

The Problem-Solving Bases

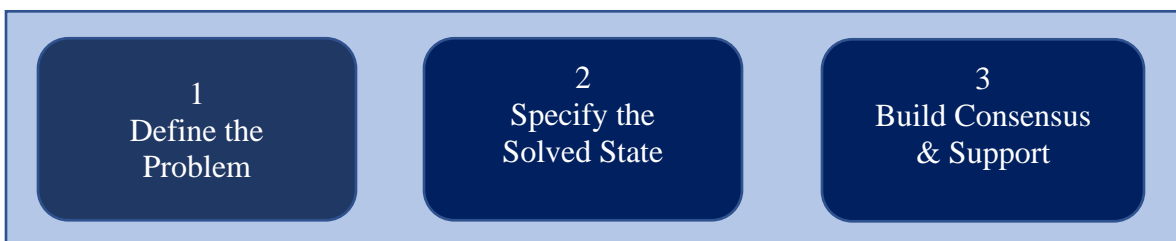
An Interactive Job Aid for Problem Solvers

Problem solving is a “cover-the-bases” kind of activity. Twelve problem-solving “bases” are shown below, organized into three stages: (1) *Identify*, (2) *Investigate* and (3) *Intervene*.

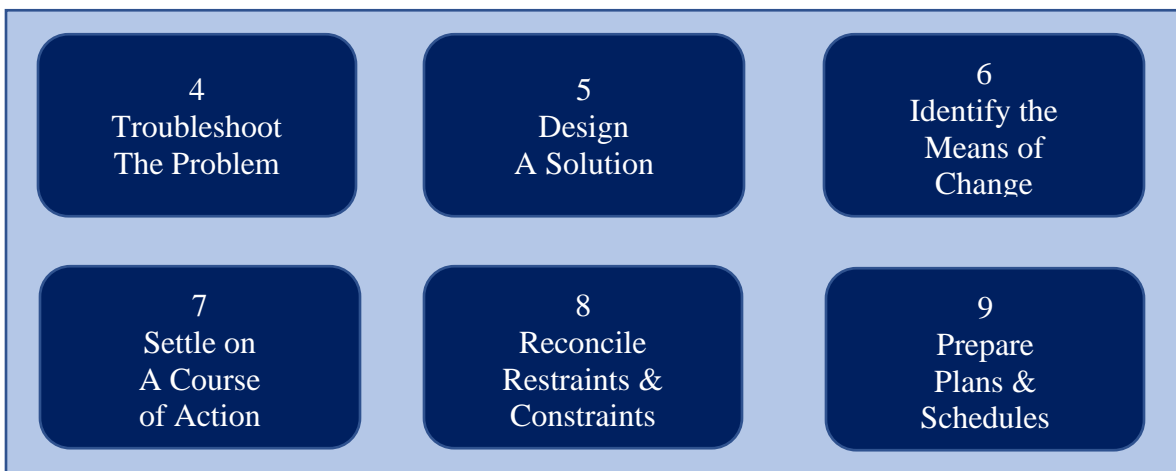
Clicking on a base below will take you to a set of questions for use in covering that base. To return to the diagram below from the question set for any base, click on or touch the curved green arrow next to the name of the base at the top of the question set.

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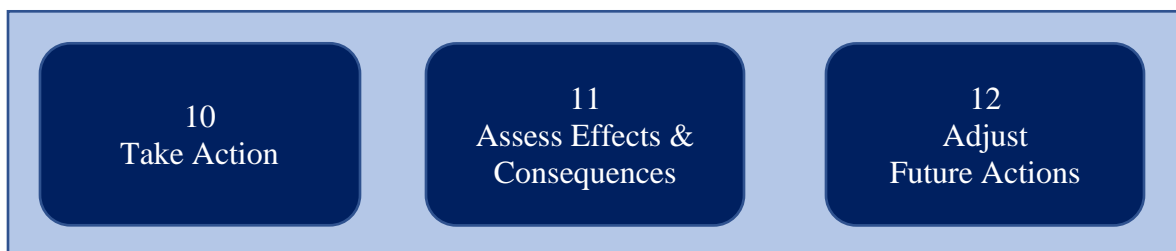
IDENTIFY



INVESTIGATE



INTERVENE



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Stage 1: Identify

1. Define the Problem

- What has gone wrong? What isn't working properly? What is?
- What should be happening that isn't?
- What shouldn't be happening that is?
- What are the specific symptoms and indicators?
- Where is it? Is it only there or is it elsewhere too?
- When is it? Is it only then or is it at other times too?
- What does it include? What does it exclude?
- What all is affected by this problem? Who all is affected by it?
- How big is it? How bad is it?
- What is it costing? Is it worth fixing?
- How urgent is it? Can we wait it out?
- Will it go away of its own accord?
- What happens if we don't do anything?
- What happens if we do the wrong thing?

