

A Placement Problem

(no, we will not be using test scores)

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A Placement Problem

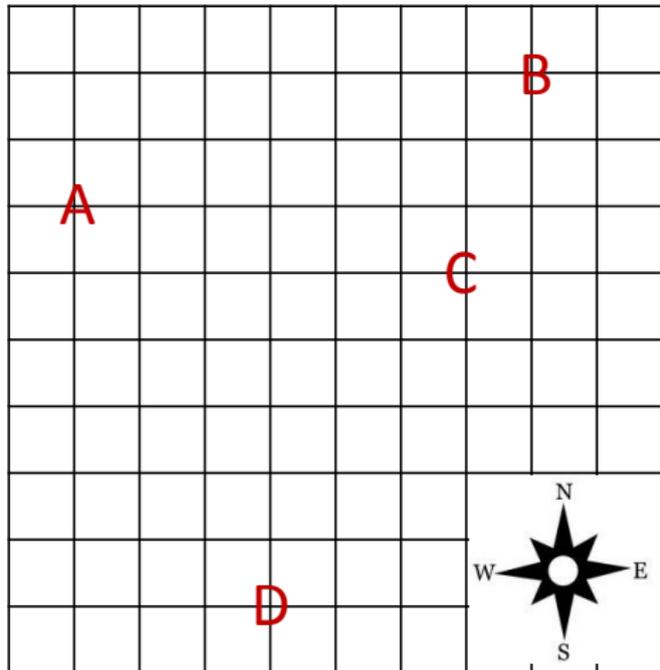
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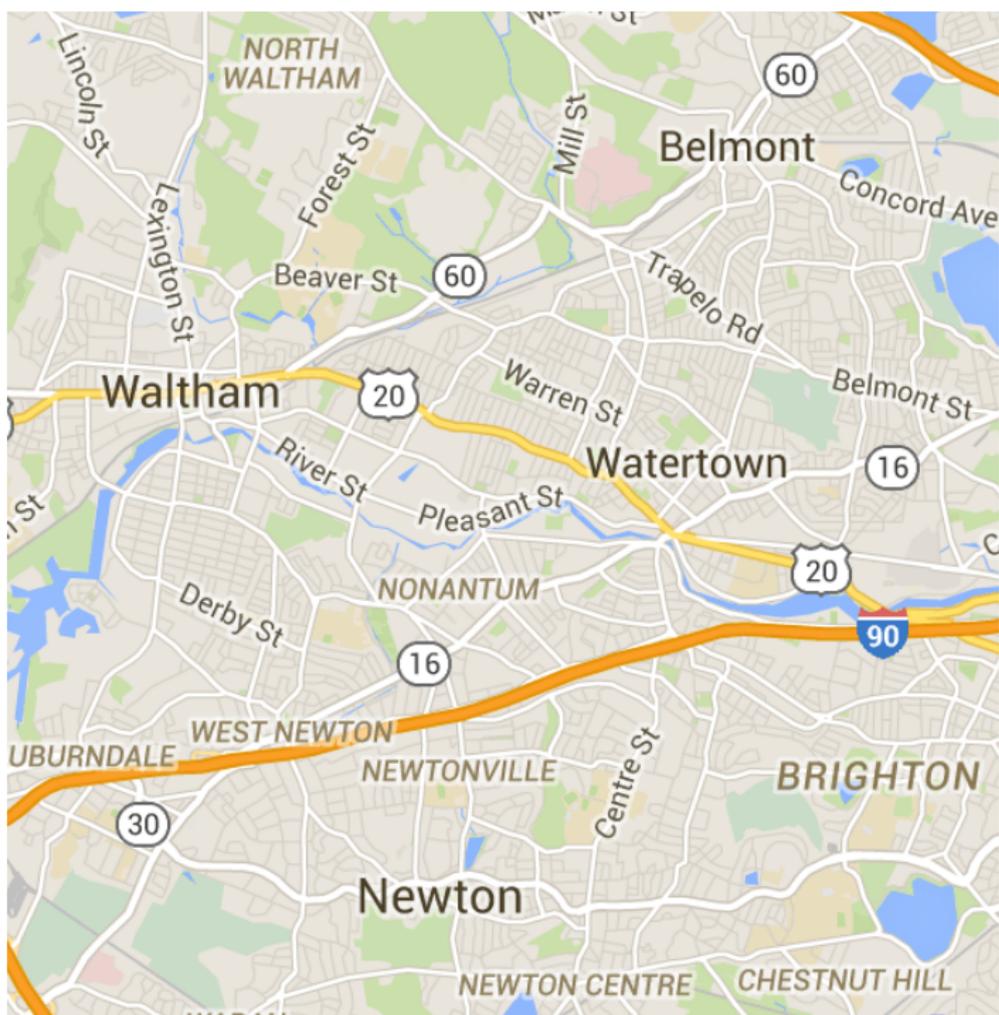
Four towns are building a park.

