

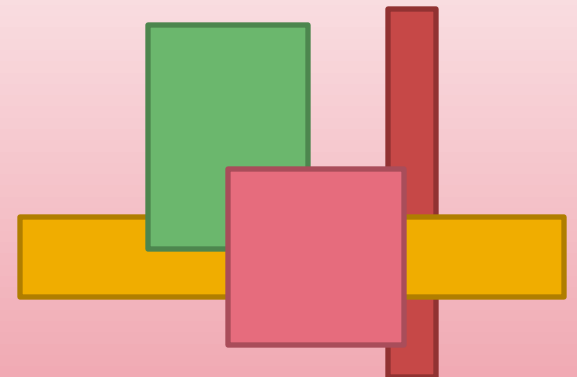
Using a Lotus Blossom to Create Student Ownership of CTSO's



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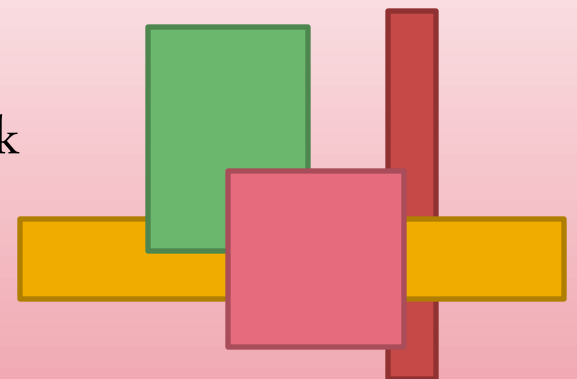
Divergent Thinking

- A CREATIVE thinking skill
- EXPANDS the picture of a problem
- Right-brained
- States the problem in various forms
- Assists in solving problems innovatively
- Hundreds of methods/processes
- Quantity!!



Guidelines for Divergent Thinking

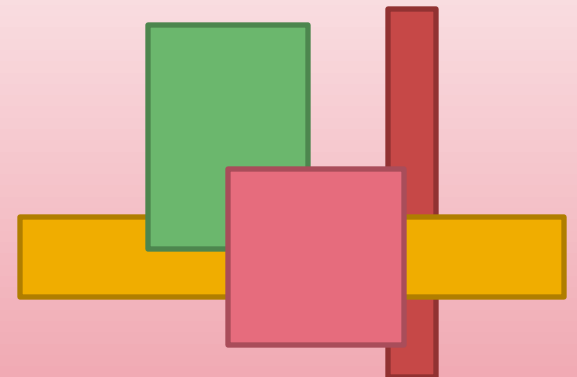
- Defer judgment (others *and* self!)
- Seek quantity
- Accept all ideas (others *and* self!)
- Stretch for connections
- Let ideas incubate
- “Yes, and . . .”
 - Seek combinations, “hitchhiker,” piggyback



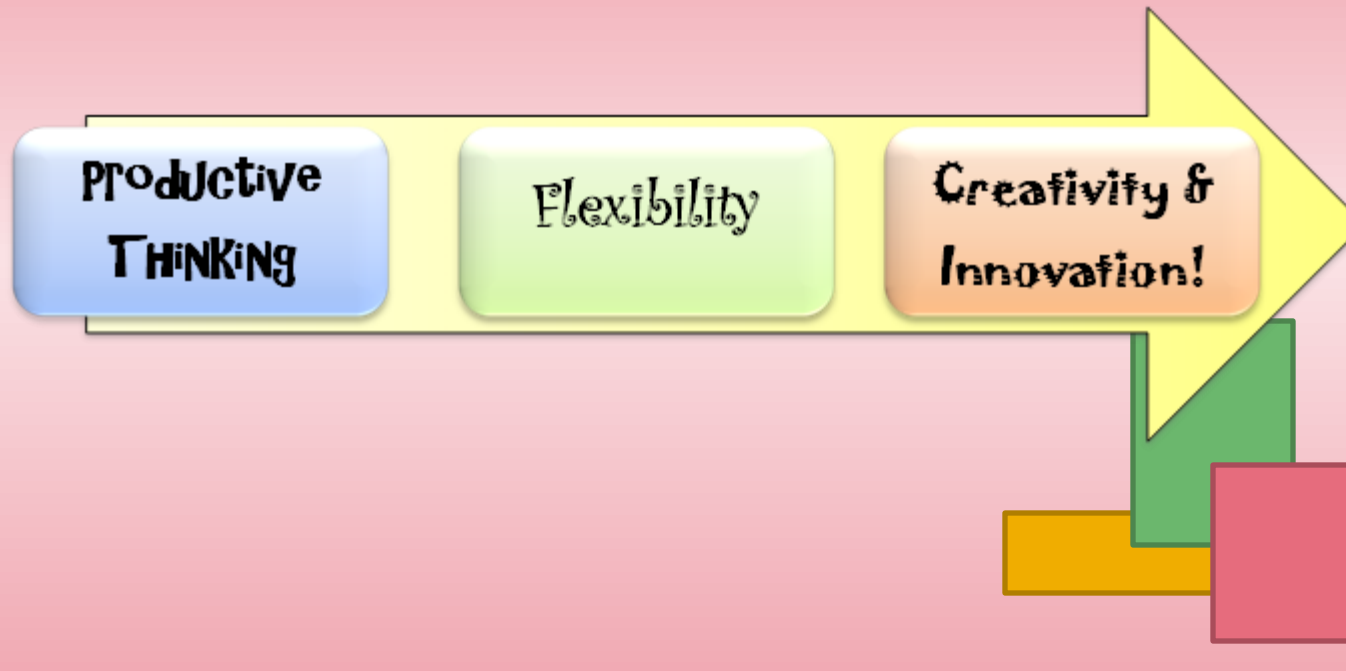
Which should you use?

