CONCEPT: NEUTRON-TO-PROTON RATIO

● Determining the ratio of neutrons to protons (_____) is a major method for determining nuclear stability.

□ The _____ an isotope is to its ratio then the _____ stable its nucleus.

Nuclear Stability	
Atomic Number (Z)	Neutron-Proton Ratio
Z: ___ 20	1.00
Z: __ to __	1.25
Z: __ to __	1.52

□ Above Z = _____ stable nuclei exist momentarily and are prone to radioactive decay or emission reactions.

- _____ -209 (Z = 83) is the heaviest element with stable nonradioactive isotopes.

EXAMPLE: Based on their N/Z ratio, which isotope possesses the most stable nucleus?

a) ^{3}H b) ^{10}Be c) ^{14}C d) ^{41}Ca

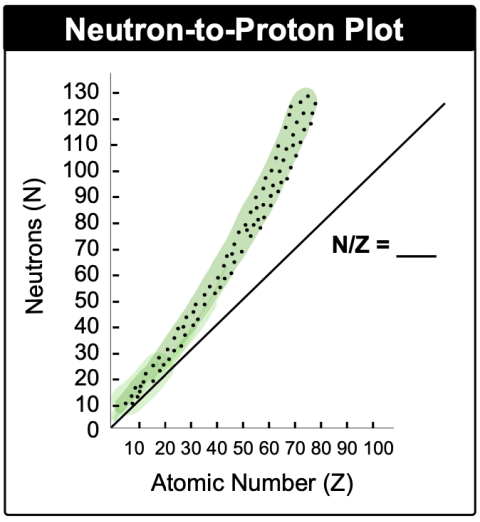
Neutron to Proton Plot

● A graphical representation of *nucleons* that depicts a *stability line* and the _____ *(Valley) of Stability*.

□ **Nucleons:** the subatomic particles confined within the _____ of an atom. (_____ + _____)

□ **Stability Line:** the straight line where the number of _____ = the number of _____.

□ **Band (Valley) of Stability:** the curved plot of different _____ _____ isotopes based on their N/Z ratio.



EXAMPLE: Which of the following isotopes will lie to the left of the neutron-to-proton curve?

a) Zirconium-90 b) Thorium-230 c) Palladium-110 d) Mercury-200