



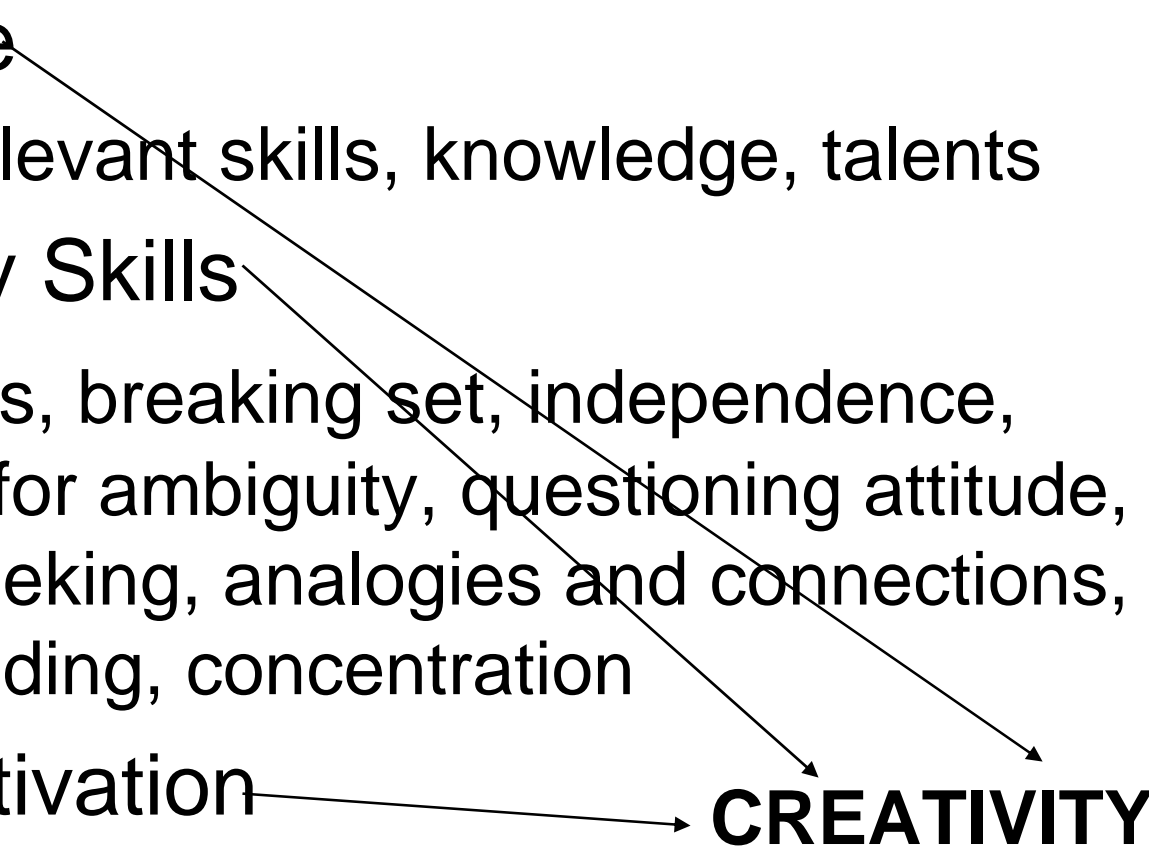
# *What Is Creativity?*

- ❖ Definition: new ***and*** useful ideas
- ❖ A process
  - problem presentation
  - preparation
  - generation of ideas
  - recognition/evaluation
  - preservation/reproduction
- ❖ “Front end” of innovation (implementation)



# *Resources For Creativity*

Amabile (1997)

- ❖ **Expertise**  
domain-relevant skills, knowledge, talents
  - ❖ **Creativity Skills**  
playfulness, breaking set, independence,  
tolerance for ambiguity, questioning attitude,  
novelty-seeking, analogies and connections,  
model building, concentration
  - ❖ **Task motivation**  
intrinsic, self-efficacy
- CREATIVITY**
- 



# *Personality and Environment*

- ❖ In Born to Rebel, Sulloway shows that first-born eminent scientists tend to identify with authority and produce incremental advances, whereas later-born scientists are more likely to “break out” with revolutionary ideas
- ❖ This “personality” is not inborn but is developed in the family as children find successful “niches” and carry that pattern later in life
- ❖ Einstein: “This coercion (in a militaristic classroom) had such a deterring effect upon me that, after I had passed the final examination, I found the consideration of any scientific problems distasteful for an entire year.”



