GESTÃO CORRENTE

GC 4 – Personal Skills: **Problem Solving**

Prof. João Pargana

Learning Objectives

- Increase proficiency in analytic problem solving
- Recognize personal conceptual blocks
- Enhance creativity by overcoming conceptual blocks
- Foster innovation among others

A Model of Problem Solving

Step 1: Define the Problem

- Differentiate fact from opinion
- Specify underlying causes
- Tap everyone involved for information
- State the problem explicitly
- Identify what standard is violated
- Determine whose problem it is
- Avoid stating the problem as a disguised solution

Step 2: Generate Alternative Solutions

- Postpone evaluating alternatives
- Be sure all involved individuals generate alternatives
- Specify alternatives that are consistent with goals
- Specify both short- and long-term solutions
- Build on others' ideas
- Specify alternatives that solve the problem

A Model of Problem Solving

Step 3: Evaluate and Select an Alternative

- Evaluate relative to an optimal standard
- Evaluate systematically
- Evaluate relative to goals
- Evaluate main effects and side effects
- State the selected alternative explicitly

Step 4: Implement and Follow Up on the Solution

- Implement at proper time and in the right sequence
- Provide opportunities for feedback
- Engender acceptance
- Establish ongoing monitoring system
- Evaluate based on problem solution

Constraints on the Analytical Problem-Solving Model

Defining the problems

- Lack of consensus on the problem
- Acceptance of problem definition
- Symptoms are often confused with the real problem
- Confusing information

Generating Alternatives

- Alternatives are evaluated as they are proposed
- Few possible alternatives are usually known
- The first acceptable solution is usually accepted
- Alternatives are based on what was successful in the past

