Learning Software Development

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Software Development is an Applied Skill

Do! ..... Apply your knowledge and skills.

Software development is an applied task — you produce software!
Computers are unforgiving of mistakes and misunderstandings.

Think! ... Reflect on What you have Learned.

What is easy? What is hard?
Could you do the software project in another way?

Read! .... Explore for Solutions, Ideas, Methods ...

Read experiences of others.
Learn about Best Practice, ie Patterns.
What things can nobody do well? and are researching how to.

Experiment!

Practice technology transfer for your own skills and knowledge.
The field evolves very quickly!

Critical Thinking Skills

Defining and Clarifying the Problem

1. Identify central issues or problems.
2. Compare similarities and differences.
3. Determine which information is relevant.
4. Formulate appropriate questions.

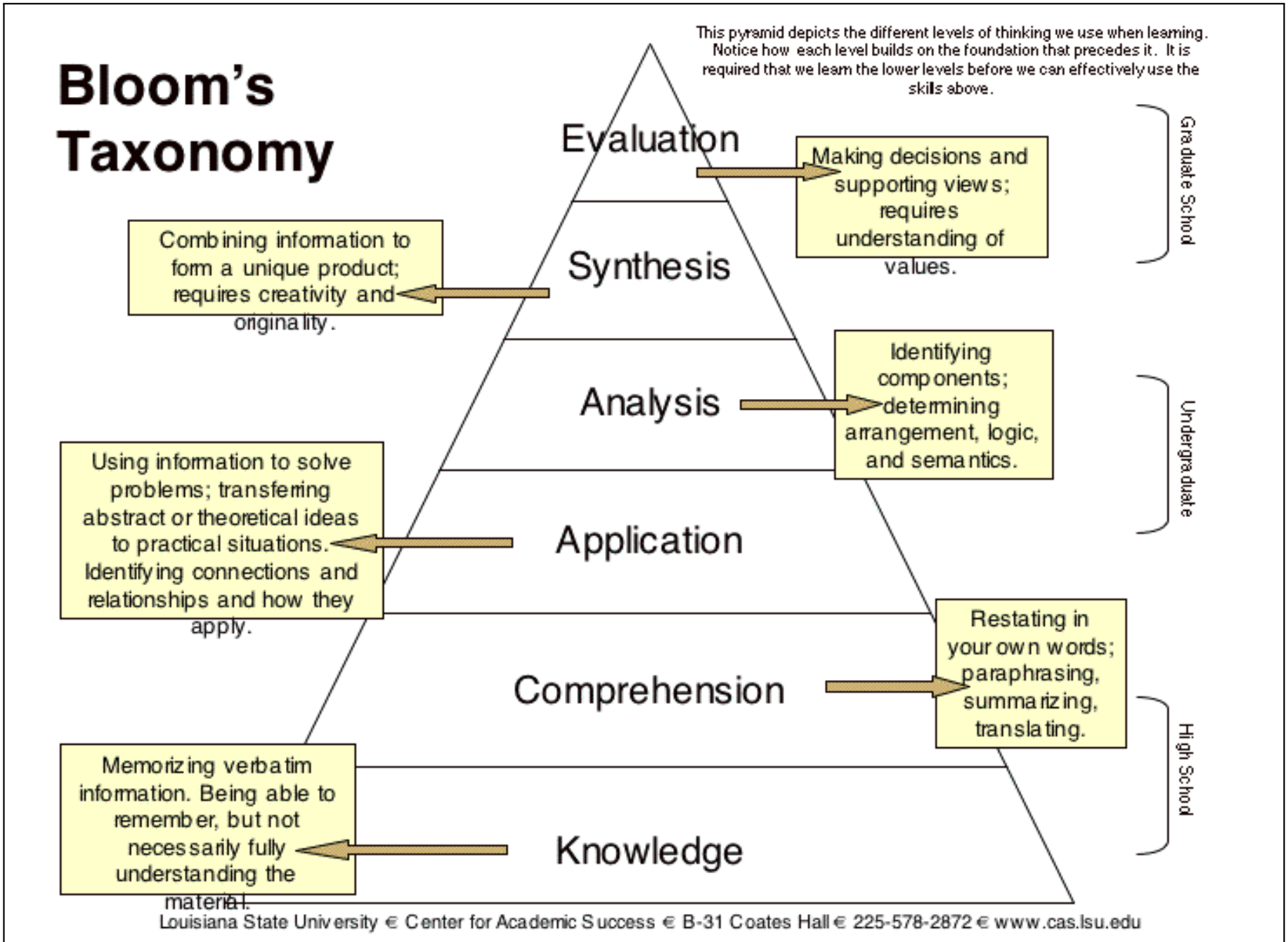
Judging Information Related to the Problem

