

## Lesson 2, Activity 2

### Introduction to Density Reflection

#### Group 3

#### Learning Goals

- Define radioactive decay as a breakdown of a large unstable atom into smaller with emission of particles producing heat.
- Radioactive decay produces heat which keeps Earth's core molten
- Identify half-life as the time it takes for half of a population of atoms to decay
- Calculate the age of rocks using the rate of decay

#### Prior Knowledge

- Earth is hot
- Core is solid (outer) and liquid (inner)
- Basic atomic structure
- States of matter
- Define isotope (ie. Neutrons=mass)
- Scientific notation

#### Misconceptions

- Decay means loss vs transformation
- Decay means seeking stability
- Heat does not come from matter conversion but from friction due to neutron bombardment
- All radioactive isotopes are harmful

#### Previous Activity

- What is Differentiation?
- How did you use that concept of differentiation to make your drawing of the fictitious planets?

#### Dating Rocks Student Activity

- Calculate the age of rocks using decay
- Use the concept of radioactive decay to determine half-lives and the ages of materials and ultimately the age of Earth and other planets

#### Following Activity

- Using chocolate kisses and round malted milk balls to illustrate the best structure to use to fit the largest number of chocolates (protons and neutrons in nucleus)
- What causes instability of particles in the nucleus (too many particles – neutrons)
- Result: harder to fit more chocolates in nucleus – neutrons (round chocolates will roll out)

#### Flipping Pennies Activity

- To illustrate the concept of half-lives by tossing 100 pennies in a container and removing those that land face up
- Repeat tossing at a consistent rate for each toss until all pennies are removed
- Record number of tosses and number of pennies left after each toss
- Pennies represent isotope becoming a more stable element

#### Atlas

- 9-12 – 4D4
- Radioactive isotopes, spontaneous decay

- Decay at predictable rate
- Used to estimate age

#### Prior knowledge

- 4D-3 atomic motion equals change in temperature
- 4D-7 conservation of matter
- 4D-1 atomic structure

#### Teacher Viewpoint

- touch directions depending on the audience
- pre-supposes some prior knowledge they may not have
- may not have done the homework

#### Learner Viewpoint

- it's fun
- tempting
- hands on
- lots of direction
- frustrating
- potentially challenging