Constraints on the Analytical Problem-Solving Model

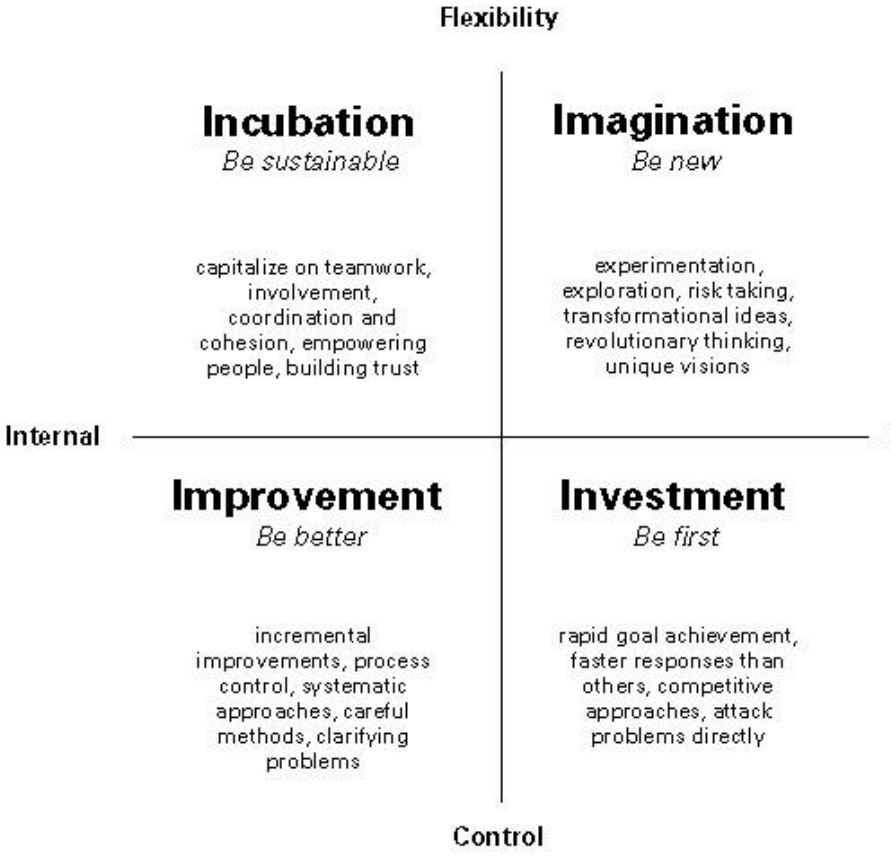
Evaluating and Select an Alternative

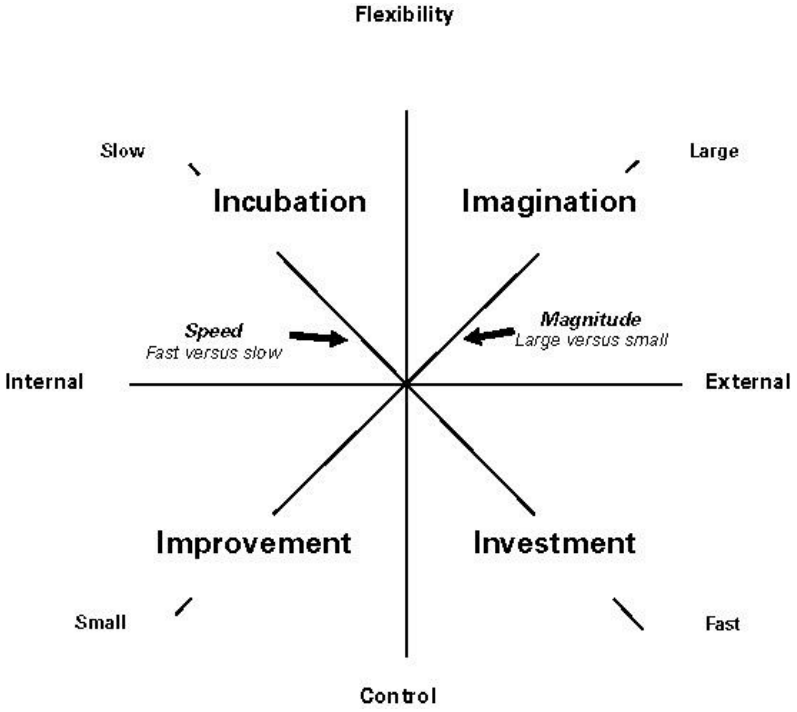
- Information on alternatives is limited
- Search for information occurs close to home
- The type of information is constrained by other factors
- Gathering information is costly
- Preferences for the best alternatives are not always known

Implementation and Follow up

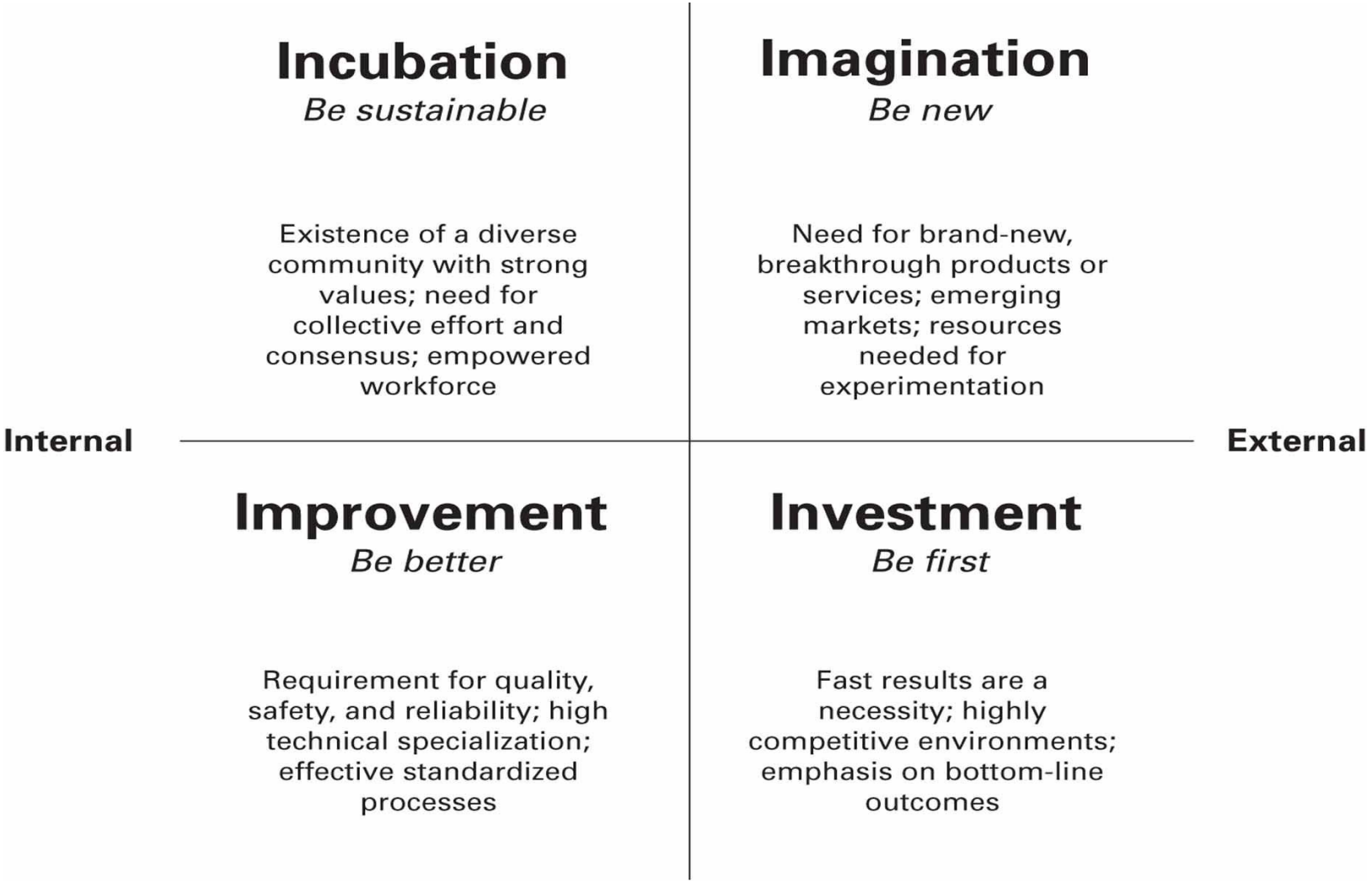
- Acceptance is not always forthcoming
- Resistance to change
- Uncertainty about what part of solution to monitor
- Political and organizational processes must be managed
- It may take a long time to implement a solution

Four Types of Creativity





When each approach is effective



Conceptual Blocks

Mental obstacles that constrain the way problems are defined.

