

The Rocket Car!!



What are We Doing?

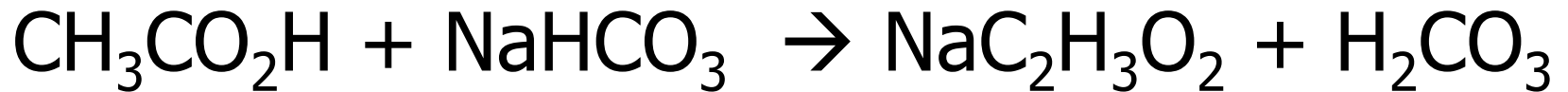
- Making a chemical fuel
- Using the fuel to power car
- Try different mixtures of the fuel to make the car GO!!!

What's This Got To Do With Chemical and Materials Engineering??

- Chemical Engineers
 - Formulation of new chemical fuels
 - Design of the chemical reactor
- Materials Engineers
 - Develop new catalyst materials to initiate the reaction
 - Cast/Form the chemical reactor housing

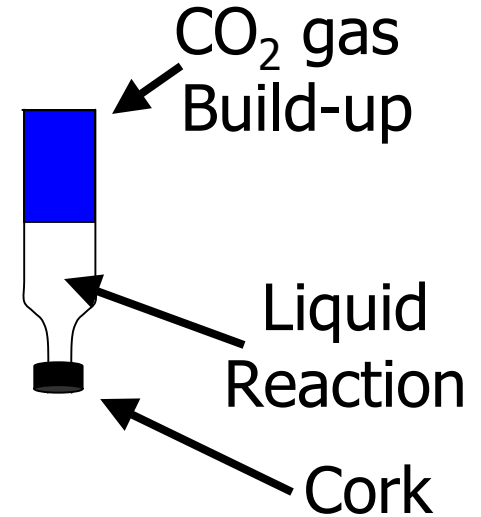
Chemical Reaction

- Acetic Acid - $\text{CH}_3\text{CO}_2\text{H}$
- Sodium Bicarbonate - NaHCO_3



Making the Car GO!!

- Create the chemical reaction in a sealed bottle
- Build up of CO_2 will pressurize the bottle



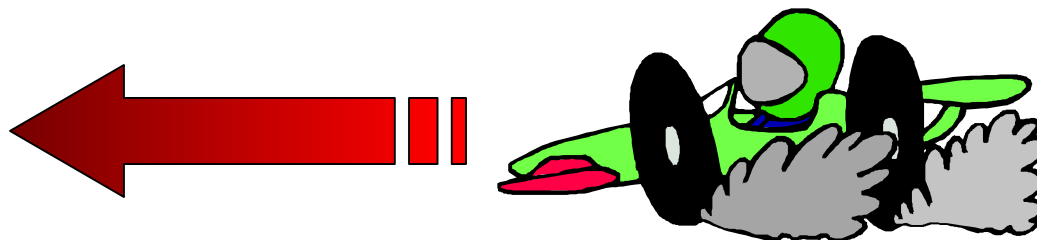
- The Bottle Fails
– **BOOM!!!**



Out pops the Cork!

GO GO GO GO!!!!

- Use the pressure force built up in the bottle to push the car
 - Momentum (mass x velocity)
- The gas generated will push the liquid below to move the car.



What Do We Get To Do??

- Race a Chemical Car!!
- Equipment and Supplies
 - Prototype CME Racer fueled by CO₂ gas
 - Baking Soda (Sodium Bicarbonate)
 - Vinegar (5% Acetic Acid)

Goals of the Experiment

- Keeping the “load” of Baking Soda constant examine the effect of different amounts of Vinegar
 - Look at 3 different levels (High, med, low)
- How far does the car go for each level?

Experimental Procedure

- Check to make sure end stopper is in place
- Fill soda bottle to the appropriate liquid level line with vinegar
- Place one (1) teaspoon of baking soda in a square of toilet paper
- Place the baking soda/toilet paper bundle into the soda bottle
- Quickly cap the bottle. Make sure that there is a good seal.
- Set to the side of the car and wait for the car to accelerate forward!!!!

CAUTIONS!!!!

- Stand to the side of the car.
 - **DO NOT** stand behind the car.
 - The resulting spray of water and vinegar from the back of the car will get you wet.
- If your car does not “ignite” after 2 minutes let an assistant know. **DO NOT** attempt to pull out the end stopper.