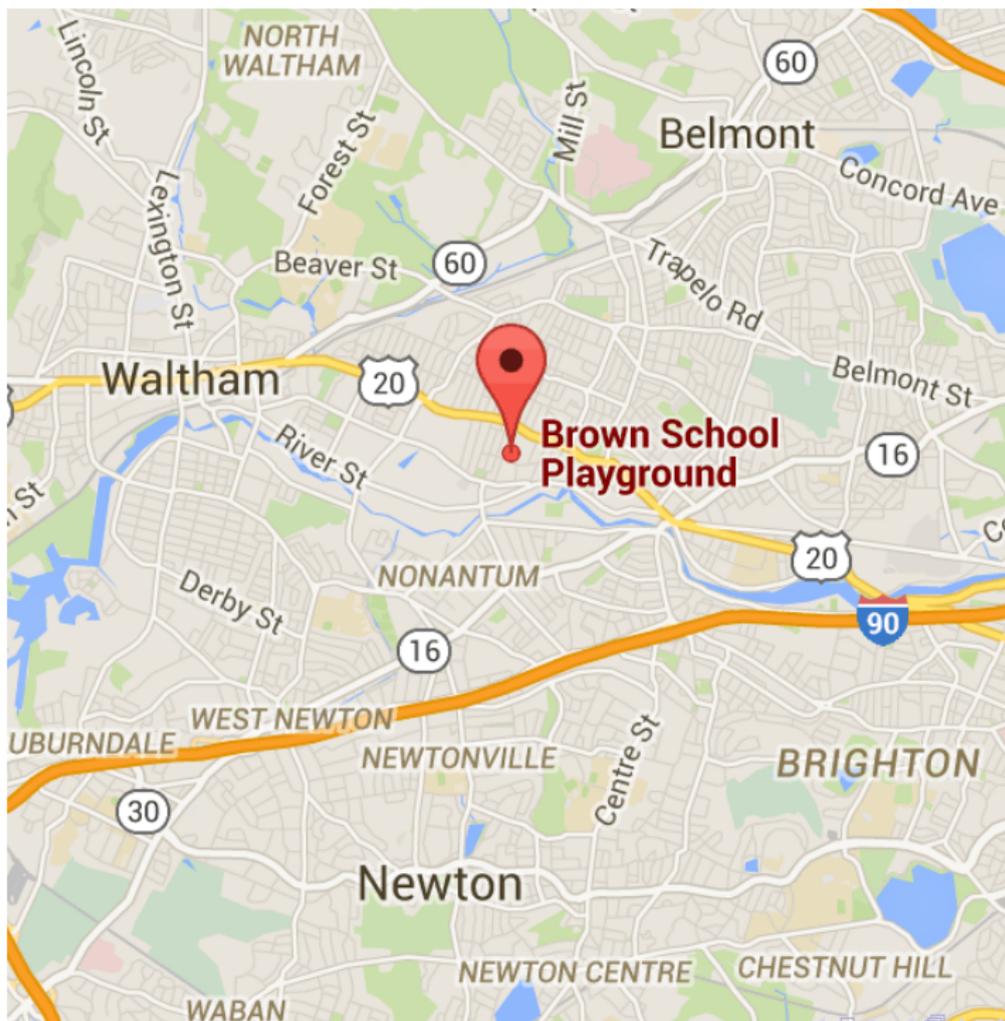
- Town A is 3 miles North and 1.5 miles West of town D.
- Town B is 4 miles North and 2 miles East of town D.
- Town C is 2.5 miles North and 1.5 miles East of town D.

