

**Lesson Plan Reflection**

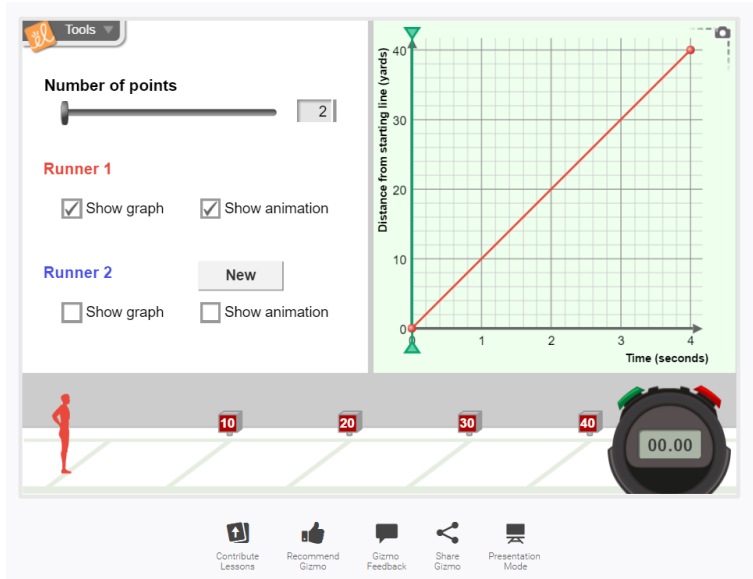
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**Plan:**

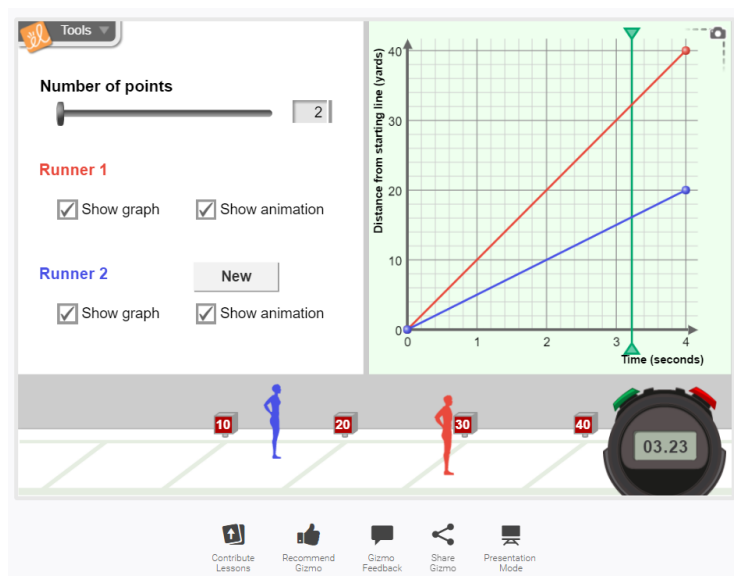
When approached with the Lesson Plan project I took it as an opportunity to really look at the internet program called Gizmos, by Explore Learning, which my school uses and requires all math and science teachers to use. I was excited for the prospect of using this new program and creating an interactive lesson where students took responsibility for their learning. This, in turn would allow me to use the “guide on the side” instead of the “sage on the stage” approach and see what my students are capable of.

I then had to choose which Gizmo to teach. In order to approach this, I looked at my notes from fall 2015 to see where my eighth grade students were in early November. Last year, in early November, my students were looking at interpreting graphs and looking at the rate of change and how different scenarios affected the steepness of lines. I looked at the Gizmo lessons and finally opted to use a lesson discussing distance versus time graphs.

The Distance-Time Gizmo showed a runner on a track with yard markers, a stopwatch, and a graph, see the picture below. Students would work with the graph moving points to discover that a positive slope would cause the runner to move forward, a negative slope would cause the runner to run backwards (towards the start line), and a horizontal line caused the runner to stop.



