**Unit 13: Radioactivity**

**Identifying Isotopes in particle numbers**

Since isotopes of the same element have ***identical chemical properties*** i.e. their ***atomic number (number of protons)***are ***constant***. However what can change is the ***mass number (protons + neutrons)***.

Thus we identify an isotope by:

* Knowing the ***atomic number*** and ***mass number*** of an atom***.***
* Specifically the ***number of neutrons (mass number – protons)*** will differ between isotopes. The number of neutrons will affect the stability of the atom, possibly ***granting it new*** or other ***physical*** or ***chemical properties***.

**Identify and discuss radioactive material**

Radioactive material is the substance ***containing a mixture of isotopes*** of the same element, some of which may be ***unstable*** and ***emit radiation*** through radiation decay.

**Examples of radioactive material**

* ***Uranium-234 –*** natural occurring and used in nuclear plants.
* ***Carbon-*14 –** natural occurring found in ***air, plants*** or ***animals.***

**Background of radiation**

Background radiation refers to the ***natural low-levels*** ofradiation we are exposed to everyday.

Sources of these type of radiation:

* ***Cosmic rays –*** contains ***high-level of radiation*** particles coming from outside ***our solar system.***
* ***Radon gas –*** present in the atmosphere.

**Application of isotopes**

Radioactive material can be ***very dangerous*** and should be handled with care. Some radioactive material are so dangerous they ***should not be handled*** by humans at all. In such cases these materials should be ***handled by robots.***

However there are some useful radioactive material:

* ***Medicine industry –*** isotopes can be used medical imaging and treatment, such as in positron emission tomography (PET) scans, used to ***detect and visualize diseases*** in the body.
* ***Nuclear energy –*** isotopes are use as fuel in nuclear reactors to generate electricity.