

Critical Thinking by Design
"The Art of Collage"

Understanding Cognitive Complexity

Visual Literacy in the 21st Century

- “He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast.”

Leonardo da Vinci

21st Century Skills

- Communication
- Collaboration
- Critical Thinking and Problem Solving
- Creativity
- Innovation
- Information Literacy
- Media Literacy
- Technology Literacy
- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

SPARKS OF GENIUS

Thinking Tools at the Heart of Creative Understanding

- **Observing**
- Imaging
- Abstracting
- **Recognizing Patterns**
- **Forming Patterns**
- Analogizing
- Body Thinking
- Empathizing
- Dimensional Thinking
- Modeling
- Playing
- Transforming
- Synthesizing

Recognizing Patterns

“Recognizing patterns is the first step toward creating new ones.”

“From patterns we recognize general principles of perception and action and base our expectations on those patterns. Then we try to fit new observations and experiences into these expectations.”

“In any form of pattern recognition, one must know what to expect and how to compare things before the patterns become evident.”





Counting Vowels in 45 seconds

A E I O U

How accurate are you?

Count all the vowels in the words on
the next slide.

Dollar Bill

Dice

Tricycle

Four-leaf Clover

Hand

Six-Pack

Seven Up

Octopus

Cat Lives

Bowling Pins

Football Team

Dozen Eggs

Unlucky Friday

Valentine's Day

Quarter Hour

Let's look at the words again...

What are they arranged
according to?