The Gizmo also came with a student worksheet to help guide them through using the tools and manipulations in the Gizmo and guide them to the necessary discoveries. Additionally, as students became more comfortable with the Gizmo they could add another runner to the track and compare how the steepness of various lines would affect the runners as shown below.



Ideally, the lesson would sit in the middle of the unit being surrounded by an introduction to the effects of slope on a graph and followed by more real-world scenarios. I would introduce the

concept of slope and emphasize that slope and rate of change, in math, were different names for the same, graphical, concept. We would talk about the differences in positive, negative, and zero slopes and practice with some worksheets and class discussions. We would then use the Gizmo as an introduction to the real-world scenarios discussing the cost per topping on Domino's pizzas and which Goldfish Cracker's product is the best deal for school lunches.

My goals for the lesson would be that students would discover the effects of slope, through adjusting the Gizmo graph and running the simulation. Students would be adjusting the points to create the different kinds of slopes and eventually comparing how the steeper slopes compare to lower slopes. My role would be as a guide to aide students in their discoveries instead of standing in the front of the room lecturing.

Some questions I would like to ask to help guide my students are:

- What does the graph look like when the runner is moving forward?
- What does the runner do when the graph is sloped down (negatively)?
- When you have two runners on the track how many lines do you have?
- If one line is very steep and one line is very low what is the difference in the runners?  
Who would win the race?
- Switch the lines, now who will win?
- What does the steepness of the line control?

I would expect my students to follow the directions to the best of their ability. I would expect them to be challenged but not out of their skill level. Students may complain about the more "hands-off" approach of the lesson as they are used to very direct instruction from my colleagues and often from myself as well. I think my students will push through given the prompts above

and probably additional encouragement that they do have all the tools (including their brains) necessary to complete the assignment.

### **Teach**

The hour started with the students coming into their assigned seats and doing their daily warm-ups. Daily warm-ups are a few short questions which students complete at the beginning of each hour to get them thinking about math and let me take care of attendance and such. Students then got their assigned computers out of the cart and started them up. As always, there were issues getting the computers started up and running correctly. Assigned seats are set up in groups of four based on behavior, talking, and ability level, trying to spread out the highest and the lowest students so they can help one another.

During this time, I was running around helping students and troubleshooting problems. Students were also helping one another and getting logged into Explore Learning. Students had signed into the program a few days prior so they had their log-in information but I still needed to move around the room and get a new student, and students who had been absent logged into Explore Learning and into the Gizmo.

I handed out the Gizmo packet and told students to follow the directions of packet and to work with their groups. While students worked I walked around and helped students understand how to work the Gizmo and listened to student conversations. As I circulated I asked the questions listed in the Plan above to check for student understanding.

Some students finished their work early and others did not finish the assignment. The class period passed very quickly and students only had a few minutes to turn-off and put away computers prior to being dismissed.

**Reflect**

The first thing that I did not like about this lesson is where it ended up falling. Due to a family circumstance out of my control I was absent from school for two weeks leading up to this lesson and my students had fallen behind during this time. Students had worked minimally with slope and were not as familiar with the interchangeable terms “slope” and “rate of change” as I would have liked if I had been in class. Other teachers had helped create some of my lesson plans while I was gone so my students had not had much instruction about how slope affects graphs.

Leading up to the lesson students only had experience with how to calculate slope, not the effects slope would have on a graph or how to relate it to a real-world situation. My students did not have all the background knowledge required to get the most out of the lesson. This lesson ended up being the introduction to rate of change, real-world scenarios, and the effects of slope on a graph.

The beginning of class went smoothly, students have gotten back in the routine of coming in the room and getting right to work. The problems started to arise as the computers came out. As always happens when using technology, the computers caused problems. A lot of our time was eaten up by troubleshooting and waiting on computers. I feel this is probably going to be an issue that we always need to account for as we can never guarantee that computers and other technologies will work flawlessly.

