2019 MCTM Mini-Grant Recipient Follow Up
Making Math Real:
Gathering & Analyzing Real World Data

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I am **Jessica Marcet**, a middle and high school mathematics teacher at New Lothrop Area Public Schools. In addition to teaching mathematics for fourteen years, I enjoy coaching New Lothrop High School's quiz bowl team, advising the New Lothrop chapter of the National Honor Society and spending time with my husband and our three-year-old son. I am honored to receive one of the MCTM Teacher Mini-Grants for 2019 and look forward to helping my students experience and think critically about mathematics.

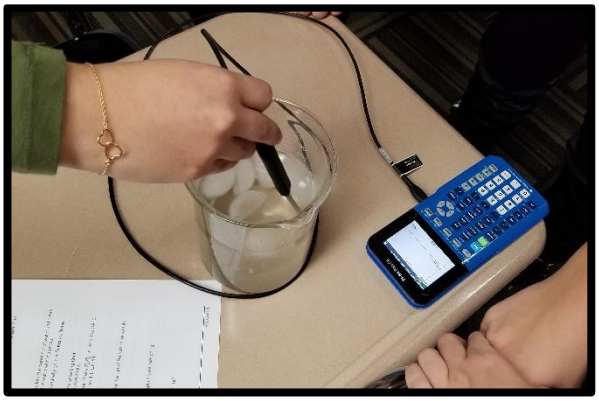
Statement of Purpose

"The purpose of this project is to help create a culture of thinking and learning within our school. I hope to show students that learning, especially in mathematics, is more than being able to just recall information. It is important for students to be able to preserve and problem solve when they do not immediately know the answer to something."

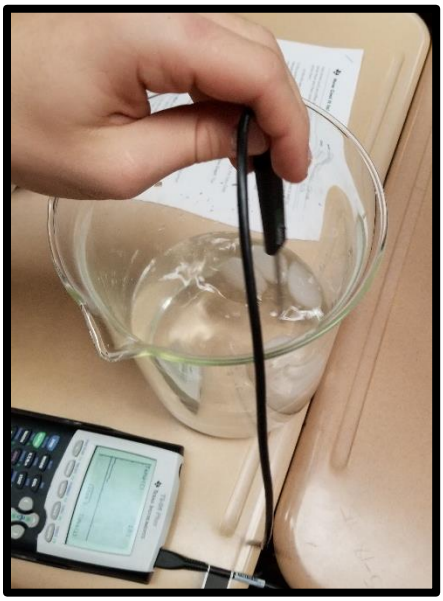
Project Description

Pre-Calculus students will gather and analyze real-world data involving exponential and logarithmic functions. I will implement two activities from Texas Instruments (How Cool It Is! And Not Just a Good Idea – It's the Law!) that use TI graphing calculators and Vernier Easy Temp temperature probes.

