

# STEMTeach KU



THE UNIVERSITY OF KANSAS

## LESSON PLAN TEMPLATE – C&T 291

Group Members: KP Preut And Willa Kelpel

Lesson #: 1

Draft #:

Date Lesson will be Taught: 2/24/23 Time of Lesson: 9:26-10:16 Length of Lesson: 50 min

Host Teacher: Ms. Clarkson Grade Level: 7 School: Liberty Memorial Central Middle School

### LESSON OBJECTIVES (Students will be able to...)

- Students will be able to create an expression with a coefficient, variable, and a constant given information from a word problem.
- Students will be able to create inequalities given information from a word problem.

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### ALIGNED STANDARDS

7.EE.4b. Solve word problems leading to inequalities of the form  $p + q > r$  or  $p + q < r$  where  $p$ ,  $q$ , and  $r$  are specific rational numbers and  $p > 0$ . Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions. (7.EE.4b)

### NECESSARY MATERIALS

Attach any handouts to the end of this lesson plan.

- 1 TV
- 2 Whiteboard markers to write on TV
- 1 eraser for white board
- 25 copies of interactive notes
- 25 copies of ice cream worksheet
- 25 copies of create-a-business worksheet
- 25 copies of summative assessment

## SAFETY AND PRECAUTIONS

- Students should be respectful when discussing their ideas and not disparage their classmates' answers.

## CLASSROOM MANAGEMENT STRATEGIES

State at least 4 classroom management strategies that will be utilized in your lesson.

- Using table groups in the Explore and Explain sections. If students would like to work alone they can choose to do that.
- Walking around the classroom to engage with students and help prevent off task behavior.
- For the Elaborate section, ask students to raise their hand if they are working in a group. Give students 1 minute to form their groups and move if needed. **Instruct students to stay in these groups for the entirety of the Elaborate section.**
- **At the beginning of the Engage section, tell students to remove headphones and put their phones away. They will get one additional warning. If they still have them in/have not put their phone away, they will be directed to put their headphones/phone in a basket at the teacher's desk. They can collect their belongings at the end of class.**
- **If students need to leave the classroom, they need to inform the teacher where they are going.**

## DIFFERENTIATION STRATEGIES

Identify at least 2 differentiation strategies that will be utilized in your lesson. State the element (content, process, product, learning environment) that is being modified and the difference (readiness, interest, learning profile) that justifies the modification.

- Giving students a choice to work with a group or by themselves for the activity.
  - Learning environment changes based on learning profile
- In the elaborate section, students will have the option to work on modeling inequalities for a business plan or continuing to practice with job pay examples.
  - One student teacher will be assigned to work with each group.
  - Content changes based on readiness.

Presentation:

[https://docs.google.com/presentation/d/1syDO18Z2b3w9jdliq99JjaLVwicyn\\_W64v718Yu65mk/edit#slide=id.g1f282795999\\_1\\_101](https://docs.google.com/presentation/d/1syDO18Z2b3w9jdliq99JjaLVwicyn_W64v718Yu65mk/edit#slide=id.g1f282795999_1_101)

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| <b>ENGAGE (Willa)</b>   | Estimated Time: 3min   |
| What the teacher does and what the students will be directed to do:   | Critical questions the teacher will ask the students. What questions will guide this part of the lesson? <i>How might the students answer?</i> |
| <ul style="list-style-type: none"><li>● Display the agenda slides and go over the plan for the hour. <b>(2nd Slide)</b></li></ul> | <i>One job has a bonus of \$100 and another job has a bonus of \$200. What job would you choose? Why?</i>                                      |

