Units, Dimension, and Scale

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Units, Dimension, and Scale

Goals:

- Review notions of unit, dimension, and scale
- Explore arsenic case study
- Program in Python

Zaslow Appendix 5 (review/learn)

- 5.1: Units
- 5.2: Scientific notation
- 5.3: Scientific notation under operations

Some practical instances (estimate value with appropriate unit)

- US Gross Domestic Product
- Avagadro's number
- number of calculations a supercomputer performs in a day
- chance of winning this week's Powerball jackpot
- charge on an electron
- number of cells in a liver

Intensive vs. extensive properties

The physical properties of a system can be classified into two categories:

- **Extensive properties** depend on the mass of a system.
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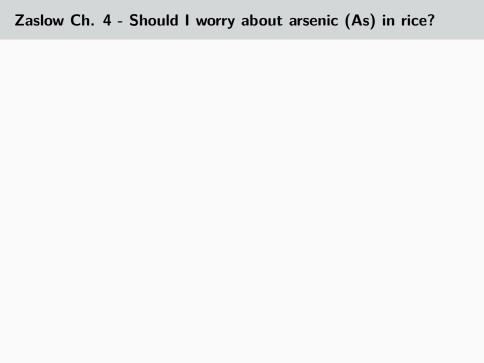
Examples of each?

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See https://sciencenotes.org/intensive-extensive-properties/ for more on this.

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What are the possible responses?

What would it take for you to favor a particular respone?

What are the key subquestions to answer?

- How much As do I ingest associated with rice consumption?

- Is that quantity of As enough to worry about?

Example: ppm

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For water solution with neglible solute mass,

$$\text{ppm} = 1 \text{ mg/L}$$

SHIFT TO WHITEBOARD

Two programs today:

- Simple program that triples and input and generates formatted output.
- Documented program that performs conversion similar to assigned problem.