Divergent or Convergent?

- Both! Know which to use when.
- Academia and organizations teach/use CONVERGENT . . .
weak in DIVERGENT
- Start with DIVERgent and then move to CONvergent

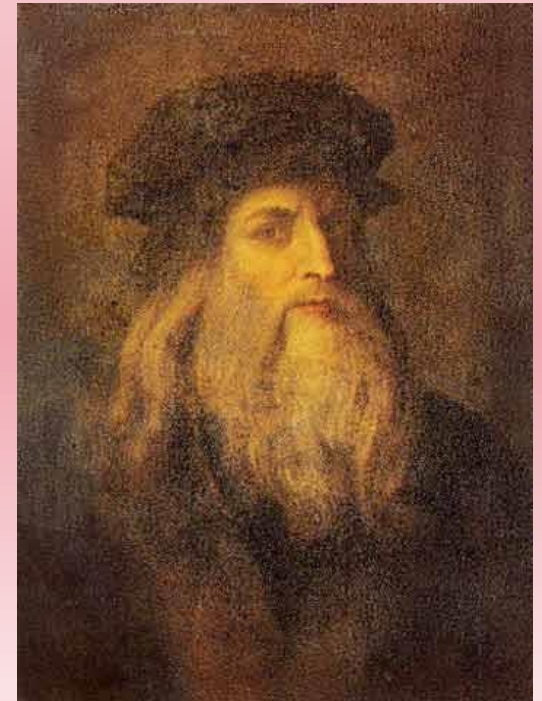


Reproductive vs. PRODUCTIVE



Productive Thinking Strategies

1. Look at the problem in different ways and find new perspectives that no one else has.



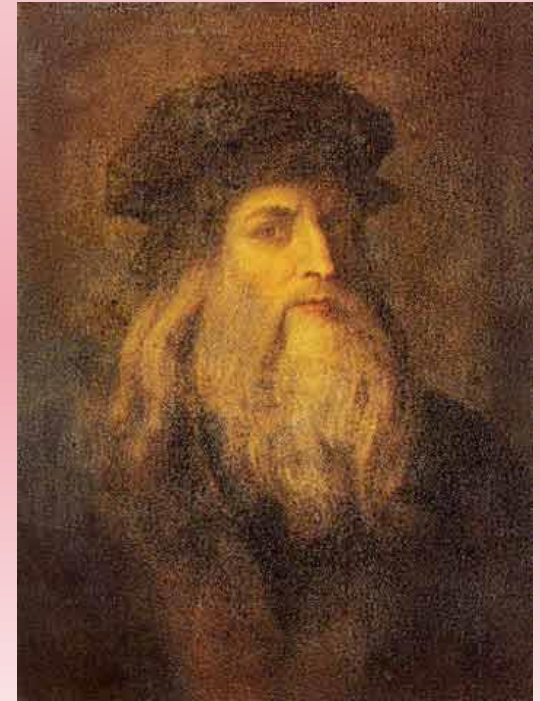
Leonardo da Vinci



Productive Thinking Strategies

- The first look is too biased toward the usual way of seeing things.
- daVinci restructured his problem, looking at it from one perspective, then another, and still another.

http://www.creativitypost.com/create/how_geniuses_think#sthash.5D5aradF.dpuf



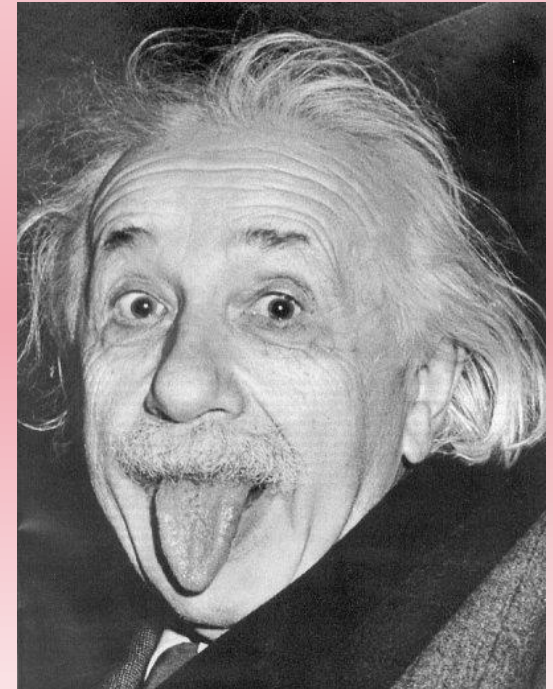
Leonardo daVinci



Productive Thinking Strategies

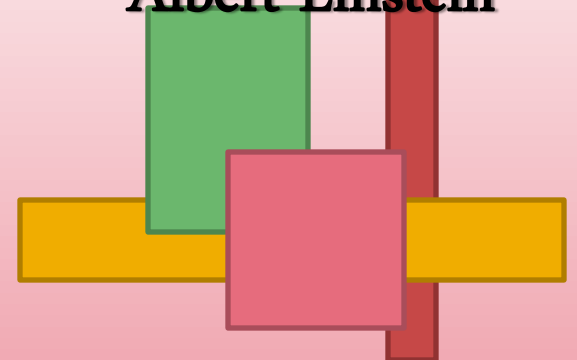
2. Visualize!

- Einstein formulated challenges as many ways as possible, including drawings and diagrams.
- Galileo revolutionized science by making his thoughts visible with diagrams, maps, and drawings.



