What I want them to know about stable isotopes

What stable isotopes are

* Isotopes are:
  + Forms of the same element that differ in the number of neutrons in the nucleus
  + Has at least as many neutrons as protons except in the case of Hydrogen and helium
  + Are labeled with the number of **protons** + **neutrons** as a superscript in front of the unique letter corresponding to an element.
* **Isotope versus Stable isotope**
  + There are more isotopes than stable ones
  + Most undergo radioactive decay
  + Stable ones are abundant in organisms
* Stable isotopes
  + Persist in the same form for eons after they are formed
  + Provide some of the few surviving records about early life on earth and the early ecology of our planet
  + Safe isotopes that do not decay and are not hazardous to human health
  + Are abundant and natural parts of organisms
  + Only 283 that do not undergo radioactive decay
  + Light isotopes react faster than heavy ones in kinetic reactions (fig 1.6)
* Fractionation vs. mixing
  + Fractionation splits apart mixtures to form source materials
  + Sources recombine via mixing
* Most isotopes are very short-lived radionuclides
* 16O is the most common (by weight) isotope in a human body
* what are the 5 elements associated with organic matter
  + HCNOS
* Heavy versus light isotopes
* How common are they?

Two types of isotopes are

Heavy and light

Light and dark

Top and bottom

Stable and dark

How they are measured

What they can be used for

What some of the concerns are---this we can do in class

I love this youtube video about fractionation:

<iframe width="853" height="480" src="//www.youtube.com/embed/v0dgJ4JMNrE?rel=0" frameborder="0" allowfullscreen></iframe>

it introduces what a stable isotope is (not radioisotopes)

what delta is (per mil instead of per cent)

the rate of movement of isotopes, where lighter isotopes move faster than heavier, but at higher temps you get more heavier isotopes moving

calculating from a reference

Carbon is a standard from a fossil found in the Pee Dee river

Hydrogen in ice caps

Oxygen in water and ice caps

Carbon in leaves🡪life likes lightweight carbon (12C)

Enrichment

The number in front of the element means the number of protons plus neutrons

opposite signals for atmosphere and ocean

The hidden passage had no opening to the outside of the skull and ran underneath the airway connecting the nose and throat. Where the two passageways touched, a long, skinny slit would have let air through. Sounds bouncing around inside the skull’s sinus cavities could have become louder.