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| Date: | | | Duration of Lesson: 60 minutes | |
| Title of Unit: Functions | | | Title of Lesson: Graphs and Stories | |
| Lesson Objectives: Students will be able to read and interpret a distance-time graph and match a story and a table to a graph. | | | | |
| Groupings (e.g., whole class, small groups, co-teaching): whole class and small group | | | | |
| Skills & Standards:  CCSS.8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. | | | | |
| **Progression of Learning & Teaching** | | | | |
| Opener: | * Provide students with a blank graph and then have them * label the X & Y axis. * Create a story and put the title on the graph * What would the X & Y axis represent in your story * Share out with class * Students will analyze a graph and select the story that describes the graph (Desmos [screen 1](https://teacher.desmos.com/activitybuilder/custom/60549a1d0dc1920cb77b5e00)) * Talk with students about the importance of being able to read and interpret graphs. Graphs tell stories, and we have to be able to accurately interpret those stories. * There are two learning targets: matching graphs with stories and communicating thinking. These can be introduced as you go over the directions for the first card sort on Desmos [[screen](https://teacher.desmos.com/activitybuilder/custom/60549a1d0dc1920cb77b5e00)](https://teacher.desmos.com/activitybuilder/custom/60549a1d0dc1920cb77b5e00) 2. | | | **Points to Remember**   * Remember to freeze the desmos activity so students cannot go beyond the assigned screens based on your directions |
| Activities & Tasks: | **Instructional Lesson:**  Student:   * + Before starting the Desmos, you could show two graphs set with different scales to drive home the importance of being able to read graphs accurately and that people can make the graph say with they want it to.   + The Warm-Up in Desmos should provide the teacher with insight into how the students are understanding the problem and enough teaching points to fill in gaps for students so all students can get started on the lesson. * I Do:   + During the initial discussion, be sure to have students discuss the label on the y-axis – distance from home – what does that mean, and what a segment that goes down really means in terms of the context. Have students share out their interpretations * Y’all (students share with a partner or a table):   + Work through lesson with partner   + Each student should have their desmos open and work collaboratively to complete the slides * We Do: Facilitate a class discussion   + Stop at a few points noted in the lesson to hold a class discussion and summarize thinking.   + Teachers can target students they know need added support. Teachers could also print the card sorts on desmos slides 3 & 8 and group the card sorts into two groups for students, so they are not trying to sort through all 10 cards. * You Do**:**   + There isn’t really independent practice for this lesson, but screen 11 is an extension for students who finish quickly.   + Alternatively, change the slide to indicate it is to be completed in class or for homework     **Activities/Tasks:**   * 5 minutes: Screen 1 with some quiet think time, then a class discussion. * 10 minutes: Screens 2 – 5; introduce directions, students work in partners * 5 minutes: summarize screen 5, address misconceptions (going down the hill does not mean the graph goes down – she’s getting farther away from her house.) * 5 minutes: Screen 6 with some quiet think time, then a class discussion. * 10 minutes: Screens 7 – 9: introduce directions, students work in pairs; \*You could pause at screen 9 and discuss or let students continue to work * 5 minutes: Screen 10 – encourage students to give this screen some time. Use the comment feature to respond to student thinking and encourage detail in their answer. * 5 minutes: screens 11 – 12: Screen 11 is an extension if students finish the rest early. All students should complete screen 12 * If time: look at students’ responses on screen 12 and respond to questions if needed. * \*This lesson could also be broken up into two days. | | | Resources:   * Desmos Lesson: [Graphs and Stories](https://teacher.desmos.com/activitybuilder/custom/60549a1d0dc1920cb77b5e00)   Vocabulary:   * No vocabulary words are used specifically in this lesson, but students should be familiar with these concepts:   + x- and y-axis   + input/output tables * These concepts should have been introduced in prior grades if students have not yet worked with them this year. * Students should have at least a basic understanding of graphs and tables when they begin the lesson.     Monitoring/Scaffolding:   -Monitoring: There are pacing suggestions in the Desmos lesson. The Teacher Dashboard will also show how far students are and selected correct answers.  -Differentiation:  \*There is an “Are You Ready for More” screen at the end for students who work quickly.  \*For students who are struggling with the card sort in Desmos slide 3, 8 , you could print them out and group them into two piles – one with 2 sets of matches and one with 3 – to help narrow the choices. |
| Level of Cognitive Complexity: | ☐ Creating  ☐ Evaluating  ☐ Analyzing | ☐ Applying  ☐ Understanding  ☐ Remembering | |
| Key questions: | * In each section of the journey, is Isabel’s speed steady (or constant)? Where is it increasing? Decreasing? How do you know? * How does distance change as time goes in the graph? * How can you tell if Isabel is traveling toward or away from home? * How can you tell where Isabel was going the fastest? | | |
| Closure: | * Use the Teacher Dashboard to monitor progress. You may want to pace students to screen 10 about 10 minutes before the end of class so they can write Isabel’s story. You can then display some of the stories to share and/or discuss. The last screen asks students to rate their understanding and write about what they learned and what questions they have. * Use screen 12 to see how students are feeling about the lesson and about the mathematics. If time, you could answer questions students pose. You could also ask them which screens helped them understand the most, which screens were the most challenging. | | |
| Next Steps: | Students could do more work with reading and interpreting graphs. Distance time graphs are also a good, concrete way to introduce the concept of function.  Begin next class (Opener) with student results from slide # 11. Choose the anonymize function and share both accurate and inaccurate results with the class for a turn and talk activity with a peer. Then do a whole group discussion based on partner discussions | | | **Formative Assessment Criteria for Success:**   * What types of formative assessments will you use, and at which points in your lesson will you check for understanding?   + Screen 1: The teacher will use the student responses and class discussion to assess students’ understanding of reading a graph. At this point, the teacher needs to correct enough of the misconceptions so students can work through the rest of the task, but not too much to take away the cognitive demand of the task.   + Screens 2 – 5: There is feedback for the students on the card sort on screen 4. The teacher can watch the Teacher Dashboard to see which students need support as they match the graphs with the stories. The teacher can pause the class at screen 5 to discuss the graph on that screen – which is a commonly misinterpreted graph and story.   + Screen 7 – 9: There is feedback for the students on the card sort on screen 9. The teacher can watch the Teacher Dashboard to see which students need support as they match the tables with the graphs.   + Screen 10: This is the screen for teachers to see how well a student understood the lesson.   + Screen 12: Students have a chance to rate their learning and describe any questions they have. * Evidence of Mastery: A detailed, accurate story of Isabel’s journey on screen 10. The card sorts should be correct, too. |