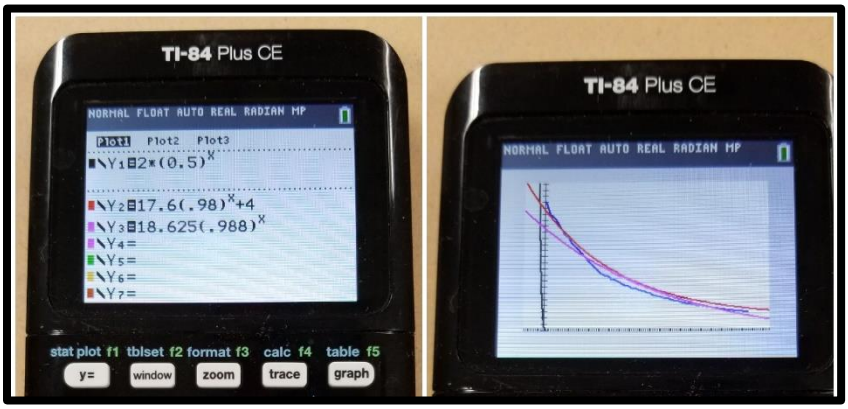
Photos



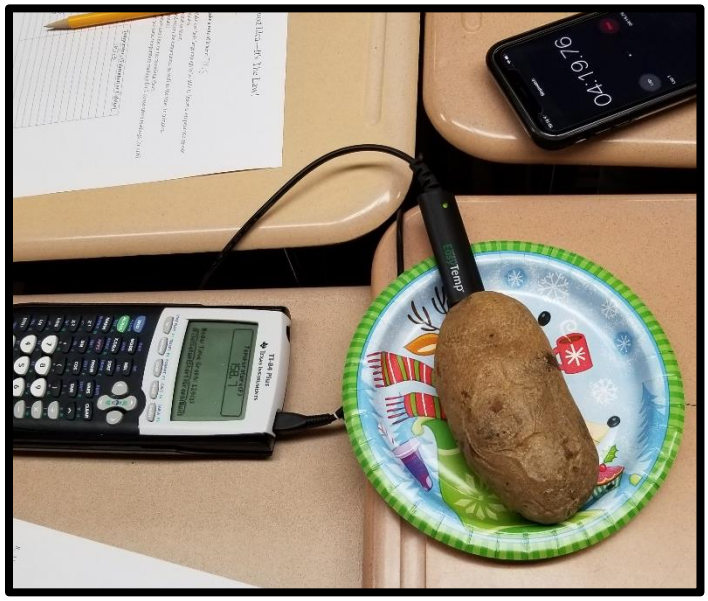
Picture #1: Students gathered data regarding water temperature using the Vernier EasyTemp. The TI-84 Plus CE graphing calculator graphed the data in real-time.



Picture #2: Students wondered if the rate at which the water was stirred would affect the temperature change rate. These students stirred their water quickly and compared their data to other groups.

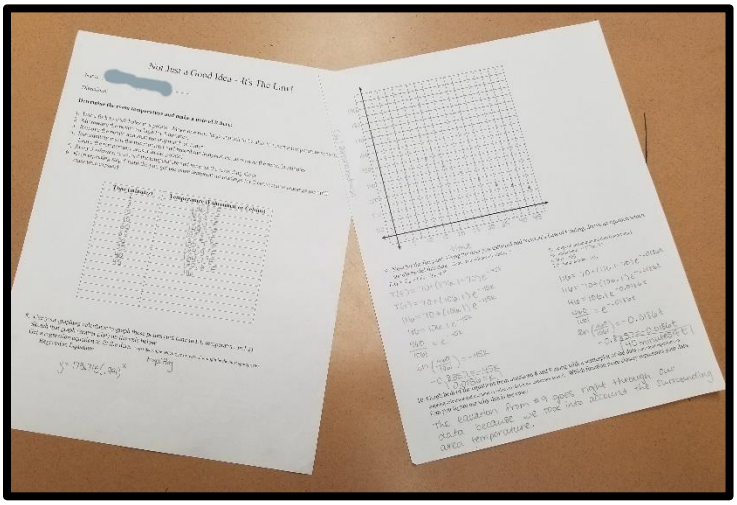


Picture #3: Students created and graphed exponential models to represent the temperature data.



Picture #4: Students gathered temperature data on their baked potato. The Vernier EasyTemp constantly displayed the temperature of the potato on the TI-84 Plus graphing calculator.

Picture #5: Students recorded the temperature of a baked potato in five-minute intervals. They also noted the room temperature so they could apply Newton's Law of Cooling.



Picture #6: Based on data gathered using the Vernier EasyTemp, students used the exponential regression feature on a graphing calculator to create a model for their data. Students then applied Newton's Law of Cooling to create a more accurate model.

Reflection

Students enjoyed completing two activities using the Vernier temperature sensors. These sensors provided students with a hands-on experience in an upper-level math class, which, unfortunately, is neither common nor always easy to create. I was able to witness students noticing and wondering throughout both activities as the sensors tracked temperature data in real-time. "This is cool" was a common phrase heard throughout the classroom during both activities.

According to responses on the feedback forms, students enjoyed doing something different. Students felt like they were "playing" instead of doing math. Overall, they appreciated a break in the traditional format of a math class and commented that they wanted to do "more projects like this" in the future. Based on these comments, I was inspired to continue searching for hands-on activities for students to learn and experience mathematics. One activity I implemented shortly after this involved graphing the sine and cosine curves using uncooked spaghetti and pull-n-peel licorice.

Although students did not verbalize this, I could sense some frustration when working through each temperature sensor activity. Once data was collected, students were asked to analyze and/or interpret what the data was telling them. Answers to these types of questions are not immediately apparent, which led to frustration in a few students. However, with a bit of prompting from me, students were able to persevere and form conclusions.

I was able to assess student's mathematical understanding using a summative assessment. Most students were able to create an exponential model given a set of

data and solve an exponential equation for an unknown with no mistakes. Mistakes that did show up were simple calculation errors – students understood the concept but made a small error along the way. It was beneficial for students to have the two temperature sensor activities to refer to; each activity allowed students to connect math concepts to an experience.