Assignment #5

"If There's a Problem, Math Will Solve It!"

Day 5: Model with Mathematics

Objective: You will move explicitly between real-world scenarios and representations of those scenarios, assessing how this is like what happened at another time or place and what was done before. Did it work?

Rationale: You do not need to "reinvent the wheel" when solving problems. Chances are, similar problems have been solved and we can learn from what was done and how it worked (or didn't work). Using models and representations reduces risk while still providing authentic opportunities for trial and error.

Goal: Analyze maps and graphs, as models, to determine factors that may lead to environmental discrimination.

Key Terms: Environmental justice, environmental discrimination, pollution, urban planning

Materials & Resources:

Social Studies

1.) Connecticut Air Pollution Map vs. Minority Density (Teaching Tolerance, www.tolerance.org)
2.) Biases in Exposure to Pollution in Massachusetts (Teaching Tolerance, www.tolerance.org)
3.) Pollution Map for Allegheny County, PA (*Breathe Project,* www.breatheproject.org*)*
4.) **Environmental injustice in Pittsburgh (*Environmental Health News,* www.ehn.org)

** Supplementary article. Not required reading.

ELA: Quoting, Paraphrasing, Summarizing; Directly Quoting; Effective Paraphrasing
Math: Heron's Formula, 3 Simple Ways to Find the Area of a Pentagon
Science: Kids growing up in green areas have better mental health as adults

ACTIVITIES:

Social Studies

- **Analyze the maps,** *Air Pollution in Minority Areas, Pollution Map for Allegheny County*
- **Analyze the graphs,** *Biases in Exposure to Pollution in Massachusetts*
- **Define** the terms: **environmental justice*, environmental discrimination*, pollution***
- **Summarize** why poor and minority areas are often exposed to more pollution than others.
- **Make connections:**
  1.) Explain how pollution is related to inequality.
  2.) How can maps and graphs help us see where injustice exists?

ELA

- **Identify** key ideas while reading secondary sources (from fields of social studies, science, math, or other). Select the most relevant information to potentially cite in your revised proposal to help strengthen your argument.

- **Summarize, paraphrase, or directly quote** the information when you incorporate it into your revised proposal.

Math

- How does the area of a *quadrilateral* compare to a *triangle* with the same perimeter? How about a *pentagon*?
    - Cut 3 strips of cardboard, all at the same length. (3 strips of 12" cardboard)
    - Bend one strip into a **triangle**, with sides of lengths 3", 4", and 5".

Formula for area of a **triangle:**

Your answer:

- Bend one strip into a **square,** with sides of 3".

Formula for area of a **square:**

Your answer:

- Bend one strip into a **pentagon,** with sides (roughly) 2.4".

Formula for area of a **pentagon:**

Your answer:

- **Complete** an investigation to determine the best shapes to maximize space in your community.
- **Update** your thoughts on how you think math can be used to elicit change in your community.

Science

- **Read** the article: Kids growing up in green areas have better mental health as adults.
- **Analyze** the multiple benefits of vegetation within an urban space, as stated in the article.
- Then, **paraphrase** the article for more clarity, using 1-2 paragraphs.
    - What are the most important takeaways?
    - What questions do you still have?