Dollar Bill

Dice

Tricycle

Four-leaf Clover

Hand

Six-Pack

Seven Up

Octopus

Cat Lives

Bowling Pins

Football Team

Dozen Eggs

Unlucky Friday

Valentine's Day

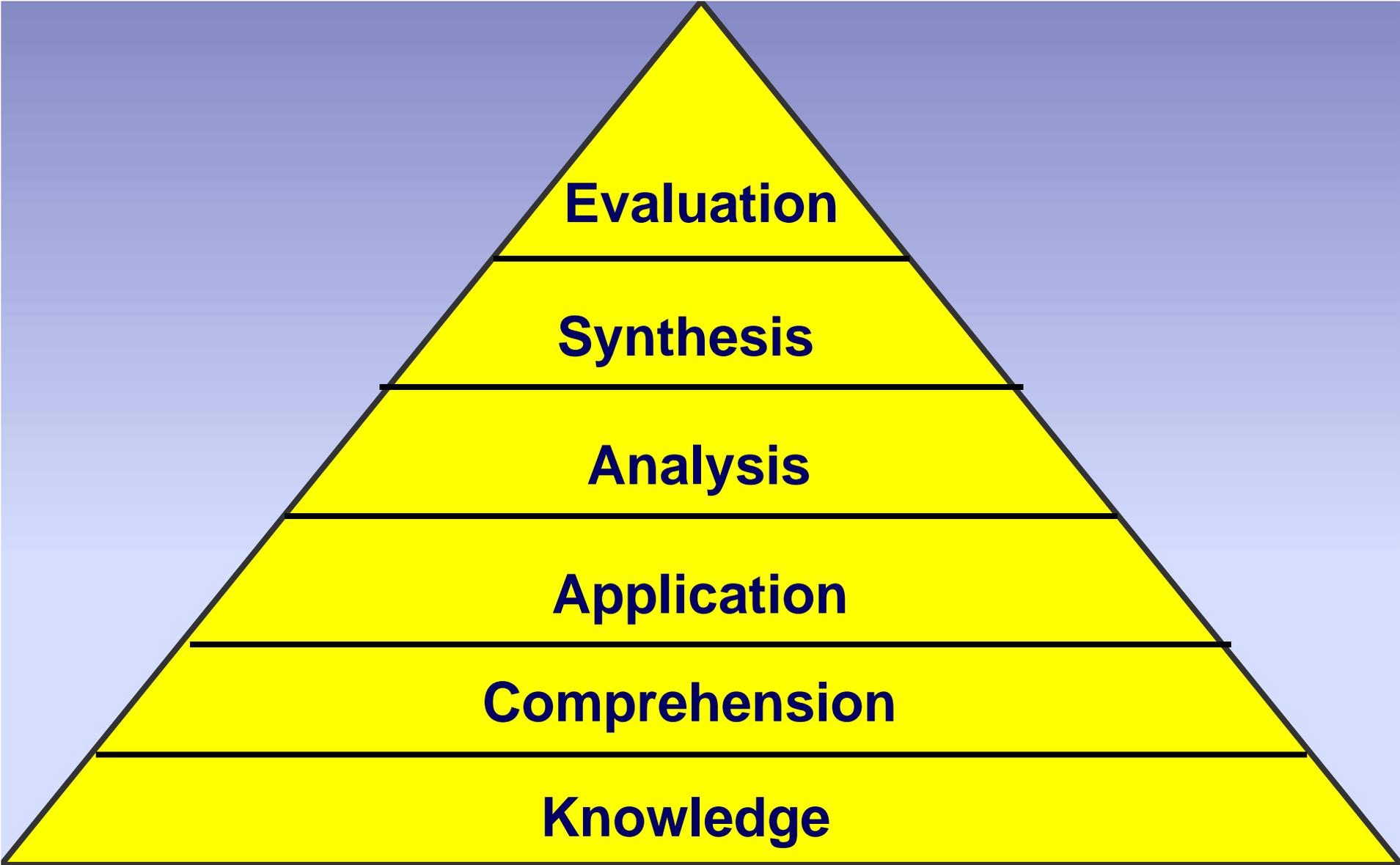
Quarter Hour

Forming Patterns

“Learning to create patterns is one of the keys to innovating in every discipline, and it is wise to learn this skill early on.”

“Making patterns for oneself is a lot more fun than memorizing—and a lot more valuable. Teasing apart one pattern and composing another requires real understanding of the basic elements of phenomena and processes. More, it opens up whole new worlds of knowledge.

Robert and Michele Root-Bernstein, *Sparks of Genius*,
The 13 Thinking Tools of the WORLDS MOST CREATIVE PEOPLE



