California State University Chico

School of Education

SSP LESSON PLAN TEMPLATE

WHO	Who is Learning?

TEACHER: Kamille Delgardo (Emily Abshier co-teacher) **DATE:** 18 September 2025

INQUIRY-BASED LESSON TITLE: (A student-friendly non yes/no question that the lesson aims to answer)

What can rate of change represent?

CONTENT AREA: Integrated Math I

GRADE LEVEL(S): 9-12

NUMBER OF ELD STUDENTS AND LEVELS:

Numerous reclassified native Spanish speakers.
One English Learner in a Structured English Immersion Program
Levels (As of 2022):

- **Oral**: 3 out of 4
- **Written**: 2 out of 4
- **Listening**: somewhat/moderately
- **Speaking**: well developed

NUMBER OF IEP and/or 504 STUDENTS:

504 - 4
IEP - 4

STUDENTS' ASSETS:

Prior to this unit I wrote a pre-assessment which I administered on Friday 12 September. Based on the results of that assessment students are coming into the lesson with strengths in **identifying the components** (slope and y-intercept) of a slope-intercept form equation. They are also clear on positive and negative slopes.

Sports - Students involved in sports should know the value of teamwork, participation, and hard work. They will understand the concepts of speed, and time and will be able to help their teammates interpret the graphs.

Digital literacy - Students know how to use their online textbook including the "Homework Help" feature. They have access to extra lessons on Google Classroom and Khan Academy.

STUDENTS' LEARNING NEEDS:

Students should make use of prior knowledge of slope-intercept form, fractions, graphing on the

Cartesian coordinate system, and solving algebraically.

Prior to this unit I wrote a pre-assessment which I administered on Friday 12 September. Based on the results of that assessment we need to focus on:

- The difference between dependent and independent variables
- Correlating real-world situations to linear models

LESSON LENGTH: 50 minutes

WHAT — What are students learning?

CONTENT STANDARD(S) & MATHEMATICAL PRACTICE STANDARD(S):

CA Math Content Standards
Mathematical Practice Standards

Content: Mathematics I F-IF.6 "Interpreting Functions"

- Interpret functions that arise in applications in terms of the context. [Linear and exponential (linear domain)]
    - Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Practice:

- 2. Reason abstractly and quantitatively.
    - Mathematically proficient students make sense of quantities and their relationships in problem situations.
    - Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
- 4. Model with mathematics.
    - Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.
    - They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

CONTENT-SPECIFIC LEARNING GOAL(S):

Students will use appropriate mathematical vocabulary, notation and graphs to create linear equations and interpret them.

ENGLISH LANGUAGE DEVELOPMENT STANDARD(S):

***CTC CalTPA Guidance on ELD Standards and Goals (2023)**: English Language Development Standards should be cited from chapter three of the current California English Language Development Standards publication. You are not required to include students' developmental levels in your citations. The citation should include the following information: The part number (I, II, or III), the letter and name of the heading, and the standard number (CalTPA, 2023).

CA ELD Standards

Grades 9-10 Part I: "Interacting in Meaningful Ways"

- A. Collaborative 1. Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics
- C. Productive 12. Selecting and applying varied and precise vocabulary and other language resources to effectively convey ideas

Develop a related ALD learning goal: Based on the relevant, related academic vocabulary needed for the lesson, create a content-specific academic language goal that supports the content-specific learning goal (see example below).

How to Write an Academic Language Development (ALD) Learning Goal

Academic language refers to the oral, written, auditory, and visual language proficiency required to learn effectively in schools and academic programs—in other words, it is the language used in classroom lessons, books, tests, and assignments, and it is the language that students are expected to learn and achieve fluency in. Academic language includes a variety of formal-language skills—such as vocabulary, grammar, punctuation, syntax, discipline-specific terminology, or rhetorical conventions—that allow students to acquire knowledge and academic skills while also successfully navigating school policies, assignments, expectations, and cultural norms.

