5th Grade Assignment – Week #10

Conversion Table. For the next few lectures, you will need the conversion table at the end of this document.

Individual Work

- *Important! The following should be completed before the Thursday's group meeting.*
    - Write out the 9's table all the way up to 400. The parent should check that the work is correct.
    - Then choose three (whole) numbers: (1) any number between 50 and 100; (2) any 3-digit number; (3) any 4-digit number. Now take each one of these three numbers and multiply it by 9. This will give you three "products" that are also in the 9's table. The parent should check for errors.
- *Making a ruler with fraction markings.*
    - The point of this exercise is to give the 5th grader an experience of creating their own ruler/yardstick. Other than initially measuring out the length of the yard, you should not use a manufactured ruler or tape measure for this project.
    - You can choose between the following three options:
      (1) If you still have a yardstick that you made in third or fourth grade, you can simply add the fraction marks to it. Then (after we introduce the metric system), you can use a separate piece of wood to make your meter stick.
        - If you choose this option, then you simply need to add the fraction marks to the first foot, using the below instructions.
      (2) You can use one piece of clean, unmarked wood (perhaps 1 inch wide and ½ inch thick) where one side is a yard stick, and the other side will (later) become a meter stick. If you choose this option, then do the following:
        - The parent should cut the stick to 1 meter long ($\approx 39\frac{1}{3}$ inches), and then should exactly measure out and mark one yard (36 inches) on one side of the stick – perhaps blackening out the end portion (the last $3\frac{1}{3}$ inches between 36 inches and the end).
        - The 5th grader should then…
            - Divide the yard (perhaps by using a string as we did in last week's assignment) into three equal parts, and then make a clear, straight mark (in black ink) across the whole width at those two places (showing where 1 foot and 2 feet are).
            - Make the one-inch marks. You may get the best accuracy by dividing each foot first into three equal parts, and then dividing each of these thirds into four equal parts. The resulting inch markings (in black ink) should go about halfway across the width of the stick.
            - Add the fraction marks to the first foot, using the below instructions.
      (3) You may find it more convenient to just create a foot-long ruler (1 inch wide and ½ inch thick). If you choose this option, then you should do the following:
        - The parent should cut the piece of wood to a length of exactly 12 inches.
        - The 5th grader should then make the one-inch marks. You may get the best accuracy by dividing each foot first into three equal parts, and then dividing each of these thirds into four equal parts. The resulting inch markings (in black ink) should go about halfway across the width of the stick.
        - Add the fraction marks to the first foot, using the below instructions.
    - **Adding the fraction marks**. This is the most important part!
        - You only need to have fraction marks for the first foot.
        - Carefully, by eye, make lines (that are a bit shorter than the inch marks) with a colored pencil for the half-inch marks. Then with a different color, and with slightly shorter lines, make the quarter-inch marks (two for each inch). Then (again with shorter and differently colored lines) make the eighth-inch marks (four for each inch). If you wish, you can also try adding (eight) sixteenth-inch marks just for the first inch.

<u>Group Assignment</u>:

- *For Tuesday's group work*:
  - Given the basic facts that you now know (including 1 mile = 5280 feet), answer the following questions:

    1 mile = _____ inches

    1 mile = _____ yards

    1 ton = _____ ounces

    1 fl.oz. = _____ tsp

    1 gallon = _____ cups

- *Making Measurement Tables.*
  - You may not get through all of these tables. Whatever you don't get to in your group work this week, you can work on later (either next week in your group, or later on your own).
  - Do each table roughly while in your group, and then later perhaps do a better version as a main lesson page.
  - **<u>Important!</u>** For each table, always have the columns go left to right from largest unit to smallest, and have the rows go from top to bottom from largest unit to smallest.
  - Remember that the diagonal cells (from top-left to bottom-right) should have a "1" in them. Cells that are above and to the right of this diagonal should have fractional values.
  - Remember that each cell in the table answers a question. Example using the below mini-table:
    - <u>Example</u>: row = inch, and column = foot.
      The row is smaller than the column, so we ask:
      "How many inches are there in 1 foot?" (Ans: 12)
    - <u>Example</u>: row = foot, and column = inch.
      The row is larger than the column, so we ask:
      "An inch is how much of a foot?" (Ans: $\frac{1}{12}$)

	Foot	Inch
Foot	1	$\frac{1}{12}$
Inch	12	1

  - These are the tables to do:
    - *Distance Table*. The units are: mile, yard, foot, inch.
      (Note that in last week's lecture I left out the mile.)
    - *Weight Table*. The units are: ton, pound, ounce.
    - *Volume Table*. The units are: gallon, quart, pint, cup, fl.oz., tbsp, tsp.
      (Yes, this is a very large table! Do what you can.)

- *For Thursday's group work*:
  - The goal is to discover the divisibility trick for 9's. Even if a child happens to know this already, I think there is still much to be learned with this exercise.
  - Everyone in the group should have arrived (see above "individual work") with their 9's table written out up to 400, and three of their own "special products", which are also in the 9's table.
  - Everyone should share their special products with the group.
  - Questions to be worked with:
    - What is always true about any number in the 9's table? What do you notice?
      (The desired answer is this: With any number in the 9's table, the digits always add up to a number in the 9's table.)
      Only after the above answer is reached, try the below questions:
    - How can you tell if a number is in the 9's table?
    - How can you know if a number is divisible by 9?

US Measurement System

Length

    1 ft = 12 in

    1 yd = 3 ft = 36 in

    1 mi = 5280 ft

Weight

    1 lb = 16 oz

    1 ton = 2000 lb

Volume

    1 tbsp = 3 tsp

    1 fl.oz. = 2 tbsp

    1 c = 8 fl.oz.

    1 pt = 2 c = 16 fl.oz.

    1 qt = 2 pt = 32 fl.oz.

    1 gal = 4 qt