Evaluation

Synthesis

Analysis

Application

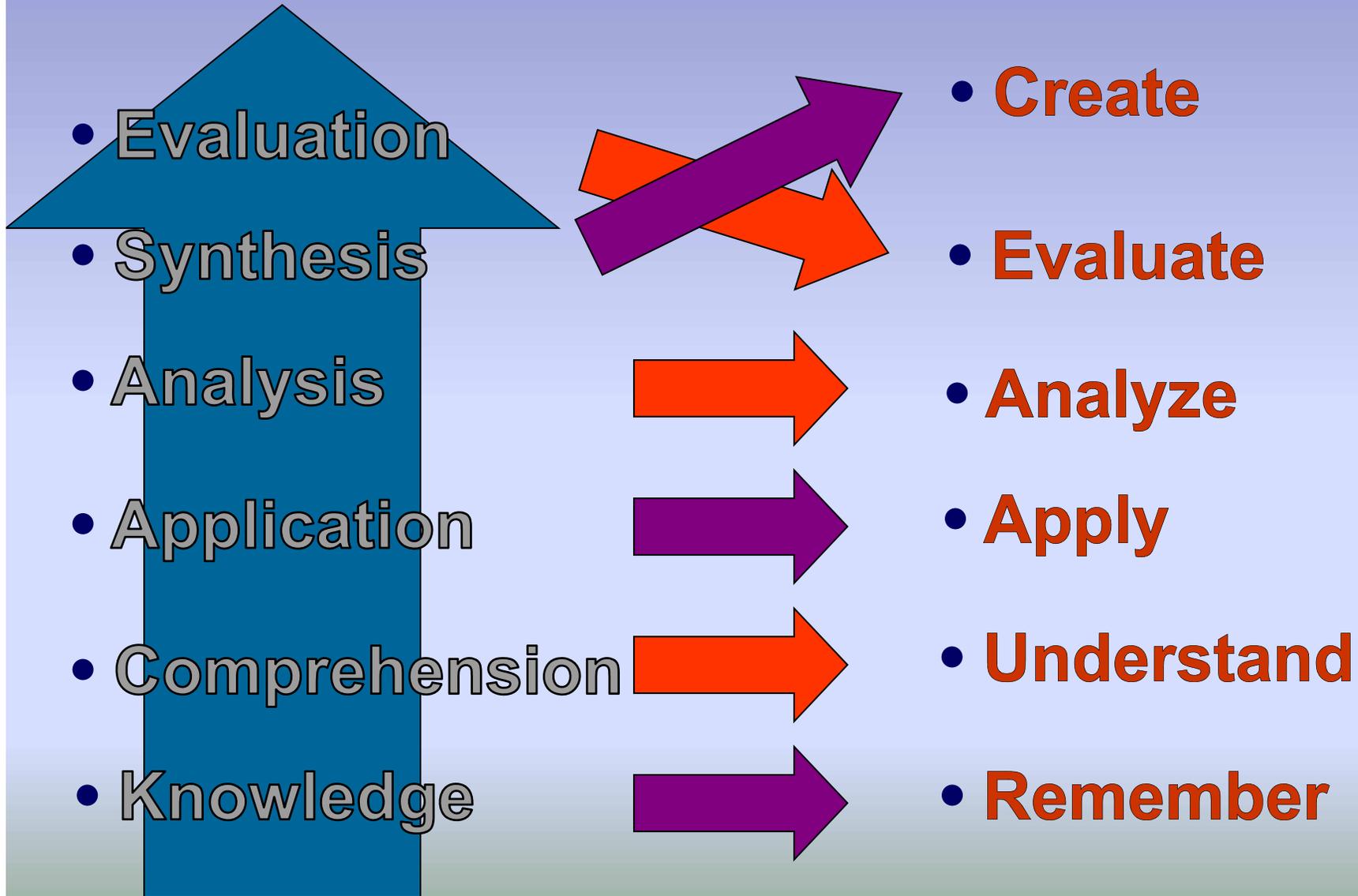
Comprehension

Knowledge

The Original Bloom's Taxonomy

Bloom

Revised Bloom



BLOOM'S REVISED TAXONOMY

Higher-order thinking



THE TAXONOMY TABLE

COGNITIVE PROCESS DIMENSION

DEPTH OF KNOWLEDGE DIMENSION	1. REMEMBER Recognizing Recalling	2. UNDERSTAND Interpreting Exemplifying Classifying Summarizing Inferring Comparing Explaining	3. APPLY Executing Implementing	4. ANALYZE Differentiating Organizing Attributing	5. EVALUATE Checking Critiquing	6. CREATE Generating Planning Producing
FACTUAL KNOWLEDGE						
CONCEPTUAL KNOWLEDGE						
PROCEDURAL KNOWLEDGE						
METACOGNITIVE KNOWLEDGE						

Teaching Students to "Understand Conceptual Knowledge"

1. Emphasize defining features or key characteristics; ask "what makes X, X?"
2. Give examples, non-examples, and "near" examples.
3. Teach concepts in relation to one another; show connections and relationships using visual representations and graphic organizers.
4. Use metaphors and similes.
5. Use "hands-on" activities and manipulatives; build models.

What is Metacognition?

- ♠ The ability to think about one's own thinking, and be consciously aware of oneself as a problem solver.
- ♥ The ability to monitor, plan, and control one's mental processing (e.g. "Am I *understanding* this material, or just *memorizing* it?")
- ♦ The ability to accurately judge one's level of learning

- Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp.231-236). Hillsdale, NJ: Erlbaum

How Do Students Learn?

Metacognition is The Key!

What's the difference, if any, between studying and learning?

