

# Creative Problem Solving

## Contents

Overview	1
What is covered?	2
Learning objectives	2
Introduction	3
What is a Problem?	4
What is Creative Problem Solving?	5
Theories & Techniques	7
- Brainstorming	7
- De Bono's Six Hats	11
- Fishbone – cause & effect	13
- Mind Mapping	15
- 7S Framework	18
Practice Exercises	20
Personal Development Log	25
Notes	26

## Overview

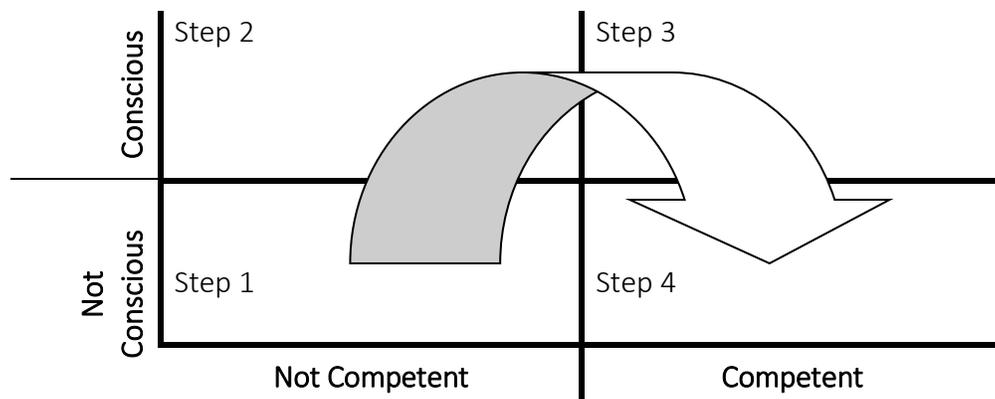
### Who is this workbook aimed at?

This workbook is aimed at those interested in understanding and being able to apply practical problem solving techniques. This workbook will equip individuals with the tools and knowledge to creatively resolve issues and problems.

### About this workbook

The workbook is intended to guide you through the process of Creative Problem Solving in order to improve your own individual effectiveness and performance, and that of your team (where applicable.) It allows you to develop your understanding by providing information and then asking you to apply the concepts to your work.

Our blend of theory and experiential learning supports the process identified by the model below. Step 1 shows a leader who is not skilled, does not know what is expected of them, is not performing, and is of little use to their team. By completing this workbook and attending the associated workshop, we will firstly increase your understanding, then develop, and embed your skills. Therefore, as in the model, by Step 4, you are able to apply the skills without having to think about them – they just come naturally!



### Who do you contact?

If you have any questions regarding this workbook, please contact Simon Hinks [simon@p-m-a.co.uk](mailto:simon@p-m-a.co.uk)

## **How to use this workbook**

The workbook provides a number of exercises for you to complete. These are highlighted by this symbol.

## **What is covered?**

**This workbook covers the following topics:**

- Understanding the definition of a problem
- Different techniques used in creative problem solving
- A good creative problem solving team
- How to think “outside of the box”
- Practical exercises

## **Learning objectives**

**This workbook enables you to:**

- Understand how the mind can be used to expand creative possibilities
- Learn new tools that aid the creative process
- Understand why some groups make poor decisions
- Develop new problem solving strategies for use in the workplace

## Creative Problem Solving - Introduction

As the performance of individuals, teams and businesses are put under closer scrutiny by the demands of the ever-changing business environment, the need to have the right skills to identify and solve problems as quickly as possible is essential. By leaving a problem to continue, it can escalate out of control and turn from a small problem into a major problem in no time at all.

Sometimes you need to be creative and develop your skills and ways of thinking to “look outside of the box”; also known as lateral thinking. This enables you to take off your blinkers and consider solutions that you would not normally think of.

In this workbook, we will equip you with the necessary skills to enable you to use creative problem solving.

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## What is a Problem?

Problem solving differs fundamentally from decision-making. A problem occurs when something is not behaving as it should; when something is deviating from the norm; when something goes wrong. Decision-making is a case of choosing between different alternatives. Decision-making is required for the question: which computer shall I buy? Problem solving is needed for the statement: my computer will not work.



