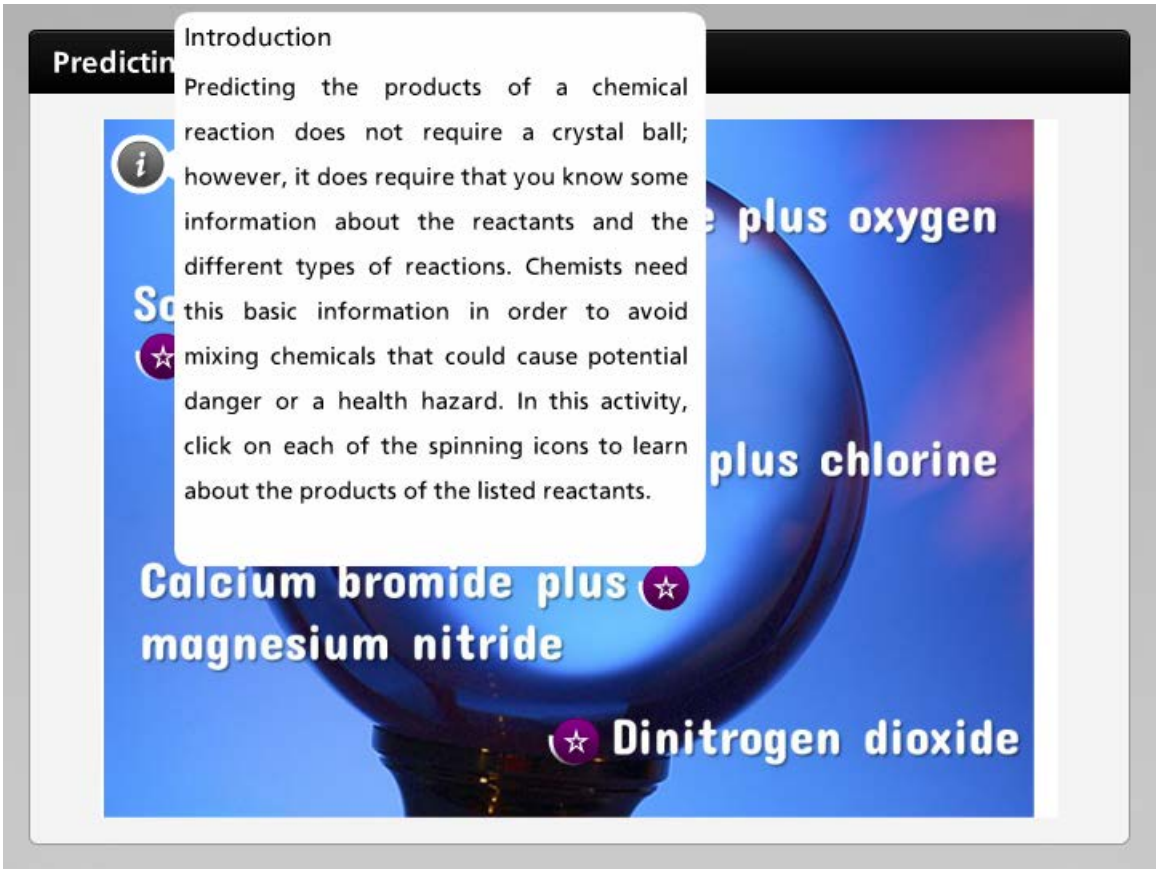
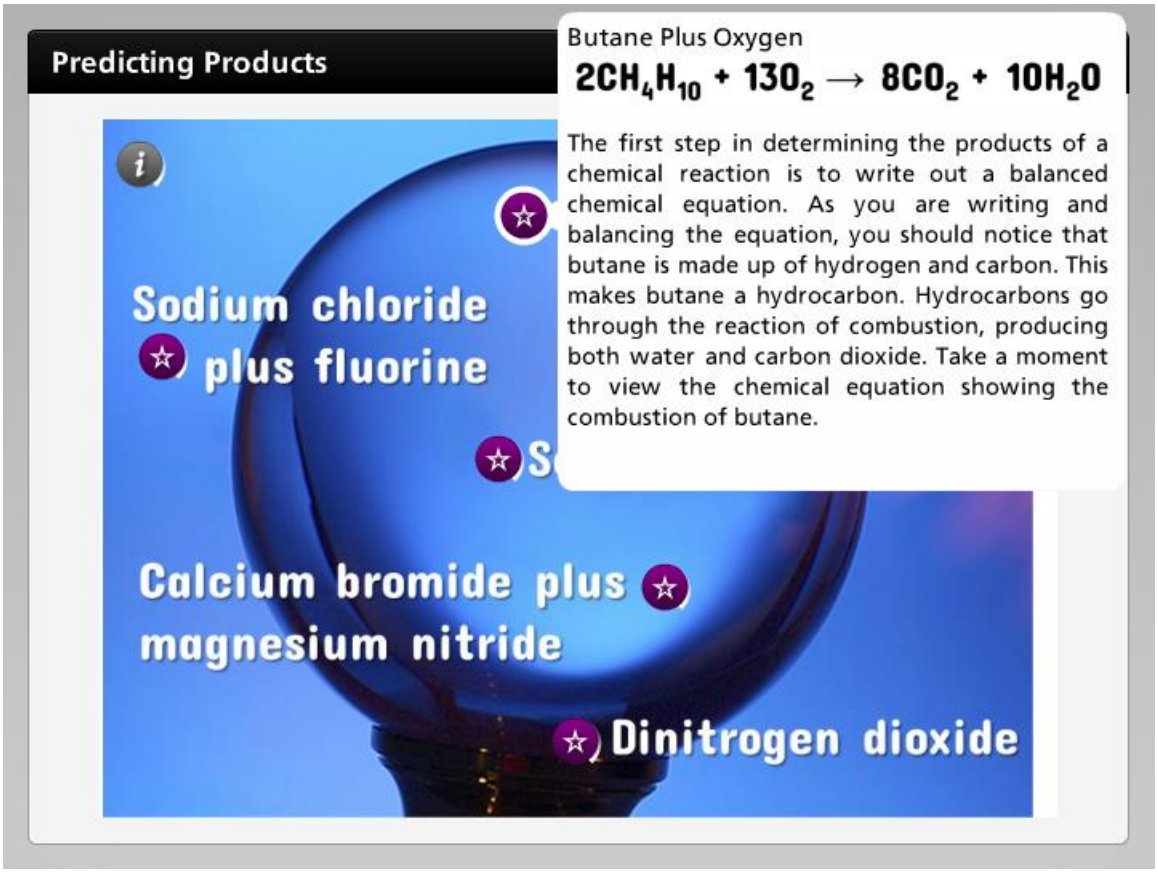
Module 6: Chemical Reactions
Topic 3 Content: Predicting Products Notes