Problem: Student does not see the underlying structure/pattern of different types of art

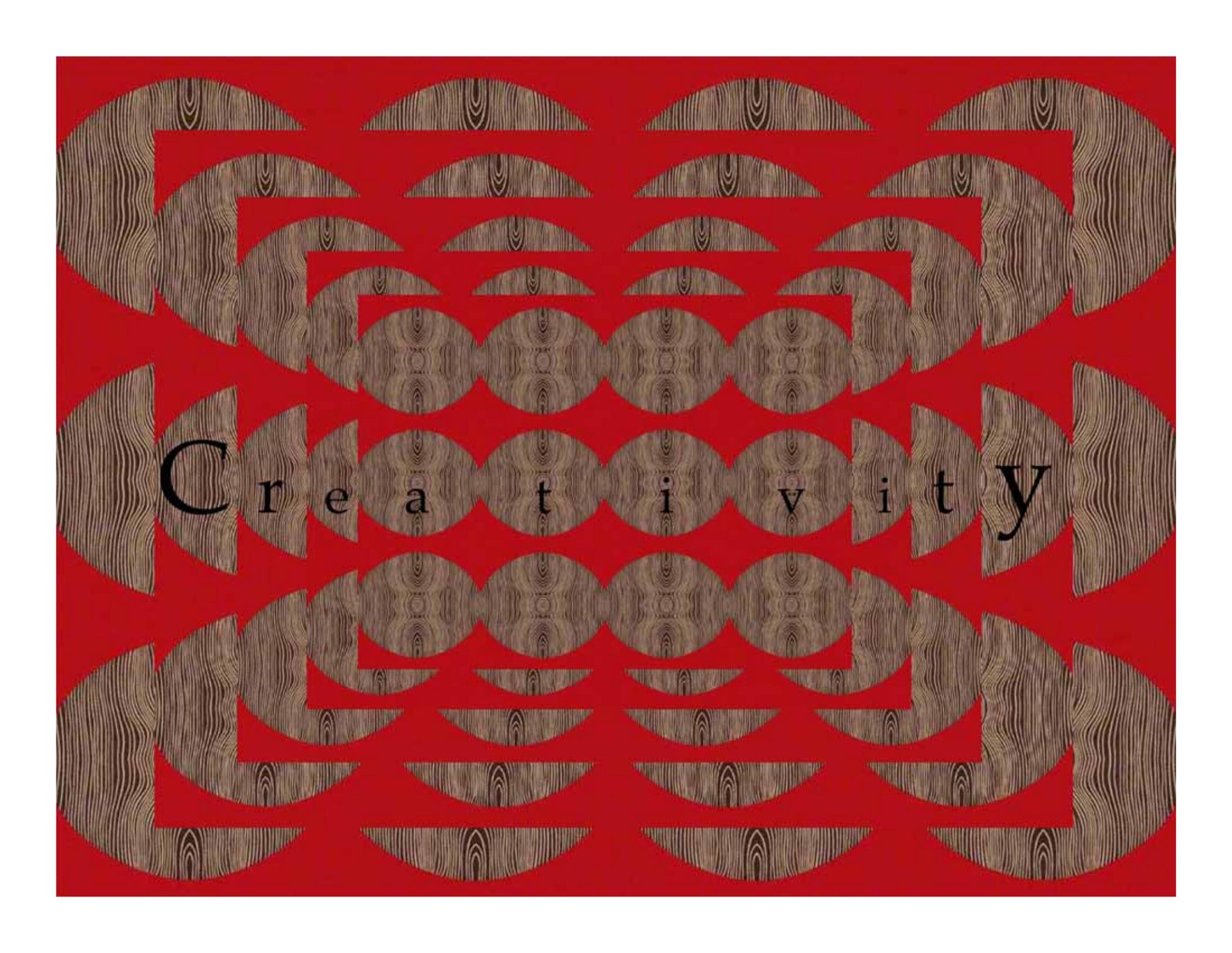
Solution: Focus on characteristics of different artists' work and the kinds of structures and patterns they use in order to identify the painter and/or style of an unfamiliar piece of art

What we know about learning

- ♠ *Active learning* – is more lasting than passive learning
- ♥ *Metacognition* – thinking about thinking is important
- ♦ *Bloom's Taxonomy* – the level at which learning occurs is important

