TEACHING CULTURALLY RELEVANT MATH

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PROJECT-BASED MATH

- The most memorable classes tend to be those with hands-on projects that require deep thought, discovery, and analysis (Fox, 2022). Much is done at the elementary level in terms of the use of manipulatives, blocks, physical geometric shapes, but when we start solving more difficult mathematical problems at the secondary level, we can start calculating and constructing more complex models and solutions.

- Project-based math is a terrific way to apply formative assessment and directly target unique cultural learning styles utilizing teams and partners to improve communication and collaboration skills. This offers students individual choice and autonomy.

- Thinking of three questions: “What’s nearby, what’s newsworthy, and who wants to collaborate” is a great place to begin for creating innovative project-based math lessons.

- Here are some ideas for your next project-based math lesson:
  - Coordinating with another class (can be from another school and/or country) to solve a common global problem (Ex: Renewable energy).
  - Using trigonometry to construct the most efficient water catchment design to help those around the globe struggling with water scarcity.
  - Using measuring devices to calculate the surface area, volume, or perimeter of an area located near or around your school. Can develop problems to integrate algebra by finding the cost to build a fence around a specific area. How could they maximize the area by altering the design of the fence.
  - Taking a social justice approach by analyzing the demographics of people affected by socio-economic, or political disaster such as the Flint Water Crisis.
  - Identify problems in and around your school where mathematical thinking can be used to help solve or reduce the impact of these issues (Ex: Reducing food waste, designing playgrounds, and creating a budget for possible improvements).
  - Measuring shadows or using a mirror to create similar triangles supplying enough information to calculate the height of a building or light post and discover the angle of elevation of the sun.

INTEGRATING TECHNOLOGY FOR 21ST CENTURY MATH

- There are numerous programs, from graphing calculators on Desmos to interactive algebra whiteboards like Graspable Math. The way in which we assess our instruction are often the same ways we teach. These modern platforms is essential to high-level instruction and learning (Kim, 2022). These applications provide students with multiple forms of representation reaching our goals aligned with the UDL framework (Lambert, 2021).

- Convert smartphone usage into a productive practice by encouraging students to collaborate on a platform like Discord. Creating a math assistance group where students can dialogue is inclusive, educational, and helps build relationships.

NATURE-BASED LEARNING

- The growing separation between humans and nature has negative effects on mental health and environmental sustainability (Baker, 2021). Creating lessons with opportunities to perform tasks using natural materials in an outdoor environment alleviates stress and promotes creative thinking.

- Providing students with tools such as chalk, clipboards, and measurement tools are just some examples of devices that can be used for many interactive activities.

- Much of math is identifying and describing patterns. For example, natural materials such as trees, leaves, waterways, mountains, or flowers can be used to identify patterns.

- How can we estimate the leaves are on a branch or tree?

- What symmetry can be found in certain leaves, flowers, or plants?

- What is the surface area of a garden or patch of grass?

- What is the volume of a building, statue, or bench?

- Encouraging students to produce questions on their own can spark curiosity and autonomy in classroom lesson plans. When students identify patterns, mathematical solutions, and characteristics in our natural environment it gives them a context for where math can be used and more importantly discovered. Facilitating culturally relevant activities in students’ local environment is a great way add meaning and collective curiosity to a lesson.