**Adrienne Deshaies**

**STARS Science**

**Monday, July 19, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  Whiteboards and markers  lab report packets  11 calculators  VIP for taking an average  VIP for bar graphing (TAIL = title, axis, increments, labels)  Butcher paper  Graph paper  Story problems  Computer and dongle | | **Your Preparation**:  Make packets  Make VIPs  Make story problems  Get supplies  Make copies of good group data | | **Agenda (w/times)**: 55 mn  Do Now: 3 mn  Group graphing: 17 mn  Practice with rate: 5 mn  Structured practice: 5 mn  Guided practice: 15 mn  Go over hw and ex cred: 10 mn |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: On your whiteboards, take 30 sec and think/write: what was the scientific question we were asking when we did our catapults lab? I wander, find a good answer, have student copy it to board. Others provide input until we have an answer we agree on. I hand out lab report packets, write the scientific question in the first section of the handout. | | | | |
| **Objective**: *Today you will be able to…*  -Begin writing a complete report of our catapult lab.  -Use a bar graph to display our lab data, and calculate speeds of the three projectiles. | | | **Proving behavior**: *by…*  -Coming up with a scientific question about the catapult lab  -creating a bar graph as a class | |
| **Purpose**: *We are doing this because…* a picture is worth 100 words, a graph is worth 1000. We got interesting results in our lab, right? And we want to be able to share what we learned with other people, who didn’t see what we did. Graphs are a great way to help show/educate other people, and are very effective for showing trends visually. Graphing is a tool you can use in your life, no matter what subject you’re working with (I show some examples of graphs – funding of education in CO, rise in global temp, music genre trends, etc) | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** I hand back group data tables with times/distances from lab. Also, I hand out copies of one group’s table that has accurate, complete data (we will use this to create class graph). Just looking at these numbers, which object, in general, had the longest distances? Which one had the shortest times?  **See:** On board, different students fill in: longest distance\_\_\_\_\_\_\_, shortest time\_\_\_\_\_\_\_\_.  **\*Do: I**f you had to guess, without doing any math, which one would you say went the fastest? Take a vote. | | | |
| Step 2: | **Say:** Let’s work together to get the averages of these trials. Someone remind me the first step of taking an average? For sake of time, we are all going to use calculators, because you’ve all proven to me already that you know how to do the math by hand. Take 30 sec to add the 3 distances for the hacky sack from this group’s table.  **See:** Step 1, VIP of getting an average  **\*Do:** Everyone punches the numbers, hold up your calculators and we make sure we all got the same sum. | | | |
| Step 3: | **Say:** Someone remind me the second step of taking an average? Take 30 sec to find the average of these three numbers.  **See:** Step 2, VIP  **\*Do:** Everyone finds average, hold up calcs and compare numbers. Have student record average on board | | | |
| Step 4: | **Say:** Now, with the person next to you, take 2 mns to calculate the average distances for the cherry/cotton ball and the pinecone.  **See:** VIP remains up  **\*Do:** Pairs find averages, once they have it, come write it on the board. Did we all get the same number? If not, punch it in again to check. | | | |
| Step 5: | **Say:** Now that we have average distances, we are ready to graph them, to make it easier to compare the three objects. We’re going to work together as a class to come up with a bar graph for this data. Quick review of VIP for bar graphing  **See:** Steps of VIP for bar graphing  **\*Do:** For each step, I call a volunteer (popsickle sticks) to come up to a butcher paper and complete the step (i.e. draw the axes, label them, create the increments) As we go along, everyone copies the graph onto their own piece of graph paper to keep for reference. | | | |
| Step 6: | **Say:** Finally, let’s review our rate equations (d=rt, r=d/t, t=d/r). Remember, we want the unknown variable by itself on one side so we can find it easily.  **See:** Examples of story problems on board. On your white boards, write the equation you should choose for this problem, first person to hold up the right answer gets a ticket  **\*Do:** Take 3 mn with a partner (and calculator) to find the average speeds of each of the three objects. Afterward, compare and make sure we got the same answers. | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time:  Materials:  Group Size: 2 | **Example 1**  Projected – examples of student graphs (anonymous). On whiteboards, what is missing? (title? labels?) Take 30 sec and hold it up. Have one person explain what the graph is missing. | | | |