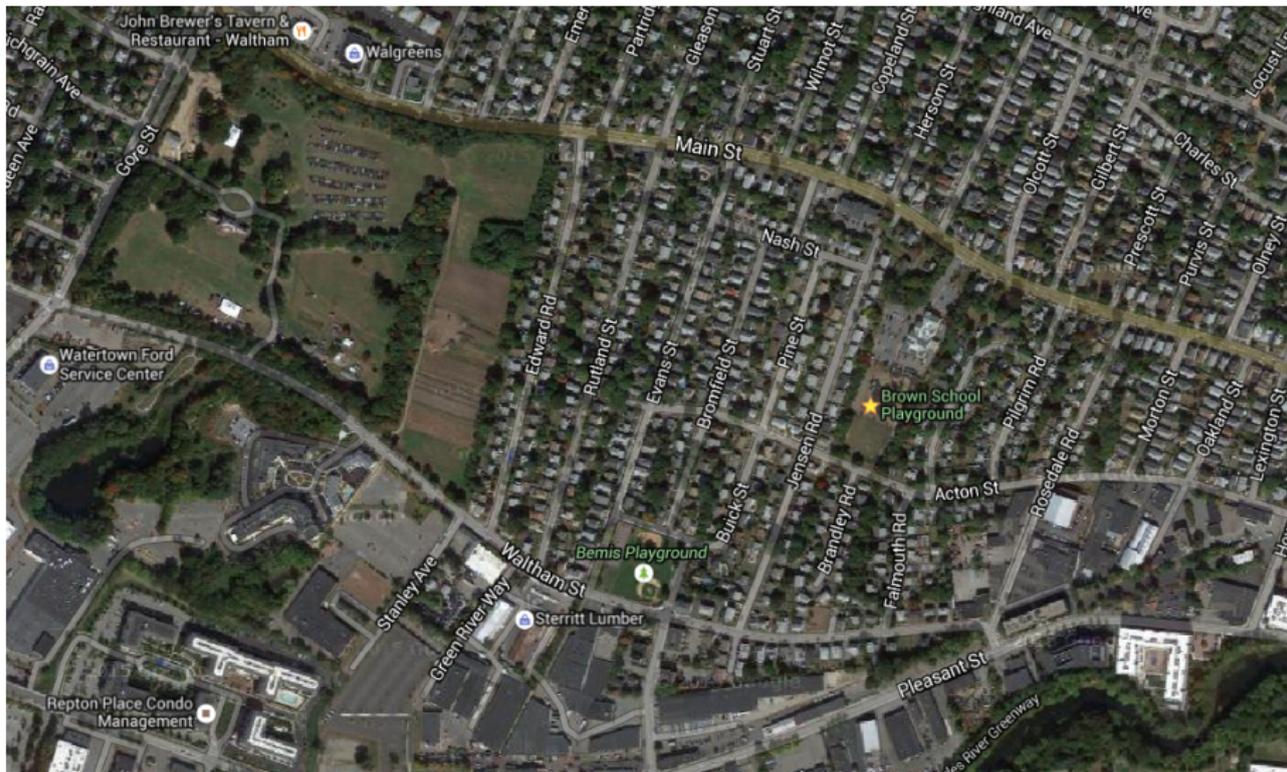
Where should they build the park?

What else would you like to know in order to make a better decision?

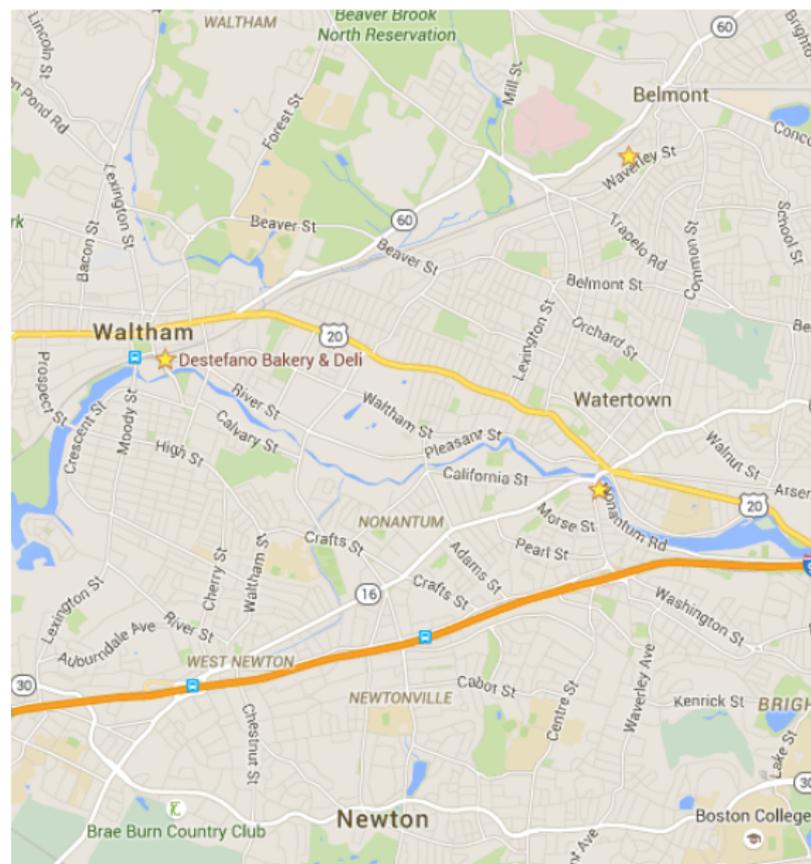








A Real Placement Problem?