Albert Einstein

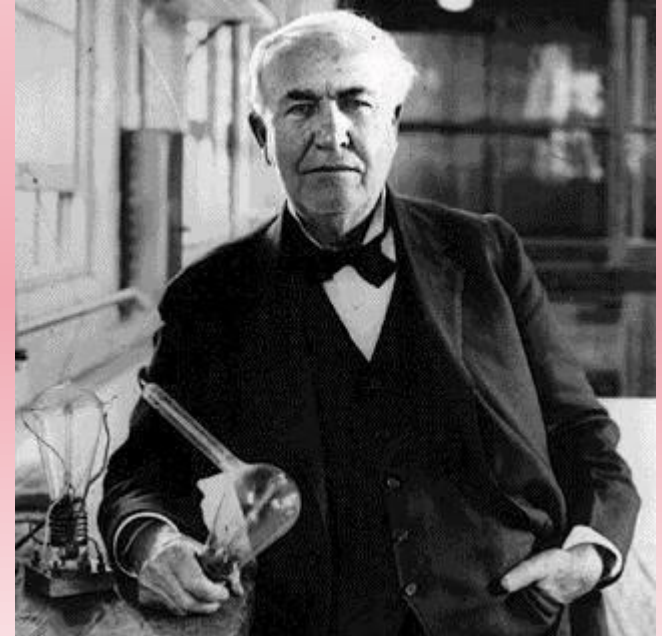
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Productive Thinking Strategies

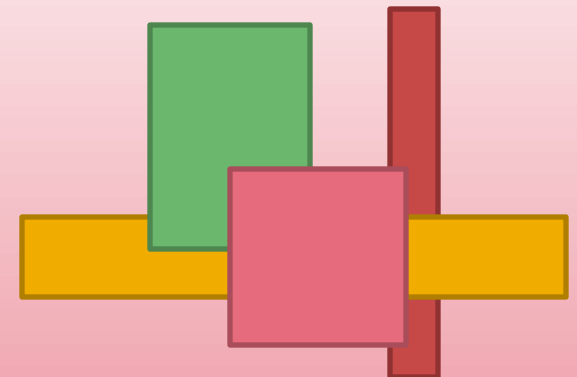
3. Produce!

- Edison held 1,093 patents.
- Gave himself and his assistants idea quotas.
- His personal quota--one minor invention every 10 days and a major invention every 6 months



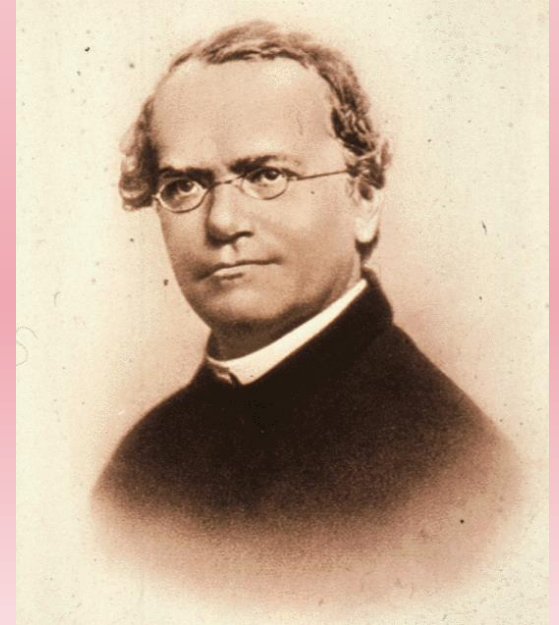
Thomas Edison

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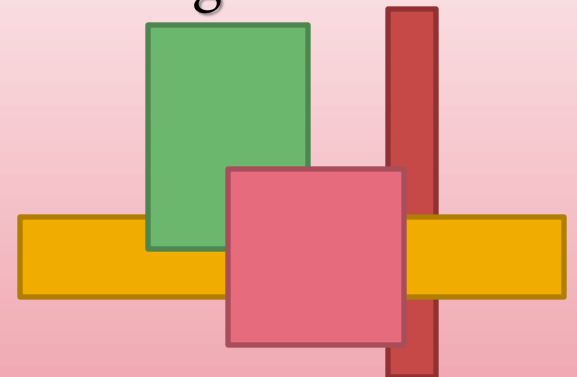


Productive Thinking Strategies

4. Make novel or unusual combinations. Combine and recombine ideas, images, and thoughts.

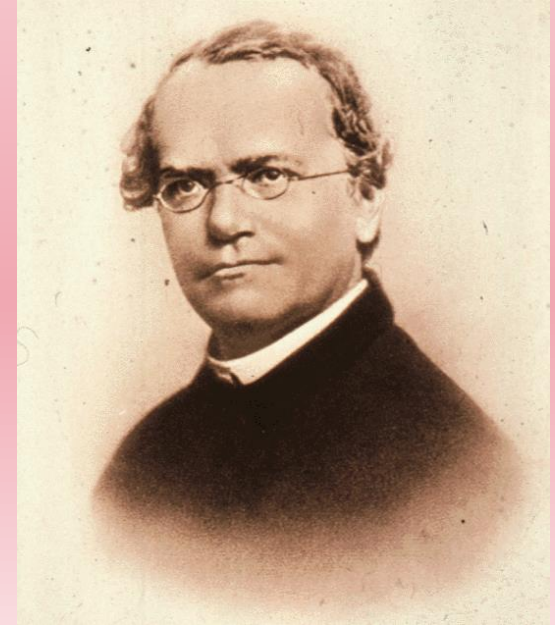


Gregor Mendel



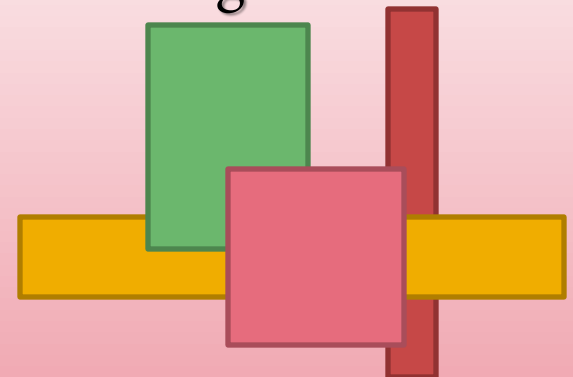
Productive Thinking Strategies

- Mendel combined mathematics and biology to create a new science: genetics.
- Einstein did not invent energy, mass, or speed of light. He combined them in a novel way: $E=mc^2$.