INNOVATION

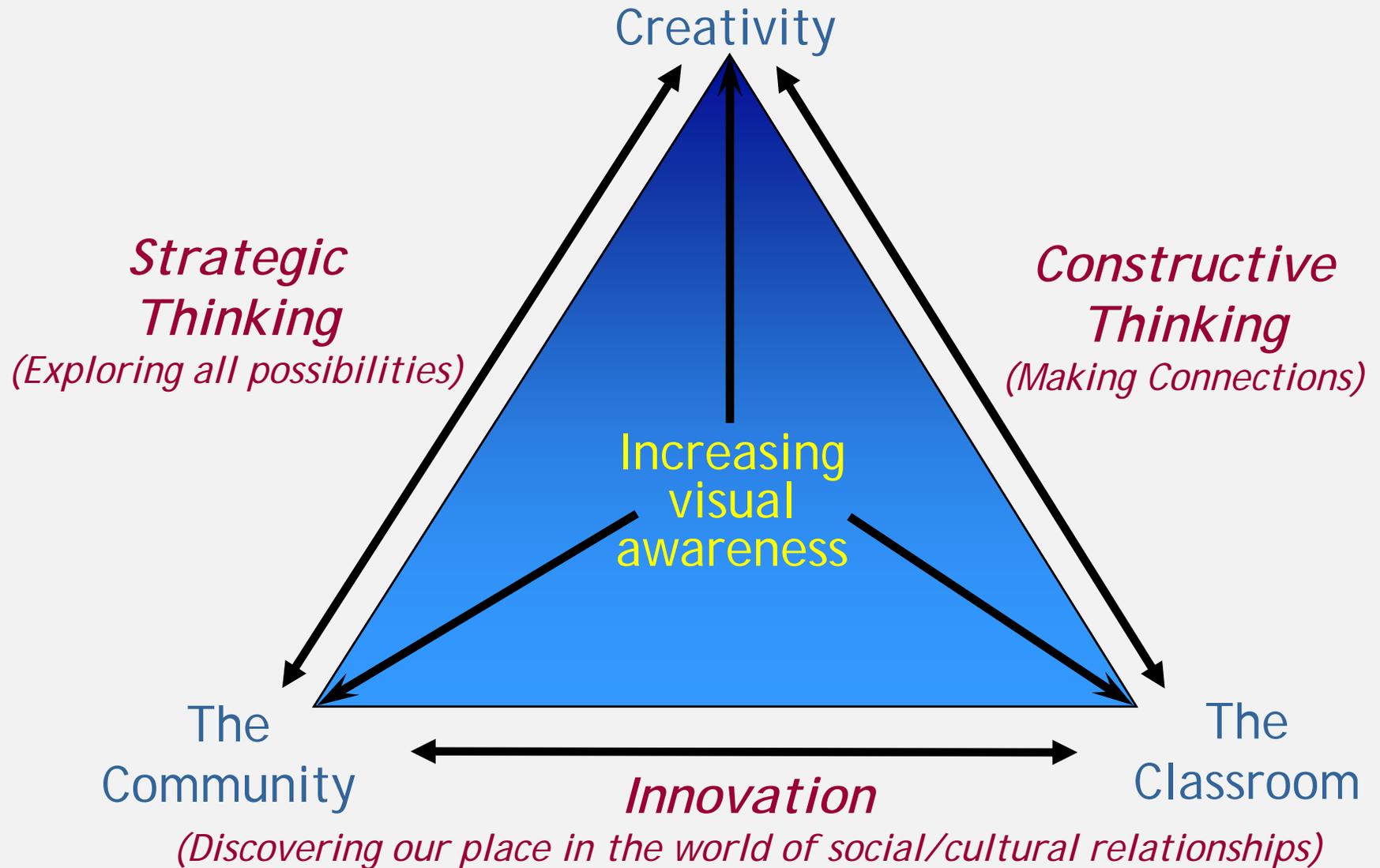
*Developing, implementing, and communicating new ideas to others.
Acting on creative ideas to make a tangible and useful contribution to the domain in which innovation occurs*



Creativity

The Goal:

To increase visual awareness, visual thinking and co-created meaning



Developing a *Creative* Environment

Creativity awareness and knowledge will increase ones creative confidence

Responsive and curious students will develop original ideas

Encourage deeper learning by designing complex creative activities

Articulation with the language of art supports linguistic fluency

Think creatively through the arts, and move beyond the text naturally

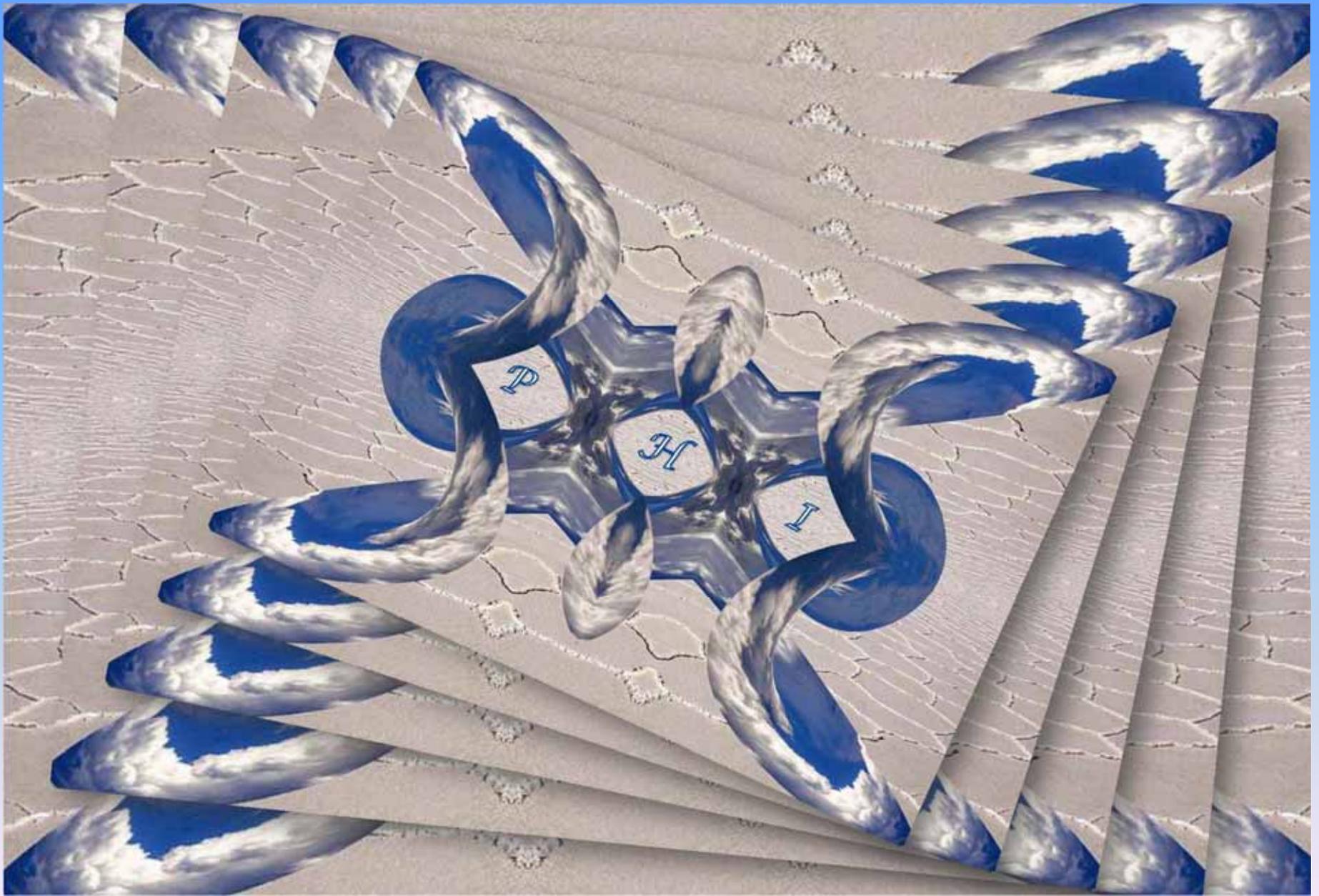
Increase student engagement through aesthetic discussion and reflection