Example ALD learning goals based on the 8th grade ELA standard:
"Students will understand and correctly use the terms 'central theme,' 'tone,' and 'inference' in their discussions about the text."

Students will describe parts of a linear equation using the terms we brainstormed today for the components of a linear equation when they are working in groups:

- For m: slope, rate of change, change in y over change in x, steepness, direction
- For b: start, y-intercept, starting point

IEP GOAL(S) FOR IEP STUDENTS (if applicable):

- Our ADHD student will self-regulate by taking short breaks outside, as needed. We have moved his seat to be next to the door for easier access.
- Students will raise hands to ask appropriate questions or answer questions posed to the class.

ACADEMIC/CONTENT LANGUAGE DEMANDS AND PLANNED SUPPORTS:

Language Function:

- Students will be able to explain what strategy(ies) they used to solve a problem.
- Students will be able to describe the direction and magnitude of a line based on its slope (rate of change)

Vocabulary:

1. Subject-specific meanings:
    a. Slope
    b. Function
    c. Domain
    d. Negative
    e. Line
    f. Unit
2. Academic vocabulary:
    a. Calculate
    b. Explain

c. Justify
d. Describe
e. Summarize

3. Subject specific words:
    a. Numerator
    b. Denominator
    c. Piecewise graph
    d. Algebraic

Discourse:

- Explaining solution steps
- Interpreting graphic representations

Syntax:

- Long or elaborate phrasing
- Mathematical sentences using words or symbols

Supports:

- Students will use appropriate mathematical vocabulary and notation to **discover and interpret the rate of change**.
- Rate of change (vocabulary):
    - Work through textbook problems as a class and in groups
- Interpret (function):
    - Correlate parts of a word problem to components of an equation in slope-intercept form

WHY — Why does this lesson matter? (Rationale)

RELEVANCE:

Linear functions are relevant to many real-world phenomena like budgeting, unit conversions, and as we are exploring today, speed (m/s). In this lesson we are not only creating lines, but then interpreting them and determining the results of a real-world phenomenon.

PRIOR KNOWLEDGE:

Students have prior exposure to slope-intercept form. They have been practicing solving systems of equations algebraically. Most of them understand input and output. They know how to read a graph. They recently learned function notation.

HOW — How is Learning Being Facilitated?

CREATE HEALTHY CLASSROOM COMMUNITY:

As students work in groups we will be checking for and marking on a card per team the qualities of an effective team (**UDL 8.3 Foster collaboration, interdependence, and collective learning**).

An effective participating team member will:

- *Stay on task and help the team stay on task*
- *Not talk to another team*
- *Not let a team member work ahead or fall behind*
- *Justify and explain/speak up if I don't understand*
- *Reread problems/draw diagrams/check toolkit*
- *Keep working through the whole period*

ACADEMIC LITERACY (Listening, Reading, Writing, Speaking):

Students will listen to teachers as they present and to each other in groups. They will read the assignment steps from the textbook opened on the smartboard. They will write their findings as they discover them and speak their findings to the class.

ACCOMMODATIONS, MODIFICATIONS, Adaptations, & UDL CONSIDERATIONS:

- A Spanish version of the textbook is available in print and on Chromebook.
- Mrs. Riley will be pushed in from the resource classroom to assist.
- Students will be able to **read** the scenario from their textbook. They will **write** their equations on the graphing handout we give them. They will be creating **visual representations** of the racers' speed.. They will **listen and speak** to the class and to their groupmates.

CO-TEACHING Strategy(s) AND/OR PARAPROFESSIONAL SUPPORT (If applicable)**:**

Cooperating teacher and I will each take the lead on a question. I will handle 2-52 and Mrs. Abshier will take 2-53. Historically these two questions have taken an entire period. Co-teacher, Mrs. Riley, and I will circulate through groups individually after each main lesson.