To help us through the process of solving problems, we need a process that:

- Is systematic and thorough
- Provides evidence to show how the problem was solved
- Avoids the rush to jump to a solution without knowing the cause of the problem
- Enables possible causes to be tested
- Is suitable for complex or fuzzy problems

Checklist:

**Define the problem** -Identify what is wrong. This avoids solving the wrong problem.

**Gather the relevant information** –Ask open questions, get the details.

**Identify possible causes** – When did it occur? What has changed? Do not blame!

**Identify a possible solution** – How will you know when it is right?

**Work out the solution** – Look at all the possible solutions.

**Make a decision** - Select the most promising solution.

**Monitor the results** – Track the changes, monitor impact.

## What is Creative Problem Solving?

In groups or as an individual, explain what you believe problem solving is all about.

What has been your experience of solving problems?

Your first answer may have looked like this:

- Looking outside of the box
- Lateral thinking
- Involving others
- Moving out of your comfort zone
- Continuous improvement
- Asking questions
- Consider several solutions
- Eliminate impractical solutions

Now redo the previous exercise, and explain in one minute what you believe creative problem solving is all about.

Add any additional ideas and produce an amalgamated list removing duplications.

**Key learning points:**

- Working as a team generates more ideas than an individual.
- Adding a time limit can pull the team together and/or generate more ideas quicker.
- Thinking outside of the box can produce creative and realistic solutions to problems.
- It is a good exercise to get a group, who do not know each other, working together.

## Creative Problem Solving - Theories and Techniques

### Brainstorming

The above exercise was an introduction to brainstorming.

Steps in the process	Things to bear in mind
1. Select the problem to be brainstormed	An item that requires a number of possible solutions.
2. Establish what you want to achieve	Where are you going?
3. Choose a facilitator	An open, outgoing person capable of relaxing the participants, controlling dominant people and keeping on track.
4. Select a venue	Could be away from normal place of work.
5. Think of the group mix	Include specialists and non-specialists. Get dynamics right and avoid a blame culture. All participants are equal and none are more equal than others.
6. Think of the right number	There is not a right number, but keep it manageable; five or less could make it difficult to generate creativity. More than ten could be unmanageable.
7. Get the equipment right	Flipchart, plenty of different colour pens, post-it notes, blu-tack.
8. Get the layout right	Not formal - try circle or u-shaped.
9. Get the timing right	Consider concentration spans. Brainstorming of ideas can go from dynamic to exhausted and back again. Allow for breaks when the flow stops – do not continue for more than one hour.
10. Get the time of day right	Not easy as some people are better in the mornings whereas others are better at the end of the day.

### Definition

Brainstorming involves a spontaneous, open-minded discussion in a search for new ideas. It is a means of getting a large number of ideas from a group of people in a short time. It can prove valuable for identifying opportunities e.g. for market development, tackling organisational problems, or problem solving in general.



### Advantages

- Numerous ideas and concepts are rapidly generated
- It enables many people to be involved and make a positive contribution
- The cost of the process in terms of people and time is quantifiable

### Disadvantages

- The session can be dictated or side-tracked by dominant individuals
- Getting people to be non-critical can be a problem

A good facilitator can overcome these problems.

### The Rules

- All ideas are accepted.
- Encourage an informal atmosphere free from blame or inhibition.
- Suspend judgement, avoid evaluative comments such as *“that won’t work”* or *“that sounds silly.”* Laugh with wild ideas, not at them.
- Go for quantity not quality.
- Encourage drifting or dreaming and try to bring the subconscious into play; the wilder the idea the better.

After the free flow of ideas has finished:

- Remove duplications.
- Categorise into broad areas
- Select the categories relevant to the topic you want to work with

In groups or as an individual, practice brainstorming now by considering different ways in which society can reduce the negative impact it has on the environment.

## Effective Creative Problem-Solving Teams

What makes a good creative problem-solving team?

What makes a poor creative problem-solving team?

**A good creative problem-solving team could include:**

- Open minded individuals
- Mixed selection of people
- Reputation for solving problems
- Dynamic group
- Inspirational
- Supportive
- Open to suggestions
- Prepared to make a mistake
- Prepared to listen to each other
- Work off each other
- Work as a team

You may expect to see the opposite of these for a poor creative group.

**De Bono's Six Hats**

If your group becomes bogged down in the storming stage - perhaps discussions seem to become circular, maybe new ideas are scarce or arguments begin to dominate the proceedings - applying De Bono's Six Hats method creatively can move the group from storming into the norming and performing stages.

