Quantitative Literacy and Co-Construction in a High School Math Course, by Mark Russo, **Appendix B.**

Road Trip Assignment

For this assignment, we will explore some of the mathematics that you might encounter in a road trip. You are welcome to work with one other person, if you would like, but then you will have to factor in expenses for two people, and also split the bill.

This project will have multiple parts, and I will outline them below.

1. Before starting your road trip, I would like you to get a bit more comfortable with your car, and specifically, with all of the indicators on your dashboard. For each gauge, answer the following questions:

    a. What does each gauge measure?
    b. What are the unit(s)?
    c. Is there an acceptable range with which you should be driving?
    d. How does the gauge actually work?

    Speedometer, Odometer, Tachometer, Fuel Gauge, Temperature

2. Now, you will plan a road trip. Your road trip must meet the following requirements:

    a. It must be a loop that returns home by a different route
    b. It must include at least 5 stops, not including home (points of interest)
    c. Assume you cannot go more than 4 hours without a bathroom break
    d. It must be at least 12 hours in each direction
    e. You must stop for food at least three times every day
    f. You must stop for gas, obviously (note: you should find out how much gas your car holds, and your car's average MPG)
    g. Your road trip must include at least two days
    h. You must stay overnight somewhere

3. Please describe, in detail, each leg of your journey (note: you may want to do #s3 and 4 together)

    a. Starting Point – What time do you leave and why did you choose this time?
    b. Leg 1 – How far do you drive? What is your speed? How long do you drive? At what time do you arrive at your first stop? Please explain, in detail, how you determined your speed. This description must include research on speed limits, and a reference to traffic congestion on that particular route during the specific times you will be driving
    c. Stop 1 – Give me an address, and tell me the purpose of your stop (i.e. gas and food, or bathroom, food and Tour of Jacobs Field)
        i. Is this a gas stop? What time do you arrive? How long do you stay? How much gas is left in your tank when you arrive (**show me the math**)? How much is gas at this gas station? How much will you pay, based on how empty your tank is?
        ii. Food stop? What time do you arrive? How long do you stay? Do you have to buy anything? If so, do research to determine how much you will pay.
        iii. Bathroom stop? What time do you arrive? How long do you stay?
        iv. Or point of interest? What time do you arrive? How long do you stay? Do you have to buy anything? If so, do research to determine how much you will pay.
        v. A sleeping stop? What time do you arrive? How long do you stay? Do they have a vacancy on the given date? What type of room will you get? Do they provide breakfast? Wi-fi? Will you need to pay extra for those things? Do research to determine how much you will pay.
        vi. Note: If there is overlap (i.e. gas and food, bathroom and sleeping, food and bathroom and sleep), please answer questions for each category (no need to answer same question twice, such as how long will you stay)
    d. Leg 2 – Repeat
    e. Stop 2 – Repeat
    f. Continue repeating for the length of your trip

4. Please print out a map, and in pen, draw your road trip on the map. Your annotations must include all stops, including food stops, gas stops, bathroom breaks. Please label the time and date at each one of your stops. In between each stop, please label the distance, time and estimated speed you will be traveling on the road.

5. Calculate the total costs of the trip. Please include the following:
    a. Gas (include your first tank of gas)
    b. Food
    c. Hotel
    d. Points of Interest
    e. Depreciation of Car: Note, go to KBB Cost to Own Calculator. Go through the process to calculate your 5 year cost to own. Once you finish, click on "See Yearly breakdown", and zone in specifically on the depreciation cost for your year (i.e. If it is a 2010, you are in year 5; if your car is older than 5 years, just choose 5). Write this number down. (Let's say it's $1,100, for argument's sake). Then, go down to customize, and change the number of miles. The default is 15,000. Change it to 17,500, and see how your number changes. For example, let's say that $1,100 is now $1,275. That means that an additional 2,500 miles would depreciate your car by $175. Now, you probably didn't drive 2,500 miles, but you can use this ratio to figure out how much your car depreciated in value. You can set up a proportion:

$$\frac{depreciation\ \$\ based\ on\ KBB}{2500} = \frac{x}{number\ of\ miles\ you\ crove}.$$

    Solve for *x*.

6. By the time you are done, you must have answers to question 1, a detailed map, a detailed accounting of each leg and stop of your trip, and total costs. Your final project will be a PowerPoint (and handwritten map) or a poster.