Appendix 8. Sample From the Archives (Department) Article

"Gerrymandering: When Equivalent Is Not Equal!"

From the Archives highlights articles from NCTM's legacy journals, as chosen by leaders in mathematics education.

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In "Gerrymandering: When Equivalent Is Not Equal!", authors Farshid Safi, Sarah Bush, and Siddhi Desai provide a series of learning tasks designed to help students apply mathematics to the real world. Although this article was published not that long ago, the political and educational world has changed tremendously, and thus this article is worth taking a fresh look at. The world has become much more polarized, whether it is debating masks, vaccine effectiveness, what is being taught in schools (consider the bans some states have now implemented on critical race theory), or a host of other topics. Because of this polarization, we, as educators, must show—now more than ever before—how mathematics is used in decision-making.

Although the original article was written for middle school teachers, the ideas definitely extend to other grade bands as well. The opportunity to incorporate social justice into the mathematics classroom is a key feature of this article. Discussing how those in power can create structures to help keep them in power and can use mathematics to do so can be eye opening for middle school students. In addition to the actual tasks, which are outstanding, this article can teach several other lessons.

MATHEMATICS IS USED TO MAKE DECISIONS

Many middle school students likely believe that mathematics is merely solving problems to get an answer. Through the tasks found in the article (available as supplementary files to this Introduction [link online]), they begin to see that mathematics is used to make decisions—and not always equitable ones. A great follow-up to these tasks is to show pictures of actual congressional districts so that students see this is truly an issue. Doing an internet search will yield many real-life examples of gerrymandered districts. This task also provides a wonderful opportunity to work with your social studies colleagues to further student knowledge.

DISCOURSE IN MATHEMATICS CLASS IS IMPORTANT

These tasks also provide a wonderful opportunity to promote student-to-student discourse. Most middle schoolers do not have difficulties talking in mathematics class, but talking about mathematics in mathematics class can be challenging. The engaging nature of these tasks, especially the final gerrymandering one, can make *stopping* the mathematics conversations difficult! Students see why discussing

mathematics is so important and how doing so can help them discover other ideas and deepen their knowledge.

TASK SEQUENCING

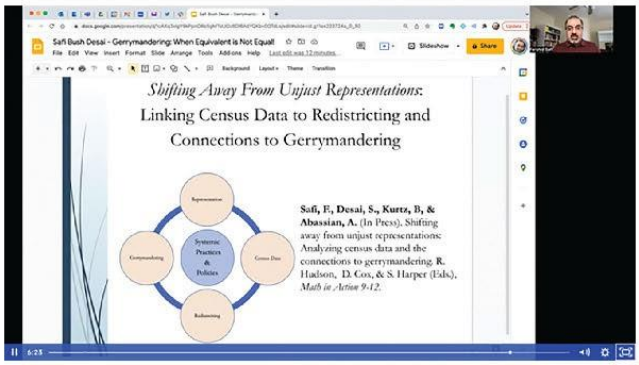
This article provides a series of four tasks designed to help students explore the idea of equal versus equivalent. These tasks are strategically organized to best support students in developing the main ideas to build the necessary conceptual understanding. Careful attention was paid in this series of tasks to building from what students had previously done to help develop and deepen their understanding. The importance of thoughtfully sequencing tasks to support students is clearly illustrated in this article and should serve as an example that can be followed when developing other concepts.

MULTIPLE ANSWERS ARE POSSIBLE IN MATHEMATICS

We know that many people believe that each problem in mathematics has only one correct answer. This article clearly shows how a single problem might have many potential answers; the districts could be configured in many ways to yield the same results. Students may be accustomed to solving a problem in multiple ways and yet the answer remains the same. The gerrymandering task has multiple answers as well as multiple ways to do the problem.

Perhaps this task will enable you to provide a spark for some students to begin to see the joy, beauty, and wonder of mathematics. Enjoy the rich conversations and deep learning that will occur from these tasks! In video 1 (link online), Farshid Safi reflects on the original article from *Mathematics Teaching in the Middle School* (*MTMS*).

Video 1 Farshid Safi Discussing the Legacy Article from *MTMS*



Watch the full video online.

REFERENCE

Safi, Farshid, Sarah B. Bush, and Siddhai Desai. 2018. "Gerrymandering: When Equivalent Is Not Equal!" *Mathematics Teaching in the Middle School* 24, no. 2 (October): 82–89.

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doi:10.5951/MTLT.2021.0339