Learning to Graph using the City of Chicago

One of the premises of the Algebra Project http://www.algebra.org/index.html is that students have the tools they need within their lives to understand a new mathematical concept. The Algebra Project identifies algebraic thinking as the basic step to higher education, thus algebra is a key every student needs to move ahead.

After reading about the Algebra Project, I started looking for ways to use their methods in my own teaching. Chicago's street map and the maps of the Chicago Transit Authority's bus and rail systems are absolutely perfect for beginning algebra. http://www.transitchicago.com/maps/systemmaps.html

A ride on the Red Line is exactly a trip up and down a number line, Madison St. Station is 0, all stops north are + and all stops south are -.

Every address within the city limits is exactly a pair of coordinates on a Cartegian Coordinate System, State and Madison Streets intersect at (0,0). The Inspiration Café is at 4600 N and 500 W or (-5, +46): it is 5 blocks west of Madison St. And 46 blocks north of State St.

Teachers and tutors working in Chicago can get free maps from the CTA. Call or write to them or go to the CTA stop on the Brownline at the Merchandise Mart to get as many as you need. All CTA information can be found at http://www.transitchicago.com/maps/systemmaps.html .

The most low tech way to use a CTA map is to tape it to the wall and use a highlighter to mark the length of State and Madison Streets. Use a different color highlighter to mark every major street north/south and east/west.

A higher tech method is to use an overhead to project a grid onto a map or a map onto a marker board. When I taught in a workplace education program, the factory gave me a sheet of Plexiglas with a grid etched on it. I put the map underneath the Plexiglas.

Whichever method you use, explain to the students that they are to map their homes, jobs, school, union hall, whatever is important to them and give them markers, sticky dots, or some other means of doing so.

1. They should be taught to write the addresses as coordinates of the closest intersection and to write the East-West number first followed by a comma and then the North-South address. (XE, YN).

2. Once they are comfortable with that, it is easy to move to a plain grid and change North and South to +y and -y and East and West to +x and -x.

3. If you can afford it, take them on an El ride so they can experience the number line in person.

4. The Brownline runs in a roughly SE (0,0) to NW (35, 48) direction and you can derive a slope lesson from it. Each Brownline station gives its coordinates. The Southport stop is (1700W, 3400N).

5. While you are riding the El, have the students find other examples of slope such as roof lines, stairs, etc..

6. Number lines abound: an elevator or a stairwell (for the physically fit) provied good number line practice.

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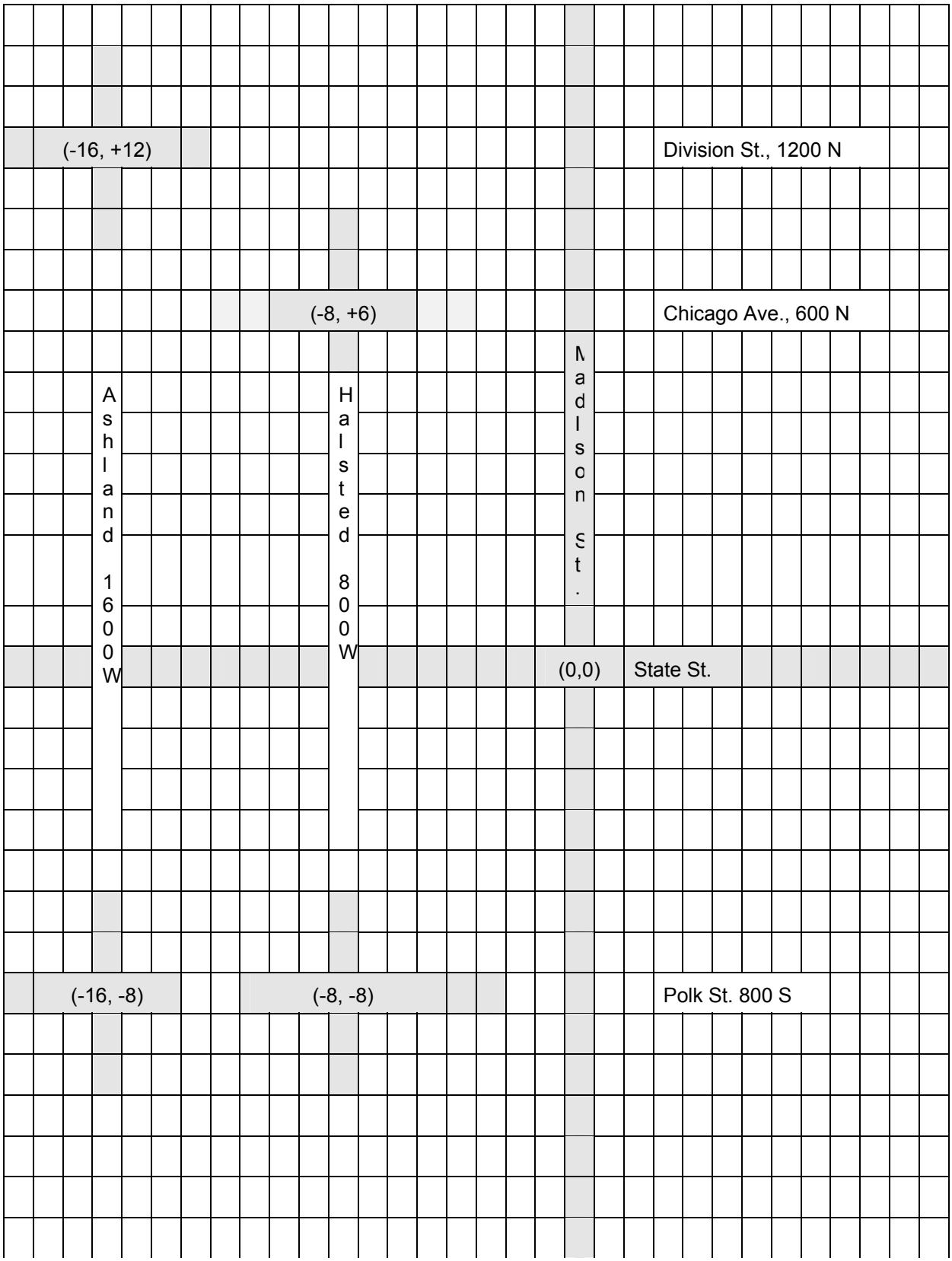

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