

**CHAPTER 3 REVIEW***Atoms: The Building Blocks of Matter***MIXED REVIEW****SHORT ANSWER** Answer the following questions in the space provided.

1. The element boron, B, has an atomic mass of 10.81 amu according to the periodic table. However, no single atom of boron has a mass of exactly 10.81 amu. How can you explain this difference?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. How did the outcome of Rutherford's gold foil experiment indicate the existence of a nucleus?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. The ibuprofen,  $C_{13}H_{18}O_2$ , that is manufactured in Michigan contains 75.69% carbon, 8.80% hydrogen, and 15.51% oxygen. If you buy some ibuprofen for a headache while you are on vacation in Germany, how do you know that the ibuprofen you buy at a pharmacy overseas has the same percentage composition as the one you buy at home?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Complete the following chart using the atomic mass values from the periodic table:

Compound	Mass of Fe (g)	Mass of O (g)	Ratio of O:Fe
FeO			
Fe <sub>2</sub> O <sub>3</sub>			
Fe <sub>3</sub> O <sub>4</sub>			

**MIXED REVIEW** continued

5. Complete the following table:

Element	Symbol	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons
Sodium			22			
	F	9	19			
			80		45	
			40	20		
		1			0	
			222			86

**PROBLEMS** Write the answer on the line to the left. Show all your work in the space provided.

6. \_\_\_\_\_ a. How many atoms are there in 2.50 mol of hydrogen?

\_\_\_\_\_ b. How many atoms are there in 2.50 mol of uranium?

7. \_\_\_\_\_ How many moles are present in 107 g of sodium?

8. A certain element exists as three natural isotopes as shown in the table below.

Isotope	Mass (amu)	Percent natural abundance	Mass number
1	19.99244	90.51	20
2	20.99395	0.27	21
3	21.99138	9.22	22

\_\_\_\_\_ Calculate the average atomic mass of this element.