De Bono originally devised his six metaphorical hats, each of a different colour, to represent a particular mode of thinking:



White hat – information (think of white paper, neutral)



Red hat – feelings, emotions, intuition and hunches (think of red fire, warmth and feelings)



Black hat – caution, risk assessment and criticism (think of a judge's black robes)



Yellow hat – logical, positive (think of sunshine and optimism)



Green hat – creative effort, possibility (think of green vegetation, growing, leaves, etc.)



Blue hat – overview, thinking and managing the thinking process (think of a blue sky)

The six hat method, originally intended to develop parallel thinking, can be highly effective when used in a variety of different ways to develop an awareness of group dynamics.

The group agrees to use a particular coloured hat - for example, when the white hat is in use, everyone in the group focuses on laying out the information. At no point is there any attempt to disagree, to challenge or to dispute a point. That way everyone is focused on the same "direction" and is thinking co-operatively and in parallel.

Once all the information is laid out, the group might decide that it is time to use the green hat. All are as creative as possible, again not censoring any ideas at this stage, but simply laying them alongside each other.

The hats may be usefully employed when one or more group member is “being difficult” in some way or other, and impeding the progress of the group. For example, if someone is being really negative, instead of being confrontational and saying, *“stop being so negative”* or *“you’re such a wet blanket, you always point out the reasons why we can’t do something!”*, you can simply ask if they could now change from the black hat and put on their yellow or green hat. This objectifies the situation and avoids potentially confrontational situations.

Use De Bono’s Six Hat theory for a genuine problem within your company. To be completely effective, you will need a facilitator who is familiar with the technique. Otherwise, use it as an aid to ensure that you get a balance of thinking when solving the problem. Learn from your experience.

## Fishbone – Cause & Effect

What is a fishbone diagram?

Dr. Kaoru Ishikawa, a Japanese quality control statistician, invented the fishbone diagram. Therefore, it may be referred to as the Ishikawa diagram. The fishbone diagram is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects. Because of the function of the fishbone diagram, it may be referred to as a cause-and-effect diagram. The design of the diagram looks much like the skeleton of a fish. Therefore, it is often referred to as the fishbone diagram.

Whatever name you choose, remember that the value of the fishbone diagram is to assist teams in categorising the many potential causes of problems or issues in an orderly way, and in identifying root causes.

### **When should a fishbone diagram be used?**

Do you:

- Need to study a problem/issue to determine the root cause?
- Want to study all the possible reasons why a process is beginning to have difficulties, problems, or breakdowns?
- Need to identify areas for data collection?
- Want to study why a process is not performing properly or producing the desired results?
- Analyse factors impacting on the business?

### **How is a fishbone diagram constructed?**

Basic steps:

1. Draw the fishbone diagram.
2. List the problem / issue to be studied in the “head” of the “fish.”
3. Label each “bone” of the “fish.”

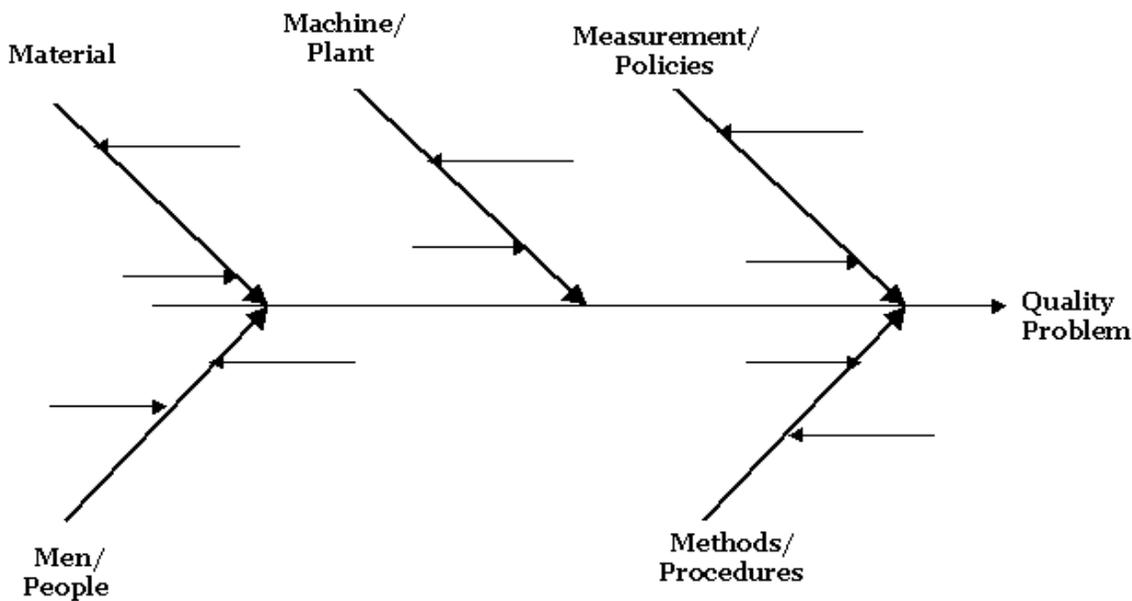
The major categories typically used are:

