Work together to answer all the following questions. It is not necessarily an exhaustive review of what we have covered so far, but it can certainly help.

1. Magnesium is essential to life on earth. I'm curious to know more about this element:
    a. What is the **atomic number** of magnesium?
    b. How many **electrons** does magnesium have?
    c. How many **protons** does magnesium have?
    d. What is the name of the group of elements magnesium belongs to?
    e. What period is magnesium in?
    f. How many electron shells does magnesium possess?
    g. How many valence electrons does magnesium possess?

2. Wow! Though I'd still like to know more about magnesium:
    a. Magnesium-24 is the most common isotope of magnesium. How many **neutrons** does it have?
    b. What is the purpose of having neutrons in an atom?
    c. What is the mass number for the magnesium-24 isotope?
    d. Which noble gas is closest to magnesium?
    e. How many electrons does magnesium gain or lose to achieve the same electron configuration as a noble gas?

3. Isn't magnesium such an interesting element? With winter quickly coming towards us we can even use it to help salt our roads. If an ionic compound of magnesium and chlorine is made:
    a. What is the **chemical formula** of this salt?
    b. What is the **name** of this salt?
    c. What is the **charge** of the magnesium ion?
    d. What is the **charge** of the chlorine ion?
    e. If you have **1.00 g of this salt**, how many atoms of chlorine do you have?

4. The salt described above can even be used as an aqueous solution to help in the purification of water to remove lead ions by precipitation. If you combine the above salt with a solution of lead(II) nitrate, you will find a precipitate will form.
    a. What is the **complete molecular equation** of this reaction?
    b. What is the **complete ionic equation** of this reaction?
    c. What is the **net ionic equation** of this reaction?
    d. Does this reaction have spectator ions? If yes, what are they?

5. If you have a 500.0 mL sample of water with a $[Pb(NO_3)_2] = 0.025\ M$, and you add 100.0 mL of the salt solution with a concentration of 0.250 M:
    a. What is the **chemical formula** of the precipitate that forms?
    b. What is the **name of the precipitate** that forms?
    c. What is the mass of the precipitate **in mg**?
    d. What is the concentration of magnesium ions left in solution after reaction?
    e. What is the concentration of chlorine ions left in solution after reaction?
    f. What is the concentration of nitrate ions left in solution after reaction?
    g. What is the concentration of lead ions left in solution after reaction?

I think we've talked enough about magnesium for now, but there's so much more that can be said. Now we'll look at something separate. Let's look at combustion analysis!

6. First, let's look at a combustion reaction. We'll use the example of burning acetylene (C_2H_2) gas in the presence of oxygen gas, and it makes carbon dioxide gas and water vapour as products.
    a. What is the balanced chemical equation?
    b. Assign the oxidation states of every element in this reaction.
    c. What are the reducing and oxidizing agents?
    d. Is this an example of a precipitation, acid-base, or redox reaction?
    e. How can oxidation states be used to help determine the type of reaction?

7. Now, lets take a look at an actual combustion analysis. If we have a 300.0 mg sample of a compound that contains carbon, hydrogen, and oxygen that we want to analyze, we will have to combust it. After combustion we recovered 694 mg of carbon dioxide and 142 mg of water.
    a. What is the empirical formula of this compound?
    b. If the actual compound has a molecular mass of 152.144 g/mol, what is its molecular formula?