## ESTABLISHING PURPOSE

**1** **What are the key content standards I will focus on in this lesson?**

Content Standards:

A.REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A.REI.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately (e.g., using technology to graph the functions, make tables of values, or find successive approximations).

F.BF.1. Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them.
- Use appropriate tools strategically.
- 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*: To use our understanding of systems of linear equations to make informed decisions about a real-world problem.

*Language*: To construct viable financial arguments based on mathematical reasoning and communicate them verbally and in writing.

*Social*: To work toward mathematical and logical consensus with our collaborative teams.

**3** **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?**

Open the day with an overview to set the stage for this closing transfer task: We've gained all these tools; let's use them to solve real-world problems. As I introduce the task, I will refer 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

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

## INSTRUCTION

**5** **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 revoice the context 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.

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

Collaborative Task (Are hybrid cars really worth the price?), a close-reading application task that leads to a collaborative poster, followed by a gallery walk and whole-class discussion.

**7** **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 (average monthly miles, average MPG, and average cost of gasoline) into the slope of a line and the cost of the vehicle into the y-intercept.
5. Printed copies of Scaffold 2: Review of solving systems of linear equations with references to prior class notes and examples.

**8** **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 a hybrid car? What is a non-hybrid car? Why is this difference important, according to the task?

   What information is provided in the table? What does each column mean? What does each row mean?

   What exactly is MPG? Why is this information important to the 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?

   How can we determine the average yearly gasoline cost for each model?

2. Collaborative Work/Guided Practice

   Once the class as a whole is understanding 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? Are hybrid cars really worth the price?

   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 cost of each vehicle 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?

Reflection:

What other situations might lend themselves to this type of modeling?

What possible inaccuracies exist in our assumptions/generalizations? Where is our math the weakest?

Could anything change our claims (i.e., different yearly miles driven, different cost of gasoline, highway miles driven vs. city miles driven, etc.)?

Overall, how confident are we in our claims?