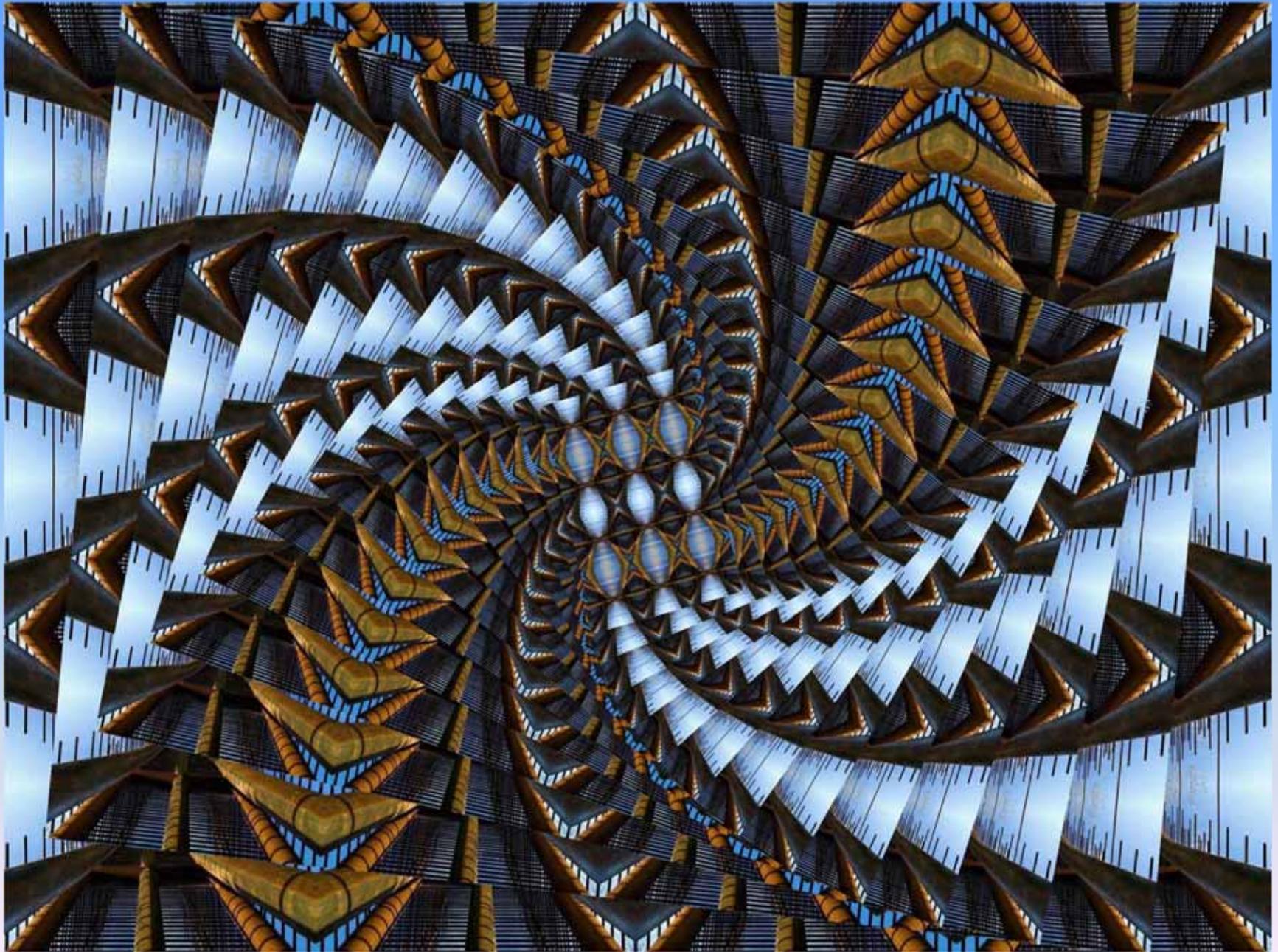
Varying activities, text, and creative topics frequently will increase flow

