

ATOMIC ENERGY

Requirement 1

Tell the meaning for the following:

Alpha Particle: _____

Atom: _____

Background Radiation: _____

Beta Particle: _____

Curie: _____

Fallout: _____

Half-Life: _____

Ionization: _____

Isotope: _____

Neutron: _____

Neutron Activation: _____

Nuclear Energy: _____

Nuclear Reactor: _____

Particle Accelerator: _____

Radiation: _____

Radioactivity: _____

Roentgen: _____

X-Ray: _____

Requirement 2

Make three-dimensional models of the atoms of the three isotopes of hydrogen. Show neutrons, protons, and electrons. Describe your models: _____

___ Show your models to your counselor.

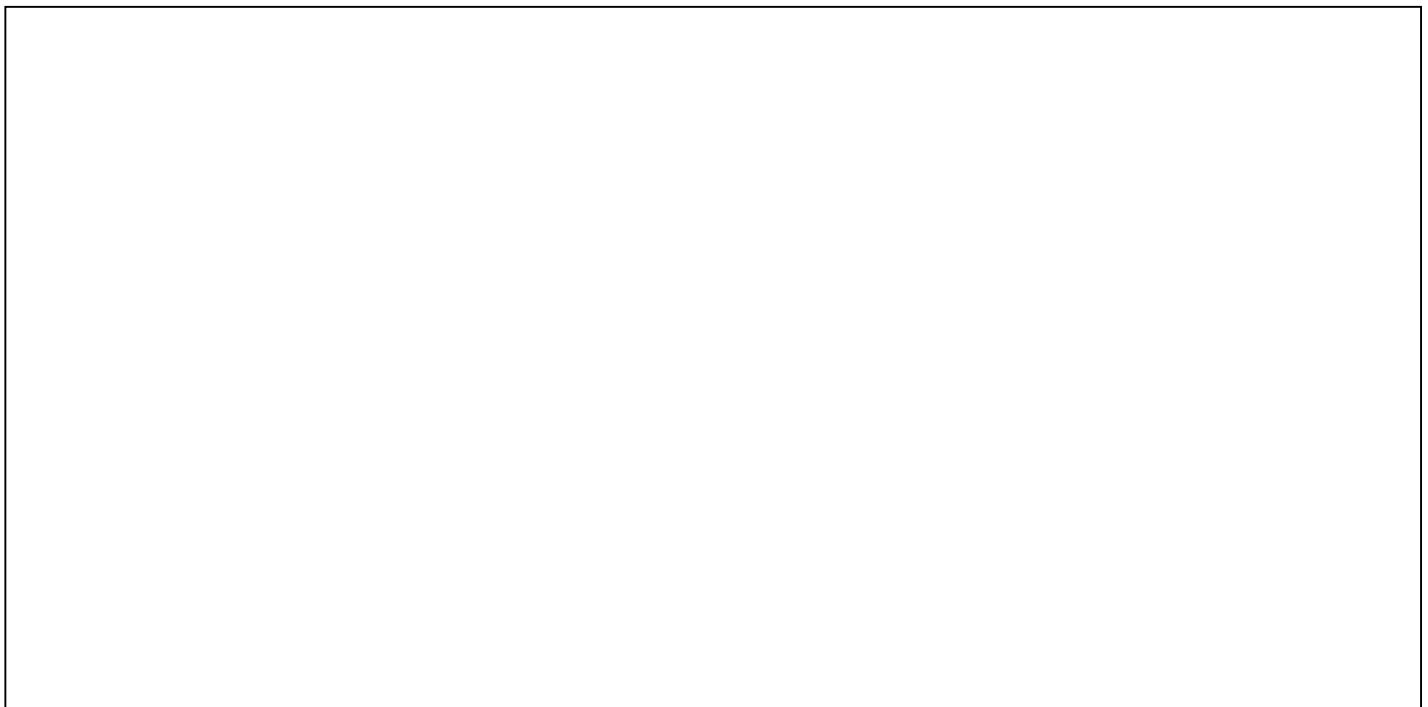
Explain the difference between atomic weight and number: _____

Requirement 3

In the space below make a drawing showing how nuclear fission happens. Label all details.



Make a second drawing showing how a chain reaction could be started. Also, show how it could be stopped.