1. Constancy
   - Vertical thinking (defining problems in only one way)
   - One thinking language (not using more than one language to define and assess the problem)

2. Commitment
   - Stereotyping based on past experience (present problems as a variation of past problems)
   - Ignoring commonalities (failing to perceive them among elements that initially appear to be different)

3. Compression
   - Distinguishing figure from ground (not filtering out irrelevant information)
   - Artificial constraints (defining the boundaries of a problem too narrowly)

4. Complacency
   - Non-inquisitiveness (not asking questions)
   - Non-thinking (a bias toward activity in place of mental work)

Conceptual Blocks: Vertical Thinking (de Bono's Ways of Thinking)

- Vertical Thinking
  - Continuity
  - Chooses
  - Stability
  - Searches for what is right
  - Analytic
  - Where the idea came from
  - Develops an idea
- Lateral Thinking
  - Discontinuity
  - Changes
  - Instability
  - Searches for what is different
  - Provocative
  - Where the idea is going
  - Discovers the idea

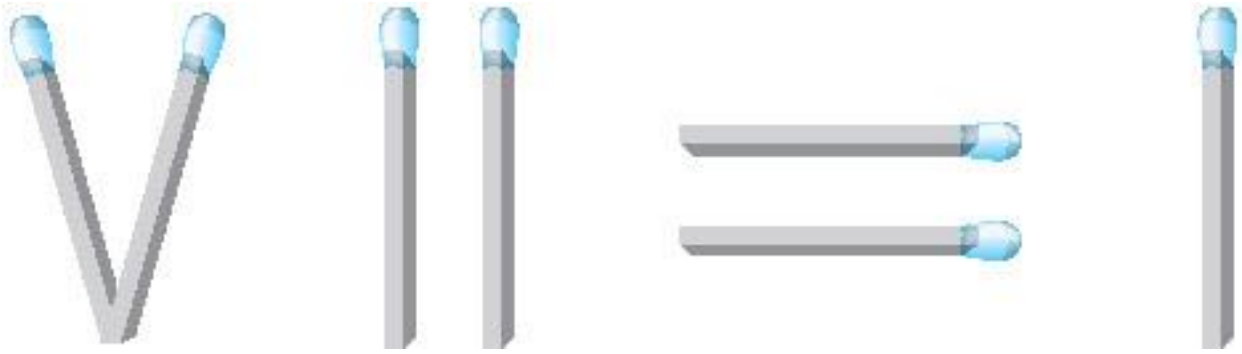
Conceptual Blocks: Multiple Thinking Languages

The more languages available to problem solvers, the more creative the solution will be.

- Words
- Symbols
- Sensory (i.e. smell)
- Feelings and emotions
- Visual imagery

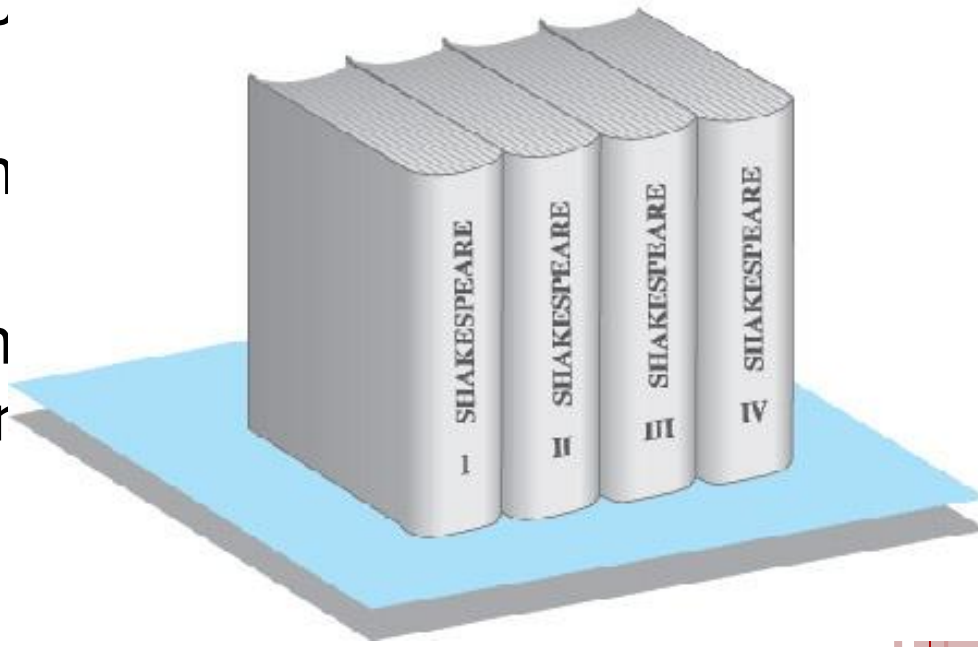
Conceptual Blocks: Multiple Thinking Languages, Example: The Matchstick Configuration

Below are 7 matchsticks. By moving only one matchstick make the figure into a true equality (the value on one side equals the value on the other side).



