18.1 Scientific Notation and Units

Chemistry

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Scientific notation is a way of expressing numbers that are too big or too small to be conveniently written in decimal form. It is commonly used by scientists, mathematicians and engineers, in part because it can simplify certain arithmetic operations.

Normalized Notation. Any given integer can be written in the form m×10n in many ways: for example, 350 can be written as 3.5×10^2 or 35×10^1 or 350×100.

Units of Measure. The SI base units and their physical quantities are the meter for length, the kilogram for mass, the second for time, the ampere for electric current, the Kelvin for temperature, the candela for luminous intensity, and the mole for amount of substance.

Best Estimate ± Uncertainty. When scientists make a measurement or calculate some quantity from their data, they generally assume that some exact or "true value" exists based on how they define what is being measured (or calculated).

Wikipedia.com

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Title of Passage.

1

A metric prefix is a unit prefix that precedes a basic unit of measure to indicate a multiple or fraction of the unit. While all metric prefixes in common use today are decadic, historically there have been a number of binary metric prefixes as well.

2

Each prefix has a unique symbol that is prepended to the unit symbol. The prefix kilo-, for example, may be added to gram to indicate multiplication by one thousand: one kilogram is equal to one thousand grams. The prefix milli-, likewise, may be added to metre to indicate division by one thousand; one millimetre is equal to one thousandth of a metre.

https://en.wikipedia.org/wiki/Metric_prefix

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Numbers in Science: Scientific Notation

When scientists measure a quantity, they actually measure two pieces of information--the value they think they have measured, and the uncertainty. This can be stated as "We measured ten, plus or minus one", and often scientists do use these terms. However, this notation gets cumbersome fast. We need a quick, generally accepted method by which we can indicate the precision of our measurements.

Scientists put only the digits they can reasonably be certain of in their numbers. They might say, for example, that they measured "10." cm (note the presence of the decimal point). This is actually different from saying that they measured "10" cm. The use of the decimal point indicates that the scientist is sure of both digits to some reasonable degree -- it is "10 point something", not 11 or 9, even though rounding both of these numbers to one digit gives 10.

The number "10." is said to have two significant digits, or significant figures, the 1 and the 0. The number 1.0 also has two significant digits. So does the number 130, but 10 and 100 only have one "sig fig" as written. Zeros that only hold places are not considered to be significant.

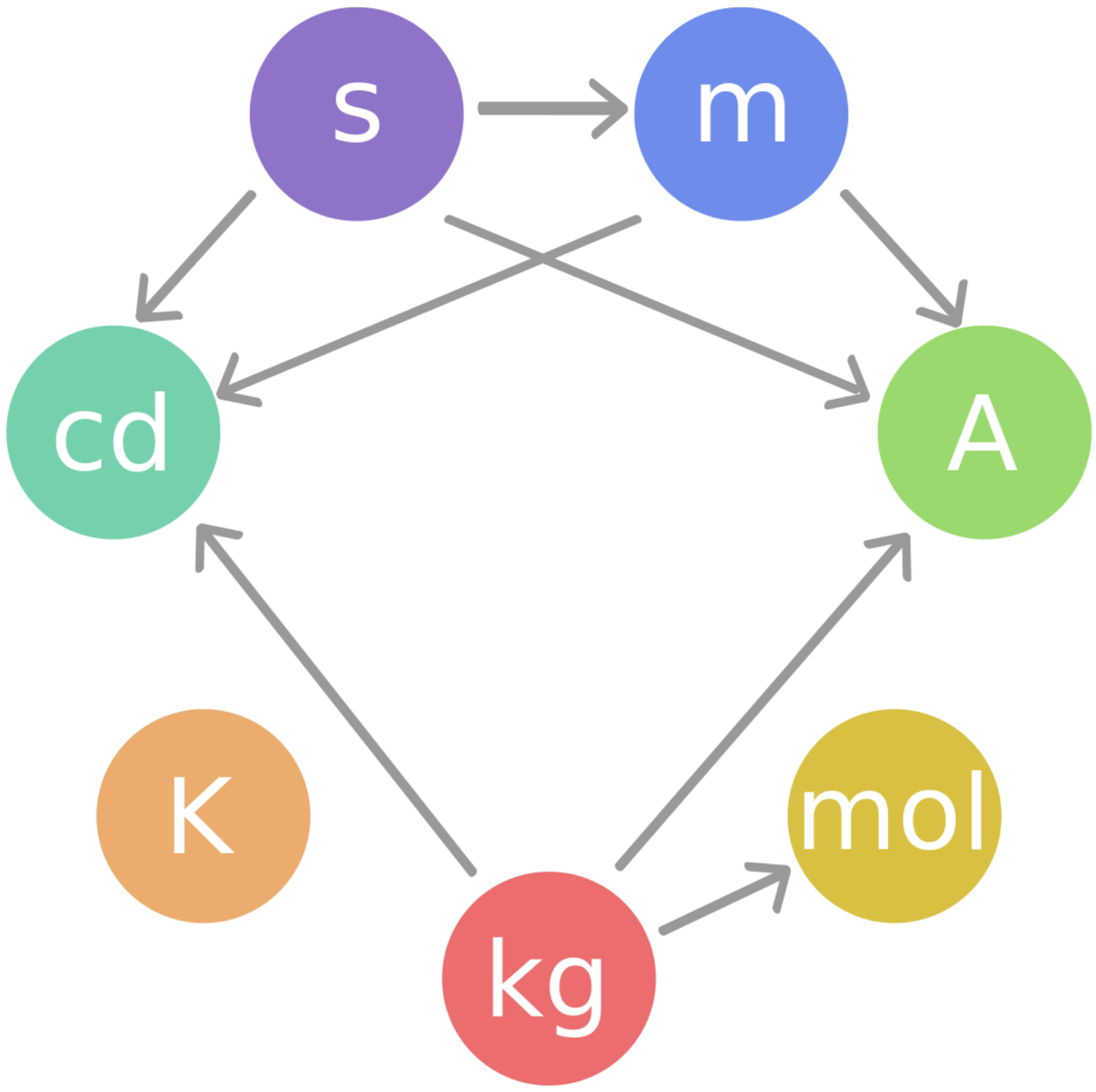
So, how does a scientist indicate that two of the digits in 100 are significant?? We can't put in a decimal point alone to make 100. because that would indicate 3 digits. What should we do?