INFORMAL ASSESSMENT(S):

Ask leading questions as we circle around:

- For racers who got a head start: what does this y-intercept represent?
- Were there any points at which 2 racers were head-to head? How can you tell?
    - How would you confirm this algebraically and not just visually? (**UDL 1.2 Support multiple ways to perceive information.**)
- What is the slope of this line? How did you determine it?
- Are the slopes positive or negative? Why?
- Challenge questions for advanced teams (**UDL 8.2 Optimize challenge and support)**:
    - Who would win if the race were 10 meters? 30 meters?
    - How many meters would the race have to be for Kristin to win?
    - How could we represent someone starting with a handicap (they start X meters behind the line instead of in front of it)?

FORMAL ASSESSMENT(S):

When we come back together as a class each group will answer a different question: plotting each of the 3 racers' lines, determining their finish times, and finding who won the race.

MATERIALS NEEDED: (List equipment and materials necessary for the lesson.)

Students will be provided a set of axes on which to graph the lines for 2-52 and 2-53. A ruler will be provided to each group of 4. Colored pencils are available if students want their lines to be distinguished by color. (**UDL 5.2: Use multiple tools for construction, composition, and creativity.**) As always, students have calculators.

LEARNING ACTIVITY SEQUENCE: (Procedure)

0: We will start by checking the homework from lesson 2.1.4, then we will answer any questions students bring up (**UDL 5.3 Promote individual and collective reflection**).

1. **Engaging Introduction**:

I will be using **UDL Principle 7.2 of optimizing relevance, value, and authenticity** in this lesson by involving the students' own athletic data. I will introduce the concept of graphing the results of a race. I will ask who thinks they have the fastest mile and get a time in minutes/seconds.

How could we graph this? Draw a graph on the smartboard and plot the students' times. Point out that our axes are labeled time in minutes (x) and distance in miles (y) and reiterate how we would read the graph.

Plot the mile time of the current world record holder for running a mile (3 minutes 43 seconds). Ask what we notice about these two lines? Who can we say is faster and how do we know?

2. **Learning Activities**:

2-52

THE BIG RACE – HEAT 1

Before a big race, participants often compete in heats, which are preliminary races that determine who competes in the final race. Later in this chapter, your class will compete in a tricycle race against the winners of these preliminary heats.

In the first heat, Leslie, Kristin, and Evie rode tricycles toward the finish line. Leslie began at the starting line and rode at a constant rate of 2 meters every second. Kristin got an 8-meter head start and rode 2 meters every 5 seconds. Evie rode 5 meters every 4 seconds and got a 6-meter head start.

a. On neatly scaled axes, graph and then write an equation in terms of x and y for the distance Leslie travels. Let x represent time in seconds and y represent distance in meters. Then do the same for Kristin and Evie using the same set of axes.

b. After how many seconds did Leslie catch up to Evie? How far were they from the starting line when Leslie caught up to Evie? Confirm your answer algebraically and explain how to use your graph to justify your answer.

c. The winner of this heat will race in the final Big Race. If the race is 20 meters long, who won? Use both the graph and the equations to justify your answer.

d. How long did it take each participant to finish the race?

e. The school newspaper wants to report Kristin's speed. How fast was Kristin riding? Write your answer as a **unit rate**, that is as a rate with a denominator of 1.