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| <ul style="list-style-type: none"> <li>● General statement about being respectful to other students will be given.</li> <li>● The teacher will ask students to raise their hand and answer. Students will be directed to state their names when answering and state which job they would choose and why. <b>(3rd Slide)</b> <ul style="list-style-type: none"> <li>- Job A with \$200 bonus</li> <li>- Job B with \$100 bonus</li> </ul> </li> </ul> | <p><b>Answers:</b></p> <ul style="list-style-type: none"> <li>● <b>\$200 because it's more.</b></li> <li>● <b>How much do I make hourly?</b></li> <li>● <b>\$100 depending on what the job is.</b></li> </ul> <p><i>Why didn't you choose Job B?</i></p> <ul style="list-style-type: none"> <li>● <b>Because it does not make as much.</b></li> </ul> |
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| <p><b>EXPLORE (KP)</b></p>  | <p>Estimated Time: 10-15 min</p>   |
| <p>What the teacher does and what the students will be directed to do:</p>  | <p>Critical questions the teacher will ask the students. What questions will guide this part of the lesson? <i>How might the students answer?</i></p>  |
| <ul style="list-style-type: none"> <li>● Add in the salary rares to the jobs <b>(4rd Slide)</b> <ul style="list-style-type: none"> <li>- Job A \$200 bonus plus \$10 an hour</li> <li>- Job B \$100 bonus plus \$15 an hour</li> </ul> </li> </ul> <p>*Which job would you pick now?</p> <ul style="list-style-type: none"> <li>● <b>Teachers will pass out interactive notes and direct students to fill them out as they work.</b></li> <li>● Have students discuss the equations at their table groups then we will share them as a class. Use <b>5th Slide</b> to write equations on the board <ul style="list-style-type: none"> <li>○ Students will use thumbs up or down to agree with the equation stated by the students</li> </ul> </li> <li>● Students have the choice to continue working with their table groups or work individually.</li> <li>● What if you work 10 hours, which job makes more?<b>(6th Slide)</b> <ul style="list-style-type: none"> <li>○ Now in by yourself or in your group compare if you worked 15 hours. 20? 25?</li> <li>○ Teachers walk around while students are working to observe</li> </ul> </li> </ul> | <p><i>The job with the \$100 bonus has an hourly pay of \$15. The job with the \$200 bonus pays \$10 an hour. Considering the hourly pay, would you change your answer? Why/why not?</i></p> <ul style="list-style-type: none"> <li>● <b>Job B because I make more per hour.</b></li> <li>● <b>Job A because it has a larger bonus.</b></li> <li>● <b>Depends on what the job is.</b></li> </ul> <p><i>Create an equation to represent the pay for Job A and Job B.</i></p> <ul style="list-style-type: none"> <li>● <b>200+10x</b></li> <li>● <b>10+200x</b></li> <li>● <b>100+15x</b></li> <li>● <b>15+100x</b></li> <li>● <b>200+10</b></li> <li>● <b>100+15</b></li> </ul> <p><i>If you work 10 hours a week, which job makes more money?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A</b></li> <li>● <b>Job B</b></li> </ul> <p><i>If you work 15 hours a week, which job makes more money?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A</b></li> <li>● <b>Job B</b></li> </ul> <p><i>If you work 20 hours a week, which job makes more money?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A</b></li> </ul> |

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|  | <ul style="list-style-type: none"> <li>● <b>Job B</b></li> </ul> <p><i>If you work 25 hours a week, which job makes more money?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A</b></li> <li>● <b>Job B</b></li> </ul> |
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| <b>EXPLAIN (KP)</b>  | Estimated Time: 5-10 min  |
| What the teacher does and what the students will be directed to do:  | Critical questions the teacher will ask the students. What questions will guide this part of the lesson? <i>How might the students answer?</i>  |
| <ul style="list-style-type: none"> <li>● Students will be directed to raise their hands and explain how they solved the problems <ul style="list-style-type: none"> <li>○ Students will receive candy if they get the correct answer.</li> </ul> </li> <li>● Ask students to raise their hands and answer what the symbols mean. <b>(7th Slide)</b></li> <li>● Students will use the worksheet handout for the notes to write the inequalities between the expressions. They can work individually or in their previous groups <ul style="list-style-type: none"> <li>○ After working in groups grab attention of students to the front to discuss the answers they got. Have students raise their hands from groups or individuals to explain their answer. Correct any misconceptions</li> </ul> </li> <li>● Use a fist to five to ask if students are comfortable with the differences</li> <li>● Ask students to raise their hand if they would choose job A or job B. <ul style="list-style-type: none"> <li>○ Ask 1 student from both sides to explain why.</li> </ul> </li> </ul> | <p><i>What do these signs mean?</i></p> <ul style="list-style-type: none"> <li>● <b>Greater than</b></li> <li>● <b>Less than</b></li> <li>● <b>Equal</b></li> </ul> <p><i>How can we use these inequality symbols to represent which job makes more when you work a certain amount of hours?</i></p> <p><i>At 10 hours a week?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A makes more</b></li> <li>● <b>Job B makes more</b></li> <li>● <b>They are equal</b></li> </ul> <p><i>At 15 hours a week?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A makes more</b></li> <li>● <b>Job B makes more</b></li> <li>● <b>They are equal</b></li> </ul> <p><i>At 20 hours a week?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A makes more</b></li> <li>● <b>Job B makes more</b></li> <li>● <b>They are equal</b></li> </ul> <p><i>At 25 hours a week?</i></p> <ul style="list-style-type: none"> <li>● <b>Job A makes more</b></li> <li>● <b>Job B makes more</b></li> <li>● <b>They are equal</b></li> </ul> <p><i>What job would you choose now?</i></p> <ul style="list-style-type: none"> <li>● <b>I would choose Job A cause I make more money when I work less</b></li> <li>● <b>I would choose Job B because I make money faster</b></li> </ul> |