5. Distinguish amongst facts, opinion, and reasoned judgement.
6. Check consistency.
7. Identify unstated assumptions.
8. Recognize stereotypes and cliches.
9. Recognize bias, emotional factors, propaganda, & semantic slants.
10. Recognize different value systems and ideologies.

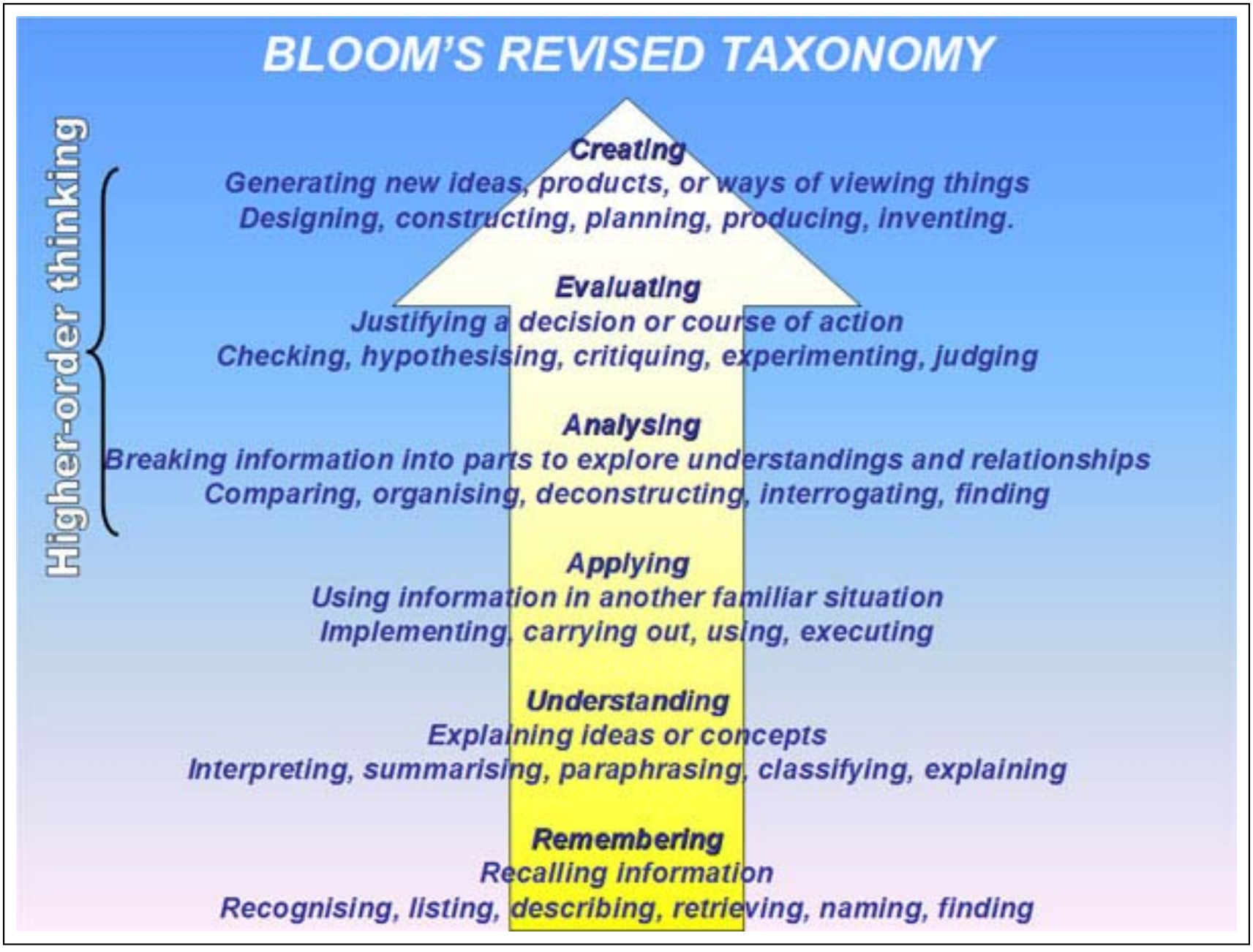
Solving Problems / Drawing Conclusions

11. Recognize the adequacy of data.
12. Predict probable consequences.

Bloom's Taxonomy of Thinking Skills



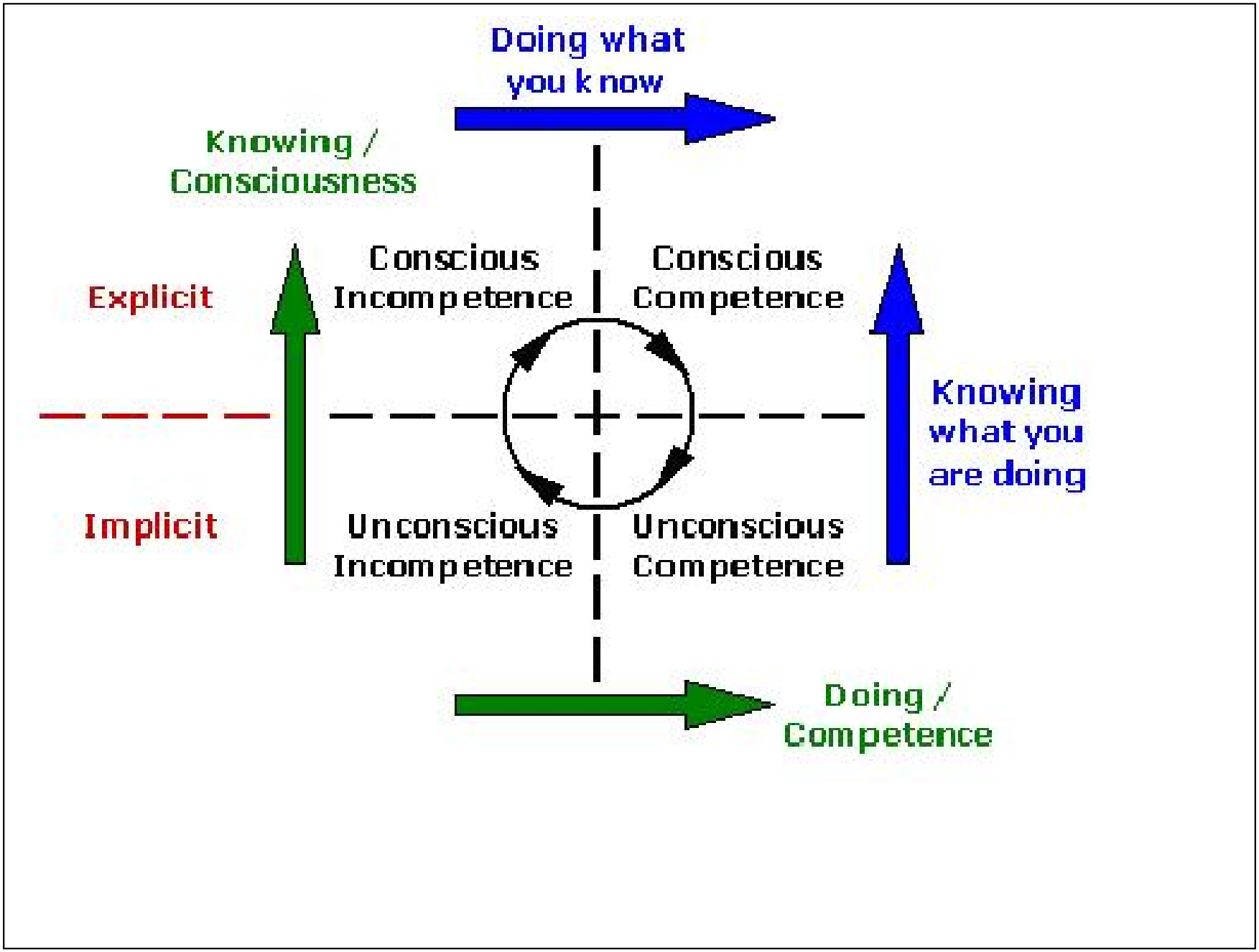
Bloom's (Revised) Taxonomy of Thinking Skills



