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BIOL 131
In-class Activity 1

History of Life: The Geological Timeline of the Earth

Background
This activity is intended to set the stage for BIOL 131 by providing students with a perspective on the scale of evolution and the major events in the history of the Earth. By the end of this activity, students will 1) convert numbers to different units of measurement, 2) convert the Earth's history to a relatable metaphor, and 3) know a little more about the major events of the Earths history.

Student Learning Objectives
Students who successfully complete this lab activity will be able to:

1. Use multiplication and division to convert numbers into different units of measurement.
2. Create a conversion factor that relates the timeline of Earth's history to a relatable unit of measurement (e.g., length of a football field).
3. Create a unique image displaying and summarizing 18 key milestones of the Earth's history and the evolution of life on Earth (e.g., first appearance of life on land).

DUE DATE: Thursday, September 14 at the beginning of lecture.

Note: You may work on the math together; however, **each student must submit a uniquely different creation**! If you have any questions, please do not hesitate to ask. You have 2 weeks to stop by my office for help. Do not wait until the day/night before to complete this assignment! See syllabus for office hours and contact information.

Part 1 – Conversion factors… and Math
The first major question is… what on 'Earth is a conversion factor? A conversion factor usually takes the form of a fraction. This fraction is used to change a number expressed in one unit of measurement to another number expressed in a different unit of measurement. The important goal for this conversion factor is to ensure that the new quantity is equivalent to the old quantity. We need a conversion to answer practical questions like: how many centimeters are in 38.3 inches or how many cups of water are in a 1979 gallons? We can use a conversion factor to ask less-practical questions like: how many ducks are in 1 row? Enough of the examples – let's practice.

Problem Set 1: How many centimeters are in 38.3 inches?

Step 1: Create the conversion factor. There are 2.54 centimeters (cm) in 1 inch (in).

1. Use the line below to create the conversion factor (as a fraction) for the above scenario.

$$\frac{2.54\ \text{cm}}{1\ \text{inch}}$$

2. Using the line below, how can this conversion be written differently?

$$\frac{1\ \text{inch}}{2.54\ \text{cm}}$$

Step 2: Set up the conversion equation to convert 38.3 inches to cm. Round to 1 decimal place.

$$\frac{38.3 \text{ in}}{1} \times \frac{2.54 \text{ cm}}{1 \text{ inch}} = 97.3 \text{ cm}$$

2.54×38.3

Step 3: Cross out the units that cancel out.

Step 4: Decide which mathematical operation you are using: multiplication, division, or both (circle one)?

Step 5: Complete the math with your calculator and write in the number to the right of the equals (=) sign above.

Step 6: Write in the unit of measurement to the right of your calculated number.

Step 7: **Circle your answer** (the most important step!!!).

Problem Set 2: How many cups of water are in a 1979 gallons? You know that 1 cup equals 0.06 gallons. Report the gallons as a whole number.

$$\frac{1979 \text{ g}}{1} \quad \frac{1 \text{ cup}}{0.06} = 32983 \text{ cup}$$

Problem Set 3: How many trees can be planted in one field? You know that ~~50~~ 5000 trees can be planted in 127 fields. Report the number of trees as a whole number.

$$\frac{+}{1} \quad \frac{5000 +}{127 \text{ F}} = 39 \text{ trees/field}$$

Problem Set 4: How many ducks are in 49 rows? You know that there are 10 ducks in 29 rows. Round to 1 decimal place.

$$49 \text{ rows} \times \frac{10 \text{ ducks}}{29 \text{ rows}} \quad \frac{d}{49 r} \quad \frac{10 d}{29 r}$$

$10 \div 29 = .34$

$.34 \times 49 = 16.9 \text{ ducks}$

Part 2 – The Earth's Geological Timeline

The history of the Earth is posted to D2L (Lecture – Geological Timelines Parts 1 to 3) as three PDF documents. These PDF contain short paragraphs about key events in the development of the Earth – from birth to the present – 29 boxes total. Please note that some of the information is related to Eastern Kentucky (i.e., Box #13, 16, 18, 27); however, all of this information can be applied to the area in and around Radford! **Read** each box to learn about the History of the Earth. **Pay special attention to** when the event occurred (a number followed by Ga or Ma) – recorded as Years BEFORE the Present Day. **Take note** of one interesting piece of information that you learned per box.

If you use a football field -10p

Part 3 – Converting the Earth's History to an Image Creatively Relatable (20 Points)
Listen to your instructor and take notes on the back of this page on how to construct your "relatable" timeline. Then, at home, answer the questions below to refresh your memory and help you construct your timeline.

Instructions:

1. Choose your metaphor. In other words, where would 18 major events of the Earth's history be placed on a horse racing track.
2. The units of your chosen metaphor are feet.
3. The measurement range of your metaphor is 5280 ft.
4. The age of the Earth is 4,550,000,000.
5. How many of your "metaphor's" units are in 1 year? Use the line below to create a conversion factor and show your work. I suggest that you **do not** use scientific notation to simplify this assignment.

$$\frac{5280\ ft}{4,590,000,000} = 0.00000116$$

6. **In addition to** Boxes 1 and 29, pick 16 events of Earth's history. In other words, you will place 18 total events on your creatively constructed timeline.
7. Convert each of the 18 events to your metaphor's units of measurement using Years BEFORE Present per plaque and the conversion factor that you created in Step 5 above. Essentially, you are converting millions or billions of years before the present day to a much smaller, relatable unit of measurement. Show your work for full credit and be consistent in rounding.
8. Draw your metaphor on an 8.5 by 11-inch sheet of paper. If you are technologically minded, then feel free to construct your timeline using your favorite computer software. Otherwise, use any form of writing utensil and available paper. Note: you will not be graded on your drawing capabilities; do not fret!
9. Include a scale on your timeline (e.g., 1 Duck = 6.7 Billion Years).
10. Place each historical event on your timeline according to the converted unit of measurement. You must include the following information contained within a nicely drawn box.
    a. The Plaque's Title (ALL UPPER-CASE WORDS in the top left-hand section of the box)
    b. Years before Present (a number followed by Ga or Ma)
    c. An informational, blurb (5-10 words) about the event. Do NOT copy word for word any statements (except the title) in the box. Paraphrase – read all of the information in the box, then generally summarize the important (and interesting to you) information in the box!
11. On the back of your creation, include
    a. 1 example of how you used the conversion equation to convert years to your metaphor's unit of measurement.
    b. Your answer to this question – what do you notice about when the events occurred (at equal distances or in another pattern)?

15 points will be dedicated to your unique timeline creation
5 points will be dedicated to Step 11 above.