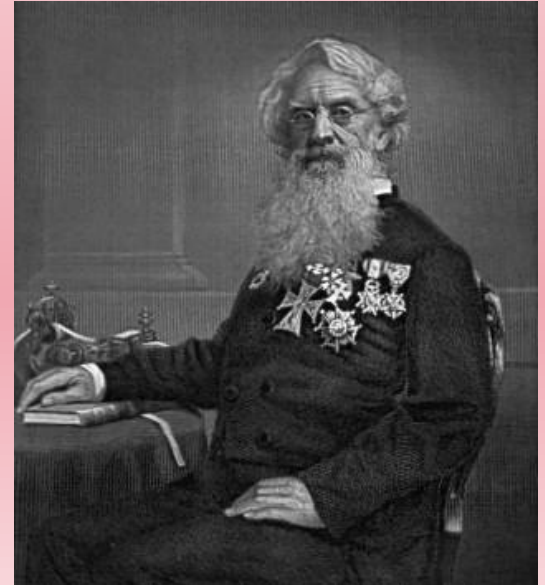
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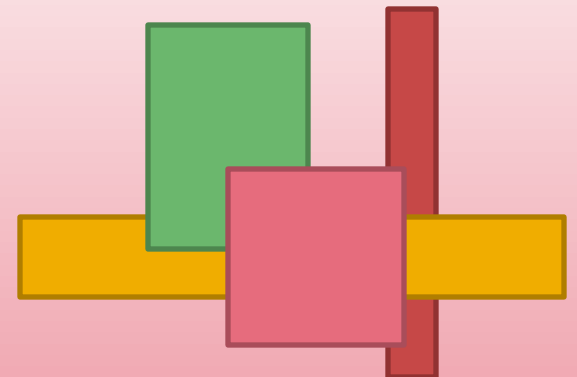


Productive Thinking Strategies

5. Force relationships by making connections between dissimilar subjects.

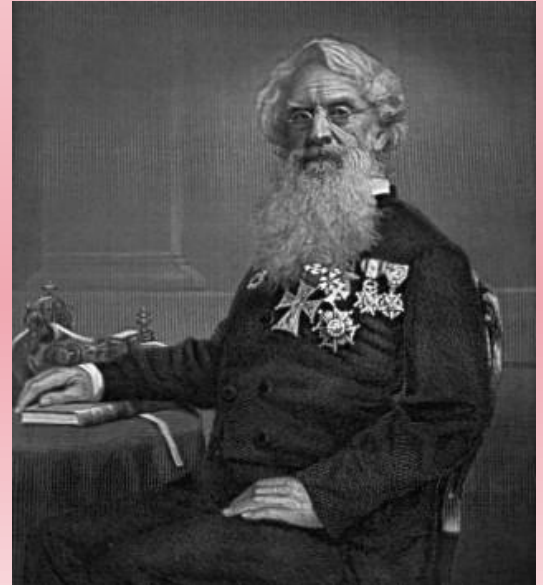


Samuel Morse

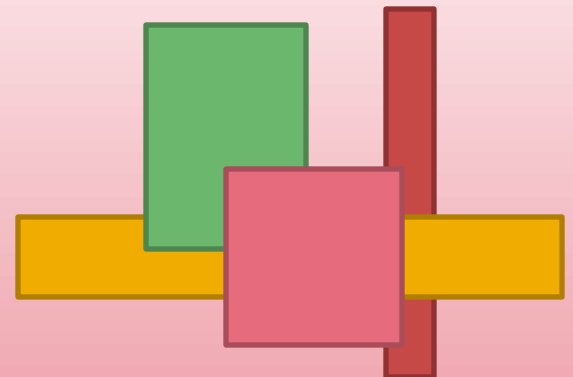


Productive Thinking Strategies

- Morse was stumped trying to figure out how to produce a telegraphic signal that could be received coast to coast.
- He saw horses being exchanged at a relay station and forced a connection between relay stations for horses and telegraphic signals: give the traveling signal periodic boosts of power.