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|  | <p>What if you were only able to work 10 hours. Which job you would choose?</p> <ul style="list-style-type: none"> <li>● <b>I would choose Job A because it makes the most money.</b></li> </ul> |
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| <p><b>ELABORATE</b> (Willa- Elaborate 2) (KP - Elaborate 1)</p>  | <p>Estimated Time: 15</p>  |
| <p>What the teacher does and what the students will be directed to do:</p>   | <p>Critical questions the teacher will ask the students. What questions will guide this part of the lesson? <i>How might the students answer?</i></p>  |
| <ul style="list-style-type: none"> <li>● Students will be given the choice, based on if they feel ready, to either participate in a group and design a business or they can go with one of the student teachers to work on more problems like in the Explore and Explain section <ul style="list-style-type: none"> <li>○ Students will be asked to raise their hand to show which option they are choosing.</li> </ul> </li> <li>● <b>Elaborate Option 1</b></li> <li>● Teacher will work with students who choose to do the review</li> <li>● The teacher will ask students to choose numbers for the bonus and hourly wages.</li> <li>● Teacher will ask the questions on the worksheet and encourage students to answer.</li> </ul> <p><b>ELABORATE OPTION 2</b></p> <ul style="list-style-type: none"> <li>● Students will be given three choices of buildings they can start a business in and three product choices that they get to choose from to create a business that will need to make at least \$2000 in profit <b>(8th Slide)</b> <ul style="list-style-type: none"> <li>○ Cost of businesses <ul style="list-style-type: none"> <li>■ \$100, \$300, \$700</li> </ul> </li> <li>○ Cost per unit <ul style="list-style-type: none"> <li>■ \$10, \$20, \$25</li> </ul> </li> <li>○ <b>Profit:</b> a financial gain, especially the difference between the amount earned and the amount spent in buying, operating, or producing something. <ul style="list-style-type: none"> <li>■ Amount of money made based on how much money you make and what costs you have to pay</li> </ul> </li> </ul> </li> </ul> | <p><u>Option 1:</u><br/><i>Will generally follow the process for the Explore and Elaborate section, but in a smaller group setting.</i></p> <p><u>Option 2:</u><br/><i>How many hours do you have to work with the business and product you chose to meet the minimum requirement of profit?</i></p> <ul style="list-style-type: none"> <li>● <b>The answer relating to their inequality.</b></li> </ul> <p><i>What if you choose a higher-selling unit and lower rent?</i></p> <ul style="list-style-type: none"> <li>● <b>Make more money</b></li> </ul> <p><i>What if you choose a lower selling unit and a higher rent?</i></p> <ul style="list-style-type: none"> <li>● <b>Make less money</b></li> </ul> |

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| <ul style="list-style-type: none"> <li>○ Students will use thumbs up or thumbs down to communicate with teacher that they understand the idea of profit.</li> <li>● Students need to create an equation and state how long they would have to work in hours to meet at a minimum the profit requirement of \$2000</li> </ul> |  |
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| <b>EVALUATE – FORMATIVE ASSESSMENTS</b>   |  |
| Identify the formative assessments that will be used to evaluate student learning throughout the lesson. State what content is being measured, how it is being measured, and when in the lesson the assessment is occurring.  |  |
| <ul style="list-style-type: none"> <li>● Fist to five: <ul style="list-style-type: none"> <li>○ with how comfortable they are with the meaning of the inequality symbols (Explain)</li> </ul> </li> <li>● Thumbs up and Thumbs down or middle thumb <ul style="list-style-type: none"> <li>○ to check in on the understanding of profit in the Elaborate section</li> <li>○ To see if students agree with the equations created in the Explore section</li> </ul> </li> <li>● Asking if students to are ready to move on to the next section (Occurs at the end of each section) <ul style="list-style-type: none"> <li>○ If not, ask for questions and try to clarify misunderstandings</li> </ul> </li> </ul> |  |

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| <b>EVALUATE – SUMMATIVE ASSESSMENT</b>  | Estimated Time for Summative Assessment: 7 minutes |
| Include a blank copy of the summative assessment, as well as a completed key/grading guide of the summative assessment. |  |
| Students will be directed to work on the summative assessment alone and put away any previous work.                     |  |

*(Elaborate Option 1)*

**Name:** \_\_\_\_\_

## ***Which Ice Cream Shop Pays More?***

### ***(Part 1)***

Shop A gives you a bonus of \$\_\_\_\_\_ and pays \$\_\_\_\_\_ an hour.

Shop B gives you a bonus of \$\_\_\_\_\_ and pays \$\_\_\_\_\_ an hour.