Show or describe what is meant by a "critical mass": _____

Requirement 4

Select five of the following people and tell who they were. Also, explain what each discovered in the field of atomic energy:

Who was *Henri Becquerel*? _____

What did he discover? _____

Who was *Niels Bohr*? _____

What did he discover? _____

Who was *Marie Curie*? _____

What did she discover? _____

Who was *Albert Einstein*? _____

What did he discover? _____

Who was *Enrico Fermi*? _____

What did he discover? _____

Who was *Otto Hahn*? _____

What did he discover? _____

Who was *Ernest Lawrence*? _____

What did he discover? _____

Who was *Lise Meitner*? _____

What did she discover? _____

Who was *William Roentgen*? _____

What did he discover? _____

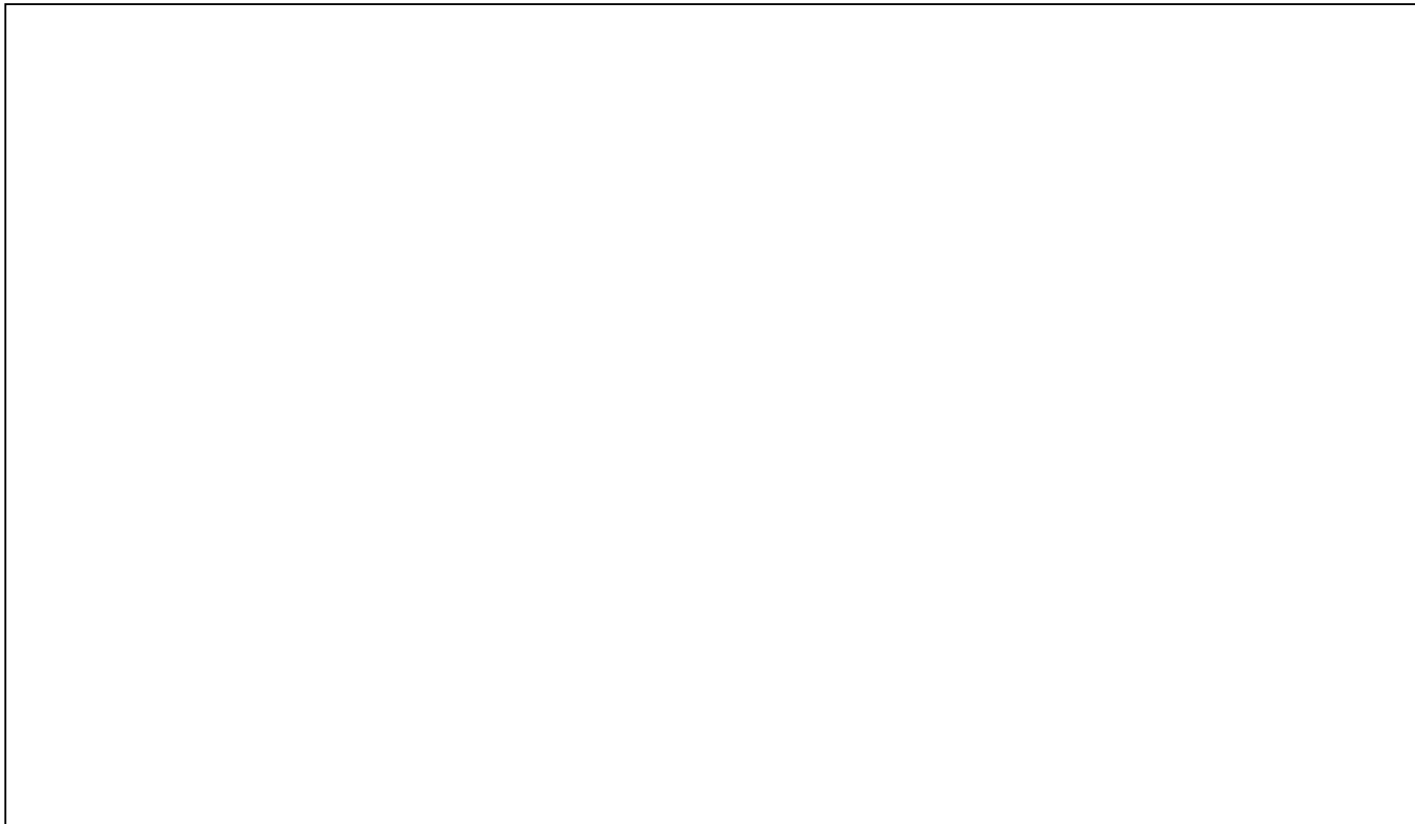
Who was *Sir Ernest Rutherford*? _____

What did he discover? _____

Explain how one person's discovery was related to another person's work: _____

Requirement 5

Draw and color the radiation hazard symbol.



Where should this symbol be used? _____

Where should this symbol not be used? _____

Tell why and how people must use radiation or radioactive materials carefully: _____

Requirement 6

You have been given ten options for this requirement. Select and complete three of them.

If you selected *Option A*:

Build an electroscope. Briefly describe how you did this: _____

Show/Describe how your electroscope works: _____

Put a radiation source inside it. What was your source that you used? _____

Explain any difference seen: _____

If you selected *Option B*:

Make a simple Geiger counter. Briefly describe how you made it: _____

List all the parts of your Geiger counter: _____

Tell which types of radiation the counter can spot: _____

Tell how many counts per minute of what radiation you have found in your home: _____

If you selected *Option C*:

Build a model of a reactor: Describe your model: _____

Make sure your model includes the following: fuel, control rods, shielding, the moderator, and any cooling material.

