Note: This is the actual assignment, as I gave it. In order to do this, you will need a number of Mercator projection maps (I just went down the hall and borrowed them from teachers), one Peters Projection Map (available from Friendship Press, http://www.ncccusa.org/friend/fphome.html), and an almanac which has the actual areas of the various land masses. If you want to do this and want to discuss it first, you can reach me at gutstein@uic.edu. This was done in an 8th grade class.

Rico Gutstein

ANALYZING MAP PROJECTIONS—WHAT DO THEY REALLY SHOW??

In this project, you will investigate two different types of world maps, the *Mercator* Projection and the *Peters* Projection and answer some questions about how these maps show the world. You will have four periods to work on this in class, in groups of 3, and the weekend to finish up the project and do the individual writeup. This project is a geometry, measurement, and estimation project.

Part 1.

Creating maps is a mathematical process. Every map (a two-dimensional object) of the world (a three-dimensional object) distorts reality in some way. Imagine getting the peel off an orange without tearing it and then trying to lay the peel totally flat. You realize you cannot, so it becomes clear that mapmakers must make some decisions about how to represent the world in two dimensions. So again, we see where mathematics affects how we understand the world around us.

The main point of this project is to compare the distortions in the Mercator Projection Map and the Peters projection. Created in 1569 in Germany, the Mercator map was made during the rise of European colonial expansion. It has been a popular map in the U.S. for quite some time, especially in schools, although that has been changing in recent years. However, for example, it is the map that appears in the majority of Rivera classrooms.

What you will do, in your groups, is to examine several countries in different parts of the world to see how the standard classroom map (the Mercator) treats areas and visual representations of those areas. What we want to see is if there is anywhere in the map where the size of countries is particularly distorted. So we want to look at countries at the same latitude as well as those in different latitudes. You might compare Mexico with two other countries that seem to be about the same size as Mexico, but where one of those two other countries is at roughly the same latitude and the other is at a much different latitude. For every country you pick, make sure that you have a good estimate of its area based on the scale of the map. Also, we are going to use Mexico as our standard unit of measure. So you can compare each all other country by saying how many Mexicos fit into it (Mexico is 760,000 square miles).

Make sure you compare, on the Mercator map, certain specific pairs of places. Write down your estimates of the size of each of these regions. These include: (1) Mexico & Alaska; (2) Greenland & Africa; (3) India & Scandinavia (which is Sweden, Norway, Finland).

As always, explain *exactly* how you did the math to find your estimates.

Find the equator on the Mercator map. Figure out two different ways to mathematically describe the effect on the viewer that the placement of the equator has.

Find the International Date Line (The Zero Meridian). Why isn't it in the middle of the map? On our classroom maps, what is? Why?

PART 2

1) OK! You should be well into Part 1, finding the areas of Alaska (compared to Mexico); Greenland & Africa; and India & Scandinavia. If you haven't finished them, make that the *first* thing you do in your group.

Make sure you write down *exactly* how you found the area of each country/region!! For each of them, you must turn in the name of the region, area that you found, and how you found it (*in detail!)*. (Chart below…)

2) When you finish that, get a world almanac (shelf under the globes) and write down (on the attached sheet) the real area of each region/country, and the difference.

3) Now go to the Peters Projection (yours or the big one) and look at the size of Mexico & Alaska, and Greenland and Africa. Using estimation, answer if the Peters Map accurately shows the sizes of the countries/regions (by now you know Mexico is slightly bigger than Alaska and Africa is over *14 times bigger than Greenland!*

4) In your groups, discuss the following questions, and then *turn in, in writing*, with all group members names on it: (a) Which map do you feel is more accurate and why? (Remember that the categories we agreed on was that a map should accurately represent directions, longitude, latitude, and sizes.) (b) How does moving the equator down in the Mercator Map affect how we see the *North* (mainly North America, Europe [including the former Soviet Union], Greenland, as opposed to how we see the *South* (mainly Africa, Asia, Central/South America, Australia)—who lives mainly in the north versus who lives mainly in the south (in terms of race)? (c) Which map are you more used to? (d) After doing this project, which map do you prefer and why?

5) Then go to the individual writeup sheet for further directions.

PART 2, cont.

Group Members:

Explain in detail below how you found the areas!!!

Country/Region	Our estimated area	Actual Area	Difference

PART 3: Individual Writeup

Please answer *all* the following questions, although it doesn't have to be done each one separately (in other words, you can just write a long letter here...).

1) What did you learn in this project, about using math, about maps, about understanding the world?

2) Knowing we were all raised on the Mercator Map, how does that make you feel?

3) Why do you think we (including teachers) were always given the Mercator maps?

4) What questions does this raise in your mind and what more do you want to know?

5) In your opinion, is this in any way connected to anything else we've studied over the last two years?