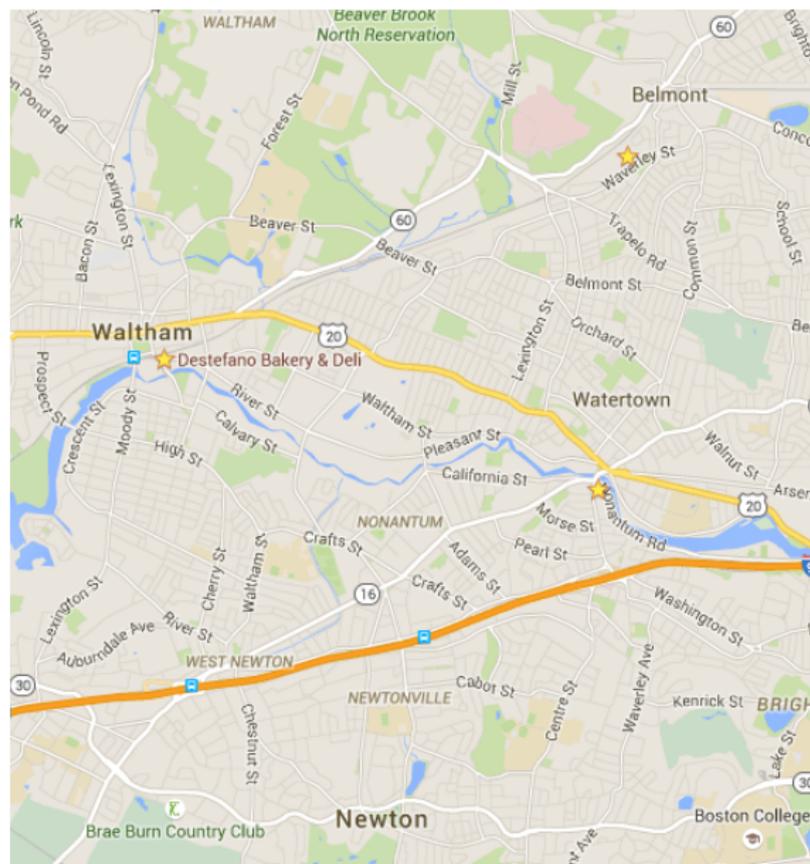


The cities of Waltham, Belmont, Watertown and Newton are building a park together.

A preliminary report identified three possible locations.

Find the location which increases the most the happiness of the inhabitants of all four cities.

A Real Placement Problem?



What do we need to know?

What's important to take into account?

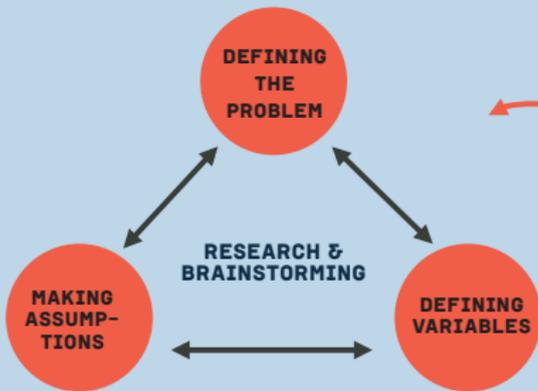
Modeling with mathematics

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

FIGURE 1.

REAL WORLD PROBLEM

BUILDING THE MODEL



REPEAT AS NEEDED OR AS TIME ALLOWS

GETTING A SOLUTION

ANALYSIS & MODEL ASSESSMENT

REPORTING RESULTS

Mathematical Modeling Resources!

- Free online **modeling handbook** by SIAM (Society for Industrial and Applied Math), from which I took the picture on the previous slide:
<http://m3challenge.siam.org/resources/modeling-handbook>
- Connections of Modeling to **Common Core State Standards**, including other disciplines than math! See same page as above, or direct link:
<http://m3challenge.siam.org/sites/default/files/uploads/siam-ccss-final-press.pdf>
- **Modeling Across the Curriculum** reports by SIAM, funded by NSF workshops to improve STEM education:
<http://connect.siam.org/siam-reports-on-modeling-across-the-curriculum/>
- *Rethinking Mathematics, Teaching Social Justice by the Numbers* (a Rethinking Schools publication) for ideas to empower your students!

Mathematical Modeling Contests!

- **Moody's Mega Math Challenge (M^3):**
is a mathematical modeling contest for high school students. It spotlights applied mathematics as a powerful problem-solving tool, as a viable and exciting profession, and as a vital contributor to advances in an increasingly technical society.
See: <http://m3challenge.siam.org/>
- **High School Mathematical Contest in Modeling (HiMCM):**
offers students the opportunity to compete in a team setting using mathematics to present solutions to real-world modeling problems.
See: <http://www.comap.com/highschool/contests/himcm/>
- **The International Mathematical Modeling Challenge (IM^2C):**
a new international secondary school mathematical modeling competition to be launched in 2015.
See: <http://www.immchallenge.org/>

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Thanks for modeling with me!

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