

Lesson Plan Template Draft: Section 3.6: Functions

<p>Teaching point / Objectives:</p> <ul style="list-style-type: none"> · Identify relations, domain, and ranges · Identify functions · Use the Vertical Line test · Use function notation 	<p>Length of lesson:</p> <p>1 hour</p>	<p>Materials:</p> <p>Active Learning Strategy Procedure I.D. Cards (for students to use as rulers) Graphing paper for teacher and students</p>
<p>Active learning strategies that this lesson employs:</p> <p><u>Adapted Ink shedding:</u> the purpose of this activity is to help students draw connections between multiple concepts, encourage increased participation and promote helpfulness and prosocial behavior in the classroom.</p> <p>Step 1: Divide class into groups of 4-5 Step 2: Provide each student a worksheet with the real-world problem set (see problem below in real-world connection section). Step 3: Give students 10 mins to complete problem on their own. Step 4: in their groups, pass their paper to the student on their left. Step 5: 5 minutes - Students should now provide written feedback of the paper in front of them, correcting any mistakes, or providing any guidance. Step 6: repeat steps 4 and 5 until the student gets their own paper.</p> <p><u>Adapted think, pair, share:</u> the purpose of this activity is to help students understand feedback given in the previous activity, and to share what they learned with the class or with their groups.</p> <p>Step 1: One students have gotten their own paper back from the previous activity, split the students into a different group/pair. Step 2: In pairs, students should go over their papers to compare feedback, think about the connections. Step 3: Pick pairs of students to go to the board to share their answers with the class.</p>		

Real-world connection / focus / word problem connecting lesson to real-world: (What is the connection between this content and a student's future study or or the "real world"? What is the context of this lesson? What problem will you use to hook students into the lesson to make a real-world connection to content that they are going to learn today?)

There will be 3 "real world" graphs generated from the following concept:

- **Graph 1: In the textbook in the review problems section for section 3.6, there is a graph of sunset times for Seward, Alaska**
- **Graph 2: With the same labeled x- and y-axis, you will make a second graph, except the parabola will be turned 90 degrees.**
- **Graph 3: With the same labeled x- and y-axis, make a graph with the sunset times at the equator. This graph should be a horizontal line.**

These three graphs will provide an introduction to students understanding the concept of functions.

Additional content to provide with the worksheet:

- **Definitions of vertical line test, domain, range, and relation (you can write these on the board as well)**
- **Sets of relations so students can identify functions by sets of relations.**

How are you using this context to introduce or reinforce the teaching point?

Questions for graph 1:

- 1) Approximate the time of the sunset on June 1.**
- 2) Approximate the time of the sunset on November 1.**
- 3) When will the sun set at 3:00pm**
- 4) When will the sun set at 9:00pm?**

Questions for graph 2:

- 1) **Approximate the time of the sunset on June 1.**
- 2) **Approximate the time of the sunset on November 1.**
- 3) **When will the sun set at 3:00pm**
- 4) **When will the sun set at 9:00pm?**

Questions for graph 3:

- 1) **Approximate the time of the sunset on June 1.**
- 2) **Approximate the time of the sunset on November 1.**
- 3) **When will the sun set at 3:00pm**
- 4) **When will the sun set at 9:00pm?**

Additional questions:

- 1) **In your own words, define the vertical line test, domain, range, and relation.**
- 2) **Identify each of the above in the three graphs**
- 3) **Identify which graph (if any) is NOT a function and write why.**
- 4) **Identify the sets of relations that are or are not functions and say why or why not.**

Anticipated time	Stage and aim	Procedure
5-10 minutes	Lead in- Handout the worksheet, write the definitions on the board, explain in procedural terms, the steps the class will take in their small groups first, then in pairs later and lastly at the board.	ü Provide the real-world problem to each student ü Make sure questions are clarified

20-30mins	<p>Focus on Concept-this is when the ink shedding procedure should be followed</p> <p>This is the “think” part of the think/pair/share activity</p>	<ul style="list-style-type: none"> v As students are working, circulate around the classroom to encourage students to work independently, and to encourage uncertain students to engage in the project. v As students switch their papers, encourage them to write thoughtful comments or provide thoughtful feedback to each other by being sure their thoughts are conveyed on paper in a complete way. v Listen for any repeated problems or questions as the papers are switched and address them as a class, so the next student can correct any problems on the paper they receive with the updated information. 	
15 minutes	<p>Regroup- this will be done as a think-pair-share</p>	<ul style="list-style-type: none"> v Teacher will pair students with someone they have not worked with previously. v The pair will review the feedback received on both papers to compile the “best possible” answers for each question. 	
15 minutes	<p>Feedback-the “share” part of the think-pair-share</p>	<ul style="list-style-type: none"> v Call on students to provide answers for the class to each question on the sheet. Ask follow-up questions if needed and provide guidance if concepts are still missed. 	

Anticipated problems and potential solutions in this lesson (These can be either problems with logistics / timing, or problems to anticipate with students' knowledge / grasp of the content. Where will students have difficulties? What would you want a newer teacher to anticipate?)

Ø For the adapted ink shedding activity, students may have difficulty with confidence in working alone and may want to engage their group right away. This activity will not work properly unless the student tries to think it through themselves, first.

Ø For the think, pair, share activity, students may think it is easier just to speak to someone who wrote the comments or feedback, but, this activity gives the student a unique opportunity to try to understand from a different perspective and the goals of the activity will not be fully met if they do not try to work with the new partner.

Ø You may need to encourage students to write something-anything on a paper, even if they think that it is "perfect", there is always something to add!

Differentiation: In what places in the lesson are you differentiating for students in different ability groups?

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Where are these on your lesson plan?

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Ideas for extensions, notes, considerations, or alternative plans:

Ø Monitor students closely, as this is the important role that the teacher plays in facilitating learning, by catching incorrect or misguided thinking. Pay attention to vocabulary use and encourage appropriate use.