Liz Mattarazzo
Direct and Inverse Variation 8

Direct and Inverse Projects

I. Content:
The students will be practicing with direct and inverse variation. Each group will be given real life situations they will have to investigate further. They will have to make a table, graph, equations and answer several questions in a poster format then present their findings to the rest of the class.

II. Learning Goal(s):
Students will know and be able to:
- Distinguish between direct and inverse variation examples.
- Interpret both direct and inverse situations in multiple ways: graphs, tables, symbols, explanations.
- Explain their findings to their classmates in a clear concise way.
- See patterns by comparing and contrasting data from real life situations.

III. Rationale:
We have been working on our direct and inverse variation unit for over a month now and the students are still struggling with the concepts. They are especially having trouble with the inverse variation ideas. This activity will make them work through a problem entirely, making a table, graphing and presenting their findings to the class. They need to grapple with the entire picture. Last week we worked on skills worksheets to further practice the material but this lesson will solidify these concepts as a whole. From here, we will have a review game and then a unit test on all the material we have been working on. Therefore, this lesson will pull together all the concepts we have been working on from both direct and inverse variation, ideally pointing out any gaps in the kids’ knowledge so we can address them. But they will be working through these problems in groups, addressing those issues and fixing them.

IV. Assessment:
The main assessment in this project will be the poster and presentation. I will be evaluating the presentations and the information on the poster (tables, graphs, equations and explanations). During the making of the posters I will be circulating around the room to see how the groups are working together and through the problem. They will be judged based on a rubric, which I will also present to them at the beginning of the assignment so the expectations are clear.
V. Personalization:

The groups will be homogenous this time, which I do not normally do. However, in this assignment I really want them to delve into the problems, struggle, and come up with solutions. Therefore, I want each group to have problems appropriate to their respective skill levels. In addition, these problems are real life situations the students can relate to and conceptualize beyond the walls of the classroom.

This is our first group presentation activity; therefore, I need to establish the precedent in my classroom. I know they have done group projects before but this is my reasoning for creating a rubric. I want the expectations and requirements to be clear for all parties.

VI. Activity description and agenda:

Grouping: homogeneous groups of 3

Materials: chart paper, problem worksheets for each group, markers

Day 1:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>Starter</td>
<td>As students enter the classroom, they will be responding to the prompt on the board in their POD books.</td>
</tr>
<tr>
<td>6-15</td>
<td>Intro</td>
<td>Students will ask questions if they are unclear about the directions.</td>
</tr>
<tr>
<td>15-55</td>
<td>Group work</td>
<td>Students will delve into their problems. They will read over all instructions and information and then begin working on it, making tables, graphs, equations, etc. If students are happy with their results and conclusions, they will begin working on their posters. Following the rubric, they will include a table, graph, equation and explanation for each problem.</td>
</tr>
<tr>
<td>55-60</td>
<td>Continue working</td>
<td>In the last few minutes of class, I will be checking in with each group to see how they are doing.</td>
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What are some ways to determine if a situation is a direct variation? What about an inverse variation? Use specific examples if that helps you make your point.

I will pass out the tiered problems to the specific groups. I will stay back and let them talk. I want them to struggle a bit with these problems. They are in groups designed to work through them, I know they can. Specifically, if they have vocab or grammar questions, I will answer those as they arise. Otherwise, I want the groups to rely mostly on each other and not me. I realize this is a lofty goal but it’s something to strive towards.

I will explain the project to the class. We will go over the rubric, the expectations and requirements. I will pass out the tiered problems to the specific groups.
Specifically, evaluating how much time they will need the second day to work on the poster and wrap up.

