Example: Cereal

Situation: stale cereal in stores.
Perceived problem: streamline the production process to get cereal to store shelves faster.

1. Get cereal to market faster.
   1. Build plants closer to market.
   2. Improve transportation.
      1. Hire faster trucks and race car drivers.
      2. Ignore speed limits.
      3. Use jet planes.
Example: Cereal

1. Make it OK for cereal NOT to get to market faster.
   1. Stop making cereal.
   2. Make cereal stay fresher longer:
      1. add chemical to slow spoiling,
      2. make better boxes.
   3. Convince customers that stale cereal is OK.
Original: Cereal is clearly not getting to market fast enough to retain freshness.

1. Read the sentence with emphasis on each of these words – what questions do they suggest?
   • Cereal
   • Getting
   • Market
   • Freshness
Original: Cereal is clearly not getting to market fast enough to retain freshness.

2. Pick a term with a definition and replace the term with the definition, e.g.,
   - cereal -> breakfast food that comes in box,
   - market -> the place where it is sold,
   - retain freshness -> without getting stale.
   - The change in emphasis makes us think about how we might change the box to prevent staleness, rather than thinking about speeding to market.
Original: Cereal is clearly not getting to market fast enough to retain freshness.

3. Reverse: How can we make cereal get to market so slowly that it is never fresh?
   • This makes us think about how long we must retain freshness, and what controls it.
Original: Cereal is clearly not getting to market fast enough to retain freshness

4. Change “every” to “some,” “always” to “sometimes,” etc.
   • Cereal **sometimes** is not getting to market fast enough to retain freshness.
   • Makes one think about things like why it is not **always** fresh, is it OK to occasionally not be fresh, etc.
Statement/Restatement

Original: Cereal is clearly not getting to market fast enough to retain freshness.

5. Challenge assumptions.
   • “Clearly” suggests an assumption.
   • Maybe cereal doesn’t get to store already stale?
   • Maybe the store holds it too long.
   • Maybe it is stale before it leaves the factory.
Original: Cereal is clearly not getting to market fast enough to retain freshness.

6. Freshness is inversely proportional to the time since the cereal is baked: freshness = K/time.
   • Can we change K, the constant of proportionality? What does that depend on?
   • Packaging? Storage conditions? Type of cereal?
   • Change time? At factory? During shipping? Time to shelve? Shelf time?
K.T. Problem Analysis

Useful for troubleshooting, where cause of problem is not known.

Basic premise is that there is something that *distinguishes* what the problem **IS** from what it **IS NOT**.

The distinction column is the most important.
<table>
<thead>
<tr>
<th></th>
<th>IS</th>
<th>IS NOT</th>
<th>Distinction</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td><strong>Identify:</strong></td>
<td>What is problem?</td>
<td>What is not problem?</td>
<td>What difference between is and is not?</td>
</tr>
<tr>
<td><strong>Where</strong></td>
<td><strong>Locate:</strong></td>
<td>Where is problem found?</td>
<td>Where is problem not found?</td>
<td>What difference in locations?</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td><strong>Timing:</strong></td>
<td>When does problem occur?</td>
<td>When does problem not occur?</td>
<td>What difference in timing?</td>
</tr>
<tr>
<td></td>
<td><strong>When was it first observed?</strong></td>
<td>When was it last observed?</td>
<td></td>
<td>What cause?</td>
</tr>
<tr>
<td><strong>Extent</strong></td>
<td><strong>Magnitude:</strong></td>
<td>How far does problem extend?</td>
<td>How localized is problem?</td>
<td>What is the distinction?</td>
</tr>
<tr>
<td></td>
<td>How many units are affected?</td>
<td>How many not affected?</td>
<td></td>
<td>What cause?</td>
</tr>
<tr>
<td></td>
<td>How much of any one unit is affected?</td>
<td>How much of any one unit is not affected?</td>
<td></td>
<td>What cause?</td>
</tr>
</tbody>
</table>
On a new model of airplane, flight attendants develop rash on arms, hands, face (only those places). Only occurs on flights over water. Usually disappears after 24 hours. No problems on old planes over those routes. Does not affect all attendants on these flights, but same number of attendants get it on each flight. Those who get rash have no other ill effects. No measurable chemicals, etc., in cabin air.
<table>
<thead>
<tr>
<th>IS</th>
<th>IS NOT</th>
<th>DISTINCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT: Rash</td>
<td>Other illness</td>
<td>External contact</td>
</tr>
<tr>
<td>WHEN: New planes used</td>
<td>Old planes used</td>
<td>Different materials</td>
</tr>
<tr>
<td>WHERE: Flights over water</td>
<td>Flights over land</td>
<td>Different crew procedures</td>
</tr>
<tr>
<td>EXTENT: Face, hands, arms</td>
<td>Other parts</td>
<td>Something contacting face, hands and arms</td>
</tr>
<tr>
<td></td>
<td>Only some attendants</td>
<td>Crew duties</td>
</tr>
<tr>
<td></td>
<td>All attendants</td>
<td></td>
</tr>
</tbody>
</table>
Four strategies or procedures were discussed for defining the problem. Which you actually use depends on the problem and your own style.

You should consciously develop some process that addresses the major steps, which you use out of habit, to make sure that you do not end up solving the wrong problem.

Be proactive: think through whether the problem statement is correct before solving any problem.