Engaging Contexts Data Integration

Caitlyn Gironda

Methods of STEM

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a) **Data source:** United States Department of Agriculture Food Access Research Atlas https://www.ers.usda.gov/data-products/food-access-research-atlas.aspx

b) Lesson Enhancement: One of the most difficult topics that I teach in Geometry is the centers of triangles, also known as points of concurrency. There are 4 major centers the students need to know- orthocenter, incenter, circumcenter, centroid. Each has a specific geometric construction with a compass and straight edge, a set of properties that are unique to that center, and often another construction that is associated with it such as a circumscribed or inscribed circle. It is particularly difficult because of the similarities between the properties and student misconceptions over the existence of multiple different centers of a shape.

Students will use the data to research food deserts in their own area and can select a triangular region. They can then either use a compass and straightedge or a computer program such as GeoGebra to construct each type of center. Students can measure distances and angles, make conjectures about properties, and work collaboratively to generate their own knowledge of properties of the triangle centers. this, students will propose new locations for grocery stores, community gardens, and other resources that could relieve some of the hardship faced by people living in these regions. Students may propose a new store at the circumcenter, since it would be equidistant from each corner of the region. Some may argue it should be the incenter, circumcenter, or centroid for other reasons related to the properties of each individual center. No matter their proposal, they need a working knowledge of the properties to make a coherent argument.

I feel the use of this data will be a huge addition to the lesson. As I will discuss further in Part C, this data gives students a profound use of the mathematical concept in the real world- one which has an impact on the livelihood of people living in an area. In addition to these real world applications, this data will give students a hands-on medium in which they can engage with the scientific process of forming conjectures and theories. They can construct using a variety of appropriate tools and form viable arguments- both important goals of the Standards for Mathematical Practice as outlined in the Common Core State Standards. I also believe that classroom discussion will be both easier and more profound when there is a context to which students can tie their knowledge. I look forward to utilizing this during the lesson.

c) **Interdisciplinary context:** The interdisciplinary connections available from this data are plentiful. There is a connection to science as food deserts represent areas where people cannot readily access nutritional resources. This provides a context for students to discuss what good nutrition means and to analyze their own nutritional intake. It could tie nicely to a biology or health class.

Second, there is a clear connection between this context and social studies. Students are looking at prominent social issues and could be exposed to the many documentaries and news resources surrounding food desert. They are also taking a critical look at their own

region and could easily turn their proposals into letters to a local city council person or grocery chain.

There is also a clear connection to English, as students can be required to form arguments and then write to their local government. They allows for the study of persuasive writing and the use of data to persuade.

Students can also be exposed to the design process through the need to refine and tweak their argument o make it ready to send to a public official. They could even be asked to design the resource (grocery store, community garden, etc), which would tie to the design cycle even further and possibly their knowledge of ecology and plant growth for gardening.