How an Airbag Works:

Although we don't usually associate automobiles with chemistry, a lot of chemistry takes place in a working car--the burning of gasoline to run the engine, for example, and chemical reactions in the battery to generate electricity. Another reaction--one that most drivers would just as soon not experience firsthand--involves the air bag. Air bags are not inflated from some compressed gas source but rather from the products of a chemical reaction. The chemical at the heart of the air bag reaction is called sodium nitride, or NaN_3.

Under normal circumstances, this molecule is quite stable. If heated, though, it will fall apart. The chemical equation $2NaN_3$ --> $2Na + 3N_2$ describes exactly how it falls apart. Notice that the second product of the above reaction is N_2, also known as nitrogen gas. The nitrogen gas that is produced from the reaction can then work to inflate the air bag and that protects the person who is driving the car!

The Problem:

In order to protect the person driving in the car, we need to have the correct amount of nitrogen gas produced. If there is too little gas produced, the air bag will not be blown up enough in order to protect the driver of the car. If the air bag is blown up too much, it might explode which would also result in the person driving the car to be hurt.

The Question:

How could the scientist figure out how much nitrogen gas they would need in order to protect the person? Once they know how much nitrogen gas they need, how could they figure out how to produce that much nitrogen gas each time?

Resources:

You may use the internet to look up more information in order to find a solution to this problem.

Response:

 Answer the two questions with your group. Be ready to present out your solution to the class.