

ESTABLISHING PURPOSE

1

What are the key content standards I will focus on in this lesson?*Content Standards:**8.EE.C.8**Analyze and solve pairs of simultaneous linear equations.*

- a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.*
- b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*
- c. Solve real-world and mathematical problems leading to linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

8.F.B.4

Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Standards for Mathematical Practice:

- Construct viable arguments and critique the reasoning of others.*
- Look for and make use of structure.*
- Reason abstractly and quantitatively.*
- Model with mathematics.*

2

What are the learning intentions (the goal and why of learning, stated in student-friendly language) I will focus on in this lesson?

Content: I am learning to apply my understanding of systems of linear equations to make informed decisions about a real-world problem.

Language: I am learning to construct viable financial arguments based on mathematical reasoning and communicate them verbally and in writing.

Social: I am working toward mathematical and logical consensus with my collaborative team.

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When will I introduce and reinforce the learning intention(s) so that students understand it, see the relevance, connect it to previous learning, and can clearly communicate it themselves?

I will open the day with an overview to set the stage for this closing transfer task ("We've gained all these tools. Let's put them to use together to solve real-world problems"). As I introduce the task, I will refer back to the learning intentions and make connections to activate students' prior knowledge (i.e., remind them about how they can model situations with linear functions when discussing the context of the task; remind them how they can solve systems of linear equations algebraically and graphically and how to interpret a solution given a context, etc.).

As students engage in the task, I will refer to the language intention to stimulate the use of academic and content language in their speaking and writing. I will refer to the social intention to remind students of our expectations of collaboration and building consensus based on mathematical evidence.

SUCCESS CRITERIA

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What evidence shows that students have mastered the learning intention(s)? What criteria will I use?

I can statements:

- *I can mathematically model a situation with a system of linear equations.*
- *I can solve systems of linear equations using my preferred method (algebraically or graphically).*
- *I can use my math as evidence to collaboratively construct a claim about a real-world situation.*
- *I can logically communicate how my mathematical evidence supports my claim to my peers.*

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How will I check students' understanding (assess learning) during instruction and make accommodations?

We will begin the day with a structured close read of the task itself to ensure all students come to a shared understanding of the context and what the problem is asking. Students will be asked to re-voice the context of the task and the end goal of the task with their groups, and each group will be asked to share with the whole class. This is where we will discuss any unclear content and academic language. This is especially important for our ELLs, who will be encouraged to use their personal electronic devices or school devices to help translate unfamiliar English words to their first language. Additionally, collaborative groups have been constructed with this in mind—students early in their English development have been paired with others who are bilingual in English and their first language (when available) so that all students may thoroughly discuss the task.

Once students start digging into the task collaboratively, I will scan the classroom, table to table, listening in on conversations and redirecting as needed. I will be careful not to interfere while students are productively struggling through the intended rigor of the task, but only step in when groups seem to be at a dead end. Based on the reason for their stalled production, I have a series of predesigned scaffolds at the ready.

INSTRUCTION

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What activities and tasks will move students forward in their learning?

Collaborative Task: School's Out-Clock In-Rock On!

This close-reading application task leads to a collaborative poster followed by a gallery walk and whole-class discussion.

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What resources (materials and sentence frames) are needed?

1. Printed copies of the task for each learner
2. Sticky poster paper for collaborative posters
3. Markers for posters
4. Printed copies of Scaffold 1-Parallel problem turning the given information (start date, daily rate, days worked per week) into the slope of a line (weekly rate) and the start date into the x-intercept of the form (week number, 0).
5. Printed copies of Scaffold 2-Review of solving systems of linear equations with references to prior class notes and examples.

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How will I organize and facilitate the learning? What questions will I ask? How will I initiate closure?

1. Close Reading (Whole-Class)/Text-Dependent Questions

- *What is the big idea of the task/text? What are we doing?*
- *What is the mezzanine section? What is a backstage pass? How does the venue map help make sense of the ticket prices?*
- *How do ticket prices play a role in the task?*
- *What information is provided in the table? What does each column mean? What does each row mean?*
- *What exactly is "Daily Rate"? Why is this information important to the task?*
- *What are the questions we are ultimately trying to answer through this task?*
- *What are some initial ideas about how we might use math to approach this task?*
- *How might a system of linear equations help us?*
- *How can we use the information in the table to create linear equations? What would y-values represent? What would x-values represent?*
- *How can we determine the weekly rate for each job?*
- *How do the start dates factor into creating linear equations?*

2. Collaborative Work/Guided Practice

Once the class as a whole understands the context and goal of the task via the close reading, I will release them to work collaboratively. This will be my opportunity to engage struggling groups in guided practice around the necessary computations to keep the task moving forward. This is also the time for formative scanning and eavesdropping.

3. Gallery Walk

Completed posters will be displayed around the room. Groups will cycle through the room, poster to poster, leaving feedback on sticky notes and gathering talking points for the upcoming whole-class conversation.

4. Wrap-Up/Whole-Class Discussion (Backward questioning)

Conclusion

- What did we discover? Which jobs were the best for your situation?
- How does your math justify your claim?

Process

- What did we need mathematically in order to investigate this situation?
- Why/how do these equations represent the money made from each job over time?
- What was the point of solving a system of equations? What does the solution represent?
- How did your group decide to solve your system? Why?
- What other situations might lend themselves to this type of modeling?

Reflection

- What possible inaccuracies exist in our assumptions/generalizations? Where is our math the weakest?
- Could anything change our claims (e.g., different job start dates, different number of days worked per week, rainy days or getting sent home from work early, working more than one job, etc.)?
- Overall, how confident are we in our claims?