Team Instructions

Note: These are notes taken from instructions on team preparation from the Mathematical Contest in Modeling.

As you read each project, you should think about what role you will fill in a project team, what responsibilities you can assume, and how you can best prepare. Each team will consist of approximately three members. Each person will email Dr. [insert supervisor project] their two top preferences and teams will be assigned on a first ask first get basis, once the call for selections is out. Here are the roles each person will assume in a team:

Computer Person

Most successful teams do some to quite a bit of computer work. This could mean programming in a language like Matlab, C++ or Java. Most complex models require a computer to make their predictions. The computer person must first implement the mathematical model so it is capable of making predictions, then set up the solution methods to tell the mathematical model what we are going to do, then deal with the resulting data and compare how different solution methods work out. You'll never know what works or what doesn't until you actually get through the third step in the process. This will often involve a HUGE amount of time in front of the screen. Books on numerical methods can be very useful, depending on the type of problem that you work on. One very good one is called Numerical Recipes in C.
Visualization is also very important. Make sure that you're ready to make lots of plots and graphs, in Matlab, Maple, Exel, or whatever you're using.

Writer

The paper is what your team will be graded on–note that you cannot leave things off the paper because you plan to discuss it in the presentation. The presentation will only highlight some part of your work. The rule thumb os that if it's not in the paper, it doesn't matter. The paper must be written very very clearly. It must say things very simply and precisely. You do not need to make things sound complicated–anyone can do that. As writer, your goal should be to make everything as simple as possible. Don't write in that phony 'The data were collected.' style. Use personal pronouns: 'We collected the data.' This makes the writing much more active, and much less dry. Also, the key to interesting writing is often a good verb. If you've got a sentence that's dry and boring, try to find the action in it–what HAPPENS!- and try to find a good verb to rebuild the sentence around.

READ THE PAPER OUT LOUD. Let me say that again: read the paper OUT LOUD You never know how things sound until you actually hear them–it makes problems so much more easy to spot. If things are even the slightest bit confusing, then they must be changed. Remember, if you don't quite understand it, the reader won't have a clue and that is not good. In the end, I think that paper writing should be a completely team project, but someone has to take the lead. The writer's goal should be to create a thorough draft of the paper, covering everything the team has worked on. You must get everyone to critique every part of the paper, and one of the hardest parts is learning not to take that criticism personally. Writing without an ego is difficult. As writer, you need to get chunks of the paper written, then circulate them around, get feedback, and go back and write again. Be comfortable with writing, and rewriting, and

rewriting over and over again. As preparation, you need to do a whole lot of reading. Read every relevant reference paper you can get your hands on, and some outstanding MCM papers (google them).

It's also the writer's responsibility to get familiar with whatever word processing package the final paper will be written on. Be sure you know how to do equations, headings/subheadings, bullet lists, etc. I'm partial to LaTeX, but Word has a reasonable equation editor, if you must. Make sure you know the basics and save it all–I recommend Dropbox for file sharing.

The Third

The third team member must look for things that need to be done. The first big hurdle is research. Find out as much as you can about the problem, and possible ways to solve it. To be useful, research has to be very specific. Dig through math texts looking for specific things that can be implemented on the computer. Get to know Numerical Recipes really well, and look for things you can use. After research, make sure to get involved in writing as well. Be a sounding board for what the writer has done, and make sure that everything is very, very clear. Everything should flow and sound completely natural.

This project should be a collaboration all the way, learning how to be a good team player is a vital skill that you can carry with you in the workplace or, believe it or not, after grad school in your academic endeavors. All team members should develop model equations, understand published work, help implement simulations, and importantly all should write.