Unit Plan - Alexis Wanner

Functions

Grade 9, 11 Day Unit

Learning Objectives: Represent mathematical relationships using graphs and identify and represent patterns that describe linear functions. Determine whether a relation is a function, write equations to represent functions, and find the domain and range of the function. Graph equations that represent functions and use function notation. Effectively share and explain ideas in a collaborative manner with others.

Lesson 1

<table>
<tr><td>Grade: 9</td><td>Subject: Algebra I</td></tr>
<tr><td>Materials: Algebra I textbook, Chromebook, pencil, loose-leaf paper</td><td>Technology Needed: Chromebook</td></tr>
<tr><td>Instructional Strategies:
✓ Direct instruction
✓ Guided practice
☐ Socratic Seminar
☐ Learning Centers
☐ Lecture
☐ Technology integration
☐ Other (list)
☐ Peer teaching/collaboration/ cooperative learning
☐ Visuals/Graphic organizers
☐ PBL
☐ Discussion/Debate
☐ Modeling</td><td>Guided Practices and Concrete Application:
✓ Large group activity
✓ Independent activity
☐ Pairing/collaboration
☐ Simulations/Scenarios
✓ Flipped Classroom
Explain: Due to COVID-19 protocol, the classroom has been flipped to best utilize the minimal amount of time students are in class in person
☐ Hands-on
☐ Technology integration
☐ Imitation/Repeat/Mimic</td></tr>
<tr><td>Standard

HS.FIF.4: Use tables, graphs, verbal descriptions, and equations to interpret and sketch the key features of a function modeling the relationship between two quantities.</td><td rowspan="2">Differentiation

Below Proficiency:
Students will work to identify relationships between data or situations and graphs with significant assistance from teacher, receiving additional supports to help connect the graphs to real-world scenarios.
Above Proficiency:
Students will be able to identify relationships between data or situations and graphs independently. Additionally, students will be able to extend this concept to describe a personal experience using a graph.
Approaching/Emerging Proficiency:
Students will be able to identify relationships between data or situations and graphs with minimal assistance from the teacher.
Modalities/Learning Preferences:
Visual, Auditory</td></tr>
<tr><td>Objective

Students will be able to represent mathematical relationships using graphs.

Bloom’s Taxonomy Cognitive Level:

Understanding, Applying, Analyzing</td></tr>
<tr><td>Classroom Management- (grouping(s), movement/transitions, etc.)</td><td>Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.)</td></tr>
</table>

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Students will remain seated in their assigned desks throughout the duration of class and follow proper COVID-19 protocols regarding social distancing and mask wearing.	Students will conduct themselves respectfully and work in their assigned spots on the homework and asking questions when help is needed in class.

Minutes	Procedures
100	**Set-up/Prep:** Record the video lesson for students to watch the night before, as is normal in the flipped classroom setting. Post the video on the Google Classroom page. Create Cornell notes for lesson and print one copy of the notes and one worksheet for each student. See Unit Plan Notes Lesson 1, Unit Plan Lesson 1-4.1 Worksheet, and Unit Plan Lesson 1-4.1 PP.
8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Students will individually complete the bell work assignment to review previous concepts about evaluating expressions. Then we will work through the problems as a class.
20	**Explain: (concepts, procedures, vocabulary, etc.)** (on video) Slowly explain the relationship between variables on different graphs. Identify what different shapes of graphs show about the relationship. Work through problems to match various data sets with the corresponding graph and describe what the relation between the variables throughout the graph.
30	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** (in class) Work through difficult homework problems with students as a class (Unit Plan Lesson 1-4.1 Worksheet). Walk around classroom and answer questions about student's points of confusion with the lesson.
15	**Review (wrap up and transition to next activity):** Have students take out a half sheet of loose-leaf paper to describe a situation in their life and sketch a graph to explain it to use as an exit ticket. Students will complete and turn in by the end of the class period.

