

How Experts Overcome Barriers to Problem Solving

1. Read the problem over several times but at different times. Be sure to understand all facets of it. Emphasize the different features each time.
2. Restate the problem in your own words, List assumptions.
3. Draw a comprehensive diagram of the process and enter *all* known information on the diagram. Enter symbols for unknown variables and parameters.
4. Formally write down what you are going to solve for: “I want to calculate ...
5. Choose a basis.
6. Relate the problem to similar problems you have encountered before, but note any differences.
7. Plan a strategy for solution; write it down if necessary. Consider different strategies. Write down all the equations and rules that might apply to the problem.
8. Formally write down everything you know about the problem and what you believe is needed to execute a solution.
9. Talk to yourself as you proceed to solve the problem.
10. Ask yourself questions as you go along concerning the data, procedures, equations involved, etc.
11. Talk to other people about the problem.
12. Break off problem solving for a few minutes and carry out some other activity.
13. Break up the solution of the problem into more manageable parts, and start at a familiar stage. Write down the objective for each subproblem (i.e., convert mole fraction to mass fraction, find the pressure in tank 2, etc.).
14. Repeat the calculations but in a different order.
15. Work both forward and backward in the solution scheme.
16. Consider if the results you obtained are reasonable. Check both units and order of magnitude of the calculations. Are the boundary conditions satisfied?
17. Use alternative paths to verify your solution.
18. Maintain a positive attitude—you know the problem can be solved—just how is the question.