

Infusing Creativity into Academic Content

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Creativity

is the generation
of novel, useful
ideas.

Who is creative? Raise your
hand.

NO 2 HB

According to Torrance,



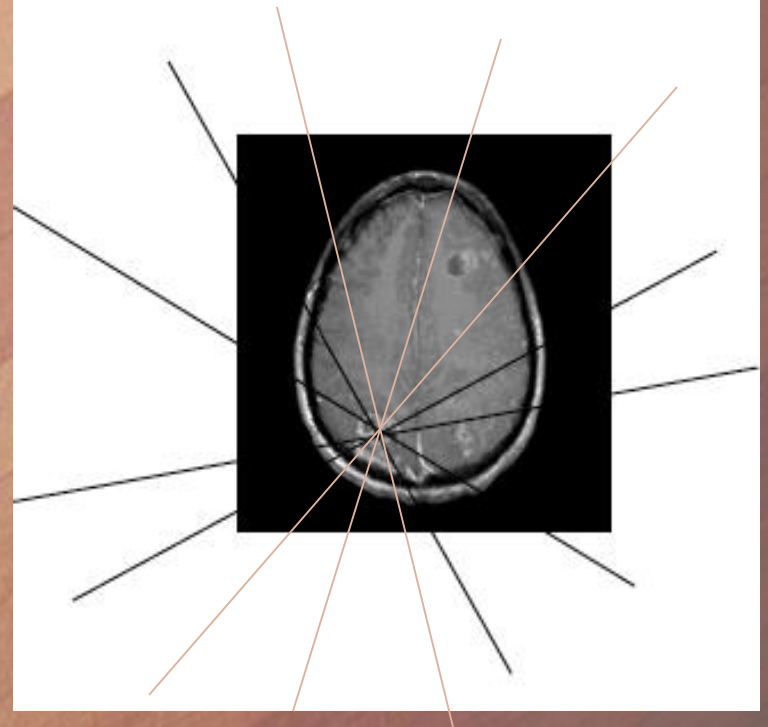
“When a person has no learned or practiced solution to a problem, some degree of creativity is required”

NO 2 HB

Example From Recent News!

A new machine can attack a tumor without destroying adjacent healthy tissue by aiming weak rays to converge on the tumor.

Gamma Knife



Assumptions

- Creativity is valued
- Everyone has some creativity and it can be nurtured
- Creative strategies and dispositions can be developed



Some simply call them C and c

- C -- works of genius



Painting by Renoir

- c -- everyday creativity



Nutritious meal by busy Parent

Why aren't creative strategies taught more in school?

- Creativity is not valued enough.
- Creativity is seen as the purview of the genius.
- There is a belief that creative strategies and dispositions can't be taught.
- Some contend that creative people don't use these strategies.
- Teachers don't have time to teach creative strategies because there are so many standards to teach.
- There is general concern that creative activities are fluff and extras, *but they need not be...*

Why Should Creative Strategies Be Taught More?

- We need creativity to solve problems that we do not yet know
- Students who participate in creative activities are engaged in school
- Students who are engaged in creative thinking “develop complex and subtle aspects of the mind.” (Eisner)
- Creative students do as well in academic subjects as do higher IQ less creative students. (Torrance)

Four Components of Creativity*

Press
or
Place

Person

Product

Process

*Rhodes

NO 2 HB

II. Person

1. Identify the creativity in your students.
2. Encourage it.



Some Characteristics-- Combination Depends on the Field

Emotional	Intellectual	Physical
<ul style="list-style-type: none">-Openness-Curiosity-Risk taking--Type T (Farley)-Strong self concept-Persistence-Courage	<ul style="list-style-type: none">●Problem solving●Fluency●Flexibility●Originality●Elaboration●Abstractness of Thought●Transfer	<ul style="list-style-type: none">●Perfect Pitch or other keen sense●Eye hand coordination●Visual memory●High energy●Body type●Looks●Size

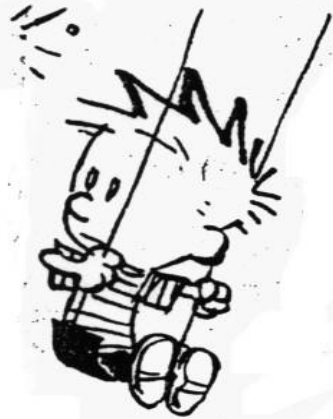
Problem Behavior or Creativity?

- In some cases the very qualities that cause creative individuals to have problems are the same ones that may facilitate their creative accomplishments .

Motor Hyperactivity or...

CALVIN AND HOBBS

RRINNGGG




NO 2 HB

..High Energy?



IT TAKES ME MORE THAN ONE RECESS TO WEAR MYSELF INTO A STATE OF SUBMISSION.



A black and white cartoon panel showing the girl from the previous panel lying on the ground, looking exhausted and holding a book. She has a speech bubble above her.

Creative People

have many characteristics that can be viewed as positive or negative

- Original or bizarre?
- Independent or stubborn?
- High energy or hyperactive?
- Spontaneous or impulsive?
- Emotionally sensitive or emotionally unstable?

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III. Process-

- preparation, incubation, illumination, verification

NO 2 HB

Process

- Instruct in creative skills
- Recognize, model, and reward creative approaches
- Focus on goals through visual and verbal cues
- Remove blocks to creativity
- Provide opportunities for creative input

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Warmups

- “We try to loosen up our thinking, to break down our concern for rules, right answers, and time limits, and to focus instead on ideation, the process of thinking up many ideas...playing with thoughts...” (Treffinger, 1980, p.33).

NO 2 HB

A yellow pencil with a black eraser and a sharp lead tip is positioned vertically on the left side of the image. The pencil has the text 'NO 2 HB' printed on it. To the right of the pencil is a clear, rectangular plastic sheet that is slightly tilted. The background is a wooden surface with a vertical grain pattern. The text is centered on the plastic sheet.

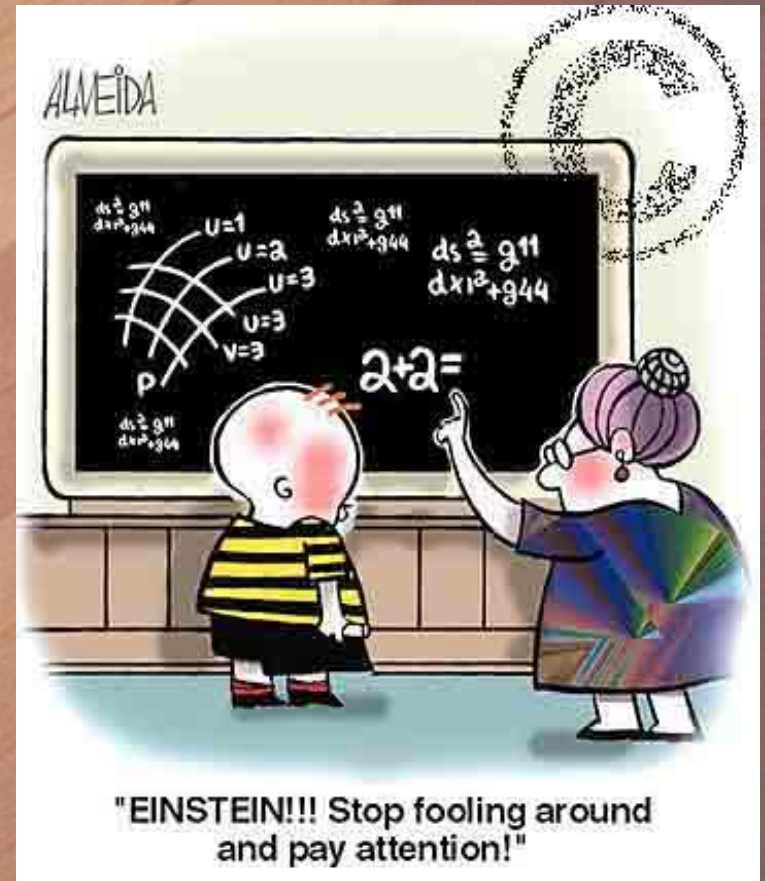
10.5 Easy Creative Strategies

Part 1, the first 5

To use with your class,
your family, or yourself

1. Use Humor

- Go to <http://cagle.slate.msn.com>
- The site has lesson plans for elementary, middle, and high school that you can adapt
- Cartoons are changed frequently