Formative Assessment: (linked to objectives) **Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc.** Walk around classroom to monitor students' progress on homework throughout the class period. **Consideration for Back-up Plan:** Prepare extra problems to work through as a re-teaching tool if students did not receive sufficient instruction from the lesson video.	**Summative Assessment (linked back to objectives)** **End of lesson:** Students will describe a situation in their life and sketch a corresponding graph on a half sheet of loose-leaf paper as an exit ticket. **If applicable- overall unit, chapter, concept, etc.:** Unit Test on Functions

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

Lesson 2

Grade: 9	**Subject: Algebra I**
Materials: Algebra I textbook, Chromebook, pencil, loose-leaf paper	**Technology Needed: Chromebook**

Instructional Strategies:

- ✓ Direct instruction
- ✓ Guided practice
- ☐ Socratic Seminar
- ☐ Learning Centers
- ☐ Lecture
- ☐ Peer teaching/collaboration/ cooperative learning
- ☐ Visuals/Graphic organizers
- ☐ PBL
- ☐ Discussion/Debate

Guided Practices and Concrete Application:

- ✓ Large group activity
- ✓ Independent activity
- ☐ Pairing/collaboration
- ☐ Simulations/Scenarios
- ✓ Flipped Classroom
- ☐ Hands-on
- ☐ Technology integration
- ☐ Imitation/Repeat/Mimic

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□ Technology integration □ Modeling □ Other (list)	Explain: Due to COVID-19 protocol, the classroom has been flipped to best utilize the minimal amount of time students are in class in person
Standard HS.AREI.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.	**Differentiation** **Below Proficiency:** Students will work to identify patterns that show linear functions on a graph with significant assistance from the teacher, receiving additional examples of patterns to reinforce concepts. **Above Proficiency:** Students will be able to identify patterns that show linear functions on a graph independently and create a pattern of their own and find its graph. **Approaching/Emerging Proficiency:** Students will be able to identify patterns that show linear functions on a graph with minimal help from the teacher. **Modalities/Learning Preferences:** Visual, Auditory
Objective The students will be able to identify and represent patterns that describe linear functions. **Bloom's Taxonomy Cognitive Level:** Understanding, Analyzing, Evaluating	
Classroom Management- (grouping(s), movement/transitions, etc.) Students will remain seated in their assigned desks throughout the duration of class and follow proper COVID-19 protocols regarding social distancing and mask wearing.	**Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.)** Students will conduct themselves respectfully and work in their assigned spots on the homework and asking questions when help is needed in class.

Minutes	Procedures
100	**Set-up/Prep:** Record the video lesson for students to watch the night before, as is normal in the flipped classroom setting. Post the video on the Google Classroom page. Create Cornell notes for lesson and print one copy of the notes, one worksheet, and one exit ticket for each student. See Unit Plan Notes Lesson 2, Unit Plan Lesson 2-4.2 Worksheet, Unit Plan Lesson 2-4.2 Exit Ticket, and Unit Plan Lesson 2-4.2 PP.
8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Students will individually complete the bell work assignment to review previous concepts about solving equations. Then we will work through the problems as a class.
15	**Explain: (concepts, procedures, vocabulary, etc.)** (on video) Slowly work through examples of patterns and ways to graph these patterns using tables. Explain the concepts of function and linear function. Then, determine if data sets are functions through multiple examples.
30	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** (in class) Work through difficult homework problems with students as a class (see Unit Plan Lesson 2-4.2 Worksheet). Walk around classroom and answer questions about student's points of confusion with the lesson.
15	**Review (wrap up and transition to next activity):** Hand out student's exit tickets to complete and turn in by the end of the class period. See Unit Plan Lesson 2-4.2 Exit Ticket.