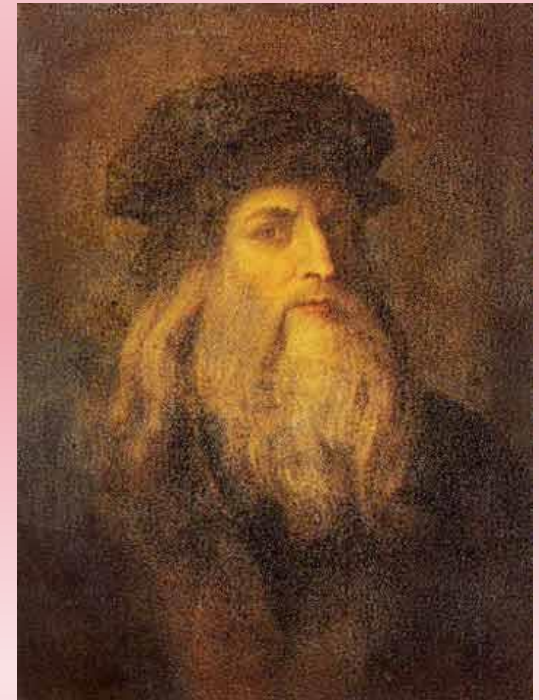


Samuel Morse



Productive Thinking Strategies

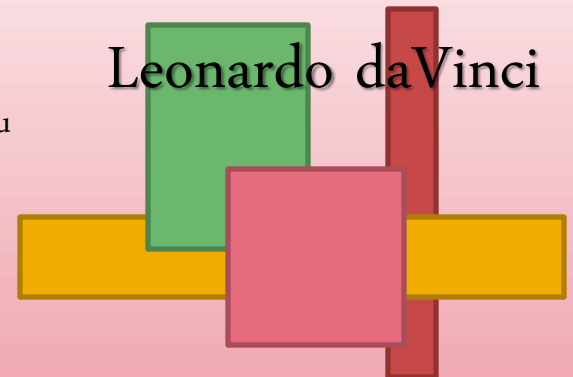
- daVinci forced a relationship between the sound of a bell and a stone hitting water. Made the connection that sound travels in waves.



Leonardo da Vinci

http://www.creativitypost.com/create/how_geniuses_think#sthash.5D5aradF.dpu

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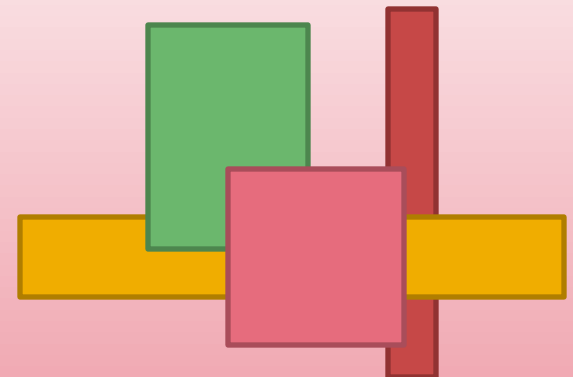
Productive Thinking Strategies

- Zable forced a connection between his 4 ½ year old son's play and his attempts to deep fry beer, finally coming up with a way to pull it off after two years of trial and error.



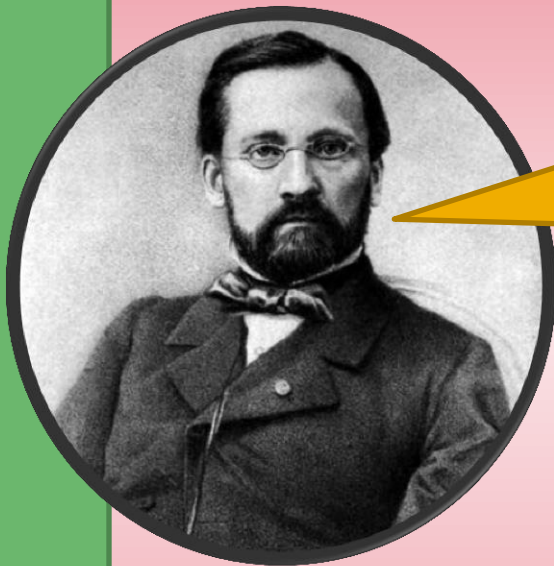
Mark Zable

<http://www.npr.org/templates/story/story.php?storyId=129595919>



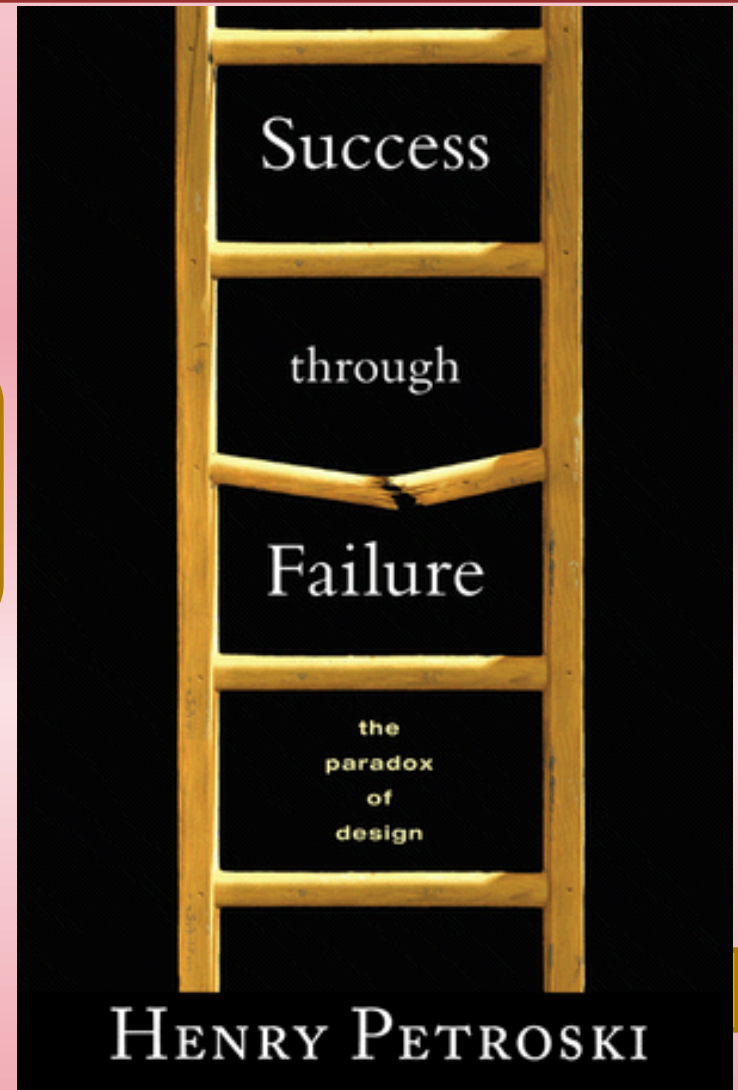
Productive Thinking Strategies

6. Prepare yourself for chance.



Louis Pasteur

Chance favors the
prepared mind.




