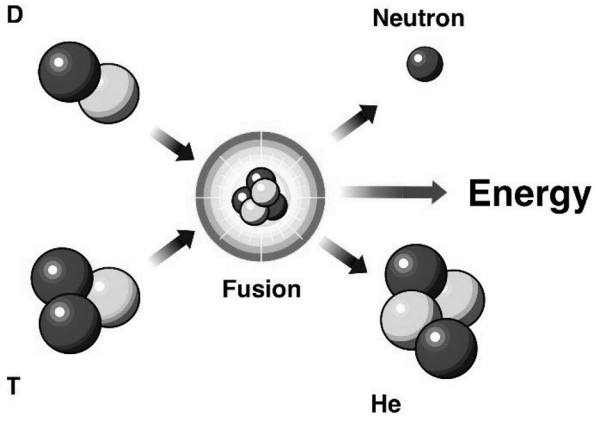
Fusion

Fission in the process where a *small isotopes* combine under pressure together to produce larger atoms with lots of energy



Production of Elements

Elements can be *transmuted* to other elements through the process of fusion.

Man-Made elements heaver than Uranium (U) can be formed through fusion with protons and neutrons

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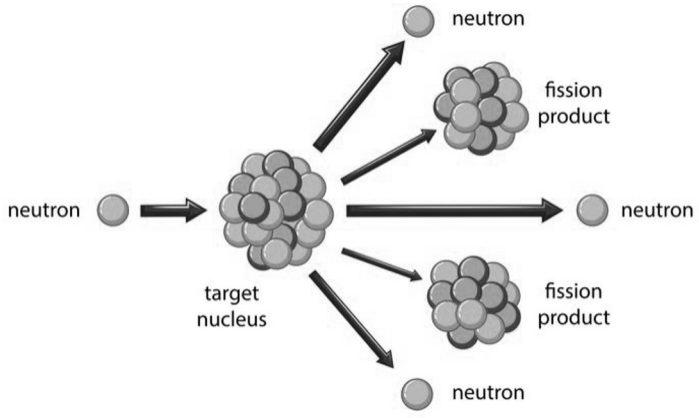
Fission

Fission in the process where a *fissionable* atom is split by the interaction of the atom by a free neutron (n^o).



Fissionable Isotopes

Uranium-235 (*uncommon*) and Plutonium-239 can undergo fission.

Uranium-238 (*common*) can be converted to U-239 when hit by neutrons, then converted to Pu-239

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Use of Fission

Fission produces a chain reaction process that can produce a large amount of energy due to repeated spitting of atoms.

Controlled Fission

Fission is used to produce power in a nuclear reaction using the fission process of quickly boil water and produce large amounts of energy. The leftover radioactive fuel is collected (*from nuclear rods*) and is stored in waste collection for generations

Uncontrolled Fission

Fission is also used to make large amounts of energy in an uncontrolled manner to destroy material is a nuclear weapon. In a nuclear reactor a *nuclear meltdown*, or uncontrolled heat production accident, can lead to similar effects to a nuclear bomb

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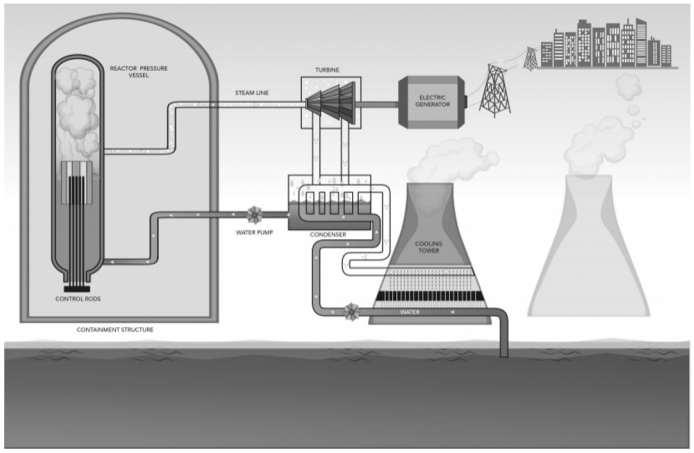
Nuclear Power

Production of Power (*Electricity*) through *nuclear fission*



Nuclear Fission occurs in a reaction chamber when fuel rods undergo fission and boils water to turn turbines which produce electricity

Control rods absorb extra n^o to control the rate of nuclear fission and heat

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Nuclear Waste

Nuclear waste from reactors need to be stored in long term storage

Large Silos (*cylinders*) are used to safety store spent nuclear fuels.

Nuclear fuels after fission contain highly radioactive isotopes that remain a major hazard for thousands of years.

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The Nuclear Power Debate

Nuclear power has its pros and cons over the use of more conventional energy production methods, including renewable sources

Pros of Nuclear Power

- No greenhouse gas (CO_2) production during the energy production process
- Larger amount of available energy for other alternate energy sources (*like electric cars*)

Cons of Nuclear Power

- Pollution due to nuclear fuel mining and purification
- The risk of nuclear meltdown
- The risk to wildlife due to the fuel cooling process, such as heating of water sources
- The need to store nuclear waste over time

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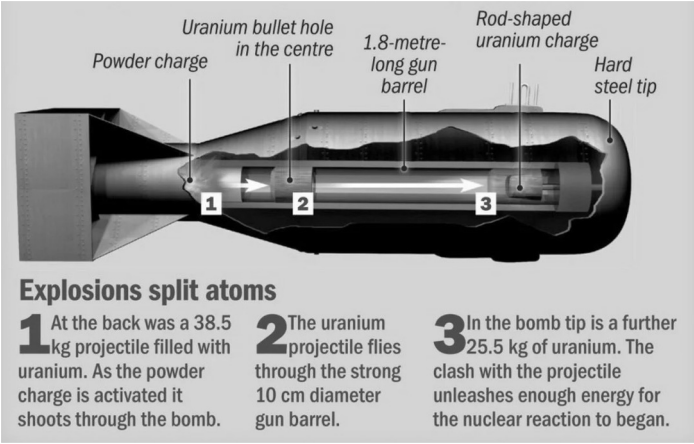
Nuclear Weapons

Weapon (*bomb*) made by creating an uncontrolled fission reaction



Nuclear weapons contain a small *bullet* of a neutron producing isotope that is shot into a large uranium-235 tip. The uranium *bullet* sets off an uncontrolled fission reaction making uncontrolled heat

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