| Time:  Materials:  Group Size: | **Example 2**  Same activity, this time, individually. | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  Group competition – each team of 3 receives a story problem with time and distance data. They work together to get rates and create a bar graph with them, on the big whiteboard. I give teams points for a. correct rates, b. complete graphs. If graph is missing something and the other team can identify and fix it, they get points. | | | **Criteria for Mastery:**  Students can get accurate rates when given distance and time, and can create a bar graph that includes all the necessary elements. Can recognize when a graph is missing something. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:**  Finish and revise last hw assgn, create a bar graph showing the speeds from the group data we used in class. Practice probs using rate equation, and multiple choice qs about graph elements (i.e. what would be the best title for this graph: bread mold, mold growth over time, my mold experiment… etc) | | | | |
| **Closure** | | | | |
| **Explain Closure:**  This week is High-School-Prep-Week. Each day, we will learn a different HS success tool and we will practice it. Today’s tool is Using Your Resources:  Extra credit assgn: people are not calling me when they are confused! In high school, taking initiative in contacting your teachers is a necessary tool you will have to master. We can’t help you if we don’t know you’re struggling, showing up in the morning with nothing done because you didn’t understand it is unacceptable.  -I hand out a slip with a riddle/impossible question on it. In order to learn the answer, you must call me tonight. If I don’t answer the first time, you must leave me a message and I will call you back. Tomorrow, anyone who knows the right answer will earn 7 golden tickets. I go over proper calling etiquette: (i.e. “hi, this is\_\_ and I have a question about \_\_\_\_\_\_,” vs. “hey A.D., so what should I do for #3?” | | | | |

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**STARS Science**

**Tuesday July 20, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  Hw passes  Lab report packets  Whiteboards and markers  LOTS of cutout dots  2 bowls  Computer and dongle, grid projection  VIP of line graphing | | **Your Preparation**:  Make passes  Get dots  Prepare projections  Make VIP | | **Agenda (w/times)**: 55 mn  Do Now and HS talk: 10 mn  Dot activity: 15 mn  Create class graph: 10 mn  Structured Practice: 10 mn  Explain HW: 10 mn |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: (1st – reward those who called me and can answer the riddle) Also – today’s High-School-Success-Tool is coming prepared. 1 ticket for each of the following: binder, paper, writing utensil, hw. 1 free homework pass awarded to anyone who came with everything they need. In HS, your teachers will not lend you pencils or paper, and won’t check your planners to make sure you wrote everything. It is YOUR responsibility to be prepared!  Go back to your hypotheses that you came up with before the catapult experiment. Check for these things:  Is it in the right format? Does it make a prediction? What are the two variables? Do not change it based on the results we got, it is okay if it was not supported. Revise format if needed, write it on your whiteboard; I come around and put checks on ones that look good, I talk to people who need to revise more. Once it is finished, copy it into your lab report packet in the second section. | | | | |
| **Objective**: *Today you will be able to…*  Use data from an experiment to create a line graph.  Read a line graph to pick out trends. | | | **Proving behavior**: *by…*  Completing a mini experiment and creating a line graph from the data we gather.  Looking at graphs of data we did not gather, and identifying relationships/trends. | |
| **Purpose**: *We are doing this because…*  We talked yesterday about the importance of creating graphs as a tool for educating others on things we know and want to show. While bar graphs are good if you have a couple of different categories (like projectiles), line graphs are better for showing patterns of increase/decrease. The other part of using graphs is being able to read them, and understanding the importance/significance of what you see. What is a topic that is important to you? (ex. scores of your favorite b-ball team) If you saw a graph showing how they did over the course of one season, you’d want to be able to know how to read and understand it, right? | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** To start off our discussion on line graphs, we have a mini-contest. I need two volunteers to come up. Each volunteer has a pile of paper hole-punch dots, and an empty bowl. When I say GO, each of you has 30 sec to pick up as many dots as you can and place them in the bowl. You may only take 1 dot at a time, using your fingertips.  **See:** I demo what it should look like  **\*Do:** 30 secs, GO. At end, have other students count how many dots made it into the bowl. I record numbers on board like so: (1 person: 20 dots) Now we are going to repeat the activity, but with 2 people working simultaneously on one pile of dots. I record #s on board. Repeat again with 3 people each team. # of dots should increase each time. | | | |