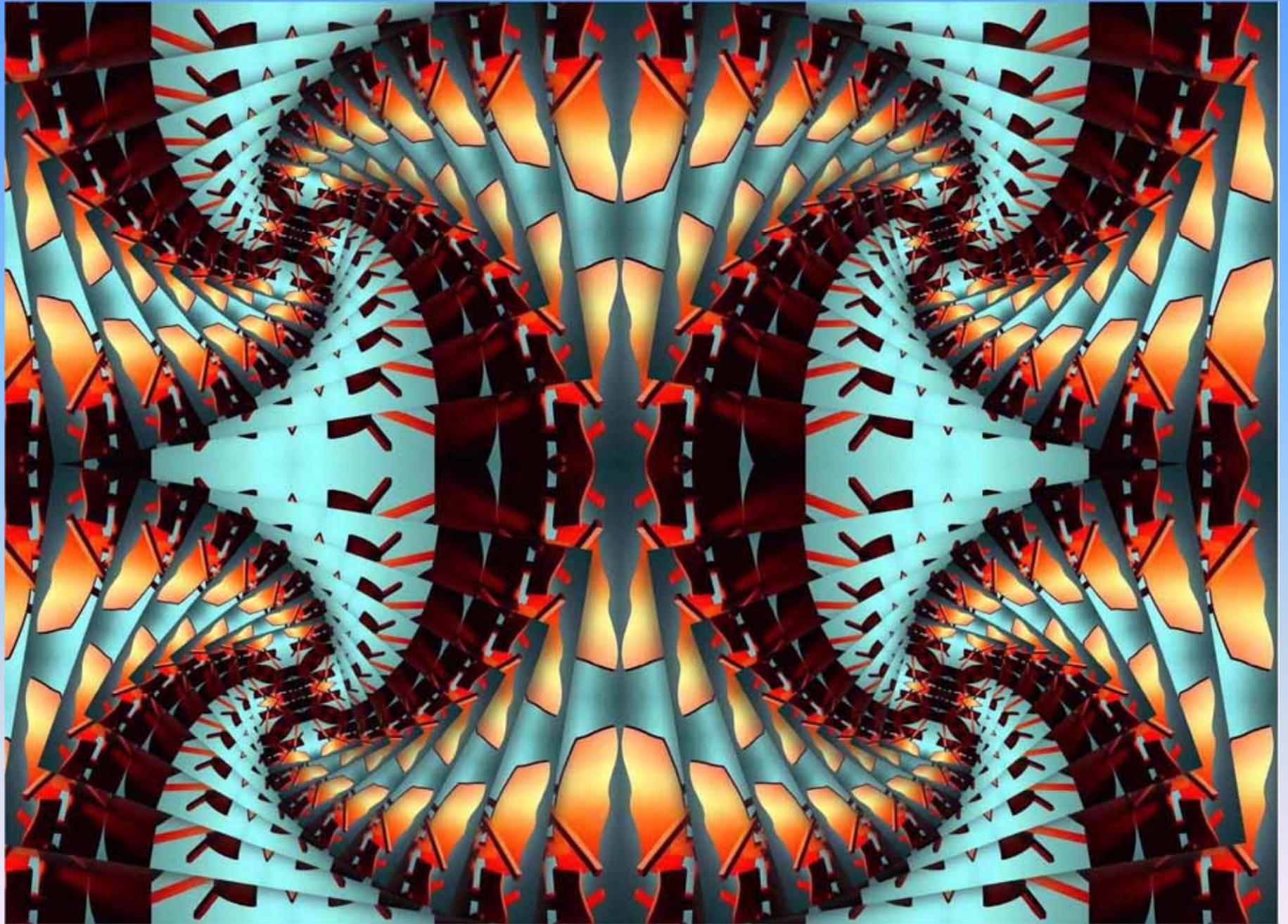
Encourage creativity... embrace high expectations... expect excellence













Thank You