Introduction



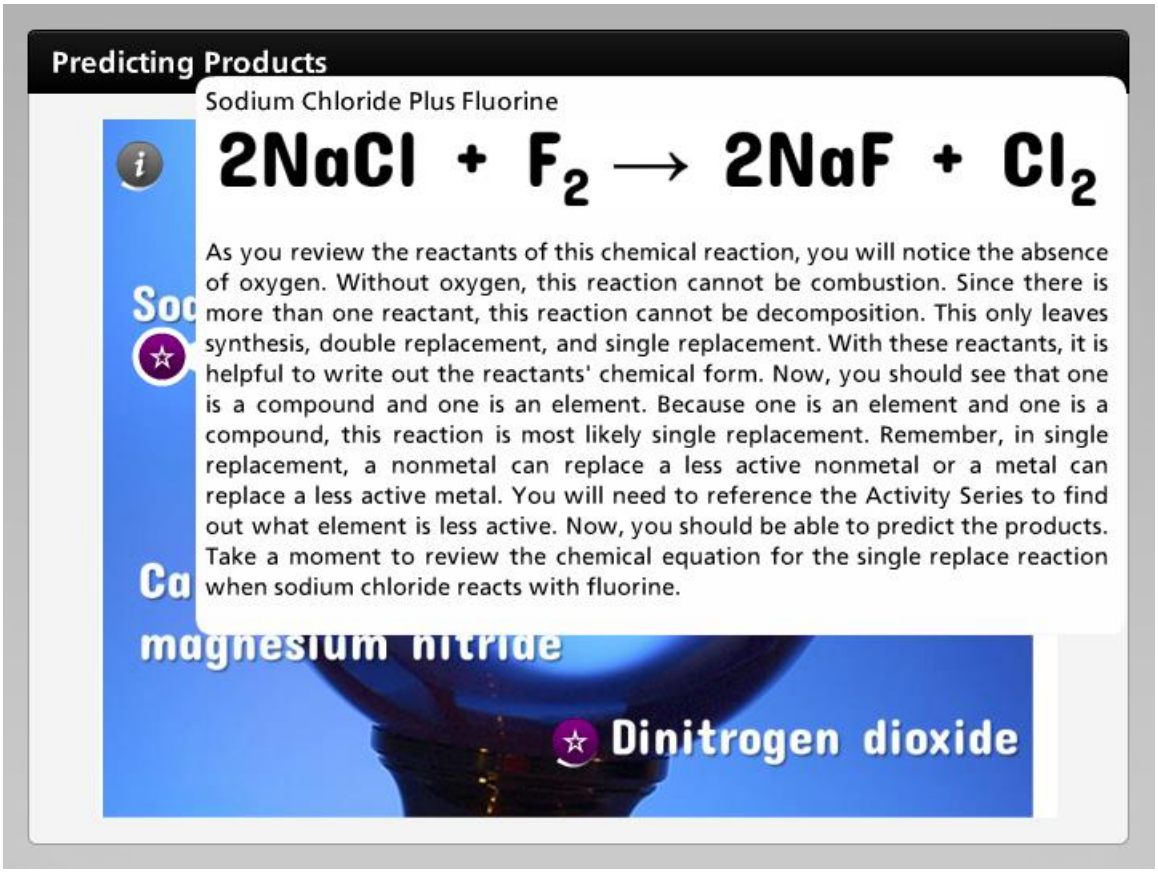
Predicting the products of a chemical reaction does not require a crystal ball; however, it does require that you know some information about the reactants and the different types of reactions. Chemists need this basic information in order to avoid mixing chemicals that could cause potential danger or a health hazard. In this activity, click on each of the spinning icons to learn about the products of the listed reactants.

