

## Problem Solving Techniques

- State the problem to be solved
- **Organize** your thoughts
- Write down the information that you have
- Draw a picture
- Consider the physical phenomena involved
  - What is happening?
  - What are the relationships among quantities?
    - If I change "this," than "that" will happen...
- What mathematical relations may be useful?
- State simplifying assumptions
- Can/should the problem be broken into simpler pieces?
- Work through the solution
- Check correctness
  - magnitude
  - units
  - boundary conditions
  - trends
- Clean up/redo the solution

## Things to consider

- Literally, ask yourself questions
  - What information do I have?
  - What do I want to know?
  - How is "this" useful?
- From the known to the unknown, from the simple to the complex, one step at a time
- Go with what you know
- **If you can't solve your problem, solve an easier problem first**
- Don't worry about making mistakes: wrong paths often provide insight and motivate more fruitful paths
- Don't give up too quickly, be patient, think, explore, try multiple approaches, have fun!