The three Chimps.

Chimps sometimes use sticks as tools to get termites out of a hole in a log. The method they use is to stip a stick, insert it into the hole, wait a short time, and then carefully pull the stick out of the hole. Some termites come out with the stick and become the chimp's snack.

You are the "engineer" chimp, and you're going to analyze this problem. First you'll need to determine what your goal is, probably more termites in a given time. Then you'll have to think about how various variables that you can control might affect the outcome and define these variables. They might include the dimensions of the stick, the length of time the stick is left in the hole, and how carefully you remove it (time issue).

Next, you are going to think about what how the termites behave inside the hole and make some assumptions about what might be happening. You will have to define some constants, such as the concentration of termites, the rates of crawling onto an off the stick, etc. etc....

Finally, you need to create one or more mathematical relationships or equations which you could solve or maximize to best meet your goal. Since rates are involved, they will probably be differential equations.

All of this should result in a page or two (depending on how small you write) of definitions, assumptions, drawings, and math. There is no "right" answer. You will be graded on your effort and insight, so just have fun and give it a shot. Don't panic, this is not that important an assignment. My goal is to get you to think about a problem you have almost certainly never thought about before and for you to try to make a math problem out of it. That is a big part of engineering. Take a real problem and make some simplifying assumptions so that you can reduce it to a math problem. The engineer would go on to solve the math problem, apply the results back to the real world and finally make changes to get results that you want. In so many of your classes all you ever do is mess with the math and you can lose sight of the real world. Our class will be very prone to that problem, so I will occasionally try to inject some "real-world" examples and issues.

If you want to work in a group, I've got some more requirements. You'll need to submit your homework as a single packet with everyone's work together. The top page should be a cover sheet with each person's name on it. Each person should include one or two pages of their own work which covers some part of the problem. Perhaps one person writes up the basic core of the problem. One person works on how you might actually find the termite constants. Another might look more closely at what happens when the stick is pulled from the hole. You get the general idea. Each person's work should be identified, although everyone may benefit from common brainstorming.

The best submissions will be displayed in the glass case for our homework solutions.