**Day 2:**

<table>
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<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0-60</td>
<td>Group work</td>
<td>Students will continue working on their posters and wrapping up. They will then divide up the talking points, because in the presentations each individual needs to talk. I will be circulating around the room, answering any last questions and moving the groups along. In general, they tend to procrastinate so I need to keep pushing them along most of the time.</td>
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**Day 3:**

<table>
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</thead>
<tbody>
<tr>
<td>0-15</td>
<td>Group Work</td>
<td>Students will continue working on their posters and wrapping up. They will then divide up the talking points, because in the presentations each individual needs to talk. I will be circulating around the room, answering any last questions and moving the groups along. In general, they tend to procrastinate so I need to keep pushing them along most of the time.</td>
</tr>
<tr>
<td>15-55</td>
<td>Presentations</td>
<td>Each group will present their findings to their classmates. Each student is required to talk during the presentation. The rest of the class will be respectful, not talking, paying attention to the presentations. At the conclusion, the group I have designated will ask questions of the presenters and after that, any additional questions can be posed. Students will get points for asking questions. During the presentations I will be enforcing the classroom behavior rules I set up. I will also be evaluating each group based on their findings – table, graph, equation, explanation. And lastly, each member of the group must talk; I will be making sure that happens. For the questions portion, I will be facilitating the discussion.</td>
</tr>
<tr>
<td>55-60</td>
<td>Exit Slip</td>
<td>Students will be responding to a prompt in their POD books. <em>Come up with 2 examples of direct variation and 2 examples of inverse variation in real life.</em></td>
</tr>
</tbody>
</table>

**VII. Massachusetts Learning Standards:**

N-Q.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
N-Q.2: Define appropriate quantities for the purpose of descriptive modeling.  

N-Q.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.  

A-SSE.1: Interpret expressions that represent a quantity in terms of its context.  

A-CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  

A-CED.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.  

A-REI.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).  

F-IF.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.  

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

VIII. Sources:  

Alex Wohler – Proportions Worksheet  

https://docs.google.com/viewer?a=v&q=cache:HQWVDfR3XGYJ:https://spaces.pcc.edu/download/attachments/14323744/vernoniahss_mathincete_lessonplan_photoresolution.doc+&hl=en&gl=us&pid=bl&srcid=ADGEESib6mOdB-Qn4yUk7ujNlYWifsRQLp3aHu5y4KANiAG9VojAnYQi0vtm9AcExj71G3cKSkJYDJA5t7hnnAa_sTnMYJPcuF4K5rY04M9ewdAAHu9EVGqrJN34ArF_5s81ZEsDFC&sig=AHIEtbROzQe6eH5m370rbGE4sTday5U5bQ  

IX. Reflection:  

I was so impressed by their presentations and their group work in this activity. I created homogenous groups for the first time and I am so happy I did. It worked out exactly the way I wanted it to. My “high flyers” were appropriately challenged with their problems and my students that were not grasping the concepts just yet got the practice they needed. The groups really learned how to work together and talk through things during this lesson. In addition, day 1 of this lesson was my round for 9B and they were AWESOME! I cannot even explain it. They worked diligently in their groups and everyone had such nice things to say about them. I was so grateful.  

When thinking of the future, I would maybe change some of the problems a little bit. This lesson was one I added at the last minute but I realized the students were not ready for the review game and the test. Therefore, while I am content with the problems I came up with here, they could be better. Specifically, the basketball drill problem, the free throw percentage one and the sky diving. The camera
resolution, which was originally my inspiration for the project, definitely required a lot of thought and confused the kids more than I expected. I may need to rewrite that a tiny bit in the future.

I also created a revised rubric in our Ways of Knowing class that I am much happier with than my original. The first day during class I had copies of the rubric to give students while they were working, however, most of them did not want it then. Therefore, of course, on the second day when they were beginning their posters and wanted the rubrics, they all had disappeared into the mess that is my desk. Unfortunately, this lead to groups sharing the few rubrics I could find and some groups were missing key information from their posters. I am not sure if this is directly related or not but I feel that if they had been checking off the rubric right in front of them they would have been more aware. For example, one group did not write why each situation was direct or inverse variation. They explained it quite well during their presentation but it also needed to be on the poster. They lost six points right there. That is one of the reasons why I like rubrics yet hate them at the same time. I always struggle with that balance.