Conceptual Blocks: Stereotyping Based on Past Experiences, Example: The Shakespeare Riddle

- Assume that there are 4 volumes of Shakespeare on the shelf.
- Assume that the pages o
exactly 2 inches thick
- The covers of each volun
thick.
- Assume that a bookworn
1 of volume 1, and ate str
last page of volume 4.

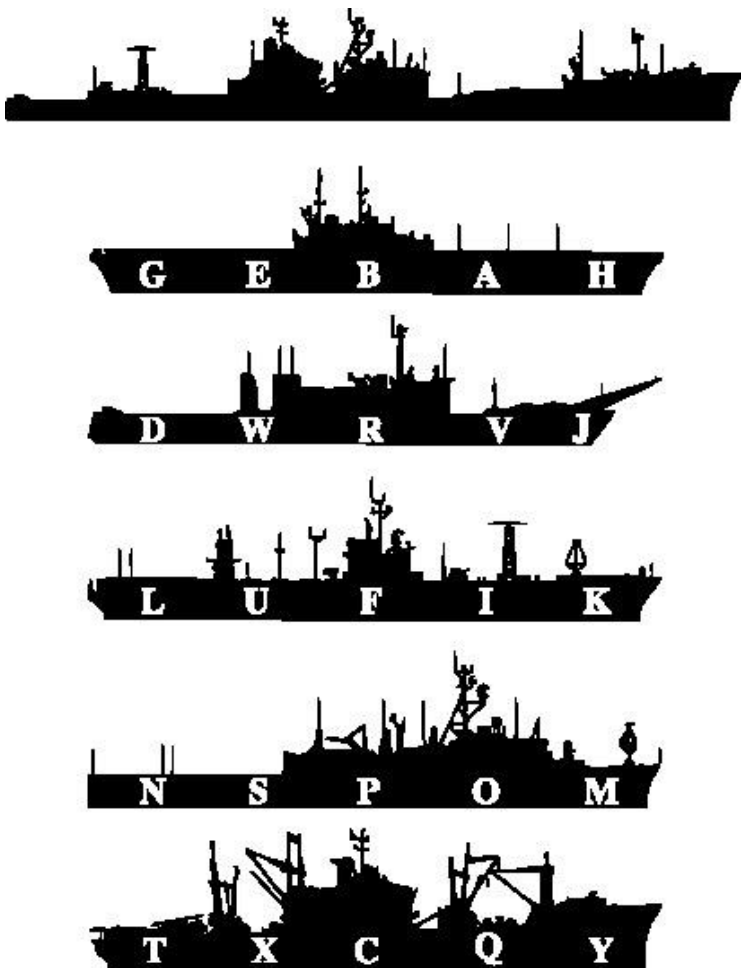


What distance did the worm cover (inches)?

Conceptual Blocks: Ignoring Commonalities

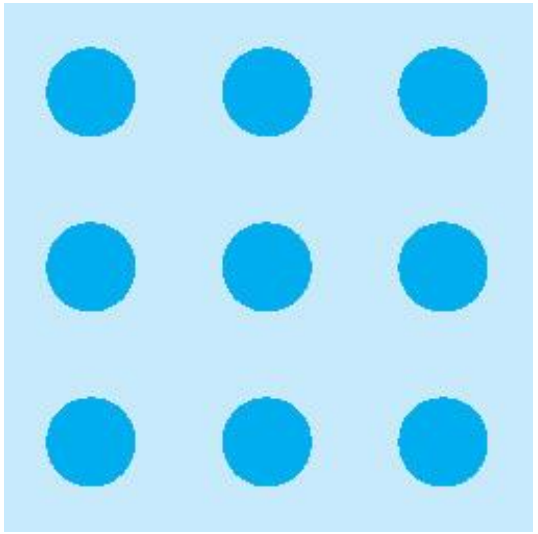
Example: Name That Ship!

- Using the code letters for the smaller ships as a guide, what is the name of the larger ship?