Formative Assessment: (linked to objectives)	**Summative Assessment (linked back to objectives)**

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Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc. Walk around classroom to monitor students' progress on homework throughout the class period. **Consideration for Back-up Plan:** Prepare extra problems to work through as a re-teaching tool if students did not receive sufficient instruction from the lesson video.	**End of lesson:** Students will match graphs with its related table on an exit ticket. **If applicable- overall unit, chapter, concept, etc.:** Unit Test on Functions
Reflection (What went well? What did the students learn? How do you know? What changes would you make?):	

Full Teach Unit Plan-Lesson 3

Grade: 9	**Subject: Algebra I**
Materials: Smartboard, pencil, loose-leaf paper	**Technology Needed: Smartboard**
Instructional Strategies: ✓ Direct instruction ✓ Guided practice ☐ Socratic Seminar ☐ Learning Centers ☐ Lecture ☐ Technology integration ✓ Peer teaching/collaboration/ cooperative learning ☐ Visuals/Graphic organizers ☐ PBL ☐ Discussion/Debate ☐ Modeling	**Guided Practices and Concrete Application:** ✓ Large group activity ✓ Pairing/collaboration ☐ Independent activity ☐ Simulations/Scenarios ☐ Hands-on ☐ Technology integration ☐ Imitation/Repeat/Mimic
Standard HS.N-Q.2*: Define appropriate quantities for the purpose of descriptive modeling. **Objective** Students will be able to write equations that represent functions. **Bloom's Taxonomy Cognitive Level:** Remembering, Applying, Analyzing	**Differentiation** **Below Proficiency:** Students will write equations that represent functions and complete some of the station problems with significant assistance from their team and the teacher. **Above Proficiency:** Students will be able write equations that represent functions and complete the station problems collaboratively with their team and do additional problems that extend this concept to other areas. **Approaching/Emerging Proficiency:** Students will be able write equations that represent functions and complete the stations problems as a team with minimal assistance from the teacher. **Modalities/Learning Preferences:** Kinesthetic, Visual, Auditory
Classroom Management- (grouping(s), movement/transitions, etc.) Students will be in their seats during the lesson and move with their respective team around the different stations around the room. Students will also follow proper COVID-19 protocols regarding social distancing and mask wearing.	**Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.)** Students will conduct themselves respectfully and work collaboratively in their teams to decode the problems from the station activity.

Minutes	Procedures
100	**Set-up/Prep:** Create PowerPoint (Instructional Strategies Full Teach- Unit Plan Lesson 3), note sheet (Math Operation Terms Code Breaker Key), Decoding Stations questions (and answers), Decoding Stations Team Answer Sheet. Print off a note sheet for each student, one copy of the station questions (without answers), and sufficient answer sheets to break the class into 4 groups (1 per group). Set up 4 stations spread out across the room with its respective questions.

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8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions)** Ask students what they think of when they hear the word "decoding". Discuss as a class what it means to decode something. Have students do a turn and talk with a neighbor an example of using decoding in history. Listening to students' feedback, share the image of the Navajo code talkers and give a brief overview of what they did. Use this as a segue way into the lesson's content. "Did you know that math is its own unique language!"
15	**Explain: (concepts, procedures, vocabulary, etc.)** Explain to the students how the class will be code breakers today- their mission is to decode and encode between English and Math. Slowly work through the Code Breaking Key, having students fill in their notes out. Next, go over the steps to decode a math sentence and do several examples, including a word problem.
25	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** Break the students into teams of two or three. Have students move with their groups, bringing with them their note sheet, a writing utensil, and pass out a team answer form to each group. Encourage the students to work together to decode at least two of the problems at each station, rotating between the stations about every 5 minutes. Walk around classroom and answer questions about student's points of confusion with the stations and guide collaboration between students if need be.
3	**Review (wrap up and transition to next activity):** Collect all the team answer forms either once the groups finish or at the end of the class period.

