

(d) **Scientific research:** Radioisotopes are used:

- For studying various physical phenomena such as rate of diffusion, solubility in a liquid, surface phenomena, etc.
 - To study the speed mechanism and conditions of equilibrium of reactions.
 - To investigate molecular interactions.
 - To study biochemical reactions in living cells.
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Health Hazard of Nuclear Radiation

Nuclear radiations such as α - rays, β -rays, γ - particle, neutrons, X- rays can cause harm to living being by ionizing complex organic molecules, the danger of our exposure to these radiations is called Radiation hazards.

Moreover, **the presence of radiation in an environment is called radiation pollutions.** The main pollutants of radiation are:

- (a) The radioactive elements such as uranium, radium, etc.
- (b) The cosmic rays

Effects: The radiation damage produced in biological organisms is due primarily to ionization produces in living cells. The main damage to the genetic material, DNA is a particularly serious one since it can damage not only the individual but also future generations as well.

The possible damages are

- (a) Over radiation exposure can cause lung cancer.
- (b) Radiation can cause genetic damage by dividing the reproductive cells.
- (c) Radiation exposure can cause blindness.
- (d) The exposure to radiation may cause the start of leukemia (death of RBC in the blood)
- (e) The radiation can cause skin burn & can ultimately lead to skin cancer.

Safety: The following safety precautions should be taken while using the radioactive source:

- (a) Radioactive sources must be handled with the help of remote-control devices.
- (b) Radioactive sources should be placed in thick-walled lead containers so that the lead may absorb the radiations.
- (c) The worker must wear a lead apron while working in hazardous areas.
- (d) The radioactive waste must be avoided from the working areas.
- (e) Nuclear explosions should be carried far away from the public areas.