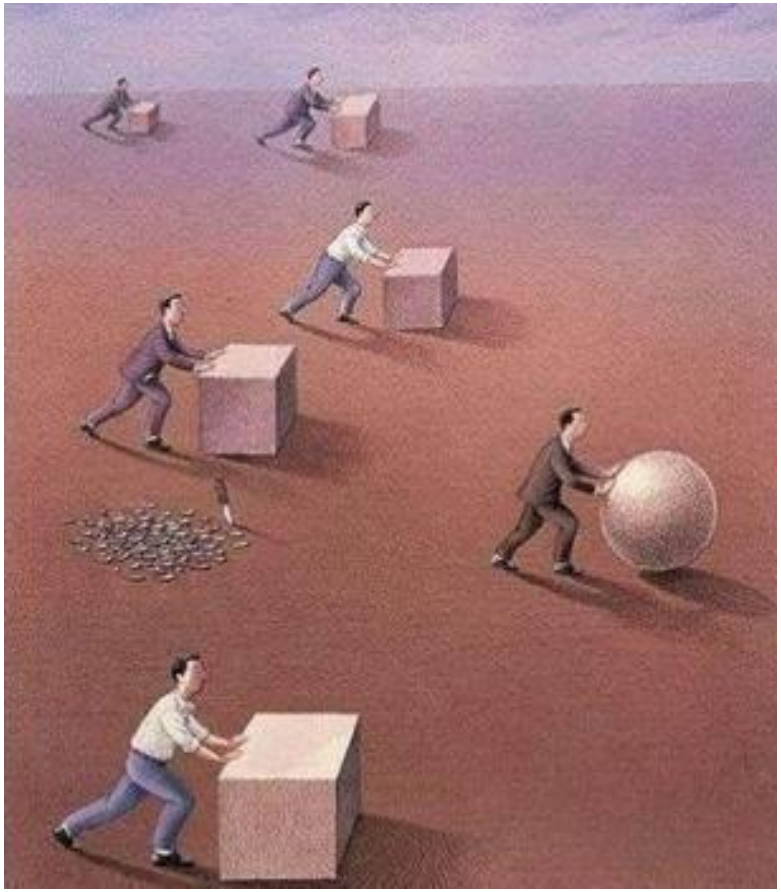
Conceptual Blocks: Artificial Constraints, Example: The Nine-Dot Problem

- Without lifting your pencil from paper, draw four straight lines that pass through all nine dots.



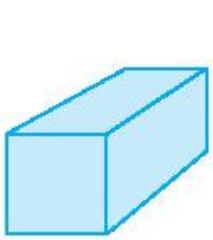
Conceptual Blocks: Artificial Constraints, Example: Digging in the sand

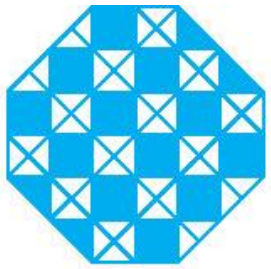
"There is only one way to do it …""

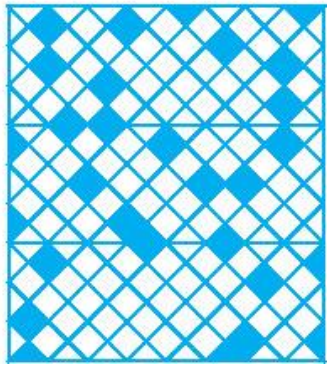


Conceptual Blocks: Separating the Figure from Ground, Example: Embedded Pattern

- For each pair, find the pattern on the left that is embedded in the more complex pattern on the right.
- Now try to find at least two figures in each pattern.







Conceptual Blocks: Separating the Figure from Ground, Example: Embedded Pattern

- How many babies?

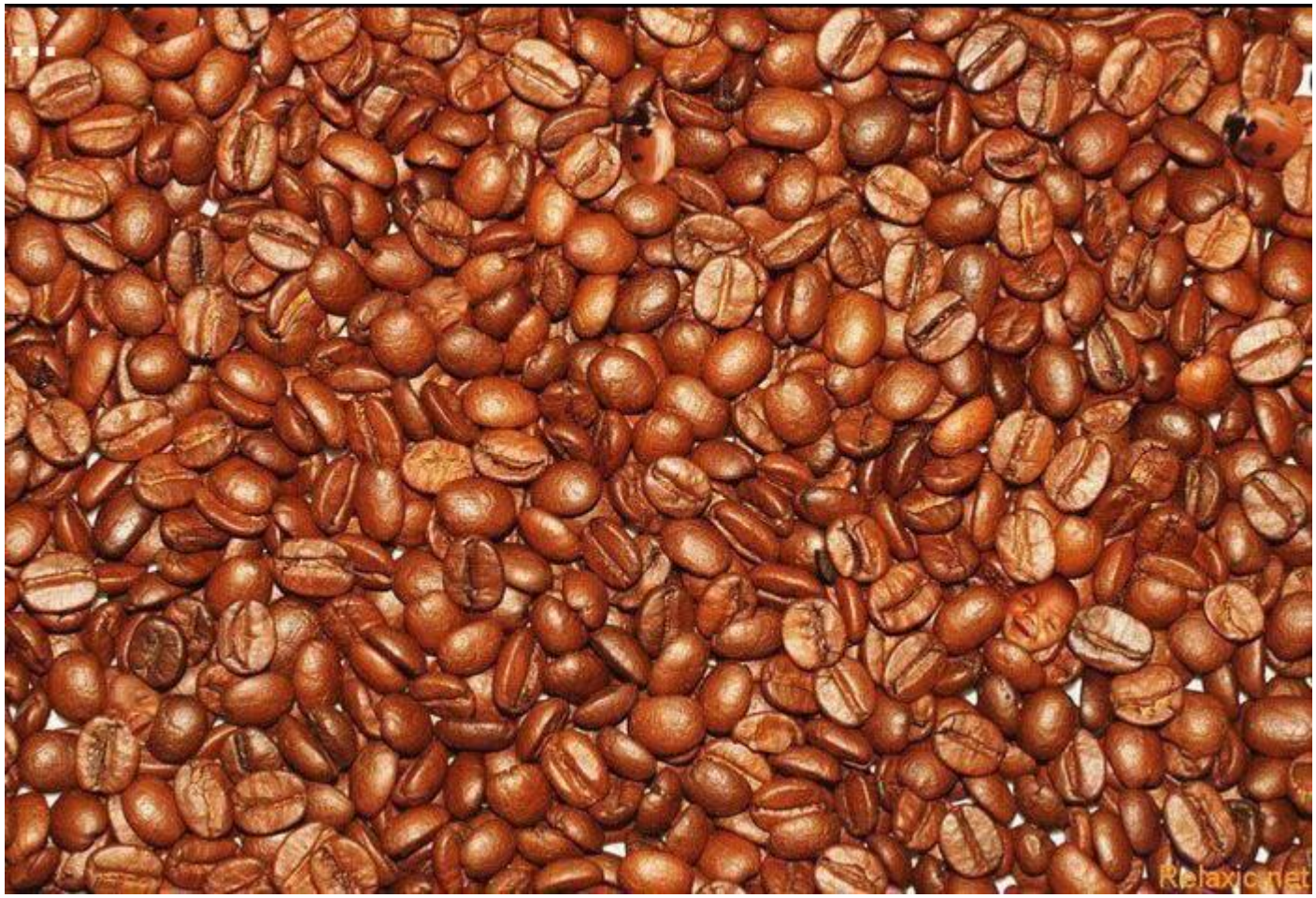
0?