__ Show your model your counselor. Point out the above parts.

Explain how a reactor could be used to change nuclear into electrical energy or make things radioactive: _____

If you selected **Option D**:

Use a Geiger counter and a radiation source. Show how the counts per minute change as the source gets closer. Briefly describe this exercise: _____

Put three different kinds of material between the source and the detector. Tell about the counts per minute for each material:

Material: _____ Counts Per Minute: _____

Material: _____ Counts Per Minute: _____

Material: _____ Counts Per Minute: _____

Tell why there were differences between the materials: _____

Tell which is the best material to shield people from radiation and why: _____

If you selected **Option E**:

Using fast-speed film and a radiation source, show the principles of autoradiography and radiography. Give a brief summary of how you did this: _____

Explain what happened to the films: _____

Tell how someone could use this in medicine, research, or industry: _____

If you selected **Option F**:

Using a Geiger counter (that you have built or borrowed), find a radiation source that has been hidden under a covering. What did you find? _____

Find at least three other places under the cover and list them:

Explain how someone could use this in medicine, research, agriculture, or industry: _____

If you selected **Option G**:

Visit a place where X-ray is used. Where did you visit? _____ Date: _____

Draw a floor plan of the room in which the X-ray is used. Show where the unit, the person who runs it, and the patient would be when it is used:



Describe the radiation dangers from X-ray: _____

If you selected **Option H**:

Make a cloud chamber. Describe how you did this: _____

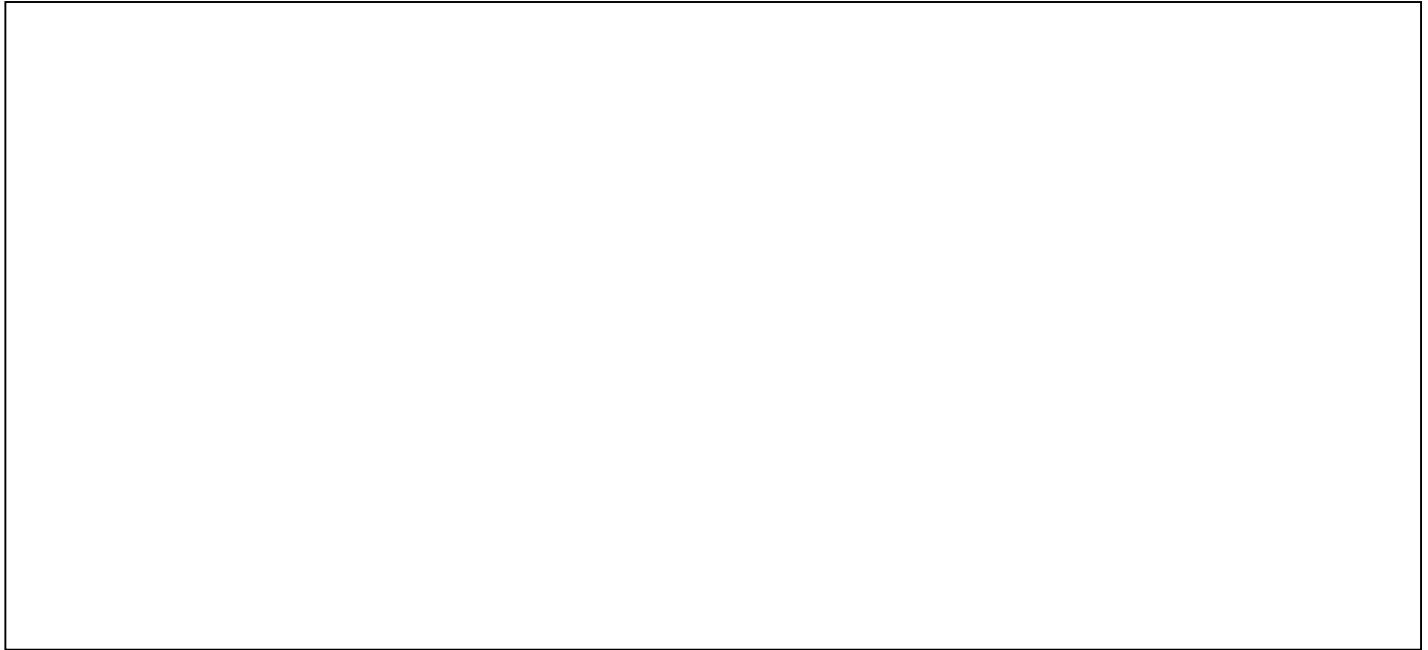
Tell/Show how it can be used to see the tracks caused by radiation: _____

Explain what is happening: _____

If you selected **Option I**:

Visit a place where radioisotopes are being used. Where did you visit? _____ Date: _____

Explain by drawing how and why it is used:



If you selected **Option J**:

Get samples of irradiated seeds. Plant them. Plant a group of nonirradiated seeds of the same kind. Grow both groups.

What kind of seeds did you plant? _____

What differences did you see between the irradiated and nonirradiated seeds when they grew? _____

Tell what irradiation does to seeds: _____
