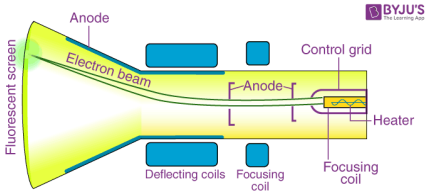
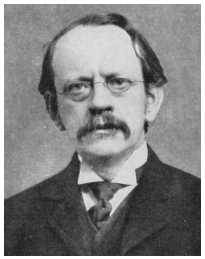
Subatomic Particles

Thomson's Cathode Ray Experiments

Thomson worked with Cathode "Canal" Rays in a vacuum to determine the energy and charge of e^-



Cathode Ray Tube Experiment



Joseph John Thomson
English Chemist
1856 - 1940AD

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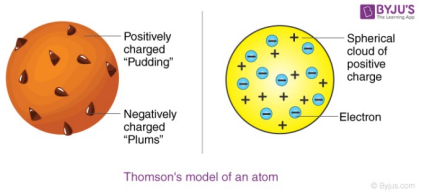
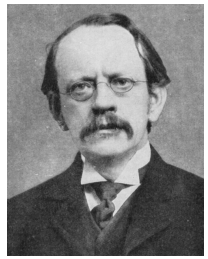
Subatomic Particles

Thomson's Plum Pudding Model

Thomson's discovery of the electron (e^-) lead to the *plum pudding model,* e^- in an atom surrounded by a positive *matrix*



Thomson's model of an atom



Joseph John Thomson
English Chemist
1856 - 1940AD

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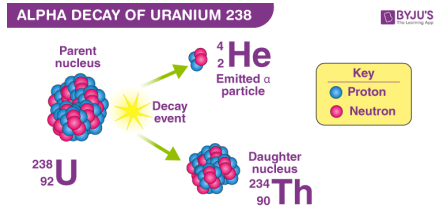
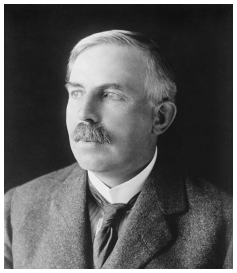
Subatomic Particles

Radiation and Alpha Particles

Rutherford separated nuclear radiation into three types of radiation. Alpha Decay (α), the weakest had 2 positive and 2 neutral particles





Earnest Rutherford
English Chemist
1871 - 1931AD

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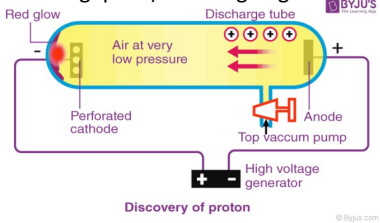
Subatomic Particles

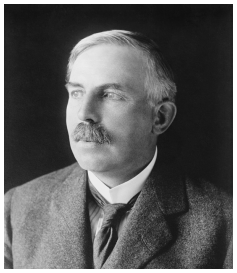
Rutherford's Nitrogen Experiment

Rutherford accelerated *shot* alpha particles (2 pos. and 2 neg. part.) at nitrogen gas in a vacuum.



Discovery of proton

The resulting particles were positive protons (p^+)



Earnest Rutherford
New Zealand Chemist
1871 - 1931AD

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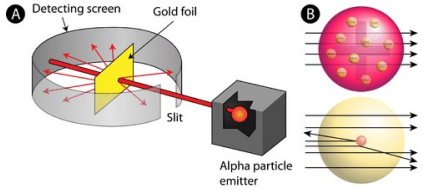
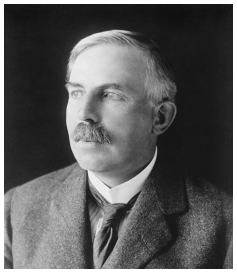
Subatomic Particles

Rutherford's Gold Foil Experiment

Rutherford accelerated *shot* alpha particles, charged helium atoms, at gold foil



The alpha particles showed the atom to be basically empty except for a nucleus in the center



Earnest Rutherford

New Zealand Chemist

1871 - 1931AD

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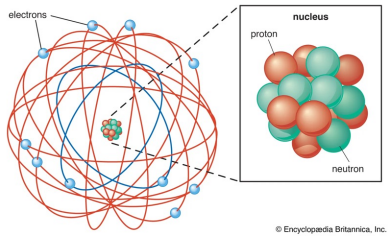
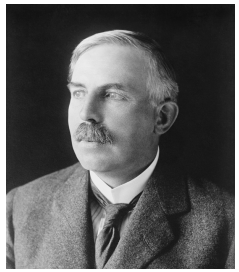
Subatomic Particles

Rutherford's Atomic Model

Strong positive center to the atom (*nucleus*) surrounded by negatively charged electrons (e^-)





Earnest Rutherford

New Zealand Chemist

1871 - 1931AD

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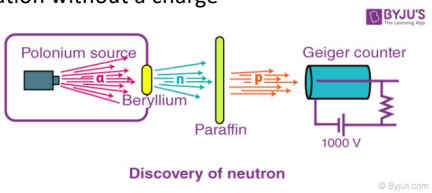
Subatomic Particles

Chadwick Alpha Particle Experiments

Chadwick observed a heavy byproduct of nuclear radiation without a charge



The neutron (n^o) is a neutral charged particle balancing the protons (p^+) in the nucleus

James Chadwick

English Chemist

1891 - 1974AD

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Role of Subatomic Particles

The modern atomic model contains protons, electrons, and neutrons *(+, -, and neutral)*

Protons

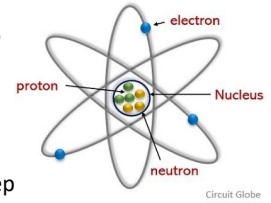
In nucleus (*center of atom*), identifies atom, keep electrons within the outer portion of the atom

Electrons

Atomic communication, connection to other atoms, balancing protons in the atom

Neutrons

Barrier between protons/electrons, sheilding



Basic Structure of the Atom

Includes electrons (e^-), protons (p+), and neutrons (n^o)

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