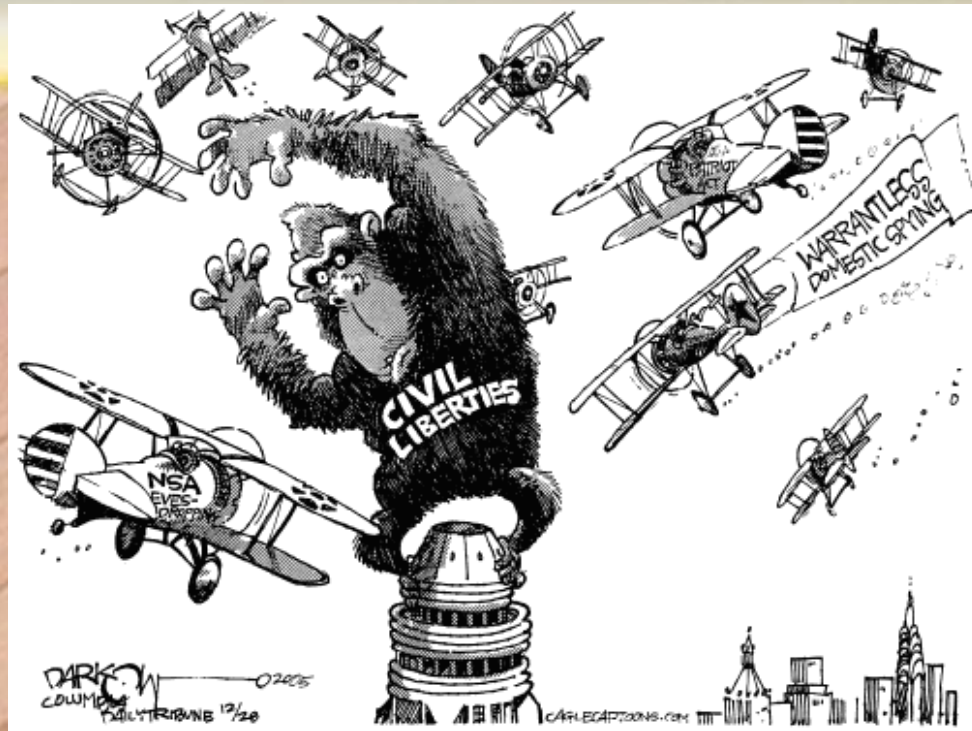


Humor



- Another tack is to have participants draw cartoons to represent current or historical events, OR

Humor



- Or, create a cartoon to represent the other side of the issue. Here, participants could discuss the issues on both sides of a controversy, such as the Patriot Act, and draw an editorial cartoon in answer to this one.

Humor



- Cartoons can be used to teach science, art, journalism, English, and research, too.

2. Use an encounter experience

Question of...

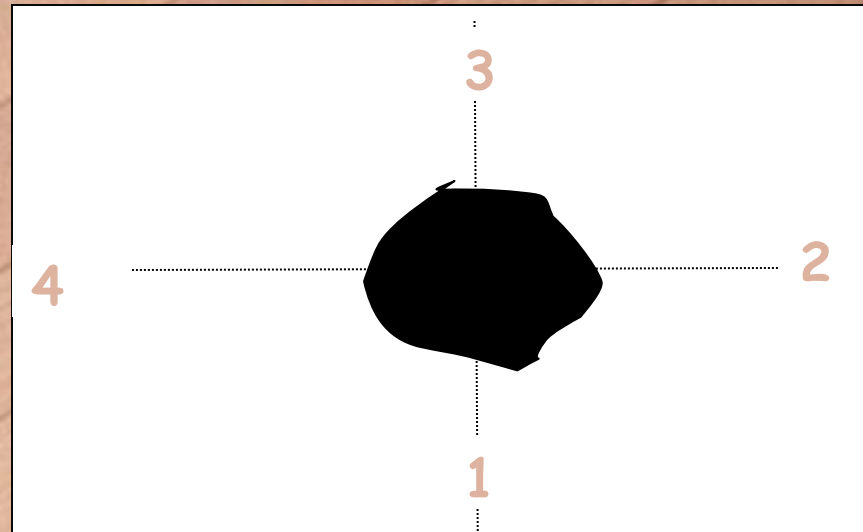
1. Identity
2. Awareness
3. Isolation
4. Risk or danger
5. Wisdom

EXAMPLE: Introducing a Lesson on Native Americans

1. What kind of Native American are you?
2. What do you see? Hear? Smell? Taste? Feel?
3. You are away from the rest of your people. Why?
4. You hear voices of the enemy near. Who are they? What are they doing?
5. What have you learned about? What would you like to know?

3. Inkblot

- Groups of 4 with inkblot or paint blot on paper



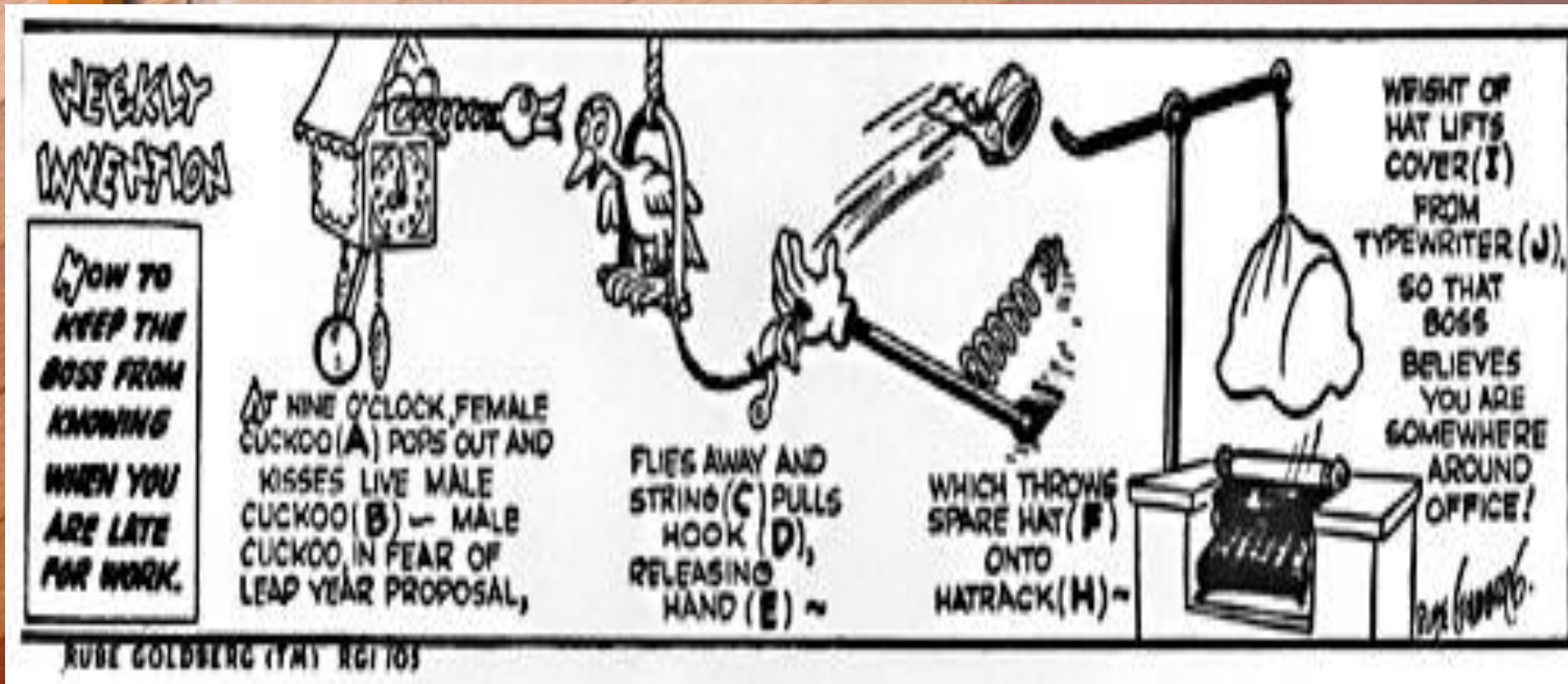
1. Fold the paper in half horizontally and vertically.
2. Then put a few drops of paint, refold paper and press to smear.
3. Number the 4 sides and brainstorm for 2-3 minutes on each side what the blob could be.