| Step 2: | **Say:** I reward winning team. Now, competition over. We’re going to combine our data and graph it. Take 1 mn with a partner to average the # of dots for each trial (1 person, 2 people, 3 people)  **See:** Data recorded on the board, VIP of averaging hanging up  **\*Do:** Compare answers, make sure we got same ones. Have student record averages on board. | | | |
| Step 3: | **Say:** A line graph gets set up the same way a bar graph does – it also needs TAILs.  **See:** First few steps of bar graphing VIP  **\*Do:** Get with a partner, I assign each group a graph element: title, labels, increments, etc. Take 2 mns to figure out what it should be for the graph of our dot competition. Groups come up to board (I have grid projected onto white board) and place their elements. Whole class critique of whether they’ve done it right, revise if needed. | | | |
| Step 4: | **Say:** For plotting the data, first we need to be clear on which is the independent and dependent variables. Did the # of dots depend on the # of people, or vice versa? Once we decide this, we can label our axes. Then, for each trial of our experiment, all we have to do is count over the number of people on the x axis, and then up the number of dots on the y  **See:** I model with the first data point on the projected graph. (VIP for line graphing)  **\*Do:** On your whiteboard, make a prediction about where the next point will go, using this format: over(x)\_\_\_\_\_ and up (y)\_\_\_\_\_\_\_. I call a name to come plot the next point. Repeat for the final point. | | | |
| Step 5: | **Say:** Now that I have all my data plotted, all I have to do is make a line through it. Chances are, my points will not make a perfect line (I model the crooked line that connects all 3 points). A line like this is accurate, but if I want to estimate, I can try to make a straight line that connects as many points as possible  **See:** I use meter stick and model making a line-of-best fit, that passes through 2 pts. (VIP for line graphing)  **\*Do:** Take 30 sec to look at this graph and think about it – what does the direction of this line tell us about the relationship between our two variables? What does one do while the other increases? I call on someone to share. | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time: 1mn  Materials: wbs  Group Size:1 | **Example 1**  I post an example of a complete graph. Individually, on your whiteboards, identify the relationship between these two variables. | | | |
| Time: 1mn  Materials: wbs  Group Size:1 | **Example 2**  I post an example of a graph with uneven increments. On whiteboards, what is wrong with this picture? | | | |
| Time: 4-5 mn  Materials: graph paper  Group Size: 2 | **Example 3**  I post a data table of results from a similar experiment. With a partner, take 4-5 mn to create a line graph from this data, including all the elements (TAIL) | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  Time permitting, we start the “bouncing objects” lab as a class and collect data for tomorrow. If no time, we will do this tomorrow. | | | **Criteria for Mastery:**  Students can take a set of data points and make them into an accurate line graph which includes all necessary elements. They understand how line direction signifies relationship between variables. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:**  Worksheet on creating/reading line graphs. (AND/OR: articles from newspaper involving line graphs they need to interpret) | | | | |
| **Closure** | | | | |
| **Explain Closure:** Tomorrow’s HS Success Tool is a secret until tomorrow. Think about what other things you might be responsible for in high school, come prepared tomorrow! | | | | |

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**Wednesday, July 21, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  brainstorm worksheet  lab report packets  Graph examples  Projector/computer/dongle  Ramp and car?  Grid to project  Graph paper  colored pencils/markers  Hw assgn | | **Your Preparation**:  Measure bleachers  Create hw assgn  Find graph examples  Get materials | | **Agenda (w/times)**: 55 mn  Pop Quiz = 3mn  Do Now = 10 mn  Go over HW = 5 mn  Explain slope = 10 mn  Outside mini lab = 15 mn  Explain HW and closure = 10 mn |
| **Getting Your Students Ready** | | | | |
| **Do Now:** Pop quiz! Get out your notes that you took yesterday **(**\*hint hint\*) Spread out, and no sharing notes. Write on a piece of paper steps 4-7 of how to create a line graph (only students who took good notes yesterday should be able to do this). I will only give credit if you have all three stated correctly. Today’s HS Tool is to take notes without being told. In HS, teachers often won’t tip you off by saying, this is important, write it down – you should be writing it anyway. From now on, I will give a few small open-note pop quizzes per week, so be taking good notes without me telling you to!  Now, get with a partner and brainstorm two lists about our catapult lab (I provide 2-colum paper): 1.materials we used, and 2.the steps we used to build/test our catapults. Take 2-3 mn. Then, come back together, everyone contributes to compile final list, student records on board. Copy these lists into the correct sections of your lab report packet (materials and procedure) | | | | |