Techniques: Lotus Blossom

	A			B			C	
			A	B	C			
	D		D	I	E		E	
			F	G	H			
	F			G			H	

Yasuo Matsumura

Techniques: Lotus Blossom

Useful for . . .

- Finding opportunities for improvement.
 - Breaking down a challenge into manageable parts.
 - Detailed planning.
- 

	A	

	B	

	C	

	D	

A	B	C
D	I	E
F	G	H

	E	

	F	

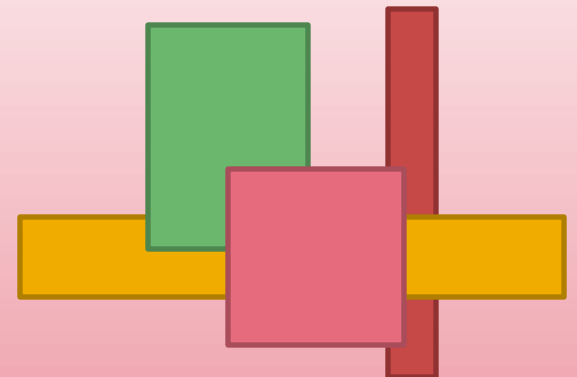
	G	

	H	

Techniques: Lotus Blossom

How To:

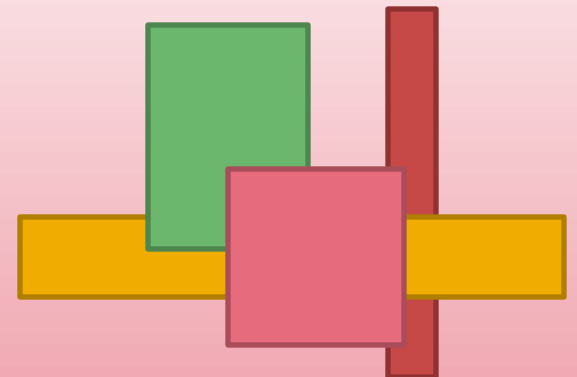
1. Central idea/challenge/theme goes in the center.
2. Brainstorm related ideas/challenges/solutions/applications, etc. for the eight surrounding “petals.”
3. Each of the eight petals becomes the center of a new lotus blossom.



Techniques: Lotus Blossom

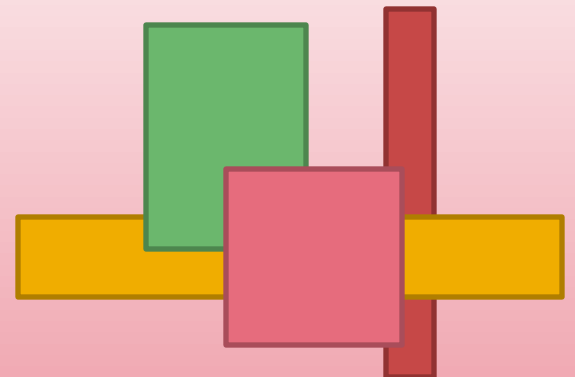
How To:

4. Repeat Step 2.
5. Continue as needed.
6. Discuss and evaluate ideas.



Techniques: Organized Random Search

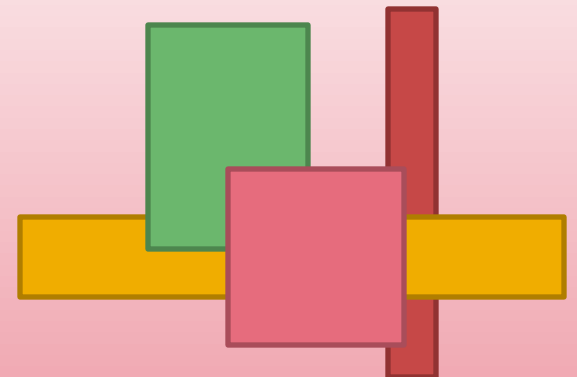
<http://creativitygames.net/random-word-generator>



Techniques: Organized Random Search

Useful for . . .

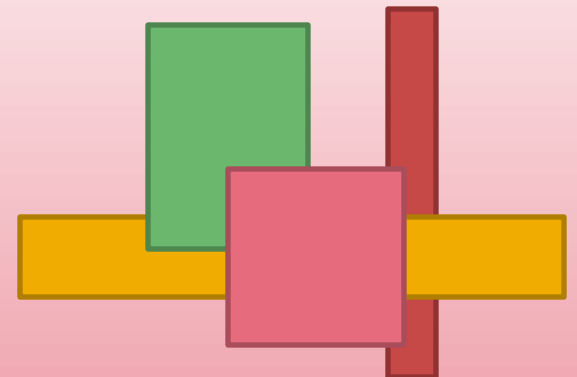
1. Generating fresh ideas.
2. Getting out of a rut.
3. Jumpstarting stalled thinking.



