

1) Organize the matter into the four types of matter and explain your answer.

Matter	Туре	Explanation
Gasoline		
Uranium		
Orange Juice		
Methane (CH ₄)		

2) How many atoms are in the compound below?

```
(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>
```

3) Organize the changes below as physical or chemical and explain your answer.

Action	Change	Explanation
Melting of gold		
Cooking meat		
Digesting food		
Charcoal drawing		

- 4) Explain the difference between the mass number and the average atomic mass number.
- 5) How many protons neutrons and electrons are in the elements below?

Element	Proton #	Electron #	Neutron #	Mass #
Nitrogen - 16				
²⁴⁶ ₉₄ Pu				
Most abundant				
Iron atom				
$^{37}_{17}Cl^{-1}$				

- 6) Chlorine has two isotopes ³⁵Cl with a mass of 34.968852g and ³⁷Cl with a mass of 35.965903. The percentage of these isotopes are 75.77% and 24.23% respectively. What is the average atomic mass unit of chlorine?
- 7) A sample of element X contains 100 atoms with a mass of 12.00 and 10 atoms with a mass of 14.00. Calculate the average atomic mass (in amu) of element X.
- 8) What is an alpha particle and what caused it to change course in the gold foil experiment?
- **9)** Carbon-14 measurements on the linen wrappings from the Book of Isaiah on the Dead Sea Scrolls indicated that the scrolls contained about 79.5% of the carbon-14 found in living tissue. Approximately how old are these scrolls? The half-life of carbon-14 is 5730 years.
- **10)**Phosphorus-32 is a radioactive isotope used as a tracer in the liver. How much phosphorus-32 was originally used if there is only 3.50 mg left in a sample after 288 h? (The half-life of phosphorus-32 is 14.3 days.)
- **11)**Show plutonium 239 going through two alpha decays.
- **12)**The isotope Uranium 238 undergoes a alpha decay and then two beta decays what is your final elemental isotope product?