## <H1> (Ignite)

During a car crash, in just a fraction of a second, the airbag inflates and protects passengers from impact. It inflates with gas. Where does that gas come from? Is it in a tank as compress gas inside the uninflated airbag? Is the gas stored somewhere in the engine? Or is it released by some kind of chemical process?

Debate with classmates: which of these three methods would be more practical to inflate the airbag? Hints, think of the space, weight and balance, safety, maintenance, cost, sensitivity to temperature, regulations, and rapidity of the process each of these would take.

## <H1> (Direct Instruction) Chemical Reactions

It turns out that the airbag inflates due to a chemical process. Inside the airbag there are some substances that when triggered, they combine and undergo a chemical change. You learned about chemical changes in prior lessons. A chemical change occurs when substances change their chemical composition, for example paper burns with fire and turns into ashes. We can represent this chemical process as:

Another term used to describe a chemical change is chemical reaction. A chemical reaction can change matter in many ways, for example it can burn substances, degrade them, or bake them. When these transformations of matter occur, some new substances are formed. For example, in the chemical reaction that takes place in the airbag a gas is released. The chemical reaction can be represented as a chemical equation. Chemical equations are similar to the representation for paper and fire to render ashes but with slight modifications. In a chemical equation, the “=” sign has been replaced by an arrow.

Debate with classmates: why do you think the “=” sign has been replaced by an arrow to represent a chemical equation?