Techniques: Organized Random Search

How To:

1. Pick a word at random.
2. Begin making associations or generate ideas.
3. Challenge yourself to list at least 50.



Techniques: Picture Stimulation

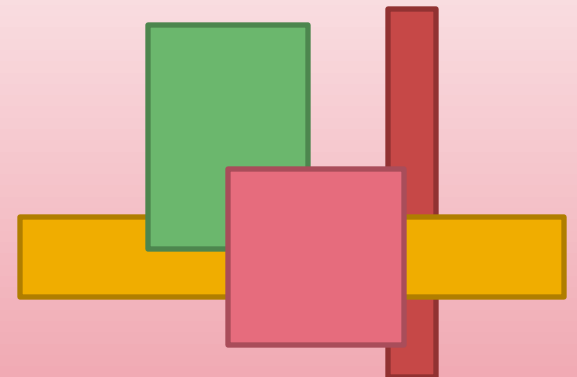
<http://www.mangle.ca/randomlj.php>



Techniques: Picture Stimulation

Useful for . . .

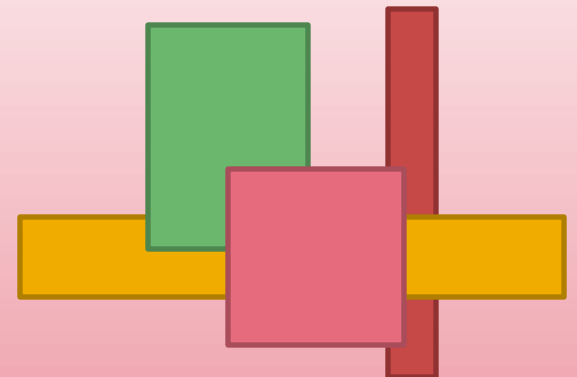
1. Generating fresh ideas.
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Techniques: Picture Stimulation

How To:

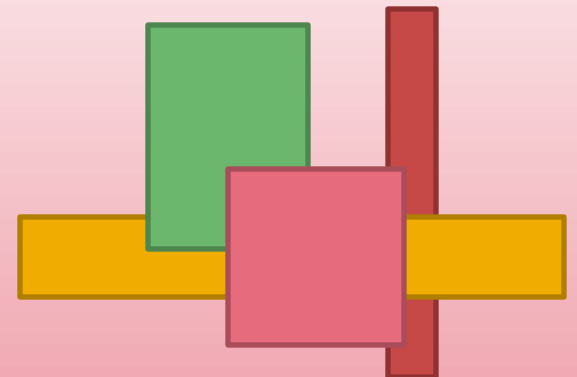
1. Select pictures from various sources.
 - Aim for some action and not too abstract.
2. Present pictures to participants.
3. Brainstorm and record words, phrases, ideas that come to mind.
 - Individually or as a group.



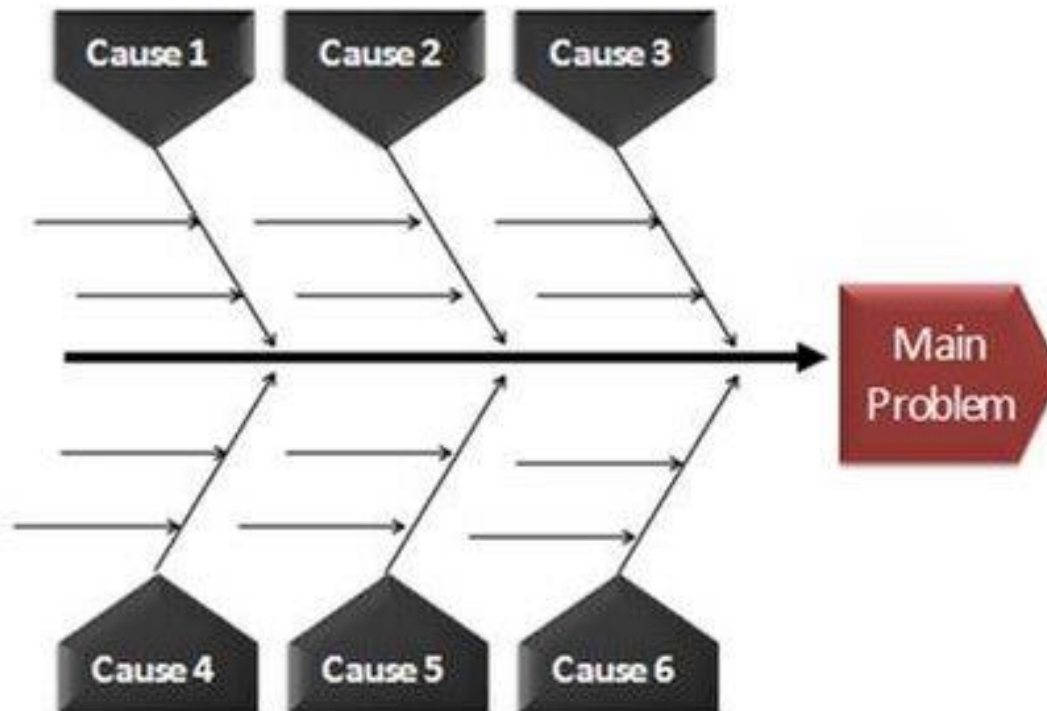
Techniques: Picture Stimulation

How To:

4. Continue through all pictures.
5. Use the brainstorm list to address your challenge.



Techniques: Fishbone Diagram



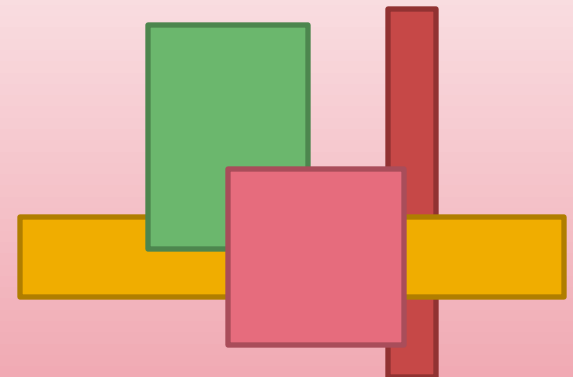
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Kaoru Ishikawa

Techniques: Fishbone Diagram

Useful for . . .

