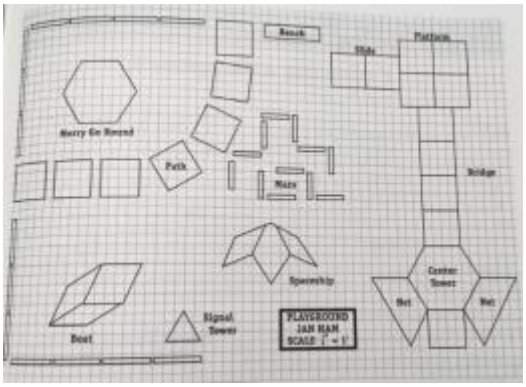
Connecting Mathematics to the Real World

Research shows that relevant content engages the learners in their social reality, allowing them to better understand the world around them (Stocker, 2006). According to Learning Transfer theory, students are able to take what they have learned in the classroom and apply it to other contexts when: they recognize that what they need to do involves something they have learned before, when they are able to retrieve information, and when they can translate the information to fit the new situation (Boaler, 1993). When teachers use real world questions, then math can be viewed as a tool to better understand their world. Connecting math to real world contexts is a great tool to make the subject culturally responsive (Harding-DeKam, 2014). Real world mathematics connections require more purposeful planning and cross-curricular discussions which result in gained engagement and impact.

EXAMPLE ACTIVITIES



Primary

✓ **Playground Creation**: Using geometry and measurement expectations, designing playgrounds builds the framework for hands-on inquiry in spatial reasoning. Teachers can have every student design their own playground with all their favourite features. Extend this into areas of measurement and scale while having students sketch and build models.

- Possible cross-curricular connections: science (structure building, materials, etc.), social studies (community planning, social relations, and accessibility), and language (descriptive and persuasive writing). Relevant resource: Ham, J. (1998). Designing playgrounds. Menlo Park, California: Dale Seymour.
- *Extensions*: Must include specific shapes/include heights of structures
- *Support:* Limit shapes (eg. Squares/rectangles), playground size can be made smaller

Junior

✓ **Poverty and World Wealth:** Have the students examine the distribution of wealth in each continent in comparison to population. Using research and have students calculate percentages of GDP, graph data, and highlight ratios and comparisons.

- Possible cross-curricular connections: social studies (global issues, interpreting data, social consequences). Relevant resource: Gutstein, E., & Peterson, B. (2006). Rethinking mathematics: Teaching social justice by the numbers. Milwaukee, WI: Rethinking Schools.
- *Extensions:* examine data over time
- *Support*: examine data of smaller populations (eg cities)

Intermediate

- ✓ **Proportions of Barbie**: Have students measure the proportions of Barbie's body. Using proportional relations and scaling, compare Barbie's proportions to the your own proportions. What do you think Barbie would look like if she was as tall as you? Comparisons can also be made to Ken's proportions. Students can also scale real human proportions down to make a more accurate Barbie, discuss body issues and distortion through commercialization, compare to Ken and his accuracy.
    - *Extensions:* Find class averages (eg. Avg. arm span), or finding averages of people at home
    - *Support*: Calculator given to help calculate percentages, also students can round to nearest 10.

CONSIDERATIONS

* It is vital for the educator to question the cultural relevance of the real world mathematics connections they are attempting to implement. The task of educators taking the necessary time to know and understand the lived experiences of their students is vital to successful world-to-math connections. If the connections being made aren't relevant to the student's life, the real world math connection could have an opposite effect and serve to further confuse the student.
* It is important to consider differentiation when planning lessons for students, especially when trying to make math meaningful. There are some useful strategies that teachers can use when they are trying to differentiate for a large class of students.
    - Using open-ended tasks is one useful strategy. Open-ended tasks involve a task that covers a key concept, but allows students to present multiple answers.
    - Parallel tasks offer students a few different choices that focus on the same key concept; offering managed choice means the students can do whichever task they prefer.
    - Teachers can adapt existing lessons from textbooks/other resources to make sure it is appropriate for their class. (Small, p. 644).
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USEFUL RESOURCES

Boaler, J. (1993). The Role of Contexts in the Mathematics Classroom: Do They Make Mathematics More "Real"? For the Learning of Mathematics, 13(2), 12-17. Retrieved from http://www.jstor.org.myaccess.library.utoronto.ca/stable/40248079

Gutstein, E., & Peterson, B. (2006). Rethinking mathematics: Teaching social justice by the numbers. Milwaukee, WI: Rethinking Schools.

Ham, J. (1998). *Designing playgrounds.* Menlo Park, California: Dale Seymour.

Harding-DeKam, J. L. (2014). Defining culturally responsive teaching: The case of mathematics. Cogent Education, 1(1), 972676. https://doi.org/10.1080/2331186X.2014.972676

Small, M. (2012). Making math meaningful to Canadian students, K-8, second edition. Toronto: Nelson Education.

Stocker, D., & CCPA Education Project. (2006). Math that Matters: A teacher resource linking math and social justice. Ottawa, Ont.: CCPA Education Project.

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