Butane Plus Oxygen



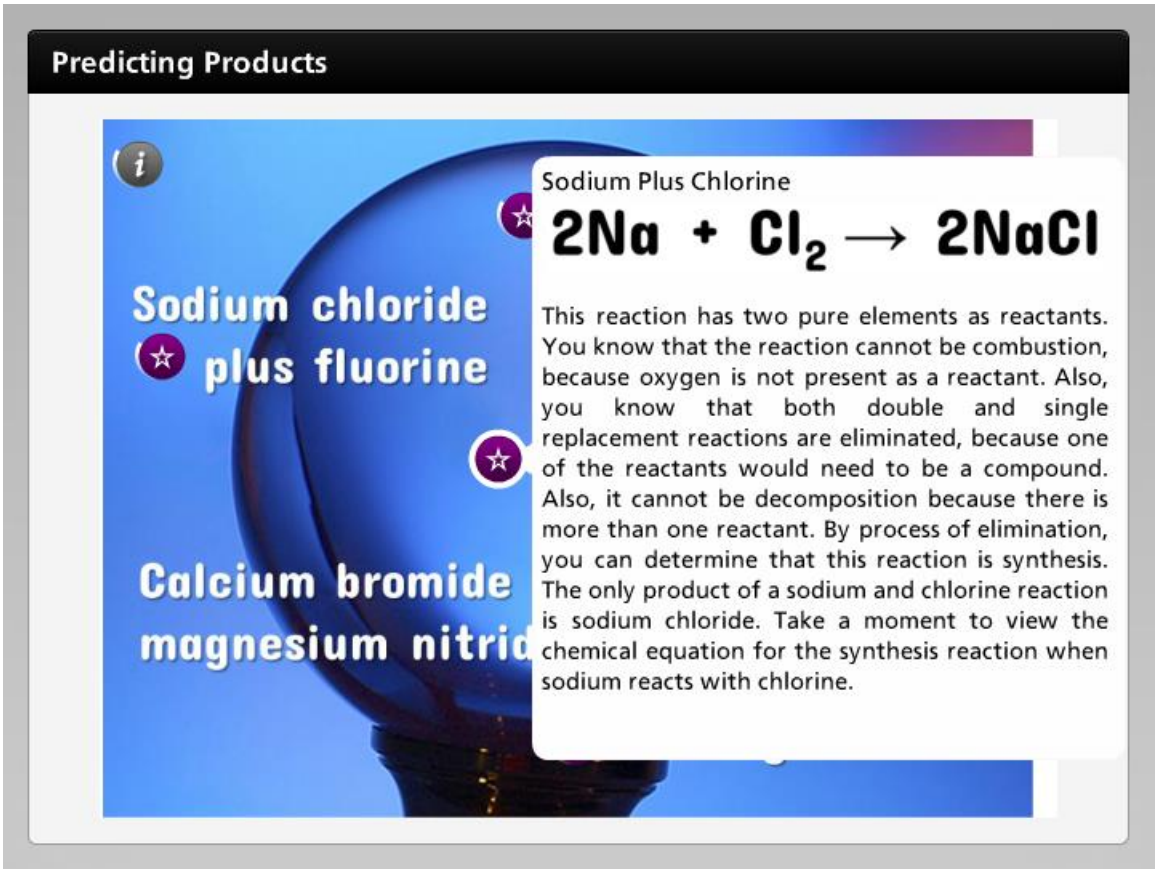
The first step in determining the products of a chemical reaction is to write out a balanced chemical equation. As you are writing and balancing the equation, you should notice that butane is made up of hydrogen and carbon. This makes butane a hydrocarbon. Hydrocarbons go through the reaction of combustion, producing both water and carbon dioxide. Take a moment to view the chemical equation showing the combustion of butane.