Inkblot: Applications

- **Creativity**--discuss who had the most
 - Responses (fluency),
 - Unusual response (originality),
 - Detailed response (elaboration),
 - Categories of responses (flexibility)
 - Recognize other attributes of creativity such as humor, emotion, fantasy, etc.
- **Geometry**--Use graph paper; make a polygon out of the figure; figure (or estimate) the area
- **Art**--Have students choose to draw or paint details to complete the picture
- **Language Arts/English/Foreign Language**--Have students write stories about the picture

4. Movement

- Familiarize students with Rube Goldberg machines like the one below.



Machine

• Machine

- A volunteer makes a repeated machine-like movement.
 - one by one others add a motion to the machine.
 - remaining students are asked to brainstorm what the machine is and how the various movements work together.
- * Gives students an opportunity to express creativity through movement.

5. Brainstorming and Just Suppose:

- **Principles:**

- 1. Deferment of judgment.
- 2. Quantity breeds quality.

- **Rules:**

- 1. Criticism is ruled out.
- 2. Free wheeling is welcomed.
- 3. Quantity is wanted.
- 4. Combination and improvement are sought--hitchhiking.

- **Economics Example:** *Just suppose you won the lottery, what would you do with the money? What might some effects be?*
- **Science/Social Studies:** *Just suppose we could cure all diseases. What would be the effect?*
- **Mathematics:** *Just suppose you could invent your own symbol system for mathematics. What might be some symbols you would create, and what would they mean?*



***10.5 Easy
Creative
Strategies
Part 2, the next 5***

To use with your class,
your family, or yourself

6. Scamper (Eberle, 1971)

- **S**ubstitute
- **C**ombine
- **A**dapt
- **M**agnify or minify
- **P**ut to other uses
- **E**liminate
- **R**everse or rearrange



“What are some ways that we could make zoos better for animals?”

- Substitute--group animals and vegetation together as in the wild and let them hunt or forage for their own food
- Combine--have the birds from the aviary in the same place with the monkeys
- Adapt--use climate control domes and vegetation to simulate their natural environment
- Magnify or minify--make zoos larger with more space; breed smaller versions of animals so that the space seems larger

“What are some ways that we could make zoos better for animals?” (Cont’d)

- Put to other uses--give the animals activities to occupy them
- Eliminate--remove as many unnatural sensations as possible--sights, sounds, smells, foods, textures, etc.
- Reverse or rearrange-- put the people in enclosures and let the animals run free

Scamper--Application

Language Arts: How might you use the SCAMPER techniques to change a familiar story?

Social Studies: How might you apply the ideas of SCAMPER to create a new society?

Mathematics: Can you write word problems using the ideas of SCAMPER?

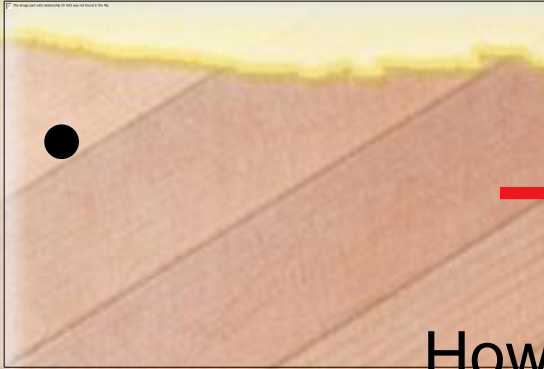
Science: How can you design a new experiment using the principles of SCAMPER.

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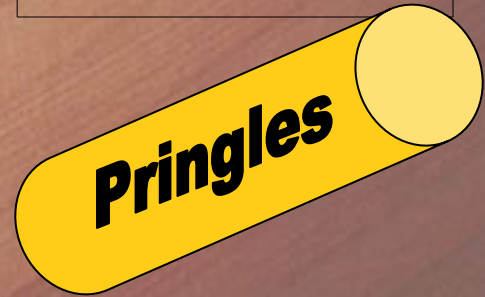
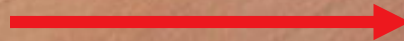
7. Metaphorical Thinking

- Life is like...
- “...a jigsaw puzzle but you don't have the picture on the front of the box to know what it's supposed to look like. Sometimes you're not even sure you have all the pieces.”
- “...riding an elevator. It has a lot of ups and downs and someone is always pushing your buttons. Sometimes you get the shaft, but what really bothers you are the jerks.”
- § What do you think life is like?

Using Analogy or Metaphor to Solve a Problem



How does nature solve this problem?



8. Forced Fit

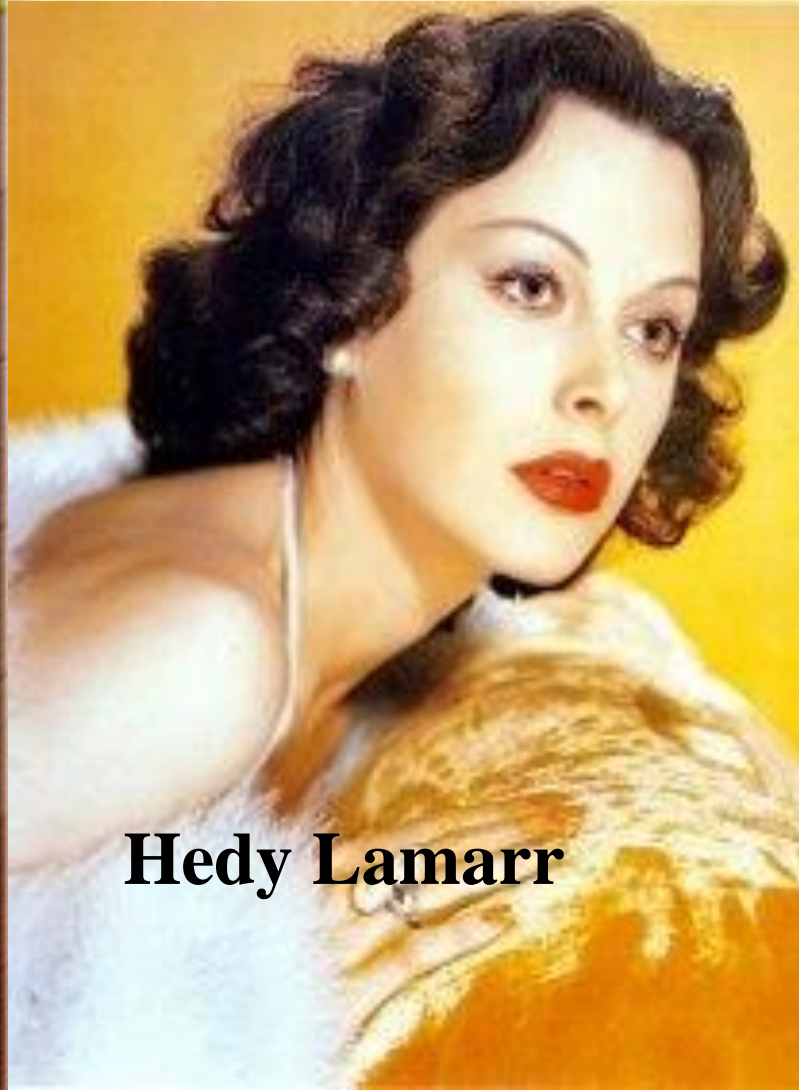
- If you can't think of a comparison, try choosing anything and figuring out how they are alike.
 - Life is like a book. How?
 - What is a garden like? How?
 - How are schools like businesses? prisons? gardens? Zoos?
- Play a game with two teams; each must think of a problem and an unlikely object with which to solve it. If the solvers can think of a reasonable solution using the object, they get a point. Otherwise those presenting the problem get the point. Take turns.
 - Example: How could you use a spoon to get children to clean their rooms?

