**Linear Regression Day 2**

1. **TITLE OF LESSON:** Writing/ Finding the equation of the line of best fit
2. **CONTEXT OF LESSON:** The students should be able to construct the line of best fit given a graph, but not find the equation of a line. They should also be able to identify a positive, negative, or no correlation. Students should also know how to find the equation of a line given two points or the graph of a line.
3. **LEARNING OBJECTIVES and ASSESSMENT:**

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| Learning Objective  Student should be able to: | Bloom | Assessment (Formative/Summative) |
| Determine the line of best fit without using a calculator. | A | The students will be completing an activity that has them finding the line of best fit of a set of data without using a calculator. |
| Find the equation of the line using a calculator. | R | The students will be completing a pair’s activity that has them finding the line of best fit using the calculators. |
| Define positive and negative correlation, and linear regression terms. | R | Pyramid game at the end of the period. I will be listening to discussions that the students are having when trying to explain the vocabulary words. |
| Make predictions about data given a graph, table, or equation. | A | Students will discuss what they think will happen with the data, and also find exact values on an activity. |
| Compare the different methods of finding the equation of the line of best fit. | A | Journal Entry |

1. **RELATED 2009 VIRGINIA STANDARDS OF LEARNING:**

**A.6** The student will graph linear equations and linear inequalities in two variables, including:

* 1. Determining the slope of a line when given the equation of the line, the graph of the line, or two points on the line. Slope will be describes as rate of change and will be positive, negative, zero, or undefined; and
  2. Writing the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.

**A.11** the student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve real-world problems, using mathematical models. Mathematical models will include linear and quadratic functions.

1. **MATERIALS NEEDED:**

I supply: Warm-up, problems by hand warm-up, calculator handout, prediction handout, ruler, calculators

They supply: pencil, paper

1. **PROCEDURE:**

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| Time | Mathematical Tasks to be Used,  Teacher Thoughts/Actions/Questions | Anticipated Student Comments, Questions, Actions, and Strategies |
| 5 min | Help students that need assistance with warm-up.  Check homework assignment for completion. If a student does not have homework, then I will write a pass for advisory so that they can complete it. | The students should come and pick up warm up from overhead and complete. The warm up will have the student plotting points from a table and fitting a line of best fit.  They should also have homework out on desk. |
| 10 min | Go over homework and warm-up. | They should be comparing graph to a partner to make sure that they have plotted the points correctly. |
| 20 min | Say: “Find two points on the line you drew. We are going to find the equation of your line of best fit. Compare this with a classmate. Why do you have different points?”  “Find the slope of your line, using the slope formula. What does the slope mean?”  “Using y=mx+b and the slope you just found, find your y-intercept. What does that mean?”  “Put it all together and you have the equation of your line of best fit. We can use it to do something, what do you think it can do? Talk to your buddies.”  “Lines of Best Fit are also called Prediction Equations, because you can use them to predict things that may happen in the future. If I wanted to find out how long it would take for the secret to spread if I told 9 people, how would I figure that out?”  Go over reasoning, listen to student discussions. Solve using my line.  “Why do you think that some of you get different answers?”  “If the secret took 4 minutes to spread, how many people did I tell it to? How would you figure that out? Talk to your partners.”  Those are the types of questions I would ask while students were working out individual problems. | Students should find two points on the line they have constructed and compare them to a seat partner.  They should find the slope of the line using the slope formula. Some may just want to use their graph to find the slope, but they should do this method and use the other method to check. After they found the slope they should find the intercept. Some students may have trouble with these topics so they may ask their seat partners and I will help them.  Discuss what they think the slope and intercept means.  The students should be using only their equation to find answers to prediction questions and compare answers to a partner. They should then participate with the class in discussing why there are different answers.  Some students may say that they are all close because it is the same set of data. Some may say they are different because there are different lines. Some students may be able to just ‘look’ at the data and figure it out. |
| 15 min | Walk around checking that the students know how to do problems by hand. Have them do this is Respect-Defend-Consensus mode. | Students will be completing independent by hand problem, when finished they will turn in a sheet with answers and then keep a sheet to compare with a friend. They will defend answers and then have a group discussion and come up with a group answer. |
| 5min | “This method can take a long time to do, especially with large data sets. Mathematicians also use technology to make things easier. I am going to show you a way to do this on your calculator.”  Go over method using calculator and hand out instruction sheets. | Students should be following along with the calculator demonstration. |
| 15 min | Hand out finding equations and predicting values. Walk around and check to make sure that the kids are working. | Student should be working on worksheet. When finished they should turn in a sheet with answers, keeping an individual copy. They will then compare answers with a partner and then the group. |
| 10 min | Have students complete Journal Entry  “You’ve learned 2 ways to find a lone of best fit. What was your favorite way and can you think of another way that you could find your equation?” | Complete Journal Entry. |
| Closure | Set up pairs for vocabulary review using Pyramid review game. | Students should get in pairs, one with back to overhead, and one facing board. Partner 1 gives clues to the words while Partner 2 tries to guess the word. Then they switch places. |

1. MEETING THE NEEDS OF ALL STUDENTS: I would shorten assignments if needed for students, as well as having more time in a study skills class to get finished. Partner pairs will help some students that are struggling.
2. WHAT COULD GO WRONG WITH THIS LESSON AND WHAT WILL YOU DO ABOUT IT? The students may not understand how to find the equation of a line and have to go over a whole lesson on that topic again. They may struggle with using the calculator in an unfamiliar way so there may be the need of more hands on involvement with the kids.
3. LINK TO CTA:This lesson uses a couple of Strebe’s methods, especially the respect, defend, and consensus mode of doing work. I also tried to incorporate open ended questions in the classroom discussion which is what Lintner taught us about. I also used Mulligan’s method of splitting up the class into parts where students are independent and in groups, as well as his Pyramid Review Game.

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