

Answer the following questions:

- How does an atom differ from a molecule?
- How do molecules of elements and molecules of compounds differ?
- Indicate whether each of the following statements is *true* or *false*. If a statement is false, change it to make it true. (Such changes should involve more than merely making the statement the negative of itself - explain.)
 - Molecules must contain three or more atoms.
 - The atom is the limit of chemical subdivision for an element
 - All compounds have molecules as their basic structural unit
 - A molecule of a compound must be heteroatomic
 - A molecule of an element may be homoatomic or heteroatomic depending on which element is involved.
 - The limit of chemical subdivision for a molecular compound is a molecule.
 - Heteroatomic molecules do not maintain the properties of their individual elements.
 - Only one kind of atom may be present in a homoatomic molecule.
 - The main difference between molecules of elements and molecules of compounds is the number of atoms they contain.
- What is the characteristic size range for atoms (in centimeters)?
- The diameter of a fluorine atom is 1.44×10^{-8} cm. How many fluorine atoms laid in a straight line would it take to fill 1.00 inch? (1 inch = 2.540 cm)
- On the basis of its formula, classify each of the following substances as element or compound:
 - KNO_3
 - CO
 - Co
 - COCl_2
 - S_8
 - Hf
- How many atoms of each kind are represented by the following formulas:
 - SO_3
 - Fe_2O_3
 - NH_4ClO_3
 - NH_3
 - HNO_3
 - $\text{C}_{10}\text{H}_{22}$
- What is meant by the statement "atoms are electrically neutral?"
- Indicate which subatomic particle (electron, proton or neutron) each of the following correctly applies. More than one particle may apply.
 - possesses a positive charge
 - has no charge
 - has a charge equal but opposite in sign to that of an electron.
 - has a mass slightly greater than that of a proton.
 - is located in the nucleus
 - has a negative charge
 - has the lowest mass of the three particles
 - is located outside the nucleus
- How did the results of Rutherford's gold foil experiment suggest that an atom has a nucleus?
- What information about an atom is given by its
 - atomic number
 - mass number
- In what ways are isotopes of an element alike? In what ways are they different?
- Can the atomic number of an element be large than its mass number? Explain.
- Arrange these five isotopes: 1) ${}_{20}^{42}\text{Ca}$ 2) ${}_{19}^{39}\text{K}$ 3) ${}_{21}^{44}\text{Sc}$ 4) ${}_{18}^{37}\text{Ar}$ 5) ${}_{22}^{43}\text{Ti}$
in order of:
 - increasing numbers of electrons
 - increasing number of neutrons
 - increasing number of protons
 - increasing mass