(If anyone can help solve this problem, with or without a spoon, all of us parents will be eternally grateful!

9. Synectics

- Solve problems using analogies and opposites
- Force fit generated responses into a realistic solution for the problem.
 - direct, actual comparisons with similar situations
 - personal, identify with some aspect of the problem
 - symbolic, putting two conflicting aspects of the problem together, or some other way of objectifying the problem
 - fantasy, uses imaginary ideas to find ideal solutions

Actual Application



Hedy Lamarr

In 1942, Hedy Lamarr and George Antheil received the patent on their "Secret Communications System," designed to protect U.S. radio-guided torpedoes from being intercepted by the Nazis--spread spectrum technology

Based on player pianos

Synectics Application

How can we improve the efficiency and efficacy of security lines at airports?

Direct: Move people through like products move through a factory line--> sit on a people mover like Disney has to ride through security

Personal: How would I want people to go through security if I were a security worker?-->people go through security without any belongings wearing paper pajamas.

Symbolic: Is there a way to have low intrusion security?--> scan people without stopping them and making them take off their shoes, jackets, jewelry, phones, take out laptops, put liquids in 3 ounce containers in bags.

Fantasy: How might we go through the airport like we did before there was so much security?--> stop the threat of terrorism so that the world is like it was before.

10. DeBono's Lateral Thinking

Get information on a contentious issue, then try to analyze the issue:

- EBS--Examine Both Sides
 - Argue one, then the other side of the Patriot Act.
- ADI--Agreement, Disagreement, Irrelevance (to look at sides in argument--should come after EBS)
 - Read an article, choose key statements, then label
- OPV--Other People's Views: Two parts:
 - Identifying the other people who are really part of the situation: What people and groups have an interest in the censorship of lyrics to popular songs?
 - Getting into the shoes of all of these others: How would you feel if you were a parent of a child who listened to them? A record producer? A recording artist? A disk jockey?
- PMI--Plus, Minus, Interesting
 - Listen to a political debate and try to label each point made by the debators as a plus, minus, or interesting point

