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| **Synopsis of high-quality task:**Ella & Grace both work after school each day. Ella works at an after school program for younger children while Grace helps out at her father’s grocery store. The girls decide they want to go to a concert that is a few months away, but want to purchase tickets as soon as possible in order to get good seats. **Anticipated student time spent on task:** 45-60 minutes (could be a second day for students to share out)**Student task structure(s):** Individual or Partner work |
| [**Math Content Standards and Practices:**](http://www.doe.mass.edu/frameworks/math/2017-06.pdf)**8.EE.B.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. **SMP1** Make sense of problems and persevere in solving them.**SMP2** Reason abstractly and quantitatively.**SMP3** Construct viable arguments and critique the reasoning of others.**SMP4** Model with mathematics.**SMP5** Use appropriate tools strategically.**SMP6** Attend to precision. |
| **Prior Knowledge:** Knowledge of unit rates, slope, and proportional relationships.**7.RP.A.2** Recognize and represent proportional relationships between quantities.**6.RP.A.2** Understand the concept of a unit rate *a/b* associated with a ratio *a:b* with b$\ne 0$, and use rate language in the context of a ratio relationship, including the use of units.  |
| **Connections to the real-world:**Ella and Grace are both high school students who are working to earn money for themselves. They are looking to attend a concert, which many children have experience with. The girls are tracking their earnings, which most (if not all) people do in order to make sure they have enough money for different things (bills, food, clothing, entertainment, etc.).  |
| **Mastery Goals:****Learning Objective:**I can compare two different proportional relationships and graph those relationships in order to determine who earns more money after ten hours of work. **Language Objective:**I can develop an explanation, in writing and using sentence stems, about who makes more money after graphing proportional relationships. |
| **Teacher instructions****Instructional Tips/Strategies/Suggestions:**1. Begin with reviewing the work that has been done with interpreting a unit rate by looking closely at the slope of a graph. Post an example of a graph to aid in this discussion/review.
2. Introduce today’s task by giving a brief example such as: When I was 16, I started a job at an amusement park. I typically worked 5 hours a day and would make $26.25 after one day. How can I determine the amount I made per hour? (you can model for students, as a review, how to determine the hourly rate)
3. Continue with the example, by stating: One summer, I decided I wanted to buy a car for myself. The car I was looking at was a beat-up, used Dodge that would cost me $1,000. I began to pick up more hours at work and increased my day to 8 hours (still making the same rate). How many days did I have to work in order to make enough money to purchase the car? (again, you can model for students, as a review, how to determine the number of days; 24 days would be $1,008.00)
4. The last bit of review/modeling would be graphing proportional relationships based on the amount of money made each day vs. the amount of days worked. Discuss the graph and the slope.
5. Move to today’s task. Read through the introduction. Explain that today they are going to go a step further and determine not just ONE person’s rate of pay, but two people - and see if they can figure out how many days (or hours, in this case) they would have to work to purchase concert tickets.
6. Have students move into partner pairs/groups. Give student task sheet and graph paper to students. As students work, circulate and facilitate discussions with partner pairs. Pay attention to those who are finding new ways of coming to the answer (for sharing out later). Ask questions such as:
	1. What do you know about the proportional relationship of Ella’s pay? How much does she make for working 1.5 hours? How could we determine how much she makes in just one hour?

After the task:Pull students back together to share out. This could take time and may need a second day, depending on how long your block of time is with students. Remember to highlight the PROCESS students took to achieve the answer. *Did anyone do things differently? How did they determine how many hours each girl would have to work to purchase the concert tickets?* |
| **Instructional Materials/Resources/Tools:** Include:* Student directions for completing the task (two-page document - see below)
* Graphing paper for parts b and c.
* Ruler for graphing.

**RUBRIC:**3 - Student was able to determine the hourly rate, graph the relationships, and compare the two sets of proportional relationships with a thorough, written explanation using proper vocabulary.2 - Student determined the hourly rate and graphed the relationships. Student also compared the two sets of relationships with a brief, written explanation using some vocabulary.1 - Student needed teacher assistance to determine the hourly rate and to graph. Student compared the two sets of relationships with an explanation of one or two sentences using little to no vocabulary.0 - Student was unable to complete the task.  |
| **Accessibility and Supports:** **Potential sentence starters:**I can tell that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ makes more money by looking at the graph, because I notice(d) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. **Key academic vocabulary:** Slope, proportional relationships, graph, points, unit rate |

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

Ella & Grace both work after school each day. Ella works at an after school program for younger children while Grace helps out at her father’s grocery store. The girls decide they want to go to a concert that is a few months away, but want to purchase tickets as soon as possible in order to get good seats.

They decide they need to begin tracking how much money they earn each week to see when they can buy the tickets. They each work approximately 10 hours per week.

Ella created the chart below:

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| **Time Worked** | **1.5 hours** | **2.5 hours** | **4 hours** |
| **Money Earned** | $15.30 | $25.50 | $40.80 |

Grace makes $8.00 per hour.

1. Who will make more money working 10 hours? Show or explain your thinking.
2. Use graph paper to draw a graph that represents *y*, the amount of money Ella would make for working *x* hours, assuming she made the same hourly rate she was making last week.
3. Using the same coordinate axes as part b, draw a graph that represents *y*, the amount of money Grace would make for working *x* hours.
4. How can you see who makes more per hour just by looking at the graph? Explain your thinking using the lines below.

**Extension Question:**

E. If tickets cost $120.00 each, how many hours would the girls have to work to get enough money for their own ticket. Show or explain how you determined your answer.

Graph paper 

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| **Sample Student Work:****Worksheet showing a student's solution to the task****Worksheet showing a student's solution to the task** |