Formative Assessment: (linked to objectives) **Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc.** Walk around classroom to monitor students' progress on the station activity, especially looking for collaboration within the teams. **Consideration for Back-up Plan:** Prepare extra problems to work through as a re-teaching tool if students did not receive sufficient instruction from the lesson.	**Summative Assessment (linked back to objectives)** **End of lesson:** Students will turn in a team answer form at the end of the period to show their progress on the material and collaboration within teams. **If applicable- overall unit, chapter, concept, etc.:** Unit Test on Functions
Reflection (What went well? What did the students learn? How do you know? What changes would you make?):	

Lesson 4

Grade: 9	**Subject: Algebra I**
Materials: Algebra I textbook, Chromebook, pencil, loose-leaf paper	**Technology Needed: Chromebook**
Instructional Strategies: ✓ Direct instruction ✓ Guided practice ☐ Socratic Seminar ☐ Learning Centers ☐ Lecture ☐ Technology integration ☐ Other (list) ☐ Peer teaching/collaboration/ cooperative learning ☐ Visuals/Graphic organizers ☐ PBL ☐ Discussion/Debate ☐ Modeling	**Guided Practices and Concrete Application:** ✓ Large group activity ✓ Independent activity ☐ Pairing/collaboration ☐ Simulations/Scenarios ✓ Flipped Classroom Explain: Due to COVID-19 protocol, the classroom has been flipped to best utilize the minimal amount of time students are in class in person ☐ Hands-on ☐ Technology integration ☐ Imitation/Repeat/Mimic
Standard	**Differentiation**

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HS.FIF.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

Objective

The students will be able to determine whether a relation is a function.

The students will be able to find the domain and range of a function.

The students will be able to use function notation.

Bloom's Taxonomy Cognitive Level:

Knowledge, Understanding, Analyzing, Evaluating

Below Proficiency:
Students will work to determine whether a relation is a function and determine its domain and range with significant help from the teacher.

Above Proficiency:
Students will be able to determine whether a relation is a function and determine its domain and range. Students will correctly use function notation to denote functions, especially to evaluate a function at a point.

Approaching/Emerging Proficiency:
Students will be able to determine whether a relation is a function and determine its domain and range with minimal assistance from the teacher.

Modalities/Learning Preferences:
Visual, Auditory

Classroom Management- (grouping(s), movement/transitions, etc.)

Students will remain seated in their assigned desks throughout the duration of class and follow proper COVID-19 protocols regarding social distancing and mask wearing.

Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.)

Students will conduct themselves respectfully and work in their assigned spots on the homework and asking questions when help is needed in class.

Minutes	Procedures
100	**Set-up/Prep:** Record the video lesson for students to watch the night before, as is normal in the flipped classroom setting. Post the video on the Google Classroom page. Create Cornell notes, exit ticket, and worksheet for lesson and print one of each for each student. See Unit Plan Notes Lesson 4, Unit Plan Lesson 4-4.6 PP, Unit Plan Lesson 3-4.6 Exit Ticket, and Unit Plan Lesson 3-4.6 Worksheet.
8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Students will individually complete the bell work assignment to review previous concepts about evaluating expressions at multiple points. Then we will work through the problems as a class.
15	**Explain: (concepts, procedures, vocabulary, etc.)** (on video) Slowly explain the concepts of domain, range, and relation. Then expand to determine whether a given relation is a function. Work through problems to find the domain and range of a given relation and whether it is a function.
30	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** (in class) Work through difficult homework problems with students as a class (Unit Plan Lesson 4-4.6 Worksheet). Walk around classroom and answer questions about student's points of confusion with the lesson.
15	**Review (wrap up and transition to next activity):** Hand out student's exit tickets to complete and turn in by the end of the class period. See Unit Plan Lesson 4-4.6 Exit Ticket.

