Learning & Problem-

Solving

Learning and Problem Solving
Handouts and Exercises

Table of Contents

Some Thoughts About Learning

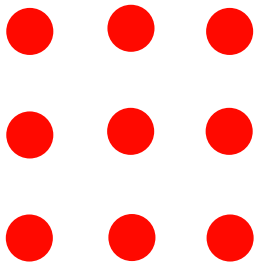
Anxiety & Learning Are Partners.
Learning, in the true sense, requires
a change in what we value and how
we act; not a retention of facts.
Technology provides retention devices
which far exceed the capability of any
mind, but no learning takes place.
No one replaces or modifies their
beliefs or behaviors without some
anxious moments and a fight. So
when anxiety knocks, open the door!

" Let's walk before we run,
stand before we walk,
crawl before we stand,
and.....

Be willing to make mistakes. No normal
person consciously tries to make mistakes,
so why do we punish ourselves when we
make a mistake? Only when we fail to learn
from our mistakes should we retreat to the
corner and sport the pointed cap.

PROBLEM-SOLVING: Point of Entry

The following exercises are designed to identify some of the preconceptions we bring to a new challenge.



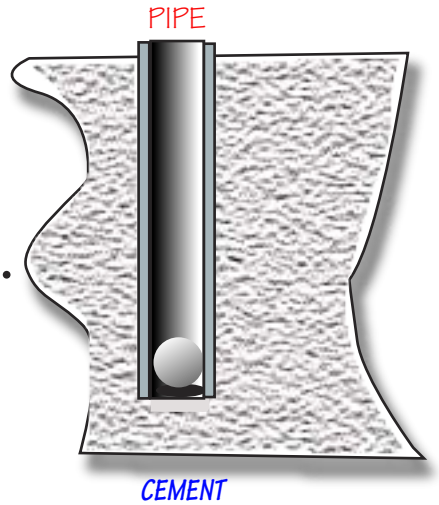
Problem #1: Connect all of the nine dots using only four continuous (don't lift pencil) straight lines. Lines may cross, but they cannot be retraced.

Problem #2: Enlarge this swimming pool to twice its size without changing its shape or the location of the trees.

2.

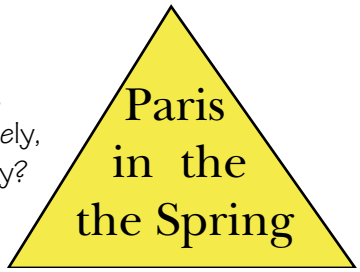
Problem #3: How would you remove this pingpong ball from the steel pipe set in solid concrete. Your only tools are: 1. Two feet of #4 cord. 2. One wire coat hanger. 3. A pair of scissors.

3.



4. Find feet in this graphic image.

5. *Read this sign outload. Now, read each line, separately, word for word. Any discovery?*



6. Draw a square in the space provided.

7. Draw an abstract square in this space.

SIX PHASES OF PROBLEM-SOLVING

Phase I: Point of Entry

1. Perceive the problem. What's bothering you?
2. Define the problem.
3. Identify preconceived and limiting ideas. Self imposed restrictions, or seeing what you want to see.
4. Vertical and lateral thinking. Do you dig a deeper hole, or dig elsewhere for the answer?

Example: The person who only sees the potential for a brick as material for building, is a vertical thinker. A lateral thinker might see the inherent qualities of a brick, consequently seeing the use of a brick well beyond material for a wall, chimney, etc.

5. Saturation: Seeing familiar but ignored data.
6. Utilization of all senses, e.g. touch, smell, sight, and taste.

7. Cutural and environmental blocks.
    a. Taboos
    b. Humor
    c. Reason and intuition
    d. Left and Right-brained thought
    e. Tradition and change
    f. Thinking through mental blocks
    g. Accepting and incorporating criticism

8. Emotional Blocks
    a. Fear of taking a risk.
    b. No appetite for chaos.
    c. Judging rather than generating ideas.
    d. Inability to incubate.
    e. Lack of challenge and excessive zeal.
    f. Reality and fantasy.

9. Intellectual and Expressive Blocks
    a. Correct language, e.g. verbal, visual, and mathematical.
    b. Lack of, or incorrect information.
    c. Inadequate language skills.

Phase II: Expansion

1. Identification of alternatives

2. Fluency and flexibility.
    a. Conventional expansion.
    b. Expanding beyond the obvious.

3. Problem statement.
    a. Need
    b. Inherent qualities/attributes.

c. Interpretation
d. Configuration
e. Material
f. Forming process
g. Sensuous qualities
h. Modifiers

Phase III: Convergence (Selecting alternatives)

1. Morphologically forced connections.

2. Reduction - closing in on alternatives.

3. Check lists (Alex Osborn)
   a. Other uses? b. Adapt? c. Modify? d. Minimize? e. Substitute?.
   f. Rearrange? g.Reverse? h.Combine?

4. Check lists of manipulative verbs (Koberg and Bagnall)

Multiply	Distort	Fluff-up	Extrude
Divide	Rotate	By-pass	Repel
Eliminate	Flatten	Add	Protect
Subdue	Squeeze	Subtract	Segregate
Invert	Complement	Lighten	Integrate
Searate	Submerge	Repeat	Symbolize
Transpose	Freeze	Thicken	Abstract
Unify	Soften	Stretch	Dissect

Phase IV: Development
Carry out the plan.

Phase V: Evaluation
What were you trying to do?
Did you do it?
Was it worth doing?

1. Can you check the result?

2. Can you check the argument?

3. Can you derive the result differently?

Phase VI: Exploitation (Can you use the result somewhere else?)

1. Improve on original idea, based on lessons learned.

2. Realize new possibilities from experience.