# *How To Destroy Creativity*

- ❖ always pretend to know more than anybody else
- ❖ police your employees by every procedural means
- ❖ have your professionally-trained staff members do technicians' work for long periods of time
- ❖ erect the highest possible barrier between commercial decision-makers and your technical staff
- ❖ don't speak to employees on a personal level, except when announcing raises
- ❖ be the exclusive spokesman for everything for which you are responsible
- ❖ say yes to new ideas, but do nothing about them
- ❖ call many meetings
- ❖ put every new idea through channels
- ❖ worry about the budget
- ❖ cultivate the not-invented-here syndrome

Machine  
Design, Inc.

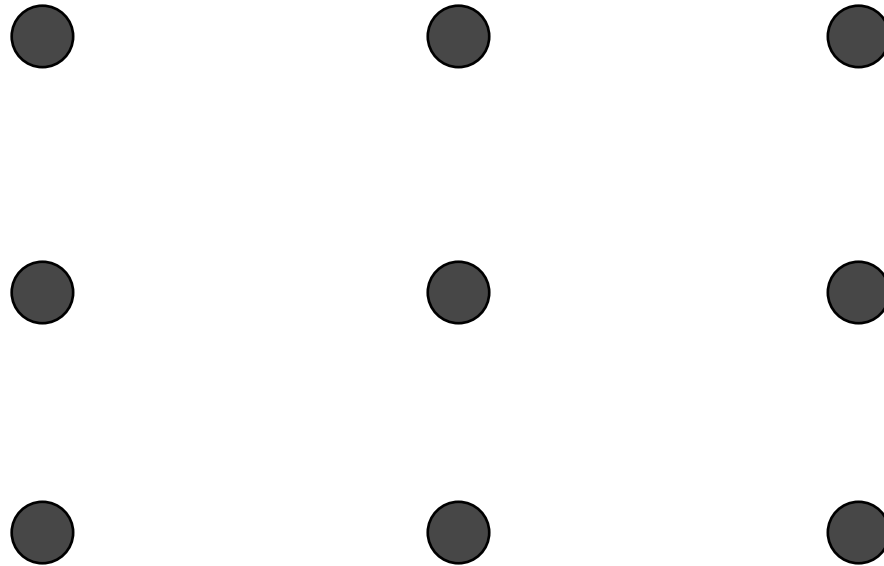


# *Individual Conceptual Blocks*

- ❖ self-imposed constraints  
e.g., Pepsi fights the Coke bottle,  
nine-dot problem
- ❖ cultural values  
e.g., ping pong ball problem
- ❖ improper symbolic representation  
e.g., algebra-word problems



# *Nine Dot Puzzle*



- ❖ Draw four straight lines that pass through all nine dots without lifting your pen
- ❖ If you get it, try three connected straight lines