10.5 DeBono's 6 Thinking Hats



Positive



Emotional



Organized



Neutral



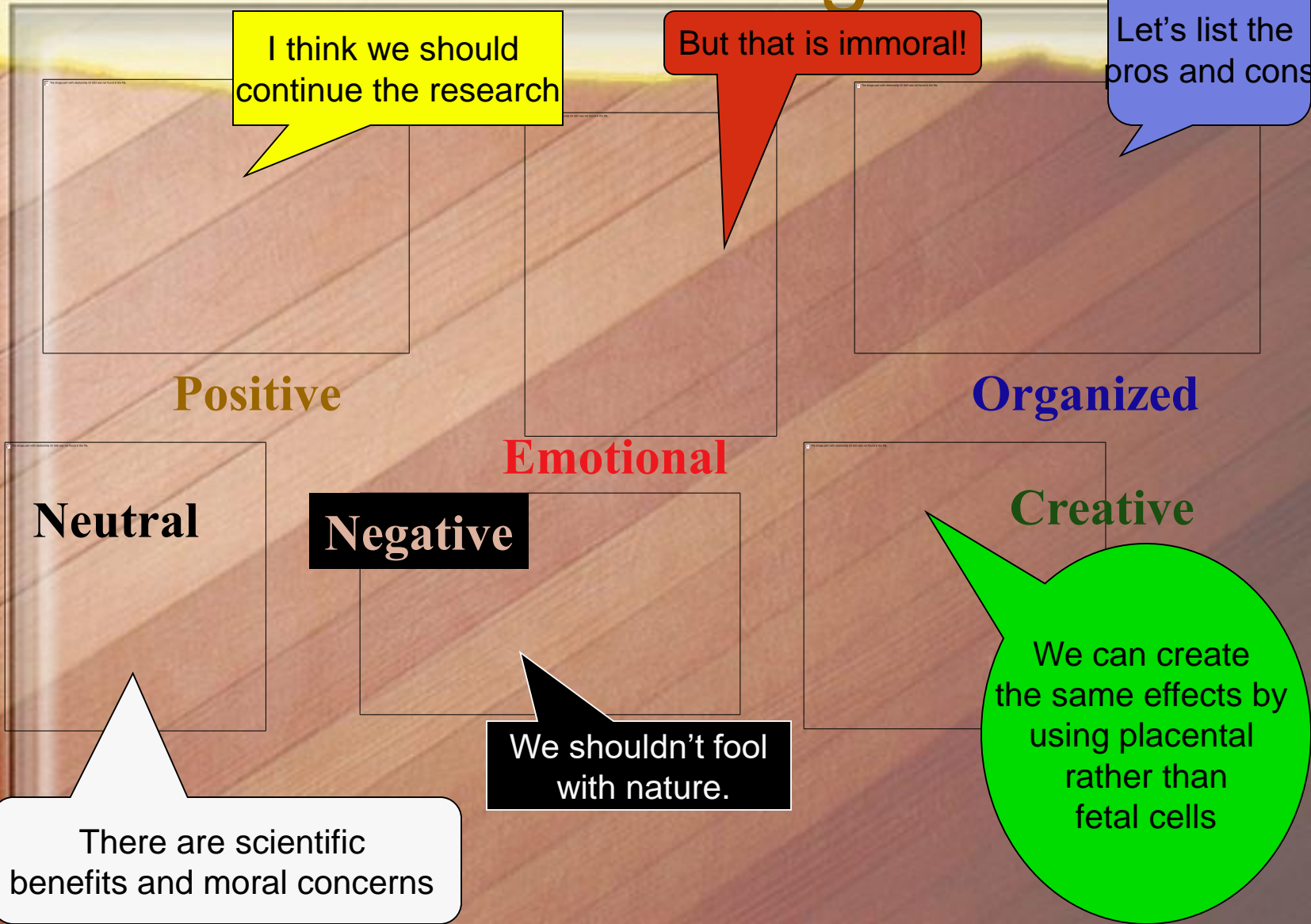
Negative

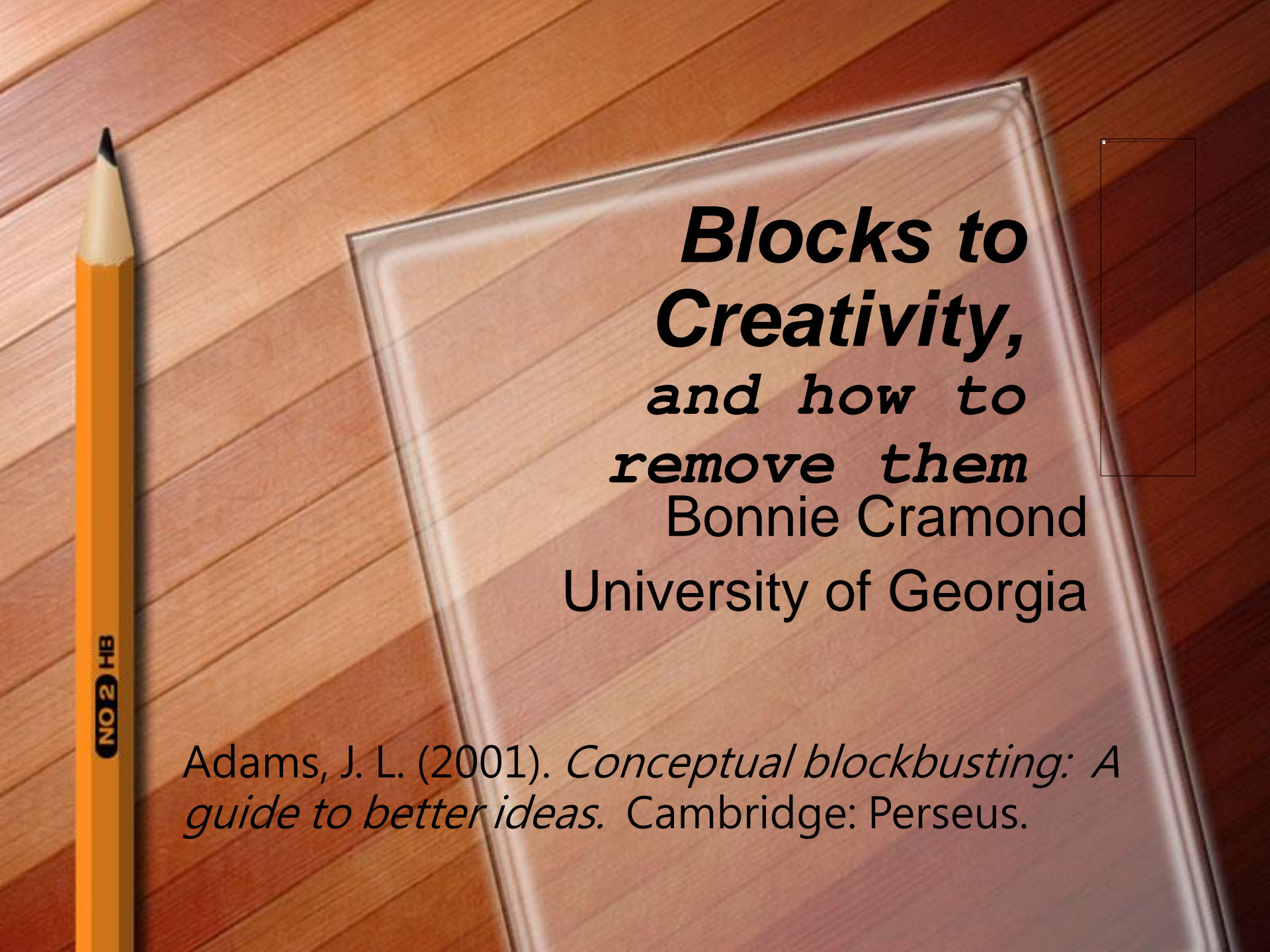


Creative

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10.5 Example of Discussion with DeBono's 6 Thinking Hats





***Blocks to
Creativity,
and how to
remove them***
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Adams, J. L. (2001). *Conceptual blockbusting: A guide to better ideas*. Cambridge: Perseus.

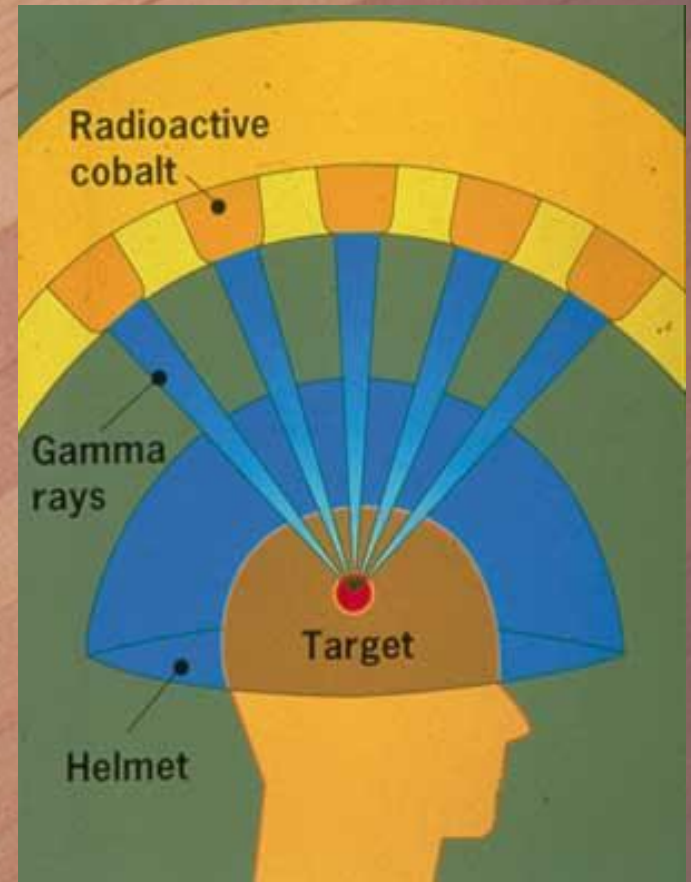
How Creativity Can Solve Problems

- Gamma radiation can destroy a tumor, but a ray strong enough to destroy a tumor would also destroy healthy tissue between the gamma source and the tumor.



Lars Leksell, Swedish neurologist

- Didn't let fear of the danger of Gamma rays block his idea to use the noninvasive procedure.
- In 1967, he invented a new machine that can attack a tumor without destroying adjacent healthy tissue by aiming weak rays to converge on the tumor.




Fear is just one block to creativity



Sculptor's block

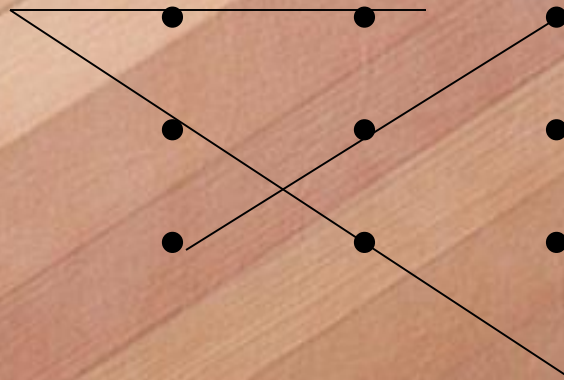
Activity 1 Read aloud



I pledge allegiance to the
flag of
of the United States of
American and to the
republic for which it stands,
one nation, under God, with
liberty and justice for all.

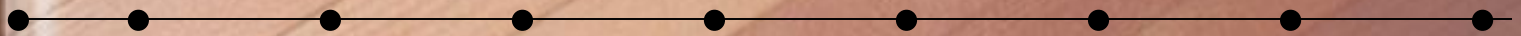
Activity 2

- Draw 4 straight lines
- without lifting your pencil from the paper
- cross through every dot once

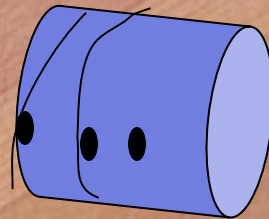


Alternative Responses

- Cut the dots out, line them up and use 1 straight line.

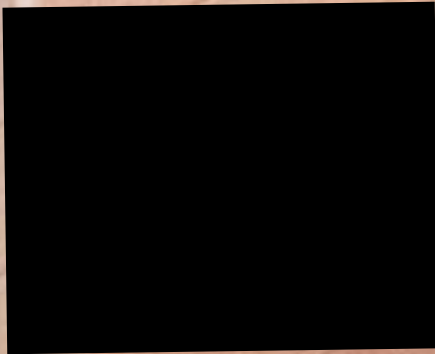


- Curve the paper around and use 1 winding line.



