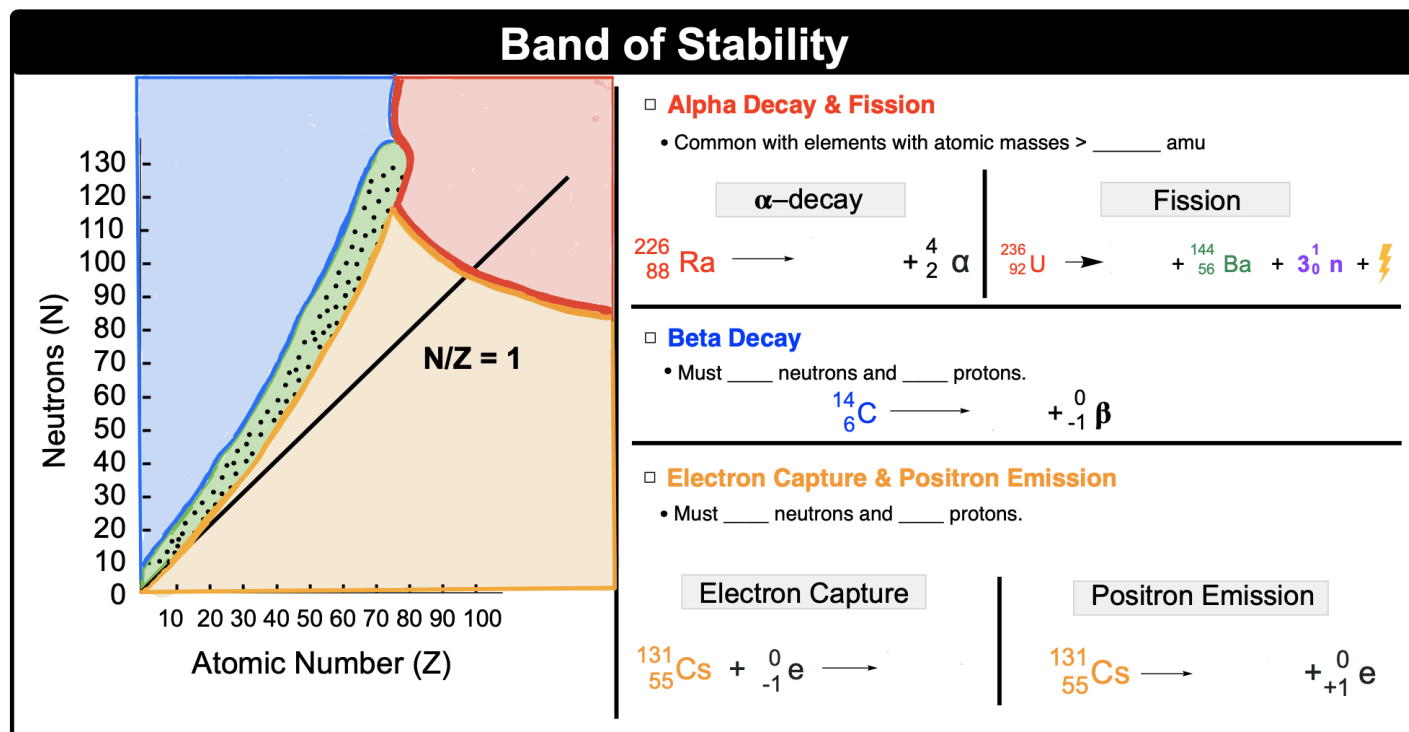


## CONCEPT: BAND OF STABILITY: OVERVIEW

### Interpreting the Band of Stability

- The **Band of Stability** represents the area where stable, \_\_\_\_\_ isotopes reside based on N/Z ratios.



**EXAMPLE:** Determine if the following nuclide will undergo alpha decay, beta decay or electron capture and provide the nuclear reaction: Radon-222

**PRACTICE:** A nuclide of plutonium-241 undergoes 2 alpha decays, 3 beta decays and a gamma emission. What is the product?

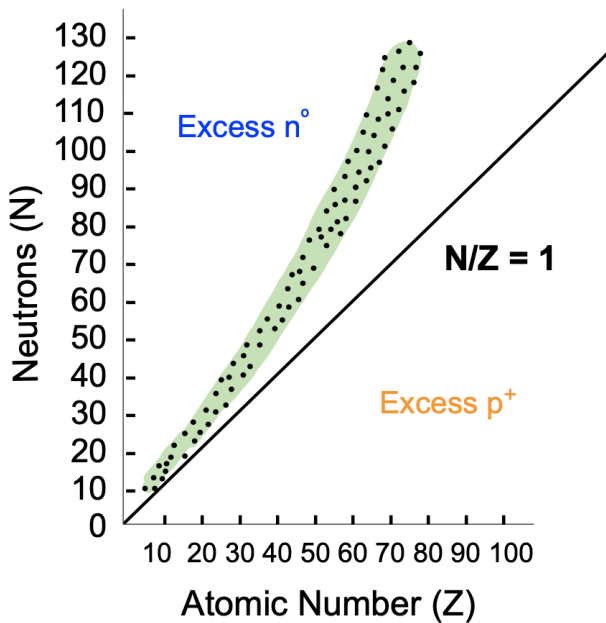
- a) Curium                      b) Neptunium                      c) Uranium                      d) Thorium                      e) Nobelium

## CONCEPT: BAND OF STABILITY: OVERVIEW

### Atomic Forces

- Recall, the \_\_\_\_\_ force holds the nucleus together and the \_\_\_\_\_ force pulls it apart.
  - \_\_\_\_\_ of an isotope act as chemical glue that holds together the nucleus.
  - These forces being \_\_\_\_\_ balance is another reason radioactive isotopes under nuclear decay.

### Neutron-to-Proton Plot



#### Atomic Forces

- In the **Band of Stability**, the forces are in balance.  
Nuclear Force \_\_\_\_ Electrostatic Force
- With **Excess neutrons** (glue):  
Nuclear Force \_\_\_\_ Electrostatic Force
- With **Excess protons** (repulsion):  
Nuclear Force \_\_\_\_ Electrostatic Force

**EXAMPLE:** Which of the following statements is true for the beta decay that would occur with the cobalt-69 isotope?

- It would decrease its nuclear force and increase its electrostatic force.
- Both the nuclear force and electrostatic force would decrease.
- It would increase its nuclear force and decrease its electrostatic force.
- No change would be observed between the nuclear force and electrostatic force.

**CONCEPT: BAND OF STABILITY: OVERVIEW**

**PRACTICE:** Determine if the following nuclide will undergo alpha decay, beta decay or positron emission and provide the nuclear reaction: Hydrogen-3

**PRACTICE:** Determine if the following nuclides will undergo alpha decay, beta decay or electron capture and provide the nuclear reaction: Vanadium-50