Sodium Chloride Plus Fluorine



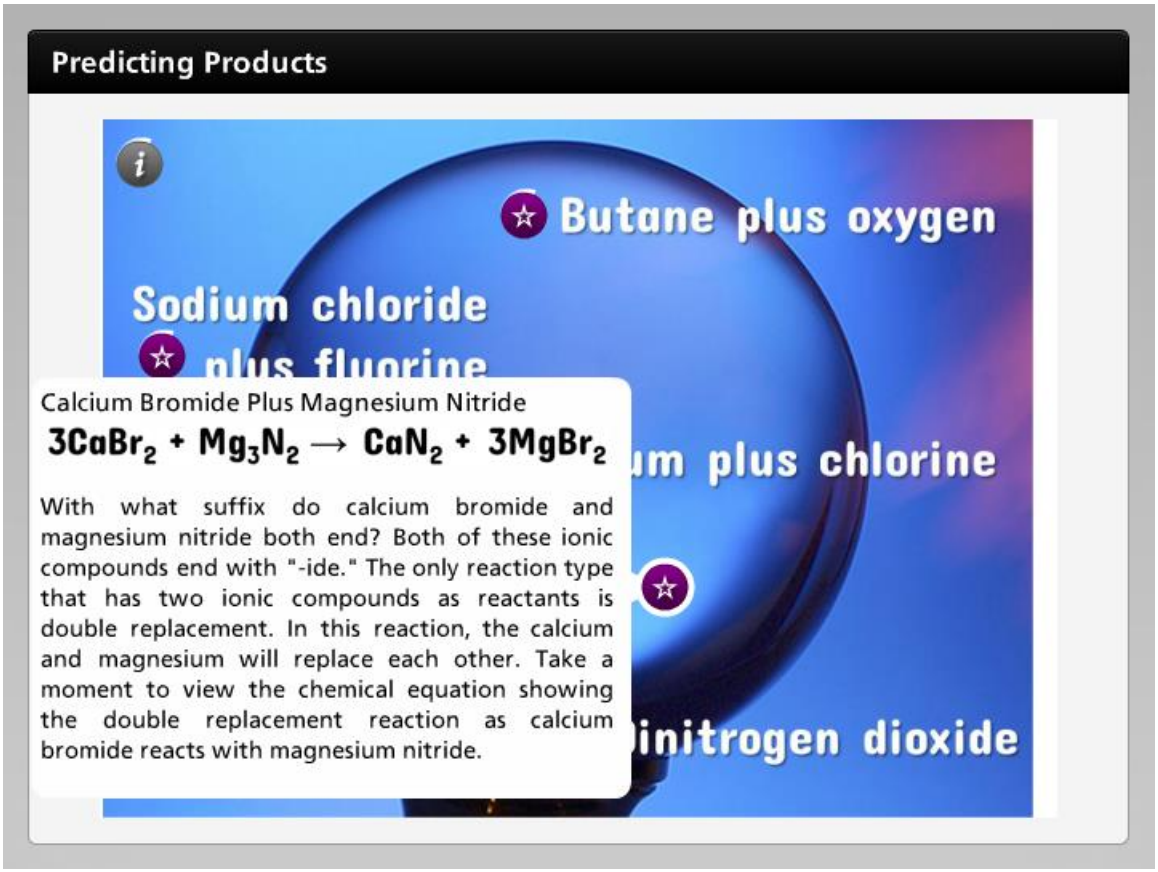
As you review the reactants of this chemical reaction, you will notice the absence of oxygen. Without oxygen, this reaction cannot be combustion. Since there is more than one reactant, this reaction cannot be decomposition. This only leaves synthesis, double replacement, and single replacement. With these reactants, it is helpful to write out the reactants' chemical form. Now, you should see that one is a compound and one is an element. Because one is an element and one is a compound, this reaction is most likely single replacement. Remember, in single replacement, a nonmetal can replace a less active nonmetal or a metal can replace a less active metal. You will need to reference the Activity Series to find out what element is less active. Now, you should be able to predict the products. Take a moment to review the chemical equation for the single replace reaction when sodium chloride reacts with fluorine.