2. Specify the Solved State

- What would things look like if they were going right?
- What would be happening that isn't?
- What wouldn't be happening that is?
- What do we want we don't have? What are we trying to achieve?
- What do we have we don't want? What are we trying to eliminate?
- What do we not have that we don't want? What are we trying to avoid?
- What do we have that we want to keep? What are we trying to preserve? What results are we after?
- What are the variables that we want to change?
- What are the desired values of the variables we wish to change?
- What will serve as evidence of success? Failure?
- How will we know the problem is solved?
- What is the "should be"? Who says?

3. Build Consensus and Support

- Who needs to know what? When?
- What is the best way to inform them?
- Who needs to be involved? When?
- What is the best way to involve them?
- Who might support or oppose our definition of the problem? Why?
- Who might support or oppose our view of the solved state? Why?
- Who might support or oppose our solution? Why?
- Whose support do we need to make this thing work?

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- What's in it for them? What's at risk for them?
- Who has to commit to what in order for this to work?

Stage 2: Investigate

4. Troubleshoot the Problem

- Should we look for causes? Were things okay before?
- Did the problem pop up or sneak up on us?
- When did things go wrong? What went wrong?
- What changed right about then or slightly before?
- Does this change account for the problem?
- Can whatever changed be corrected?
- If not, is there a viable workaround or "jury rig"?
- What do the solutions that are being proposed tell us about the perceived "causes"?

5. Design a Solution

- What frame of reference is appropriate?
- What kind or class of problem is it?
- What are we calling it? How do we have it labeled?
- What is the structure of this problem?
- What are the variables that make it up?
- How do these variables relate to one another?
- What means-end relationships exist?
- Are we dealing with some kind of mathematical structure?
- Are we dealing with some kind of production or state-change process?
- Is the structure psychological or sociological, that is, are we dealing with people and politics?
- Is the structure one of events occurring over time?
- Do we have a model of this structure?
- Should we construct one?
- How might we show all this in a picture or diagram?
- Where in the structure of the problem are the variables I'm trying to affect? Which other variables affect or drive those?
- Which of these variables are truly driving the problem? Which variables can I affect through direct, immediate action?
- What is the "Solution Path" – the path that leads from my direct, immediate actions to the variable I am trying to affect?
- Do we need to change peoples' behavior, the procedures they're following, the system they're using, or all of the above?

6. Identify the Means of Change

- What means are available for affecting the factors we've targeted?
- Training for people?

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- A procedural or methods modification?
- Process redesign?
- An equipment change?
- A systems change?
- Staffing changes?
- Resource allocation?

7. Settle on a Course of Action

- What are our options?
- What are their costs? What are their benefits?
- What are their side effects?
- How do we decide? How long do we have to decide?
- Do we have our egos out of this?

8. Reconcile Restraints and Constraints

- What are our restraints and constraints?
- What are all the things we must do?
- What are all the things we can't do?
- Who says? Are they real or imagined?
- What are we assuming? What are we overlooking?
- Can we get there from here?
- What has to give? Resources? Results? Time? Money?
- Who has to give?

9. Prepare Plans and Schedules

- What kind of a time frame are we talking about?
- Who does what when?
- What could go wrong?
- How will we know if things are going okay or fouled up?
- What's our backup or contingency plan?
- Do we even need one?
- How do we monitor progress?

Stage 3: Intervene

10. Take Action

- Do it!

11. Assess Effects and Consequences

- How did it go?
- Did it work?
- Have any new problems been created?
- Do they offset the gains from solving the original one?

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- Are we better off or worse off than before?
- What did we spend? What did we gain?
- Was it worth it?
- What did we learn?

12. Adjust Future Actions

- What didn't work? Why?
- What could be made to work better? How?
- Should our plans be revised? In what ways?

For more about the 12 problem-solving bases, see [Reengineering the Problem-Solving Process](#). For many more papers about problem solving and Solution Engineering, click [here](#) to visit that section of my web site.

About the Author

Fred Nickols is a knowledge worker, a toolmaker, a solution engineer, a writer, a consultant, and a former executive who spent 20 years in the U.S. Navy, retiring as a decorated Chief Petty Officer. In the private sector, he worked as a consultant and then held executive positions with two former clients. Currently, Fred is the Chief Toolmaker at [Distance Consulting LLC](#). His web site is home to the award-winning [Knowledge Workers' Tool Room](#) and more than 200 free articles, book chapters and papers. Fred is a longtime member of ISPI and writes a monthly column for *PerformanceXpress*. A complete listing of all Knowledge Worker columns is available [here](#).