IN MY OWN BACKYARD
USING MATH TO TEACH ABOUT POVERTY

This is a math lesson developed by educator Liz McAnanama for her Grade 8 class in an Upper Stoney Creek school in Hamilton, ON. While the school population is predominantly middle-class, there are some students who live in public housing. Within this class there is a wide range of academic abilities and learning needs, including five students on modified programs.

Integrating "real world" scenarios into a classroom lesson comes with its own set of challenges, but it can also be extremely rewarding.

I like to begin a math unit with something that provokes thinking, gives all students an entry point into the topic, and is relevant to their lives. An April 2, 2017 article in the *Hamilton Spectator* ("1 in 5 Hamilton children impoverished: SPRC study") proved to be a great "what do you notice? what do you wonder?" device to get us started. It also highlighted the big ideas in fractions and percents for students in a "real life" context, and generated discussion

Because I find that Grade 8 students do not always have a strong conceptual understanding of fractions and the big ideas related to fractions (Van de Walle, *Teaching Student-Centred Mathematics grades 5-8*, 2006), and because geometry is the least-taught strand, I spent a lot of time with students modelling with a variety of manipulatives. Students could choose their preferred manipulative (e.g., cuisenaire rods, pattern blocks, snap cubes, and colour tiles). We spent about two weeks using manipulatives to model fractions in general, and to compare fractions.

Next, I posed the question: "Is childhood poverty a significant issue in the City of Hamilton?" Students worked in pairs or alone (their choice) to respond to the prompt, for which they were required to use all of the math process expectations (selecting computational strategies/tools, representing, reasoning/proving,

I've learned how to put large values into simplified terms, using manipulatives. My thinking has changed, because my thinking has expanded, now I can use this strategy for other fractions… Something else that I could do would be, use my information and build off of it. I know poverty rates in the world and Canada, we could keep expanding to Hamilton, to really get an understanding of the topic. This way we could have connected the rates to our knowledge on poverty in Hamilton. What I liked was, how the questions were challenging and made me think about new strategies to try and find out the answer the most simple way.

— Erin

Before this assignment I didn't know that 1/5 of children in Hamilton lived in poverty, this made me think about poverty as a whole in Hamilton. At first, I thought poverty wasn't a big issue let alone child poverty, so that's where my thinking changed.

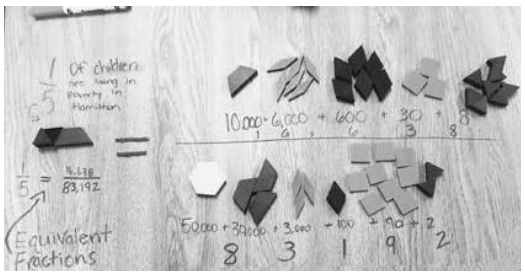
— Alishba

This information I gathered would be good for informing schools about poverty in Hamilton and spark ways to help and support those in need. To spread the word I could get a poverty expert or someone fighting against poverty to come and talk to students. I liked learning about the town I live in and seeing the problems right under my nose.

— Ryan

If I had more time to work on this I would investigate more of why the lower Mountain has more poverty than the upper Mountain…I thought before we researched that Hamilton had a low poverty rate and I thought we had a small amount of people living in poverty. But when we researched it showed that Hamilton actually had a higher children poverty rate than expected…

— Tyler



Work sample by Maddy and Sam

connecting, reflecting, communicating and problem solving).

Solely based on their work, I could evaluate the students' level of understanding, use of models, and big ideas related to fractions. I could also see when students continue to have misunderstandings such as when they attempted to compare different sized wholes (e.g., fraction of total population versus of fraction of children within the total population). I could also determine higher order thinking skills in their responses.

Students received ongoing feedback including questions about their comparatives, and suggestions for additional resources and information they might use to strengthen their argument and demonstrate how their model supported their opinion. I found there was a lot of rich discussion which transferred into our current literacy focus on social justice. It was exciting to see students make their own connections to news stories and articles on the subject (two even developed a slide presentation on the topic). A selection of their impressions about the topic, and reflections on what they learned, has been provided here. ●

34% of downtown Hamilton's population is in poverty. I think that the City Hall could collect many donations…We could also have a money/donation centre that would benefit the poor/homeless.

— Arbish

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What I liked about this assignment was writing all of my information down and giving my opinion on this matter. What I did not like was creating a model to represent my information, for as you can tell I'm more of a procedural thinker than manipulative thinker. I see things as numbers, equations and formulas; not manipulatives, models or shapes. But since I have now learned more and more about this way of thinking, it has broadened my level of thinking as well.

— Mashal

What we found challenging about this project was connecting our learning and information we have on the topic of poverty, to conceptual math. For example, when we found the number of children in the world who live in poverty, which is a high number. We are used to working with manipulatives and assigning them low values such as one third. When we had such a high number we were not sure how to connect the large value to something we are not used to assigning it to. So we had to change our way of thinking, and we figured out that the value could differ depending on what you assign it to be.

— Erin and Quinn

Well I truly learned that I have taken life for granted but after this assignment I learned how ungrateful I have become and how meanwhile while I'm complaining about my phone being dead kids in third world countries are suffering and dying every day. So in a way my thinking has changed in a sense of gratefulness….I liked this assignment because I liked how we had to find information on how many countries are affected by poverty and find the percentage of deaths or people in poverty then model it using manipulative and that's something I really liked. The only clear challenge for me was finding solid info and trying to find websites that had the same accurate data.

— Mani

I did learn that out of the 121,925 children living in Hamilton, 24,385 of them are in poverty. If you were to put that into a class of 20, 4 people in the class would be likely to live more poor than others…The most challenging part of learning about this topic was that I knew there are people just like me, hopeful children, who can't do anything about how they are living with their lives.

— Sabrina

I like that we got an actual question to focus on but it was very challenging to relate fractions the the real world. I had a hard time explaining my thinking because I didn't have accurate fractions and I didn't know the total population so I had trouble explaining if poverty was an issue or not in that situation.

— Joelle

Before this I thought Canada was poverty-free since it's a first world country….With this information I could figure out the number of children living in poverty in Canada. During this work I really like how it was related to the real world and how it was based in Canada.

— Katie

I am wondering how the government can stop poverty because we should be able that because we are a first world country. I learned there's a lot more poverty in Canada than I thought. My thinking changed because that meant I had to do more research than I thought, to find information…What I found challenging was doing the math and using manipulatives to get the answer.

— Mahdi

If I had more time I would have investigated how we could help reduce poverty in Hamilton. I feel like numbers and models are important but finding a solution to help reduce poverty would help guide us to a better future for Hamilton…I feel like with the info I gathered we could see the areas which have the most poverty (eg. downtown Hamilton, Hamilton mountain, Stoney Creek). I feel like I could expand my thinking and show how each area is affected by poverty. I liked learning about how such a big problem all over the world can be in my very own city.

— Milica