

Summary

In summary, one might consider the following steps to aid in the solution of scientific problems:

1. Develop a comprehensive understanding of the problem before attempting to solve it.
2. If there is little or no reason to believe that there will be experimental contradiction when applying current theory, approach the problem via induction. If the problem is posed in terms of potential experimental contradiction with current theory, approach the problem via deduction.
3. Apply Bohr/Wheeler radical conservatism in developing a set of general assumptions from time-tested fundamental laws that constrain the solution of the problem. Do not consider assumptions that are particular to the problem at-hand, but rather have also been found to be applicable to a more general class of problems.
4. Develop a deductive decision tree for which the problem can be further broken down or subdivided into to a set of binary questions. Those questions that fall below a given fork are contingent upon that path being correct. If a given question can be answered, i.e., yes or no, then all other paths below the one that is incorrect are eliminated.
5. Based on the decision tree, develop Gedanken experiments to answer those questions as high as possible on the tree, but that also can be expected to be evaluated in a reasonable time based on current theoretical and experimental analysis. Utilize analogies with other phenomena and apply creativity, imagination, and insightfulness in developing hypotheses that would explain the Gedanken experiments.
6. Utilize new results obtained when resolving forks at a given level in the decision tree to aid in moving up the tree. Remove or eliminate possibilities as new results are obtained based on the formation of new Gedanken experiments and the application of theoretical and experimental analysis.
7. Always remain flexible in a deductive investigation—do not eliminate any particular proposal or idea from the solution set because it appears to be incorrect based on induction. All ideas remain on the table in a deductive investigation, until disproven.