try your hardest; this will not be for a grade but I need you to read and respond to each question. Please ensure that you complete the final question which is to make a guess on what grade you will receive (out of 6) on this pretest.”</i>	10 min	Guiding/ Facilitating	Participating in discussion	Chalk/white board
<b>Lesson Body</b>	<ul style="list-style-type: none"> <li>Students will be given “<b>Parallel and Perpendicular Exploration</b>”</li> <li><i>“Today we are going to explore parallel and perpendicular lines. Who can tell me what parallel lines are? Who can tell me what perpendicular lines are? We are going to use this information and the information from this activity to determine how equations of parallel and perpendicular lines are related”</i> <ul style="list-style-type: none"> <li>Notes guide students through graphing equations of lines and comparing/contrasting similarities and differences between the lines               <ul style="list-style-type: none"> <li><i>“What do the two equations you graphed have in common? How do they differ”</i></li> </ul> </li> <li>Students will discover parallel lines have the same slope and perpendicular lines have slopes that are opposite reciprocals</li> <li>As a class, guide students through examples of writing equations for parallel &amp; perpendicular lines.               <ul style="list-style-type: none"> <li><i>“What 2 things do you need to write an equation of a line? (slope; y-intercept) How will we determine the slope of our new line? How will we determine the y-intercept f</i></li> </ul> </li> </ul> </li> </ul>		Guiding/Facilitating  Checking for understanding	-Discovery learning by making and testing conjectures  -Filling in guided notes  -Participating in class discussion	-Parallel and Perpendicular Lines Exploration Notes  -Equations of Parallel and Perpendicular lines Foldable



	<ul style="list-style-type: none"> <li>○ Students write equations for parallel and perpendicular lines. The answer to each problem can be found at the beginning of another question within the two pages, so students should be able to check their work by finding their answers.</li> <li>○ When all problems are complete, students can cut out the problems and tape the “chain” together. The chain will begin with “start” and the answer to the first question on the “start” problem will be taped next. Then the answer to those problem will go next and so on. They can <b>decorate their chain</b> (time permitting) for display in the room. <ul style="list-style-type: none"> <li>▪ <i>“Each of you were assigned a partner and given a paper. There are 6 problems on each paper and you are to complete each problem. When your equation is written, you should find it on the top of another problem either on your or your partner’s page. When you have finished all problems, you make a chain of answers from “start” to “end” linking them together with the next answer. If you have time, you can decorate your chain, as I plan to display them all around the room”</i></li> </ul> </li> <li>● NOTE: While students are working on Chain activity, index cards can be read and any misunderstandings can be addressed with individual students.</li> </ul>				
<b>Lesson Closing</b>	<p>In closing, students will watch the video “Parallel and Perpendicular Lines slope” by Shoomp (<a href="https://www.youtube.com/watch?v=wO5pmiYGqLg">https://www.youtube.com/watch?v=wO5pmiYGqLg</a> ). Index cards will be returned for students to study for tomorrow’s quiz.</p> <p>Post test will be given as a warm up in tomorrow’s class to determine retention of the information.</p> <ul style="list-style-type: none"> <li>▪ <i>“I’m going to show a quick, silly video to help you remember how to write equations for parallel and perpendicular lines. While the video is playing, I will return your index cards. Tomorrow you will have your post-test quiz to determine your understanding on this content, so you can keep these index cards and our foldable as a study tool. If you have any questions please ask me before you leave today.”</i></li> </ul>	10 min	Showing video, returning index cards	Watching video	Video & projector

<b>Possible Learner Barriers:</b>	<b>Possible Solutions</b>
Lack of Pre-Requisite skills: Getting equations in y-intercept form, graphing equations	Prior to this lesson, we spent time on slope intercept form and graphing equations. This served to refresh the student’s memories. We will also complete examples as a class within this lesson.
Understanding “opposite reciprocals”	Take time within the lesson to give examples of numbers and ask the class to state the “opposite reciprocal” for practice.

Retaining information	Students will have a variety of activities to solidify understanding. They will also have their index cards and foldable to study.
Organization of ideas	Foldable will be provided and completed in class so students have an example of writing and equation given 2 points, writing an equation of a parallel line and writing an equation for a perpendicular line.
Off-task behaviors	Students will be discovery learning, collaborating with peers, and completing 3 different activities to create transitions for students to remain interested in the activity and topic.

Possible UDL Applications for Extension	
Representation	<ul style="list-style-type: none"> <li>-Students can have access to online videos through Learnzillion (Parallel: <a href="https://learnzillion.com/lessons/251-write-the-equations-of-parallel-lines">https://learnzillion.com/lessons/251-write-the-equations-of-parallel-lines</a>, Perpendicular Lines: <a href="https://learnzillion.com/lessons/252-write-the-equations-of-perpendicular-lines">https://learnzillion.com/lessons/252-write-the-equations-of-perpendicular-lines</a> ) that reteach the main ideas.</li> <li>-They will be shown the “shoomp” video on Parallel &amp; Perpendicular lines.</li> <li>-Discovery notes present main ideas in relation to graphs and equations</li> <li>-They will complete a foldable &amp; index cards to organize thoughts/main ideas</li> </ul>
Engagement	<ul style="list-style-type: none"> <li>-In introduction, discuss where you see parallel/perpendicular lines. Incorporate sports, music, etc based on student interest.</li> <li>-Discovery learning through notes</li> <li>-Students will play “Parallel, Perpendicular, Neither” activity/ game</li> <li>-Students will work with partners during “Chain” activity</li> </ul> <p>Extension: Have students determine where they see</p>

	parallel/perpendicular lines. When would it be important to have perfectly parallel/perpendicular lines?
Expression	<ul style="list-style-type: none"><li>-Post Test</li><li>-Index Card explanations</li><li>-Participation in “Parallel, Perpendicular, Neither” activity/game</li></ul> <p>Extension: Students could create a creative project (such as a GoAnimate cartoon) that explains the relationship between parallel/perpendicular lines and their slopes.</p> <ul style="list-style-type: none"><li>-Students can write a proof that shows parallel lines have the same slope.</li></ul>



**Level III:** A few students will...

Write a proof for parallel lines having the same slope and/or perpendicular lines having negative reciprocal slopes.

**Level II:** Some students will...

Create a “Go Animate” or other video of their choice to explain how parallel & Perpendicular lines relate to slope or how to write an equation for parallel/perpendicular lines.

**Level I:** All students will...

Determine if lines are parallel, perpendicular or neither given a graph or equation of 2 lines.  
Write an equation for a line parallel/perpendicular to a given line through a specified point.