Formative Assessment: (linked to objectives)

Summative Assessment (linked back to objectives)

End of lesson:

Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc. Walk around classroom to monitor students' progress on homework throughout the class period. **Consideration for Back-up Plan:** Prepare extra problems to work through as a re-teaching tool if students did not receive sufficient instruction from the lesson video.	Students use a mapping diagram to determine if a relation is a function on an exit ticket. **If applicable- overall unit, chapter, concept, etc.:** Unit Test on Functions
Reflection (What went well? What did the students learn? How do you know? What changes would you make?):	

Lesson 5

Grade: 9	**Subject: Algebra I**
Materials: Algebra I textbook, Chromebook, pencil, loose-leaf paper	**Technology Needed: Chromebook**
Instructional Strategies: ✓ Direct instruction ✓ Guided practice ☐ Socratic Seminar ☐ Learning Centers ☐ Lecture ☐ Technology integration ☐ Other (list) ☐ Peer teaching/collaboration/ cooperative learning ☐ Visuals/Graphic organizers ☐ PBL ☐ Discussion/Debate ☐ Modeling	**Guided Practices and Concrete Application:** ✓ Large group activity ✓ Independent activity ☐ Pairing/collaboration ☐ Simulations/Scenarios ✓ Flipped Classroom Explain: Due to COVID-19 protocol, the classroom has been flipped to best utilize the minimal amount of time students are in class in person ☐ Hands-on ☐ Technology integration ☐ Imitation/Repeat/Mimic
Standard HS.FIF.5*: Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **Objective** The students will be able to graph equations that represent functions. **Bloom's Taxonomy Cognitive Level:** Applying, Evaluating, Creating	**Differentiation** **Below Proficiency:** Students will work on graphing equations of functions and determining whether the graph is continuous or discrete with significant assistance from the teacher. Students will be given additional supports to help them graph their functions. **Above Proficiency:** Students will be able to graph equations of functions and determine whether the graph is continuous or discrete independently and extend their graphing abilities to more difficult functions. **Approaching/Emerging Proficiency:** Students will be able to graph equations of functions and determine whether the graph is continuous or discrete with minimal assistance from the teacher. **Modalities/Learning Preferences:** Visual, Auditory
Classroom Management- (grouping(s), movement/transitions, etc.) Students will remain seated in their assigned desks throughout the duration of class and follow proper COVID-19 protocols regarding social distancing and mask wearing.	**Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.)**

	Students will conduct themselves respectfully and work in their assigned spots on the homework and asking questions when help is needed in class.

Minutes	Procedures
100	**Set-up/Prep:** Record the video lesson for students to watch the night before, as is normal in the flipped classroom setting. Post the video on the Google Classroom page. Create Cornell notes, worksheet, and exit ticket for lesson and print one of each for each student. See Unit Plan Notes Lesson 5, Unit Plan Lesson 5-4.4 PP, Unit Plan Lesson 5-4.4 Worksheet, and Unit Plan Lesson 5-4.4 Exit Ticket.
8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Students will individually complete the bell work assignment to review previous concepts about unit conversion factors. Then we will work through the problems as a class.
15	**Explain: (concepts, procedures, vocabulary, etc.)** (on video) Slowly work through many example problems of graphing functions (both continuous and discrete, noting their differences).
30	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** (in class) Work through difficult homework problems with students as a class (Unit Plan Lesson 5-4.4 Worksheet). Walk around classroom and answer questions about student's points of confusion with the lesson.
15	**Review (wrap up and transition to next activity):** Hand out student's exit tickets to complete and turn in by the end of the class period. See Unit Plan Lesson 5-4.4 Exit Ticket.

Formative Assessment: (linked to objectives) **Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc.** Walk around classroom to monitor students' progress on homework throughout the class period. **Consideration for Back-up Plan:** Prepare extra problems to work through as a re-teaching tool if students did not receive sufficient instruction from the lesson video.	**Summative Assessment (linked back to objectives)** **End of lesson:** Students will graph functions on an exit ticket. **If applicable- overall unit, chapter, concept, etc.:** Unit Test on Functions

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):