Alternative Responses

One very fat line:

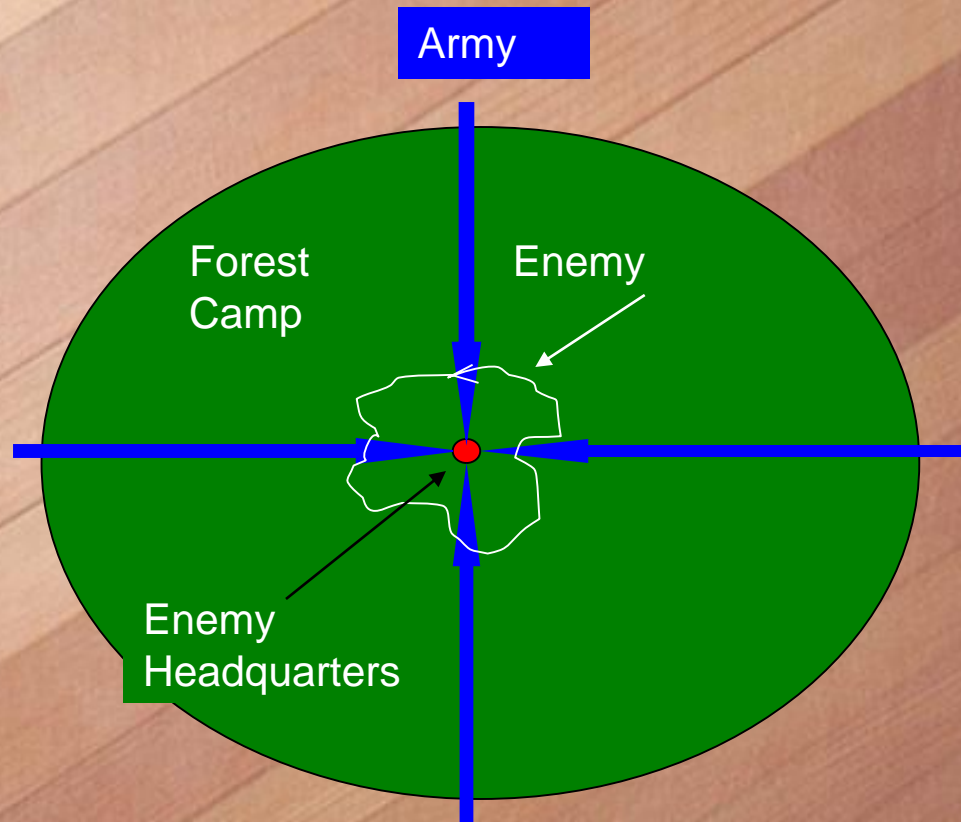


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Activity 3

- A general wants to send his army in a surprise attack on the enemy camp. However, if he sends the whole army in, they will be noisy and lose the element of surprise. If he only sends part of the army in, they may be quiet, but they will be outnumbered. What could he do?

The solution is a modification of the Gamma Knife solution




Activity 4: Pennies



- Without looking at a penny, choose the drawing that is an accurate representation.

Perceptual Blocks

- 
- A. Seeing what you expect to see-- stereotyping (Act 1- reading past words)
 - B. Difficulty in isolating the problem
 - C. Tendency to delimit the problem area too closely (Act 2- 9 dot problem)
 - D. Inability to see the problem from various viewpoints, or to transfer solutions from one problem to another similar one (Act 3--Plan of Attack)
 - E. Saturation (Act 4--Coin exercise)
 - F. Failure to utilize all sensory inputs

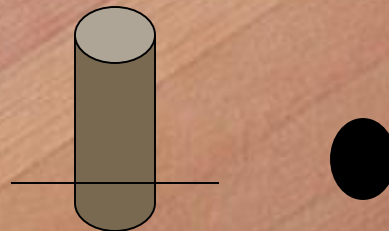
Activity 5--The Steel Pipe

- Imagine that you are one of a group of six people in a bare room along with the following objects:
 - 100 feet of clothesline,
 - a wire coat hanger,
 - carpenter's hammer,
 - a monkey wrench,
 - a chisel,
 - and a light bulb.
 - a box of cereal,
 - a file

NO 2 HB

Activity 5 Cont'd:

- A steel pipe is stuck vertically in the concrete floor with a ping-pong ball lying at the bottom of the pipe. The inside diameter of the pipe is just slightly larger than the diameter of the ping-pong ball. Your task is to get the ball out of the pipe without damaging the ball, tube, or floor. How many ways can you think of to do this?



Remove the ping pong ball from the pipe without damage



clothesline



file



hammer



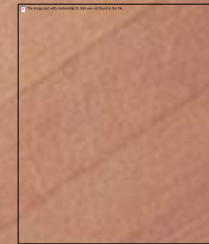
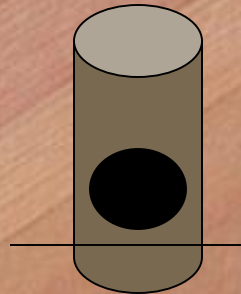
wrench



cereal



hanger



bulb



chisel



Cultural Blocks

- A. Fantasy and reflection are a waste of time, lazy, even crazy
- B. Playfulness is for children only
- C. Problem-solving is serious business and humor is out of place
- D. Reason, logic, utility, practicality are *good*; feelings, intuition, qualitative judgments, pleasure are *bad*
- E. Tradition is preferable to change
- F. Any problem can be solved by scientific thinking and lots of money
- G. Taboos (Act. 5 -- steel pipe)

NO 2 HB

Act. 6: Paper Folding

- Imagine a sheet of notebook paper, 8.5" X 11"
- Now, imagine folding it in half,
- Again
- Again
- Again
- Again
- Again
- Again
- Again
- Now, how many sheets thick is the paper?

NO 2 HB

Act. 7 Buddhist Monk

- A monk leaves to climb a mountain at 6:00 am one morning along the only path to the top.
- Along the way, he stops to rest, pray, or take refreshments from time to time.
- He gets to the top at 6:00 pm



Act. 7 Buddhist Monk (cont'd)

- When he reaches the top of the mountain, he sups, then prays and sleeps.
- The next day, he leaves the top of the mountain at 6:00 am to walk down the same path. Again, along the way, he stops to rest, pray, or take refreshments from time to time.
- He gets to the bottom at 6:00 pm



Act. 7 Buddhist Monk (cont'd)

- Must there be a spot that he passes at the same time on both days?
- You need not tell where or when, just if.
- Can you prove your answer?

The Answer is Yes. One Proof--Graphic

- Instead of one monk on two days, the same problem can be represented by two monks on one day.
- At 6:00 am, one starts at the bottom of the path and the other starts at the top.
- Must they run into each other along the way?

Top of Mt

6 p.m.

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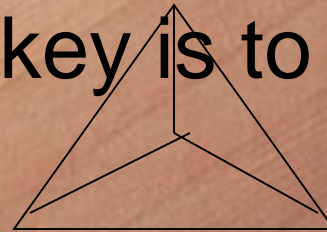
Another Proof--Visual



NO 2 HB

Act.8--4 Triangles from 6 Pencils

- Use 6 pencils (straws would work, too)
- Make 4 equilateral triangles (equal sides, equal angles) with the 6 pencils
- Don't break the pencils
- Solution: The key is to break the plane



Intellectual and Expressive Blocks

1. Solving the problem using an incorrect language (verbal, mathematical, visual) (Act. 6--paper folding)
2. Inflexible or inadequate use of intellectual problem solving strategies (Act. 7--Buddhist Monk)
3. Lack of, or incorrect, information (Act. 8--Triangles--Don't let assumption restrict what you do.)
4. Inadequate language skill to express and record ideas (verbally, musically, visually, etc.)

