* Problem Solving

1. **Defining the problem** – Knowing the problem inside and out.
   * What are the assumptions being made?
   * What are the parameters and constraints of the problem?
   * What goals are we trying to meet?
2. **Choose the part to solve** – Any large problem can be broken into smaller problems.
   * Identify sub-goals after you identify the main goal.
   * Identify the constraints for those sub- goals.
3. **Identify potential solutions** – There is almost always more than one way to solve a problem.
   * Look at the sub-problems, see if you can create solutions for them.
   * Can you generalize to make the solution work for the whole problem?
   * Don’t worry whether or not they actually work yet. We’ll test them out later.
4. **Evaluate the solutions** – Does it work? Does it work for all of them?
   * Does the solution meet the goals?
   * Dose the solution work for all cases?
   * There may be more than one solution. Rank them to see which one works best.
5. **Implementing the solution** – How will it work? Test, test, test, test!
   * Develop an action plan to implement the best solution.

* Problem Solving Activity
* **Problem 1**
  + Define the problem
    - The problem is the man on the riverbank can not take all the belongings with him on the boat at one time, he can only take one at a time and can not leave certain items together.
    - The man does not require the goat and the cabbage to travel across the river. He only wants to take the parrot, the cat, and the seed. The goat and the cat can not be left alone. However the cabbage does not matter.
    - The overall goal is to get all of the man’s belongings and the man himself to the other side of the river.
  + Break the problem apart
    - The constraints are that the man can only take one time at a time and can not leave certain items together.
    - The sub goals are to take each item to the other side of the river safely without the cat eating the goat.
  + Identify the potential solution
    - The man needs to take multiple trips.
      * The man needs to take the cat over first. Then, he needs to take the seed over, and after he needs to take the parrot.
  + Evaluate a potential solution
    - Yes, the solution meets the goals.
    - Yes, each solution will work for each case.
  + Choose a solution and develop a plan to implement it.
    - My plan is to have the man first take the cat over to the other side, so the cat does not eat the goat. Come back by himself and then bring the seed over to the side that the cat is on. After he brings the seed over he needs to go back to the opposite side by himself and get the parrot. After he brings the parrot over to the other side his duties are done and he can continue his travels.
* **Problem 2**
  + Define the problem
    - The problem is that you have to pick out socks in the dark and can not see if they match.
    - Some information I noticed that isn’t immediately visible is they did not state whether the socks were paired in the drawer already, I am going to assume they are not but it is not clearly stated.
    - The overall goal is to get one pair of matching socks, and one pair of matching socks in each color. In this case there are 3 colors.
  + Break the problem apart
    - The constraints in this problem are that you can not see which socks you are picking.
    - The sub-goals are to correctly pick a pair of socks that match in one color, and then in all 3 colors.
  + Identify potential solutions
    - You could grab a ton of socks and hope that you get a pair.
    - You could grab two socks and hope they match.
    - You could double your chances and grab two of each color for one matching pair and you can grab 4 of each color to get 3 matching pairs.
  + Evaluate a potential solution
    - Each solution might meet the goals but it’s not probable for most of them.
    - No, I do not think each solution will work for each case.
  + Choose a solution and develop a plan to implement it.
    - I choose my last option which. First I would grab 6 socks and that way my probability will be higher for one pair of matching socks. To get a matching pair in each color of the socks I would grab 12 socks. Since there are 3 colors I would grab 4 of each supposed color that way my probability will be higher but still relevant.