Sodium Plus Chlorine



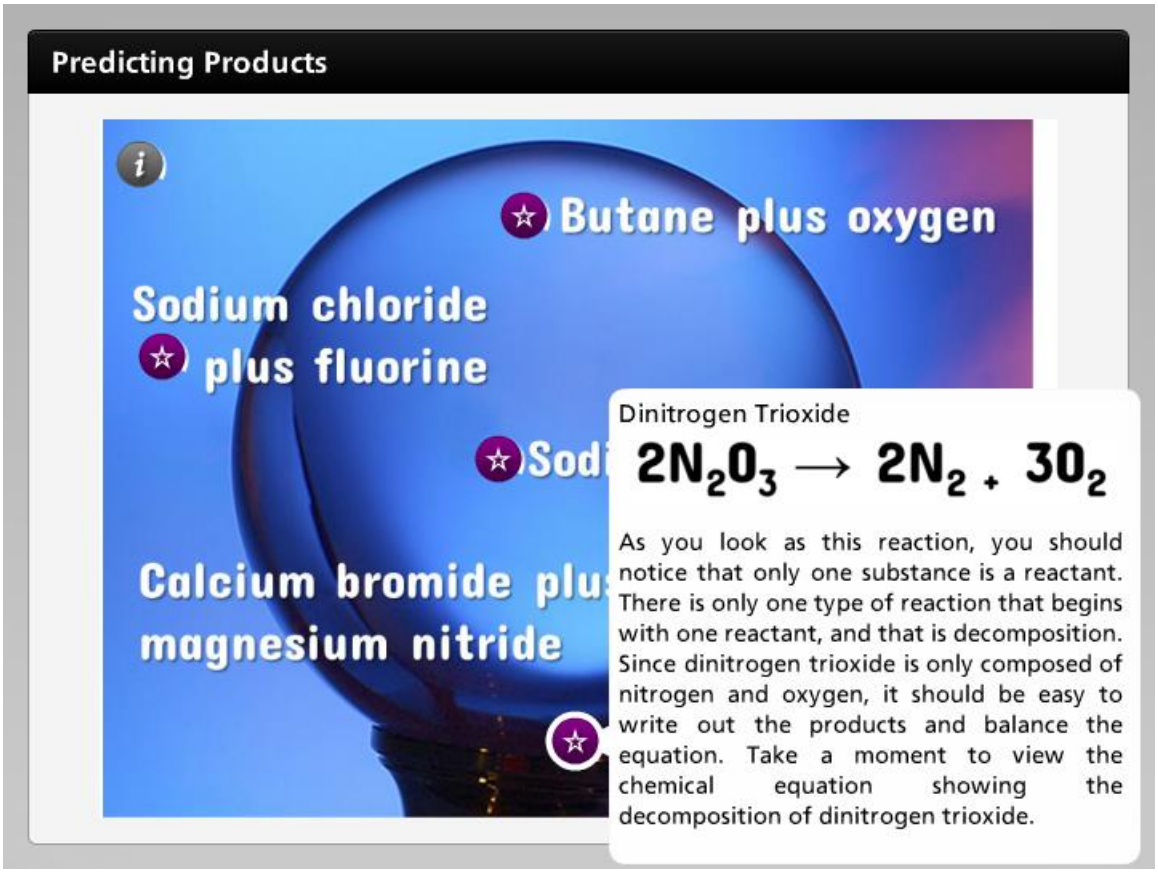
This reaction has two pure elements as reactants. You know that the reaction cannot be combustion, because oxygen is not present as a reactant. Also, you know that both double and single replacement reactions are eliminated, because one of the reactants would need to be a compound. Also, it cannot be decomposition because there is more than one reactant. By process of elimination, you can determine that this reaction is synthesis. The only product of a sodium and chlorine reaction is sodium chloride. Take a moment to view the chemical equation for the synthesis reaction when sodium reacts with chlorine.

Calcium Bromide Plus Magnesium Nitride



With what suffix do calcium bromide and magnesium nitride both end? Both of these ionic compounds end with "-ide." The only reaction type that has two ionic compounds as reactants is double replacement. In this reaction, the calcium and magnesium will replace each other. Take a moment to view the chemical equation showing the double replacement reaction as calcium bromide reacts with magnesium nitride.

Dinitrogen Trioxide



As you look as this reaction, you should notice that only one substance is a reactant. There is only one type of reaction that begins with one reactant, and that is decomposition. Since dinitrogen trioxide is only composed of nitrogen and oxygen, it should be easy to write out the products and balance the equation. Take a moment to view the chemical equation showing the decomposition of dinitrogen trioxide.