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Exploring Issues of Social Justice Through Mathematics

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Why Explore Math Through the Social Justice Issues?

The year is 2018, yet it is still very common to see math being "taught in ways divorced from the real world" (Gutstein and Peterson, 2005). It is vital that students gain an understanding of important global issues, and integrating these issues into math (and other subjects) is a very effective way of helping students learn and engage in the world around them. When we engage students in "socially relevant teaching through mathematics" we as educators help to answer the question, "when are we ever going to use this?" and students are more inclined to be active participants in their learning, and subsequently this encourages them to apply critical thinking skills in math (Powell, 2012, p. 187).

1

Teaching Mathematics with a Social Justice Focus defined math as "a gatekeeper subject that provides a 'passport' to gain entry into practices that enjoy a different status in the wider society." Three key strategies for integrating social justice into mathematics were identified as:

1. Linking math to real life inequity problems
2. Interconnecting student experience with mathematics
3. Emphasizing collaborative work and inquiry throughout.

2

A Broad Concept of Social Justice, discusses that educators must regard math as key to preparing future generations to live peacefully and with dignity for all living things. We must rethink the math classroom in order for students to see math as a tool for understanding and changing the world, inclusive of bringing shared histories and experiences into the classroom. This will allow learners to develop skills such as inferring, hypothesizing, analyzing, and drawing conclusions.

3

Math Content and Process suggests three ideas to prepare students to become active and informed citizens through mathematics education. They include:

1. Respecting students' prior knowledge and experiences
2. Teaching an extensive amount of content knowledge related to challenging material inclusive of institutional racism and seeing the math classroom as an opportunity to incorporate interdisciplinary subjects
3. Reflecting on the newly acquired knowledge

How Can We Effectively Assess the Learning throughout the Inquiry Process?

Students should have opportunities to share their knowledge and understanding, use their creative and critical thinking skills, communicate effectively, and apply their knowledge in various contexts. It is important to consistently conference with students and provide them with opportunities to share their thinking processes. Allow students to make changes based on their misconceptions or errors, and to reflect on what may be working and what is not. We would like to emphasize assessing the learning throughout and not solely the final product.

How Can We Authentically Integrate Issues of Social Justice into Mathematics?

Kindergarten to Grade 3	
Context	This activity introduces the topics of accessibility, fairness, barrier-free spaces and inclusion. Students demonstrate mathematical behaviours associated with data management and probability, measurement, and geometry and spatial sense.
Activity	Aligning with Stop Gap Foundation, students participate in a community walk and collect/organize data on accessible versus non-accessible businesses. The topic can be introduced by reading The Ramp Man by Logan Anderson and Thelma Sambrook, followed with a discussion on fairness and inclusion. Extensions: Ask students to investigate and trial what three-dimensional shapes/blocks work to create a safe ramp. Using non-standard and standard units of measurement, as well as angles, students can investigate how tall a ramp would need to be. Students can construct a map of their school or neighbourhood to highlight potential barriers or accessible entrances.

Junior: Grades 4 to 6	
Context	This activity introduces how to integrate Canada's ongoing water crisis into the mathematics classroom. Students will have the opportunity to explore various FNMI communities in Canada. It incorporates data management and probability, number sense and numeration, as well as measurement.
Activity 1	Throughout the following math activities students will discuss FNMI relations to water and earth and the impact water advisories might have on this. The story *The Water Walker* can be used to introduce the topic. Have students graph their water consumption. How might this look different if you were living under a water advisory? Extend by having students use various measurement activities to understand capacity. Discuss how many communities don't have access to clean water in Ontario (approx 60 of 207, or 29%). Through a probability activity, have student roll dice, 1 or 2 means water advisor, 3-6 means clean. Tally the results.
Context	The activity introduces food insecurity - it incorporates financial literacy, a variety of number sense and numeration concepts, as well as graphing and data interpretation.
Activity 2	Students engage in 'grocery shopping' on a budget through the use of flyers, and compare the prices of two different stores (as different as possible - i.e. No Frills vs. Whole Foods). Students can then be shown the prices of groceries in Nunavut, and graph the differences in prices (between Nunavut and their local store) for a few selected items, through discussion highlighting the concept of food insecurity and its causes. Extensions/Connections: http://www.walkto.ca/home/kensington-market-scavenger-hunt/ https://www.devp.org/sites/www.devp.org/files/documents/thinkfast-activities/05-thinkfast_adividedworld.pdf

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