The 4 Ms:           Methods, Machines, Materials, Manpower

The 4 Ps:           Place, Procedure, People, Policies

The 4 Ss:           Surroundings, Suppliers, Systems, Skills

4. Use an idea generating technique (e.g. brainstorming) to identify the factors within each category that may be affecting the problem / issue and / or effect being studied. The team should ask, *“What are the machine issues affecting / causing..?”*
5. Repeat this procedure with each factor under the category to produce sub-factors. Continue asking, *“Why is this happening?”* and put additional segments for each factor and subsequently under each sub-factor.
6. Continue until you no longer get useful information as you ask, *“Why is that happening?”*
7. Analyse the results of the fishbone after team members agree that an adequate amount of detail has been provided under each major category. Do this by looking for those items that appear in more than one category. These become the “most likely causes.”
8. For those items identified as the “most likely causes”, the team should reach consensus on listing those items in priority order. List the first item as being the most probable cause.



## Mind Mapping

Mind maps were developed in the late 60s by Tony Buzan as a way of helping students make notes using only key words and images. They are much quicker to make, and because of their visual quality, much easier to remember and review. The non-linear nature of mind maps makes it easy to link and cross-reference different elements of the map.

### How to Mind Map

- Use just key words, or wherever possible images.
- Start from the centre of the page and work out.
- Make the centre a clear and strong visual image that depicts the general theme of the map.
- Create sub-centres for sub-themes.
- Put key words on lines. This reinforces structure of notes.
- Print or write in script.
- Use colour to depict themes, associations and to make things stand out.
- Anything that stands out on the page will stand out in your mind.
- Think three-dimensionally.
- Use arrows, icons or other visual aids to show links between different elements.
- Do not get stuck in one area. If you dry up in one area, go to another branch.
- Put ideas down as they occur, wherever they fit. Do not judge or hold back.
- Break boundaries. If you run out of space, do not start a new sheet; paste more paper onto the map.
- Be creative. Creativity aids memory.
- Get involved. Have fun.



Take a problem that requires a decision. Produce a mind map to help you reach the required outcome.

Use De Bono's Six Hats / Fishbone and / or mind mapping techniques to reduce the sickness levels in your company. Look for the reasons for the sickness levels and the required action to be considered. Present your findings and solutions back to the group.

**Debrief:**

- Consider how many "outside the box"/creative potential solutions did you come up with.
- How did you handle conflict?
- Which technique was the most effective?



<b>Systems:</b>	All the processes and information flows that link the organisation together.
<b>Style:</b>	How managers behave
<b>Staff:</b>	How you develop managers (current and future)
<b>Superordinate:</b>	Longer-term vision and values that shape the goals and subsequent destiny of the organisation
<b>Skills:</b>	Dominant attributes or capabilities that exist in the organisation

There is a lot more to the 7S Framework, of course, especially how you apply it in practice. It may appear as an outmoded concept in today's environment of "constant change and learning," but the basic principle of constantly watching a variety of factors as you implement any strategy still applies. Just ensure that the apparent rigidity of the framework does not make you heavy on your feet.

The 7S helps you to ensure you have covered all areas in your brainstorming/mind mapping, etc. It is important to remember that you focus on problem solving rather than decision making immediately.

NOTES

## Practice Exercise 1

### Self-Propelled Vehicle Exercise

For this exercise, you will need:

- 4 paper plates
- 4 strips of light wood (approx.. 20cms long)
- 1 strip of wood (approx.. 50cms long)
- 2 candles
- 1 box of matches
- A length of string
- 4 elastic bands
- 2 empty toilet roll tubes
- 4 balloons Sellotape Scissors
- 1 small pulley
- flipchart paper and pens

Using the assorted materials provided (and only those) construct a small, self-propelled vehicle, which will travel a distance of three meters unaided.