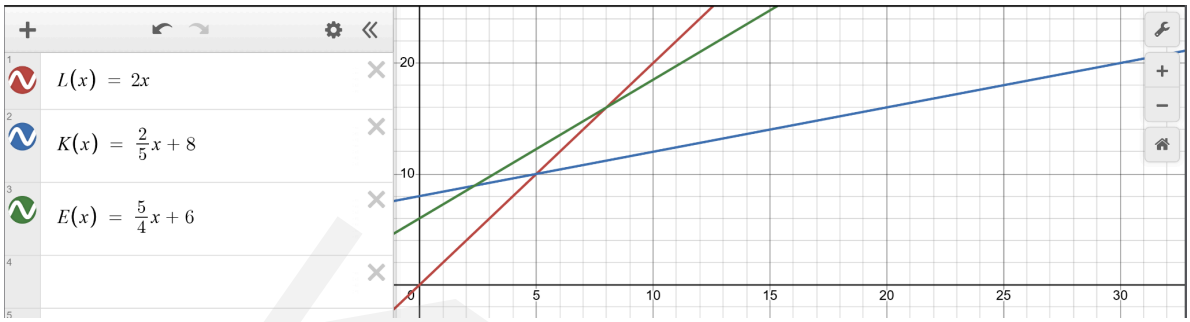
I will introduce problem 2-52: There are 3 girls competing in a tricycle race. We're going to get into groups and try to compare their speeds and find the results of the race. I will recommend naming each function differently: L(x) for Leslie, K(x) for Kristin and E(x) for Evie. Ask the class to make sure they know what each axis will be labeled.

Before we break into groups let them know their resource manager can grab some colored pencils for the group.

As Mrs. Abshier and I circle around the class, we will be looking for students correctly arriving at equations that represent the speed of the three racers. We will ask the questions listed in "Informal Assessments."

We will be keeping track of group participation using a card with desired behaviors listed in section "Create a Healthy Classroom Community."

As it seems most groups have reached question D I will regain the attention of the class. I will pull up Desmos and ask 3 groups what they got for each racer's equation, graphing them as we go along.



I will ask 3 different groups to answer question D (how long each participant took to finish the race) and how they know.

Finally, I will ask a 7th group to answer who won the race and how they know. We will then discuss question E and what a unit rate is.

2-53

In the second heat, Elizabeth, Kaye, and Hannah raced down the track. They knew the winner would compete against the other heat winners in the final race.

a. When the line representing Kaye's race is graphed, the equation is $f(x) = \frac{2}{3}x + 1$. What was her speed (in meters per second)? Did she get a head start?

b. Elizabeth's race is given by the equation $f(x) = \frac{12}{16}x + 4$. Who is riding faster, Elizabeth or Kaye? How do you know?

c. Just as she started pedaling, Hannah's shoelace came untied! Being careful not to get her shoelace tangled in the pedal, she rode slowly. Hannah's race is represented in the table below. At what unit rate was she riding?

Hannah's Race

Time (s)	Distance (m)
14	10
28	14
42	18

d. To entertain the crowd, a clown rode a tricycle in the race. His race can be modeled by the function $f(x) = 20 - x$. Without graphing or making a table, fully describe the clown's ride.

Mrs. Abshier will introduce 2-53. We will give the groups a minute or two to answer item A among themselves. While circling check for understanding that the numerator of the slope is meters (rise), the denominator is seconds (run), and the y-intercept is the head start as we saw in the previous problem. Call on 2 groups to answer m/s and head start.

I will ask item B and again give groups a minute or two to answer. We will make sure they are converting the slope into a unit rate in order to compare it to the speed from answer A.

Mrs. Abshier will introduce item C, reminding them that slope is $\Delta y/\Delta x$. We will give groups a

little more time here as they calculate differences between two points. We will poll to see which points groups used and (hopefully) if they used different pairs, get two representatives to come up and write on the smartboard how they got their answer. If they all used the same points, I will demonstrate how using a different set will arrive at the same slope **(UDL 3.2 Highlight and explore patterns, critical features, big ideas, and relationships)**.

Finally as a class we will look at item D. Ask students what the slope and y-intercept are. What would that look like on a graph and what does that mean in reality?

3. **Learning Closure:**

Thank students for their participation today. In homework we will see more scenarios that can be graphed using linear equations. Challenge students to notice things in their lives that might be described using a linear equation.

REFLECTION

ASSESSMENT RESULTS:

LESSON OBSERVATION FOCUS: *What would you like your supervisor to focus on and provide feedback for during the lesson? (Related to TPEs or previous observation goals.)*
Please focus on lesson pacing as well as student engagement as we are circling around.