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.

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.

Statement/Restatement Technique

Statement/Restatement

Technique to form a more accurate definition of a problem. Goal is to stimulate new ideas for the possible solution(s).

Restatement Triggers:

1. Vary the emphasis placed on words in the problem statement.
2. Choose terms in the statements and replace them with more precise definitions.
3. Reform the statement to a negative phrasing.
4. Change qualifiers: every:some, always:sometimes, sometimes:never, and vice-versa.
5. Replace persuasive words, (obviously, clearly, certainly), with the argument being put forth.
6. Restate using equations, images, etc.

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.

Restated: Breakfast food that comes in box is clearly not getting to the place where it is sold fast enough to retain without getting stale.

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.

Statement/Restatement

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 fresh?

- • 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?

Kepner-Tregoe Decision Making Strategy

Components

1. Situation appraisal.
2. Problem analysis.
3. Decision analysis.
4. Potential problem analysis.

Intro Problem Solving in Computer Science **©2010-12 Schaffer & McQuain**

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.

		IS	**IS NOT**	**Distinction**	**Cause**
What	Identify:	What is problem?	What is not problem?	What difference between is and is not?	What is possible cause?
Where	Locate:	Where is problem found?	Where is problem not found?	What difference in locations?	What cause?
When	Timing:	When does problem occur?	When does problem not occur?	What difference in timing?	What cause?
		When was it first observed?	When was it last observed?	What difference between 1st, last?	What cause?
Extent	Magnitude:	How far does problem extend?	How localized is problem?	What is the distinction?	What cause?
		How many units are affected?	How many not affected?	What is the distinction?	What cause?
		How much of any one unit is affected?	How much of any one unit is not affected?	What is the distinction?	What cause?

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.

	IS	**IS NOT**	**DISTINCTION**
WHAT:	Rash	Other illness	External contact
WHEN:	New planes used	Old planes used	Different materials
WHERE:	Flights over water	Flights over land	Different crew procedures
EXTENT:	Face, hands, arms	Other parts	Something contacting face, hands and arms
	Only some attendants	All attendants	Crew duties

Four strategies or procedures were discussed for defining the problem.

Which you actually use depends on the problem and your own style.

1. Problem Definition steps
2. Socratic Questioning
3. Dunker Diagrams
4. Statement/Restatement

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.