Name: _____ Date: _____

Notes: Nuclear Reactions

What are the 3 subatomic particles in an atom? _____

What is the charge of each? Proton: _____ Neutron: _____ Electron: _____

Which subatomic particles are in the nucleus? _____

State the relative masses of each subatomic particle in the spaces below:

Protons _____ Neutrons _____ Electrons _____

Why do we not discuss electrons when discussing mass? _____

How are elements identified? _____

Define ***isotope***: _____

Define ***mass number:*** _____

How do you find the number of neutrons? _____

When determining the identity of an isotope, how would you find its name?

_____

When determining the identity of an isotope, how do you find its mass number?

_____

Fill in the blanks with the correct number of neutrons for each isotope?

Carbon-13 has ____ neutrons Uranium-239 has ____ neutrons

Hydrogen-3 has ____ neutrons Boron-11 has ____ neutrons

Fluorine-19 has ____ neutrons Chlorine-37 has ____ neutrons

Write the name of the isotope for each of the combinations of protons and neutrons below:

47 protons and 61 neutrons = _____

20 protons and 20 neutrons = _____

30 protons and 35 neutrons = _____

8 protons and 8 neutrons = _____

18 protons and 22 neutrons = _____

What do we use to abbreviate elements? _____

Label the **mass number** in the diagram to the right.

Label the **atomic number** in the diagram to the right.

What will normally not be written for you in a nuclear reaction problem?

_____

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Add atomic numbers to the isotopes below.

^{16}O ^{15}N ^{5}He ^{244}Pu ^{232}Th ^{237}Np

What happens to unstable isotopes? _____

Alpha Particle

How many protons are in an alpha particle? _____

How many neutrons are in an alpha particle? _____

What is the mass number of an α particle? _____

α particles are the nuclei of what element? _____

What is the mass of a beta particle? _____

What is the charge of a beta particle? _____

β particles are also known as what? _____

Beta Particle

Positrons

What is the mass of a positron? _____

What is the charge of a positron? _____

What are positrons the antiparticles of? _____

What kind of high energy radiation is always released? _____

What is the symbol for gamma radiation? _____

What is the symbol for a neutron? _____

Completing Nuclear Reactions

Step 1: _____

Step 2: _____

Step 3: _____

1. $^{11}C \rightarrow$ _____ + $^{0}_{+1}e$

2. $^{10}B + {}^{1}_{0}n \rightarrow$ _____ + ^{4}He

3. $^{238}U \rightarrow$ _____ + ^{4}He

4. $^{14}C \rightarrow$ _____ + $^{0}_{-1}e$

Define ***fission***: _____

What is an example of a fission reaction? _____

Define ***fusion***: _____

What is an example of a fusion reaction? _____

What can radiation cause? _____

Sketch the radioactive safety symbol in the space to the right.