1?

2?

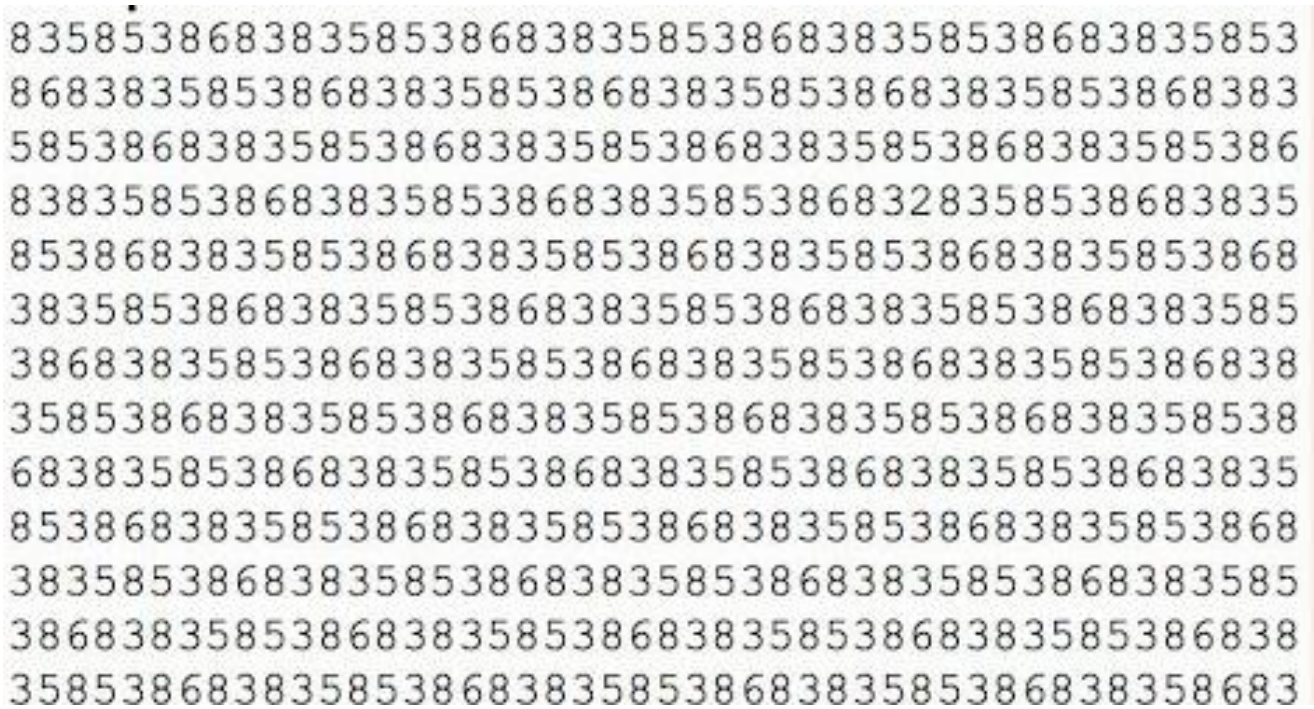
3?

4?



Conceptual Blocks: Separating the Figure from Ground, Example: Embedded Pattern

- Where is the 2?



