Problem Solving

What is a “problem”? A problem is a question for which neither the answer nor the method of solution are immediately obvious. In other words, you have a problem if you haven’t already been taught a straightforward algorithm (i.e. “recipe”) for how to answer the question.

Tips and observations about problem solving

- **Understanding the problem:**
  - may need several readings of the question.
  - may need the information in the question reorganised into tables or graphs or translated into a diagram in order for sense to be made of it (e.g. a social worker might draw a diagram indicating the relationships and dynamics of the relationships between the people who are having an important impact on their client’s life).
  - may need you to start actually trying to solve the problem! (Trying a few things and seeing what happens can lead to insights into what a question is actually asking!)

- **Solving the problem:**
  - identify and collect relevant information and/or formulas which might be useful in solving the problem.
    - Relevant information could be things given in the problem, such as contextual factors which need to be taken into account or factors in a case or medical history, or additional information not given in the problem but which is needed to address the problem.
  - where relevant, consider first the full range of possible solution options, then use a process of elimination to decide which is the best to pursue in this instance (cf. a doctor considering which of several treatment options would be best for a particular patient).
  - Give yourself time to come up with a range of solution options: first ideas are often not the best ideas.
  - don’t be too hasty! Make sure you consider all relevant factors before deciding on a solution.
  - may require the trialling of several different solution approaches before you hit on the right one.
    - So, try to see failed/incorrect solution methods as learning experiences and perhaps clues to where the correct answer or approach might lie rather than indications of a lack of intelligence or ability on your part!
    - Also, don’t just stare at a problem and hope the answer will just pop into your head – put pen to paper and try out a few things!

- **If a problem seems unsolvable:**
  - try reframing it (remember the problem of the slow lift being reframed as a problem of people getting bored while waiting for it).
  - check that you aren’t making any unnecessarily restrictive assumptions (remember the nine dots problem).
  - try a different method or approach.
  - try tackling a simpler similar problem to see if that gives you any insights into solving the more complex problem.
  - put it aside and try again another day – you may need to “clear your mind” so you can approach the problem from a different angle.
  - seek help – while there’s value in struggling with things yourself, sometimes you just don’t know enough to solve your problem.
    - Remember though, that problem solving success is often just as much about perseverance as it is about knowledge and skill – so don’t give up too quickly! (Recall that Einstein took several years to finally figure out the full details of his general theory of relativity.)

- **Once you have a solution:**
  - check that it seems reasonable;
  - review what was finally successful to see if you can learn any general principles about how to effectively approach such problems from what you experienced.

- **Problem solving abilities**, like any other abilities, can only be improved through sufficiently regular, reflective practice (i.e. you not only do problems, but also think about how you do them: what are the best strategies?).
  - But being able to solve problems also depends on you having a rich, well-organised body of relevant domain knowledge, so to improve your capacity to solve problems in your field, keep learning and organise that knowledge.

Further Reading

### What can you do to improve your problem solving skills in your discipline?

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<tr>
<th>Area to improve</th>
<th>Yes</th>
<th>No</th>
<th>Ways you will achieve this</th>
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<tr>
<td>Spend more time initially identifying and reviewing the content knowledge and theories needed to tackle a given problem.</td>
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<td>Better organise the content knowledge needed for problem solving.</td>
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<td>Work on more effective initial problem representations (e.g. diagrams, mind maps, tables etc.).</td>
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<td>Reflect regularly on problem solving approaches to identify effective and ineffective strategies.</td>
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<td>Work to improve the basic skills and understanding needed for problem solving in my discipline.</td>
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<td>Make sure all relevant factors are taken into account when deciding on problem solutions.</td>
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<td>Do more problems to develop greater proficiency and flexibility. (Where will you find these problems?)</td>
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