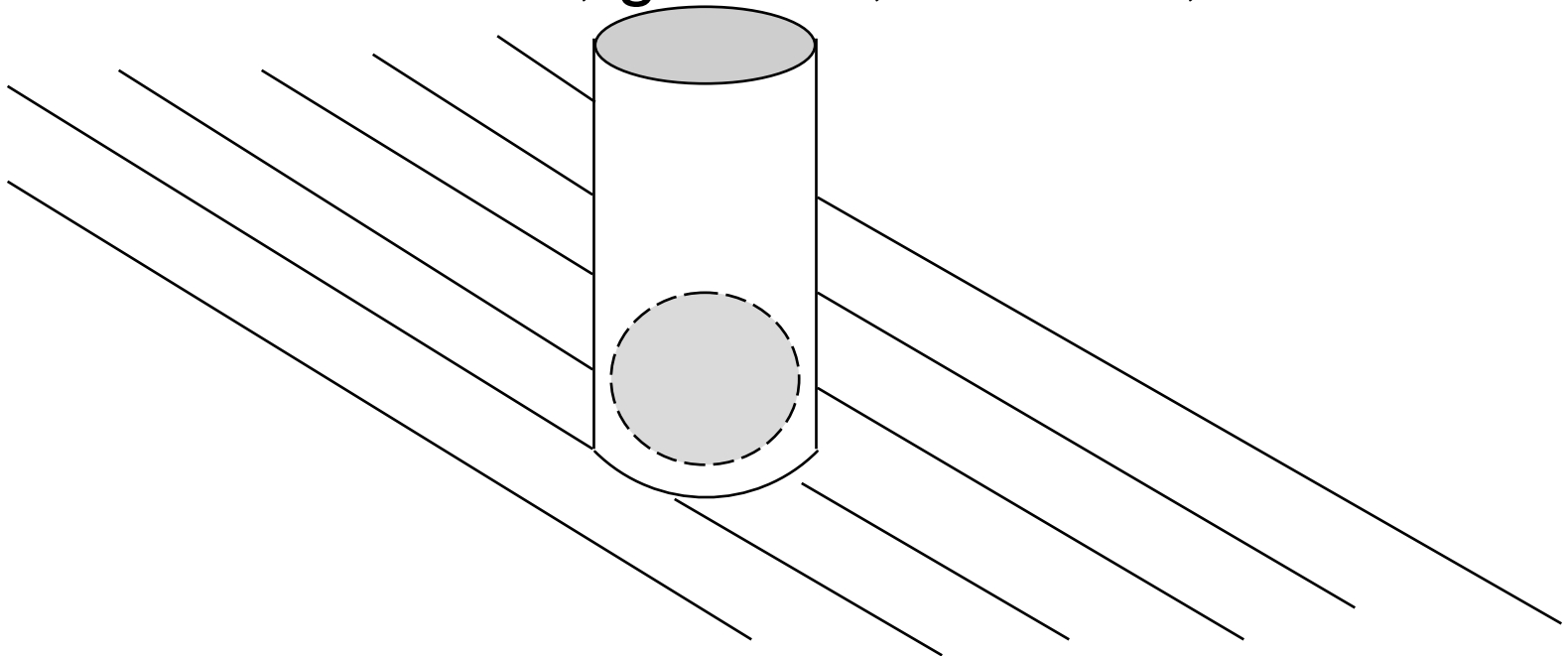


# *Pepsi Fights The Coke Bottle*

- ❖ 1950s hourglass bottle is Coke's "most important competitive advantage"
- ❖ 1958 Pepsi swirl bottle weakly imitates Coke's bottle
- ❖ 1970s John Scully, Pepsi's V-P Mkt: "How should problems such as this be approached?"
- ❖ Shift the ground rules: what do customers really want?

# *How To Get The Ball Out?*

- ❖ Get the ping pong ball out without damaging the ball, tube, or floor
- ❖ You have scissors, nails, thread, book, walkman radio, glasses, hammer, stick







# *Algebra Word Problems*

- ❖ Bob has three times as many pine cones as Dan. Between them they have 28 pine cones. How many does each have?
- ❖ If it takes 1 woman 9 months to have 1 baby, how many babies can 3 women have in 3 months?
- ❖ A hobo can make 1 whole cigar from every 5 cigar butts he finds. How many cigars can he make if he finds 25 cigar butts?



# *Some Creativity Techniques*

- ❖ Brainstorming: generate ideas uncritically
- ❖ Synectics: use analogies (e.g., biological) to join unrelated elements
- ❖ Systematic combinations and cross-impacts of elements



# *Generating Scientific Objectives For A NASA Space Program*

<u>Action Phrase</u>	<u>Target Feature</u>	<u>Target Object</u>
Observe circulation in	photosphere of	the sun
Measure tidal deformations of	surface of	the moon
Establish the structure of	interior of	Jupiter
Measure relativistic time dilations in		the space environment



# *Organizations and Innovation*

- ❖ **Management practices:** freedom, challenging work, supervisory encouragement, work group support
- ❖ **Organizational resources:** workload, networks
- ❖ **Organizational motivation:** oriented to being industry leaders, finding new ways/products



# *Ideo Video*

- ❖ What techniques are used to encourage creativity?
- ❖ How does this particular situation “rate” on Amabile’s three creativity resources?
  - expertise
  - creativity skills
  - task motivation