Conceptual Blocks: Bias Against Thinking, Example: Ambidextrous Thinking Test

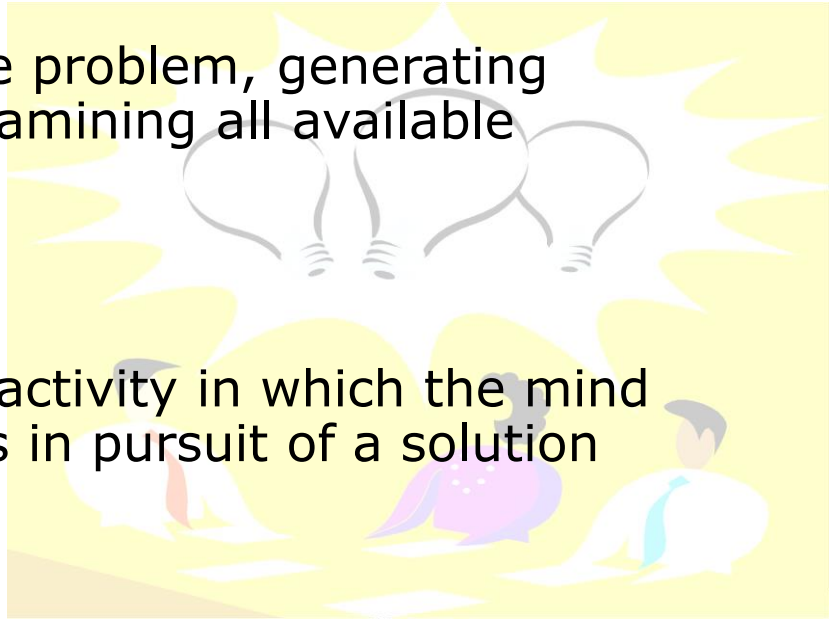
There are two lists of words:

- Take about 1 minutes to memorize the first list. Then, on a piece of paper write down as many words as you can remember.
- Now take about 1 minutes and memorize the words on the second list. Repeat the process of writing down as many words as you can remember.

LIST 1	LIST 2
Sunset	Decline
Perfume	Very
Brick	Ambiguous
Monkey	Resources
Castle	Term
Guitar	Conceptual
Pencil	About
Computer	Appendix
Umbrella	Determine
Radar	Forget
Blister	Quantity
Chessboard	Survey

Stages in Creative Thought

1. Preparation
   - Gathering data, defining the problem, generating alternatives, consciously examining all available information



2. Incubation
   - Mostly unconscious mental activity in which the mind combine unrelated thoughts in pursuit of a solution

3. Illumination
   - Occurs when an insight is recognized and a creative solution is articulated

4. Verification
   - Involves evaluating the creative solution relative to some standard of acceptability

Ways to Improve Problem Definition

Tabela 3.5, p. 221

1. Make the strange familiar and the familiar strange – Synectics
   - Put something you don't know in terms of something you do know, then reverse the process back again.
     - What does this remind me?
     - What is this similar to?
     - What is this opposite to?

2. Elaborate the definition
   - Force two alternatives hypotheses for each problem
   - Use a questions check list
     - Is there anything else?
     - Is the reverse true?
     - Is this the symptom of a more general problem?
     - Who sees it differently)?

3. Reverse the definition
   - Turn de problem upside down or back to front
   - Janusian Thinking (Roman God, with two faces looking in opposite directions)

Ways to Generate More Alternatives

1. Defer judgment
   - Brainstorming helps generating more alternatives for problem solving without prematurely evaluating, and hence discarding, them.
     - No evaluation of ideas is permitted
     - Wild ideas are encouraged
     - Quantity before quality
     - Build on ideas of others

2. Expand current alternatives
   - Subdivision of problems in smaller parts

3. Combine unrelated attributes
   - Forcing integration of seemingly unrelated elements
   - See common relationships among disparate factors
     - Morphological synthesis (four step procedure)
     - Relational algorithm (applying connecting word that force a relationship – Relational words
       - Example: "Customers are dissatisfied with our service"
       - Ling underlined word with relational words.

Hints to Facilitate Creative Problem Solving

1. Give yourself relaxation time
2. Find a place (physical) where you can think
3. Talk to other people about ideas
4. Ask other people for their suggestions about your problems
5. Read a lot
6. Protect yourself from idea-killers (black holes who absorb all your energy)

Three Principles for Fostering Creativity

1. Pull people apart; put people together
   - Let individuals work alone as well as with teams and task forces
   - Encourage minority reports and legitimize "devil's advocate" roles
   - Encourage heterogeneous membership in teams
   - Separate competing groups in subgroups

2. Monitor and stimulus
   - Accountability (people accountable for outcomes)
   - Verbalization that encourages to attempt something (eliminate …)

