

MathWalk

#8) Park it Here (Brainstorm and Concept Problem)

Across from Walker Hall on River St., there is a little park area called Jimmy Smith Park. It is just a couple of green areas with a sidewalk and benches near a little stream, which on sunny days it is really nice to sit outside and enjoy the sun while eating lunch. If your group brought a snack, this might be a good location to sit and relax while you are eating it!



Fig 12: Jimmy Smith Park

Look at the *further* patch of green grass. Can you think of a way to estimate its perimeter or area?

Since no measurements are marked on the concrete, is there something you have with you that you *do* know the length of that could help you estimate distances?

What kinds of shapes could you put together to help you estimate the area?

[Triangles, Circles, Rectangles]

Note: There are no calculations with this “problem” – only the chance to do a little bit of brainstorming and to creatively think of ways to solve a problem.

#14) Going with the Flow

Next to Jimmy Smith Park is a little creek that runs up and down the River Street which called Boone Creek.

One of the App State math professors had his modeling class come up with a way to estimate the flow of this creek. Different teams came up with different ways to attempt this. The only piece of information the class was given is that *stream flow is measured in cubic meters per second*. This group of students came up with some amazing ways to determine the flow. Why is this important?



Fig 18. The Boone Creek

In the past five decades or so evidence has been accumulating about an environmental factor, which appears to be influencing mortality, in particular, cardiovascular mortality, and this is the hardness of the drinking water. In addition, several epidemiological investigations have demonstrated the relation between risk for cardiovascular disease, growth retardation, reproductive failure, and other health problems and hardness of drinking water or its content of magnesium and calcium. In addition, the acidity of the water influences the reabsorption of calcium and magnesium in the renal tubule. Not only, calcium and magnesium, but other constituents also affect different health aspects. Thus, the present review attempts to explore the health effects of hard water and its constituents. (Abstract from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775162/>).

Which means that being able to identify accumulation points based off sources of flow in and flow out can be used to control concentrations of harmful minerals in the water and where to best deal with them.

Tasks:

Grades 9-12:

- Given that the river flows at 12 cubic meters per second, the concentration of calcium carbonate is 0.0001 grams per liter, and there are 1000 liters in a cubic meter. How many grams of calcium carbonate has the river moved in 30 minutes? (Note: 1 cm³ = 1 mL)

Grades 6-8:

- Given that you have 4 liters of water with a concentration of 0.0001 grams per liter of calcium carbonate, how many milligrams of calcium carbonate do you have?

Grades K-5:

- If a fish can swim 1 meter every minute in stationary water and you are standing in water that is moving away from you at 2 meters per minute can the fish ever reach you if it starts 10 meters away?