You have 30 minutes to complete the task and your team must demonstrate that the vehicle travels the distance required.

### Debrief

- Which problem solving theories did you use?
- How effective were they?
- Did you concentrate of the problem solving?
- Did you achieve the objective?
- What will you do differently next time?
- What lessons did you learn?

## Practice Exercise 2

### Eggs Can Fly Exercise

For this exercise, you will need:

- 2 fresh eggs
- 2 sheets of paper
- 1 reel of Sellotape
- 1 pair of scissors
- 2 balloons
- 1 piece of string

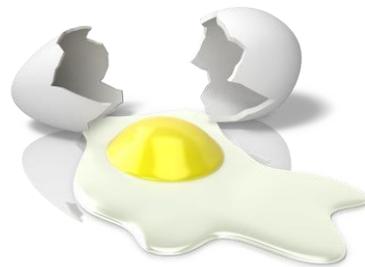
In 30 minutes, a representative of your team will be asked to drop an egg towards the ground out of a first floor window (or location that represents a similar height). The egg should fall free and land intact and unbroken.

During its descent, the egg (or any of the materials) may not make contact with anything or anyone. Once the egg has reached the ground, you will need to show that it is still intact to be deemed successful.

You cannot change the composition of the egg in any way but you may use the materials provided (and only those) to enhance your chances of success. Your team may make two attempts to achieve the task but you may not retrieve any of the materials used in the first attempt for use in the second.

### Debrief

- Which problem solving theories did you use?
- How effective were they?
- Did you concentrate on the problem solving?
- Did you achieve the objective?
- What will you do differently next time?
- What lessons did you learn?



## Practice Exercise 3

### Ground Zero Exercise

Your group is the management team of Vista Consultancy, a company specialising in the development and implementation of community projects. Your consultancy has overall control of the project. At this stage, you do not have to justify the financial expenditure. An estimate of costs will be sufficient.

Today, the role of the management team is to present a proposal of how you plan to develop Ground Zero site in light of the events of 11<sup>th</sup> September 2001.

Your proposal must satisfy the key stakeholders and meet the following criteria:

- A memorial to 11th September 2001.
- The area must continue to operate as the financial district for New York City.
- There must be an efficient and effective transport system(s)

After 30 minutes, you will be asked to present your proposal to the mayor of New York City and his/her team. The mayor will be particularly interested in the problem solving process(es) you have considered. At the conclusion of the meeting, the development contract will be awarded to the successful group.

### Debrief

- Which problem solving theories did you use?
- How effective were they?
- Did you concentrate of the problem solving?
- Did you achieve the objective?
- What will you do differently next time?
- What lessons did you learn?



## Practice Exercise 4

### Mole Exercise

The aim of this exercise is for you to reach a definition of the problem. This exercise highlights the differences between the causes of problems and symptoms.

- Mix the following statements up and hand out equally amongst the group:
- I have great pride in my lawn
- Moles eat grubs
- My lawn has always been nice before
- Moles work in the dark
- My neighbour has a nice lawn
- My lawn has good drainage
- The dead spots on my lawn look horrible
- My lawn does not need fertiliser
- Ridges cause dead spots
- Moles are eager eaters
- My neighbour laughs at my lawn
- Moles are small and furry
- My neighbour has a mole on his neck
- Moles have tiny ears and can hear well
- My push mower is broken
- Moles burrow in search of food and make ridges
- My lawn does not need watering
- My lawn has dead spots in patches
- My ride on mower works fine
- My lawn has never had any ridges before
- I do not like my neighbour
- I want to get rid of the dead spots on my lawn
- My main concern is my lawn
- My lawn is frustrating me
- I do not like moles

Only verbal communication is permitted – you cannot show each other the statements and you cannot swap statements. Once it is agreed that a statement is useless, it must be placed face down and not used again. You can repeat statements as many times as you like (unless faced down.)

Solution = the root of the problem is I have grubs in my garden!

(Most people will cite the moles as the problem but the moles are only there because of the bugs!)

**What happens next?**

Take time to ensure you have completed your personal development log. Where applicable, ensure your line manager receives a copy to enable them to review and assess your progress.

**GOOD LUCK!**



## Personal Development Log

What are the key learning points for me from the workbook?

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2.

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3.

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4.

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5.

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6.

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How will I apply this learning in my role?

1.

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2.

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3.

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4.

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5.

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6.

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