3. Reward multiple roles
   - Idea champion
   - Sponsor
   - Orchestrator
   - Rule breaker

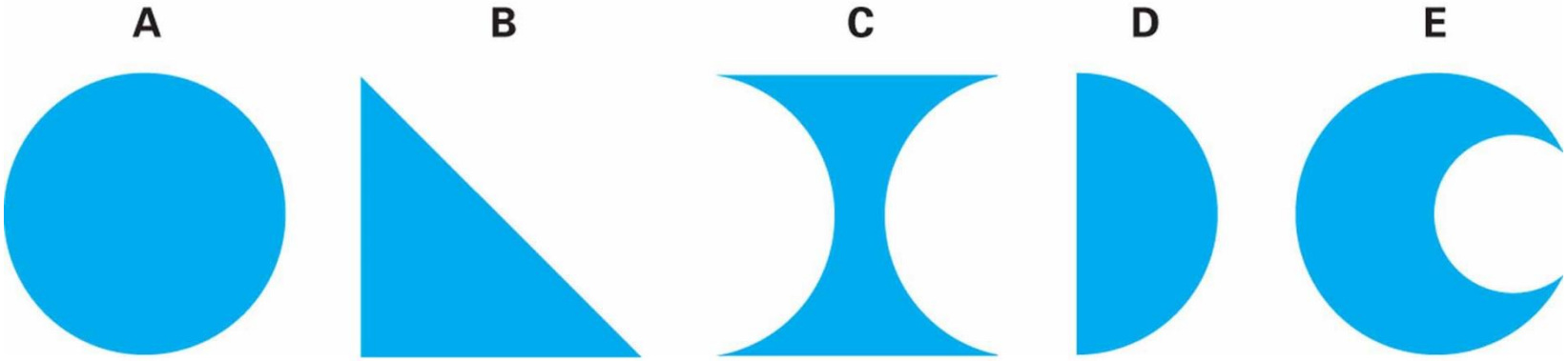
Make the strange familiar and the familiar strange

Four Types of Analogies

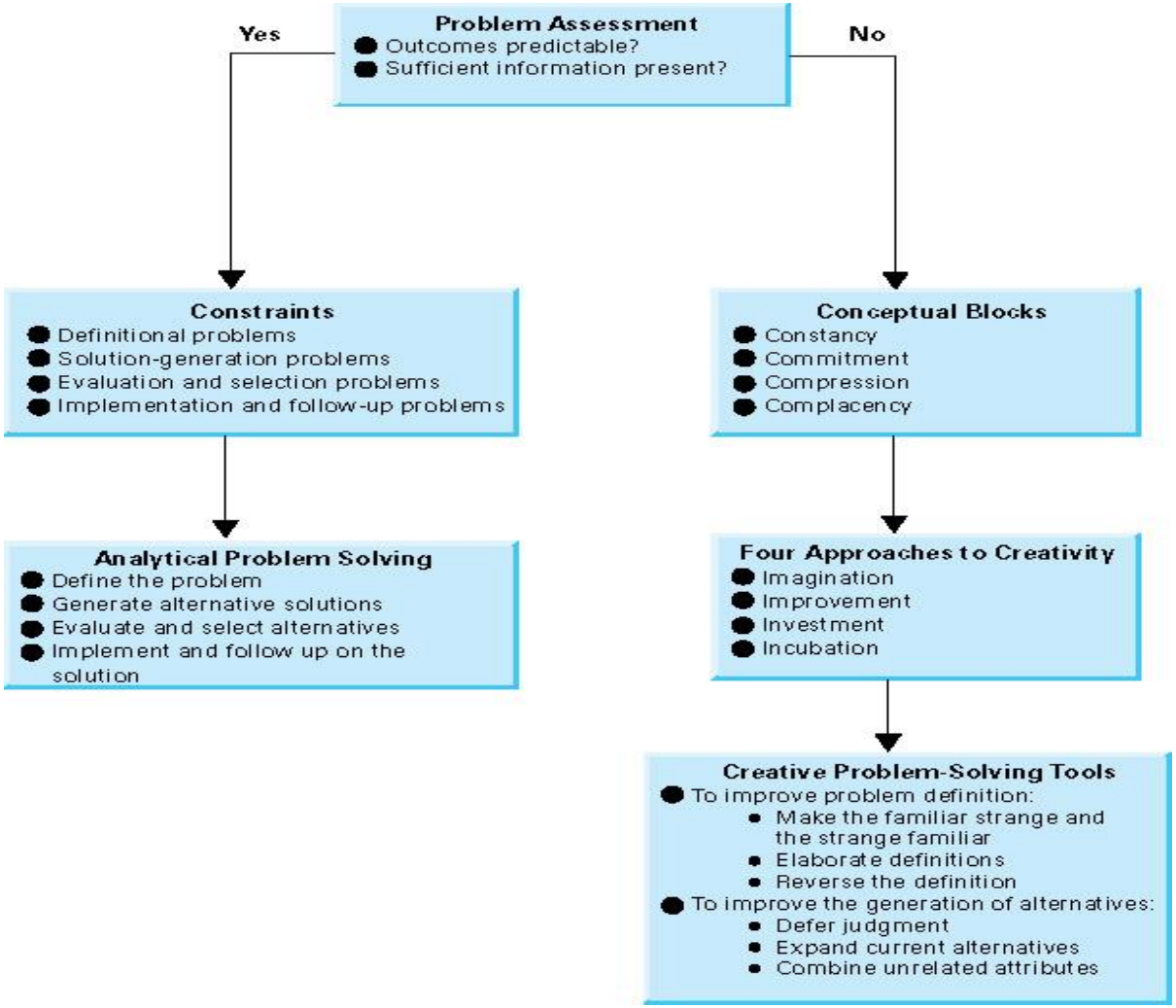
1. Personal
2. Direct
3. Symbolic
4. Fantasy

Elaborate the definition

Of the five figures below, select the one that is different from all of the others.



A Model of Analytic and Creative Problem Solving



Enabling Creativity in Others