We Can Remove Blocks by...

- Seeing them
- Practicing breaking them

NO 2 HB

Environmental Blocks

1. Lack of cooperation and trust among colleagues (**murder committees**)
2. Autocratic boss who values only his own ideas, does not reward others;
3. Distractions—phone, easy intrusions; and
4. Lack of support to bring ideas into action.



Emotional Blocks

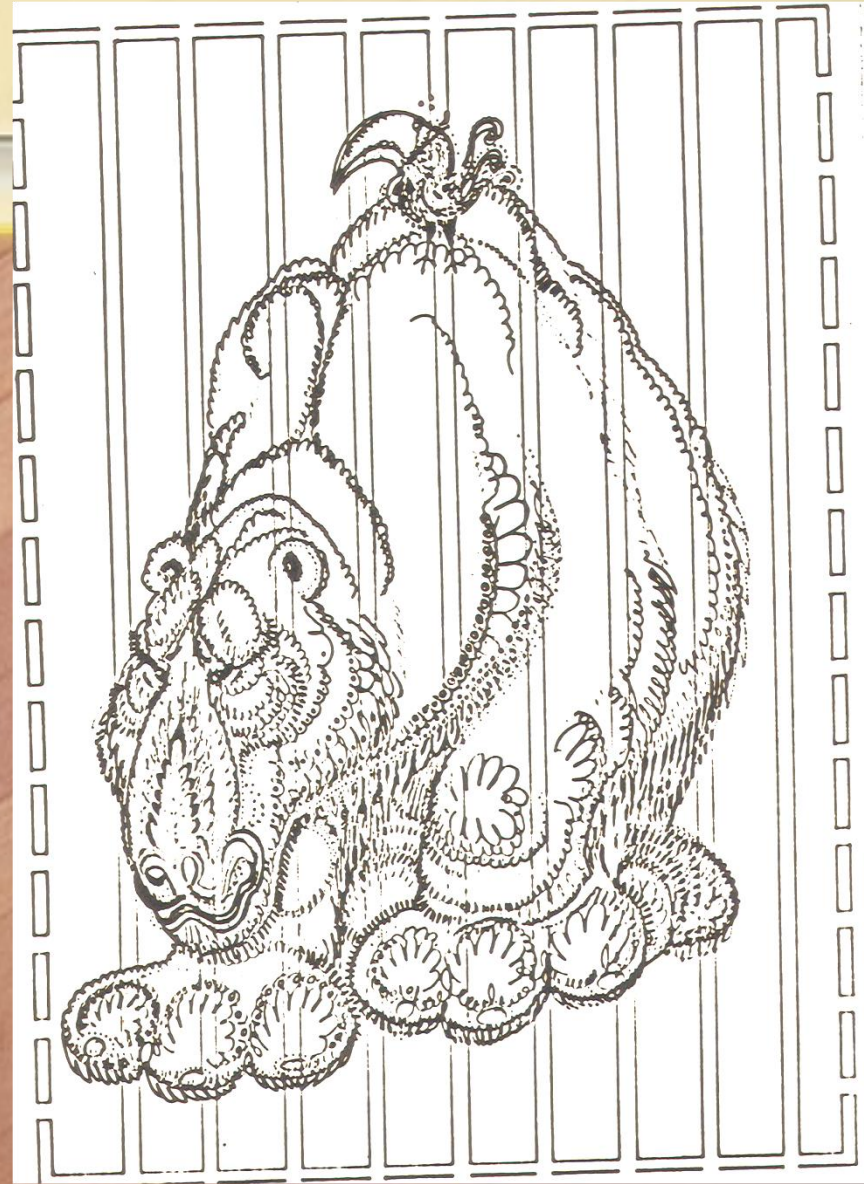
1. Fear to make a mistake, to fail, to risk
2. Inability to tolerate ambiguity; overriding desires for security, order; "no appetite for chaos"
3. Preference for judging ideas, rather than generating them
4. Inability to relax, incubate and "sleep on it"
5. Lack of challenge; problem fails to engage interest
6. Excessive zeal; overmotivation to succeed quickly
7. Lack of access to areas of imagination
8. Lack of imaginative control
9. Inability to distinguish reality from fantasy

The Parable of the Sad Bear

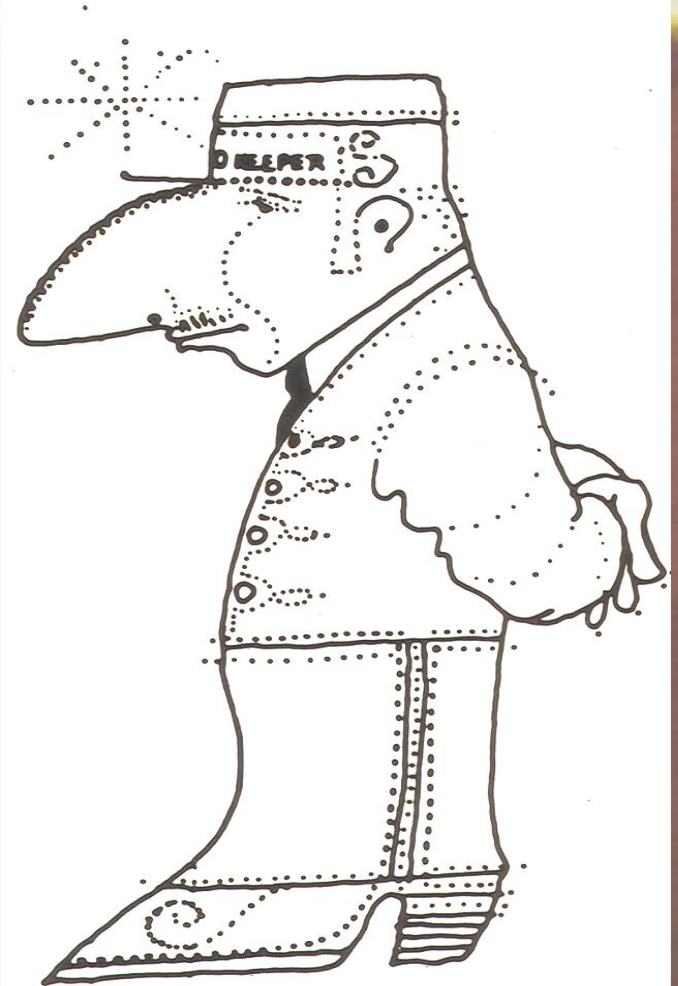
An Allegory On The School
Experience of A Creative Child



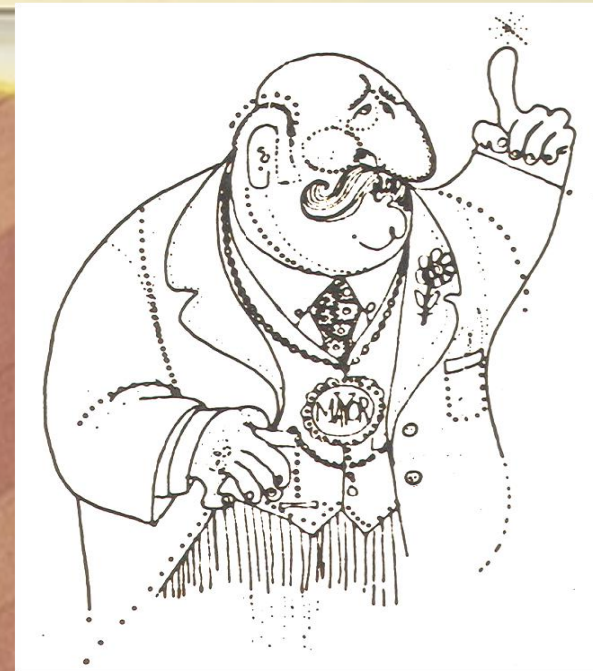
- Once upon a time there was a very sad bear who was kept in a very small cage at the town zoo. When he wasn't eating or sleeping, he spent his time pacing--8 paces forward and 8 paces back. Again and again he paced the cage.