Scientists use scientific notation to handle this problem. Scientific notation makes sure that everything but the first digit of a number is after the decimal place and therefore either certain or not used. Here are some numbers in scientific notation to study:

https://www.shodor.org/unchem/math/science/index.html

Draw Illustration

Copy and Label the Illustration in the Space Provided



https://upload.wikimedia.org/wikipedia/commons/thumb/c/c8/SI_base_unit.svg/1200px-SI_base_unit.svg.png

Draw (Copy) the Illustration Here

Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

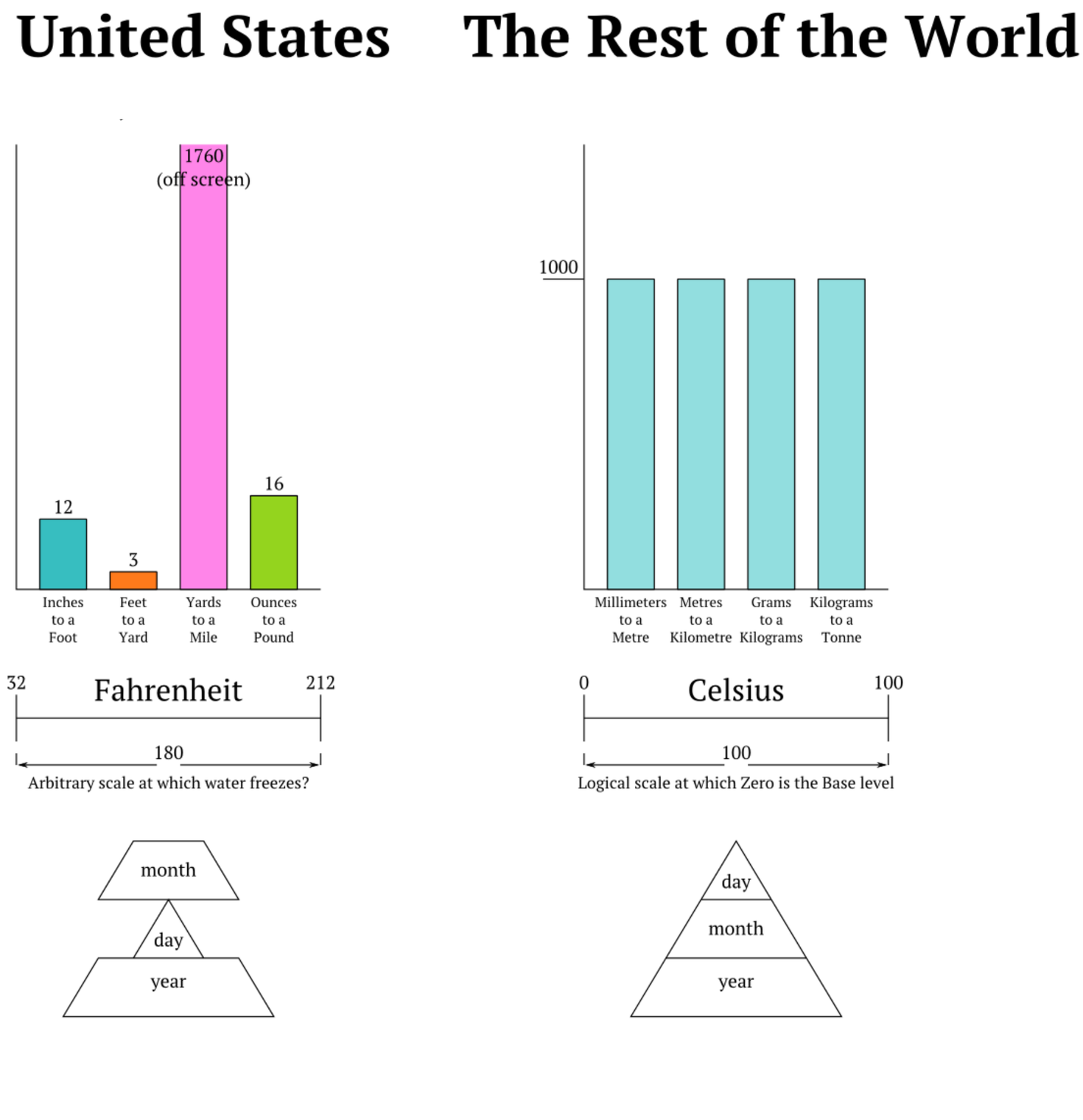
What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

_____

www.zmescience.com



Show-Off Your Smarts!

Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

Q1. How can this information be applied to a young-person's life?

Q2. How does this information apply to (or impact) communities?

Q3. When do scientists need to apply this information? How?

Q4. How would a person from 100 years ago view this information?

Q5. How does this topic connect to other science topics or math?

Write down at least three words introduced or covered by this topic.

1.
2.
3.
4.
5.
6.

Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.