### ***(Part 2)***

Use  $x$  to represent the number of hours. Write an equation to show how much Job A pays:

\_\_\_\_\_  $x$  + \_\_\_\_\_

Use  $x$  to represent the number of hours. Write an equation to show how much Job B pays:

\_\_\_\_\_  $x$  + \_\_\_\_\_

### ***(Part 3)***

**If you work 10 hours a week, which job will pay more? Use the equations in (Part 2) to write inequalities.**

\_\_\_\_\_

**(Equation for Job A)**

\_\_\_\_\_

**(Choose: > , = , < )**

\_\_\_\_\_

**(Equation for Job B)**

**when I work 10 hours a week.**

**If you work 15 hours a week, which job will pay more? Use the equations in Part 2 to write inequalities.**

\_\_\_\_\_

**(Equation for Job A)**

\_\_\_\_\_

**(Choose: > , = , < )**

\_\_\_\_\_

**(Equation for Job B)**

**when I work 15 hours a week.**

**If you work 20 hours a week, which job will pay more? Use the equations in Part 2 to write inequalities.**



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**(Equation for Job A)**

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**(Choose: > , = , < )**

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**(Equation for Job B)**

**when I work 20 hours a week.**

**(Elaborate Option 2)**

**Name:** \_\_\_\_\_

# Create Your Own Business

For this activity, you will need to create a business with the options provided to produce at least **\$2000** from your business. You will need to buy a building and choose a product to sell.

## Locations

Building 1 is \$100 and is located in a downtown area, but someone recently ran into the front window.

Building 2 is \$200, is located on the main street of town, and has no significant issues.

Building 3 is \$300 and is located in the big mall in town and is newly renovated and is state of the art.

## Products

Product 1 is slime and it is sold at \$10 per container

Product 2 is video games and is sold at \$20 per game

Product 3 is gourmet doughnuts and is sold at \$25 per doughnut

Our location is \_\_\_\_\_

Our product is \_\_\_\_\_

1. Why did you pick your building and product choices?

Your equation

$$\begin{array}{ccc} \underline{\hspace{2cm}} & \times & - & \underline{\hspace{2cm}} \\ \text{(cost per unit)} & & & \text{(cost of the building)} \end{array}$$

2. How much will you make if you sold 20 units of your product?

a. 50 units?

b. 200 units?

3. Write an inequality to show how many units you would need to sell to make at least \$2000. **Example:**  
 $80x - 900 \geq 2000$  (these are made up numbers).

4. Solve for x from your equation from question 3.

(Summative Assessment)

**Name:** \_\_\_\_\_

**(Part 1): Job A gives you a bonus of \$300 and pays \$10 an hour. Job B gives you a \$200 bonus and pays \$15 an hour. Write an equation to show how much each job pays. Use 'x' to represent the number of hours.**

**Job A: \_\_\_\_\_ x + \_\_\_\_\_**

**Job B: \_\_\_\_\_ x + \_\_\_\_\_**

**(Part 2): When you work 10 hours a week, which job pays more? Use the equations you wrote in (Part 1) to write an inequality. Show your work to prove your answer.**

\_\_\_\_\_

**(Equation for Job A)**

\_\_\_\_\_

**(Choose: > , = , < )**

\_\_\_\_\_

**(Equation for Job B)**

Summative Rubric:

Part 1:

- 0.5 point for Job A coefficient
  - 10
- 0.5 point for Job A constant
  - 300
- 0.5 point for Job B coefficient
  - 15
- 0.5 point for Job B constant
  - 200

Part 2:

- 0.5 point Job A equation
  - $10x+300$
- 0.5 point Job B equation
  - $15x+200$
- 1 point inequality symbol
  - $>$
- 1 point work is shown
  - Effort to show 10 being substituted for x in the equations

(Fill in the blank worksheet)

Name: \_\_\_\_\_

**Job A:**

Expression:

| Hours (x) | Expression | Answer (in \$) |
|-----------|------------|----------------|
| 10 hours  |            |                |

|          |  |  |
|----------|--|--|
| 15 hours |  |  |
| 20 hours |  |  |
| 25 hours |  |  |

**Job B**

Expression:

| Hours (x) | Expression | Answer (in \$) |
|-----------|------------|----------------|
| 10 hours  |            |                |
| 15 hours  |            |                |

|          |  |  |
|----------|--|--|
| 20 hours |  |  |
| 25 hours |  |  |

**Job A and Job B at 10 hours**

\_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_  
Job A Expression                      Job B Expression

**Job A and Job B at 15 hours**

\_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_  
Job A Expression                      Job B Expression

**Job A and Job B at 20 hours**

\_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_

Job A Expression

Job B Expression

**Job A and Job B at 25 hours**

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Job A Expression

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Job B Expression