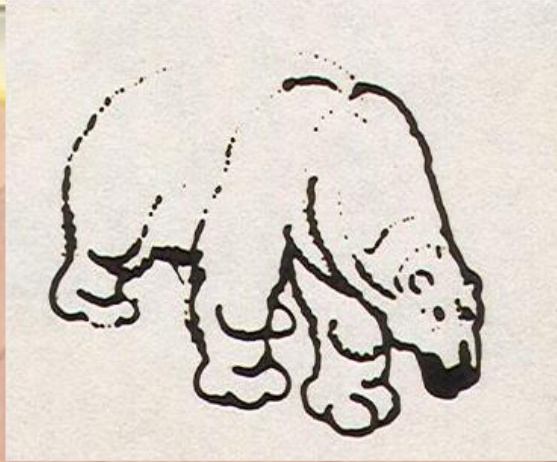
- One day the zoo keeper said, “It’s sad to see this bear pacing back and forth. I shall build him a great, open space where he can run and play.” So he did.



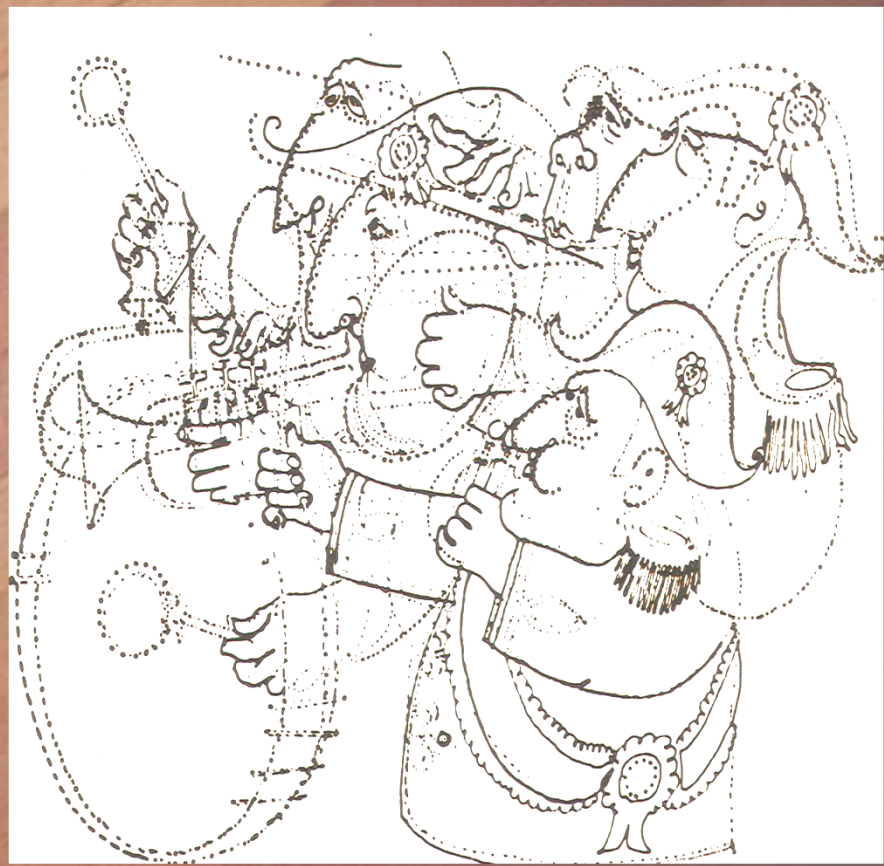
As the space was completed, great waves of anticipation charged through the town.



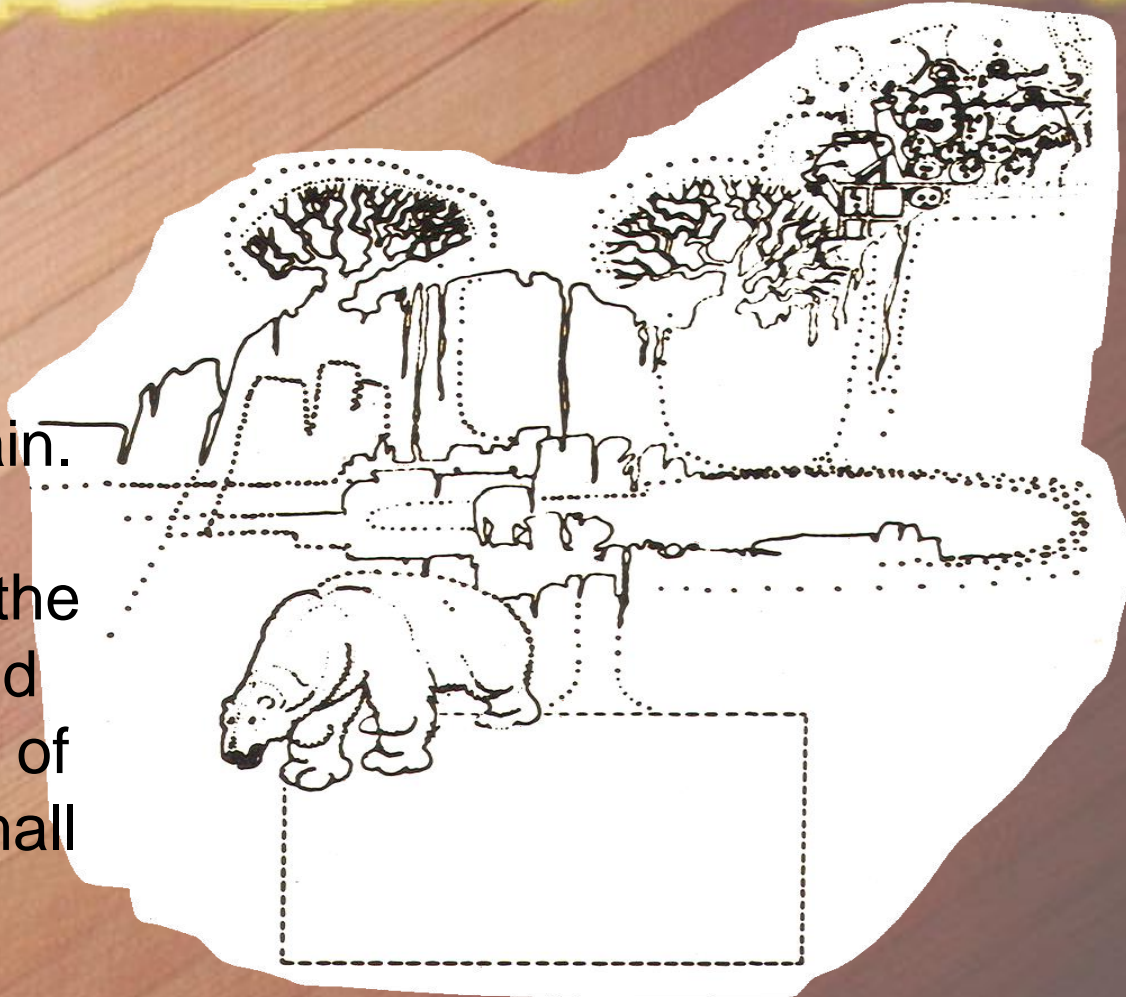
Finally the magic day came to move the bear to his headquarters. The mayor gave a speech as the children screamed with excitement.



The town band played loudly as the great beast was moved to his new large space. Everyone watched as the bear looked to his left, then to his right and began to move...



1 step, 2, 5, 8
paces forward,
and 8 back again.
To the shocked
amazement of the
crowd, he paced
the parameters of
his old, very small
cage.



NO 2 HB

Minds, like
bears, grow
accustomed to
narrow spaces.