As the class progressed I found myself helping students use the program more than guiding them through the mathematics. I had made the assumption that the students were going to be technology savvy enough to work the program with little to no guidance, or no more assistance than what was offered in the packet. I think often, as a teacher in the 21<sup>st</sup> century, I assume

students' technological are more advanced than they actually are, especially in rural areas. Just because students may have grown up with all of this technology available does not mean they know how to use it. When planning lessons, I need to include time to teach how to teach the technology instead of making assumptions regarding their skills.

In addition to the technology problems, students were lacking key mathematical vocabulary and concepts when it came to interpreting graphs. Due to my long absence and the presence of a variety of substitute teachers, students were not exposed to the vocabulary that I would have normally made available to my students. Students struggled understanding terms like rate of change and y-intercept and also struggled to interpret what those items meant when represented on the graph. I would have liked to prepare my students better prior to the lesson and had I been in the classroom the necessary vocabulary and analytical skills would have been engrained in our daily lessons in a way which would have helped the students understand these concepts when it came time to use them on the Gizmo.

Due to the technological difficulties and the lack of background knowledge I do wish I would have delayed the lesson even longer. Students would have benefitted from additional preparatory instruction. I also wish this lesson would have been allotted two class periods instead of only one. Several students needed additional time to process what was happening and express the effects the various changes had on the graph so many students left with their lesson unfinished. Other students just need the extra time to be able to wait for computers to work properly.

Another problem I ran into was that since I was running around answering questions about using the computers and what to click on to get the Gizmo simulation to work I did not get to ask my planned questions as much as I would have liked to. I did as some students as they progressed through but not nearly as many as I would have liked. I ended up having to use my planned

questions as a review of the activity at the start of the next day to make sure students got the take-aways I had been intending.

Something that I liked about the lesson was the visual scenarios which played out with the Gizmos. Students enjoyed watching how the different graphs affected the runner and having the interactive platform of the Gizmo allowed students to see firsthand what was happening instead of having to take someone's word or take the information for a piece of paper. I think that seeing these concepts did still help my students in their future lessons because they were able to refer back to the visual of the runner on the track because they had all experienced it and could relate to it. I feel they did better on a follow-up assignment analyzing the graph of a bike ride than they would have if they had not seen the Distance-Time Gizmo.

I was surprised to find that students were not as receptive to using the computers to complete a Gizmo as I thought they would be. Students expressed a desire to have paper assignments over using the computer to do assignments. I believe this is because of the extended use of Google Classroom and lack of direct instruction which led up to the use of the Gizmo due to my absence. Additionally, students had done Gizmos before and expressed a dislike of them.

As we got into the lesson students seemed to open up to the idea of the Gizmo and I felt they enjoyed being able to adjust how fast or slow the runners ran on the track. I enjoyed watching them adjust the dots on the graph to see which runner would run the fastest and win the race. I felt this hands on experience and fun gave them a better understanding which they were then able to apply to assignments discussed in the days following the Gizmo. Even though the students were initially hesitant, I feel that completing the Gizmo still helped them more than a paper assignment and direct instruction would have.

Overall, I think I had a good lesson but it was poorly executed due to the situation. If I would have been here, students would have received the appropriate background knowledge prior to the lesson and the Gizmo would have gone a lot smoother. I would also ask one of the technology people at our school to come in and help us get started so that I would have assistance addressing the computer issues. I would extend the lesson plan to cover two class periods and give students guidance on how to work with each other to help everyone finish in a timely fashion.

I think I will definitely try this lesson again next year. I would like for it to fall more into the middle of the unit instead of the beginning, or rethink how to use the Gizmo as an introduction to the unit. I would like to be able to take time to teach students how to use the Gizmo before releasing them to work in their groups. I would also allow two days for the completion of the Gizmos so that students have plenty of time to process what is happening in the Gizmo and how the graph affects the runner, describe what is happening and put it on paper, and discuss with their groups and learn from one another as they move through the Gizmo. I think if these things could have occurred during the lesson students would have gotten an even deeper understanding of the concepts and I would have seen a higher performance on the assignments which followed as well.

As I said above, I believe it was a good lesson, just poorly executed due to lack of time because of my circumstances. I cannot wait to try again next year to put into place the changes discussed and see the improvement in my students.