| **Objective**: *Today you will be able to…*  Find the slope of a line graph. | | | **Proving behavior**: *by…*  Creating a line graph from data we collected, finding the slope between two points on that line.  (optional extension – creating graphs when given slope) | |
| **Purpose**: *We are doing this because…* yesterday we learned how to get a general reading of a graph (i.e. the direction of the relationship), but line graphs like this can tell us even more. Once we have a line like this, we can determine how *strong* the relationship is between the two variables, or *how much* one affects the other. Reading this from a graph is an important skill to have, as it will make it easier to understand info presented by others and the info that we ourselves have found in our experiments. | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** Go over HW. Were there questions? Problems? Do we need to review?  **See:**  **\*Do:** | | | |
| Step 2: | **Say:** What is slope? If you’re climbing a mountain, what does slope mean (i.e. how steep the path is). When we talk about graphs, the slope of the graph means how steep the line is, or how big an affect one variable has on the other.  **See:** Example of graph with very steep slope (ex. amt of caffeine vs. energy)  **\*Do:** Get with a partner and discuss – based on this graph, for every cup of caffeine you drink, does your energy level go up a lot, a little, medium, or not at all? Have a group or two share. Now discuss – if caffeine didn’t affect energy at all, how would our line look? I call on one person randomly, have them come up and draw line on board. | | | |
| Step 3: | **Say:** Back to our mountain image. The way you figure out how steep the mountain is, is to figure out how much distance you go UP (elevation gained), and to figure out how much horizontal distance you went (i.e. how far you would have gone if you were on flat ground). The slope is calculated by taking the RISE over the RUN  **See:** I draw example of mountain climbing on board, OR demo with ramp and car.  **\*Do:** Show me with your arms how you calculate slope: Rise (arm vertical) over RUN (arm horizontal, beneath other arm) | | | |
| Step 4: | **Say:** The easiest way to find the slope of a graph is to make a triangle between two points that are on the line. I look at the RISE, or how many units the graph goes UP between those two points, and I look at the RUN, or how far to the right the graph goes between them. I use those two numbers to calculate my slope.  **See:** I demo on board  **\*Do:** I present the rise and run measurements of the bleachers in the gym. Take 1 mn to calculate the slope of the bleachers. | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time:  Materials:  Group Size: | **Example 1**  Whole class outside, mini-lab comparing people’s heights to how far they roll down a hill (rolling is optional, may choose to observe and record). All come back in and work together to plot the data and determine if there is a relationship. Grid is projected on board, Point to which axis you think height should go on, point to the one roll distance should go on. Each roller finds his/her point on the grid and marks it. Get with a partner and calculate the slope between two points (even if, as a whole, there is no trend). | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  Using the distance and time data from our catapult lab, create a graph (time on x axis, distance on y) which includes all three objects (i.e. three different lines on the same plot) Use a different color for each object. Each line will only have one data point, and you can estimate a line-of-best-fit by connecting this point to (0,0). Calculate the slope of each line, and write the slope next to the line, in the same color. You may work in partners (I assign). | | | **Criteria for Mastery:**  Students can plot data points on a line graph, estimate a line of best fit, and correctly calculate the slope between two points. We will use these graphs tomorrow to talk about rate as the slope of a d vs. t graph. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:**  Worksheet on finding slope, comparing slopes. Bonus question involves plotting a graph when given only the slope of the line. | | | | |
| **Closure** | | | | |
| **Explain Closure:**  Tomorrow’s HS Success Tool involves classroom behavior, and I’ll tell you now that it means I’ll be a lot less lenient tomorrow. So before tomorrow, reflect on how your behavior/participation in class have been and how you can improve, and be ready to come in and show me the best student you can be. | | | | |