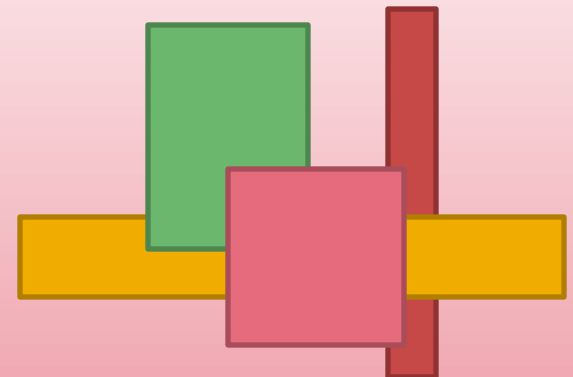
1. Discerning CAUSE vs. EFFECT and their relationships.
2. Encouraging study of *all parts* of a problem before making decisions.
3. Starting a *logical sequence* for solving a problem.
--Move from easy to complex.



Techniques: Fishbone Diagram

Useful for . . .

4. Seeing the *total problem* instead of focusing on a narrow part of it.
5. Staying focused on the *real problem* rather than going off on tangents or focusing on symptoms.
6. Helping you *see* the problem by diagramming it.
7. Finding patterns.

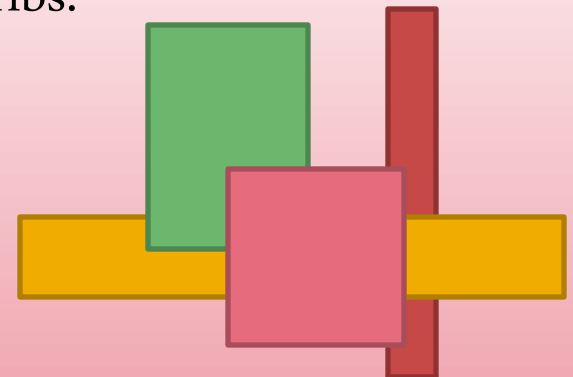


Techniques: Fishbone Diagram

How To:

1. Write the problem in the “fish head.”
2. Draw a “backbone.”
3. Draw “ribs” at 45 degree angles from the backbone.
4. Brainstorm all the causes of the problem and place them at the end of the ribs.

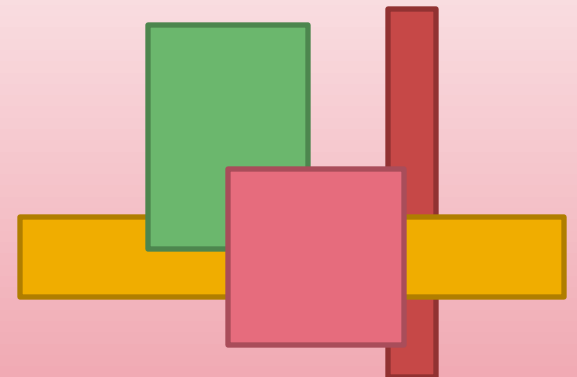
--Ask “Why?” and list the whys along the ribs.



Techniques: Fishbone Diagram

How To:

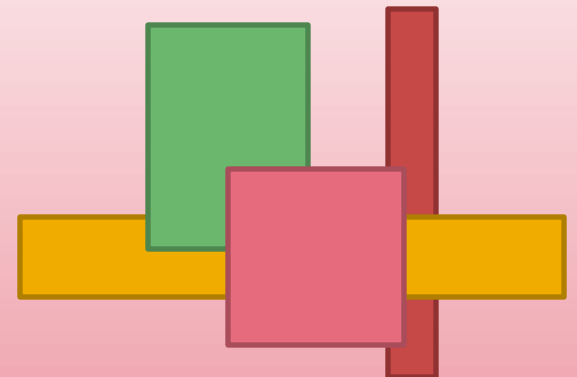
5. Draw additional ribs and sub-ribs as necessary.
6. For best results, allow it to “cook” at least overnight.
 - Revisit after letting it sit awhile. What else have you thought of?



Techniques: Fishbone Diagram

How To:

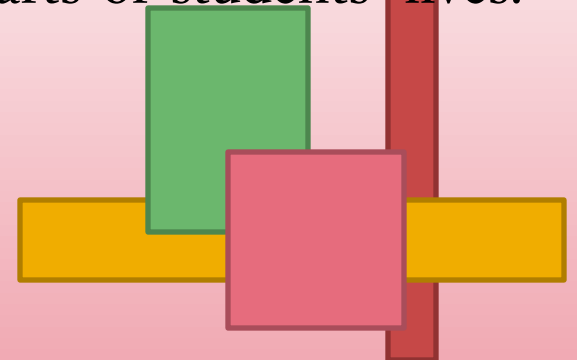
7. List more complicated causes at the tail and less complicated causes at the head.
8. Tackle the less complicated causes first.



The Payoff

Use Productive Thinking techniques to add innovation and improve problem solving in your CTSO.

- Get unstuck.
- Build enthusiasm.
- Increase confidence.
- Learn new ways to think.
- Teach skills that carry over to other parts of students' lives.



Resources

Article by Michael Michalko:

http://www.creativitypost.com/create/how_geniuses_think#sthash.5D5aradF.dpuf

101 Creative Problem Solving Techniques by James Higgins