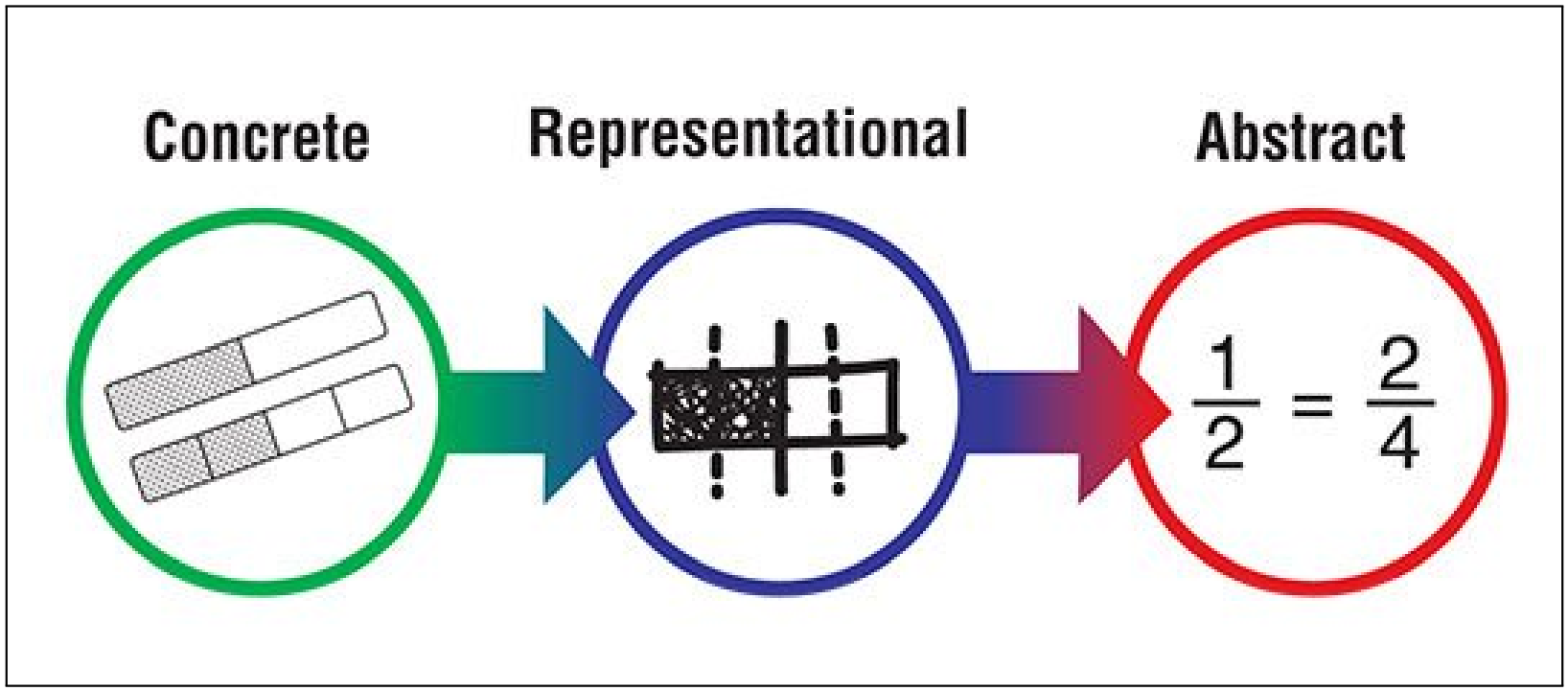
Example for Business Process Modeling (BPM)

Stage	Example	Techniques	Typical Questions
Evaluation	Informed choice between modeling techniques, tools and methodologies	Debate successful and unsuccessful case studies and propose alternative approaches (role play)	Which tool/method/technique is appropriate for our organization?
Synthesis	Generate new process design by applying outside process improvement patterns	Discuss commonalities, underlying truth of multiple methods, techniques	How can we improve/redesign/ substitute this process?
Analysis	Be able to create process architecture for an organization	Provide organizational examples and domain context for techniques	What are the weaknesses in this process?
Application	Be able to model BPMN diagram	Teach procedure models, methodologies	How can we represent this process?
Comprehension	Be able to read BPMN diagram	Teach vocabulary of modeling techniques	What does this process do?
Knowledge	Recall the definition of "Activity"	Teach Facts, Definitions, Creation of controlled vocabulary	What is a process?

The Conscious Competence Learning Model

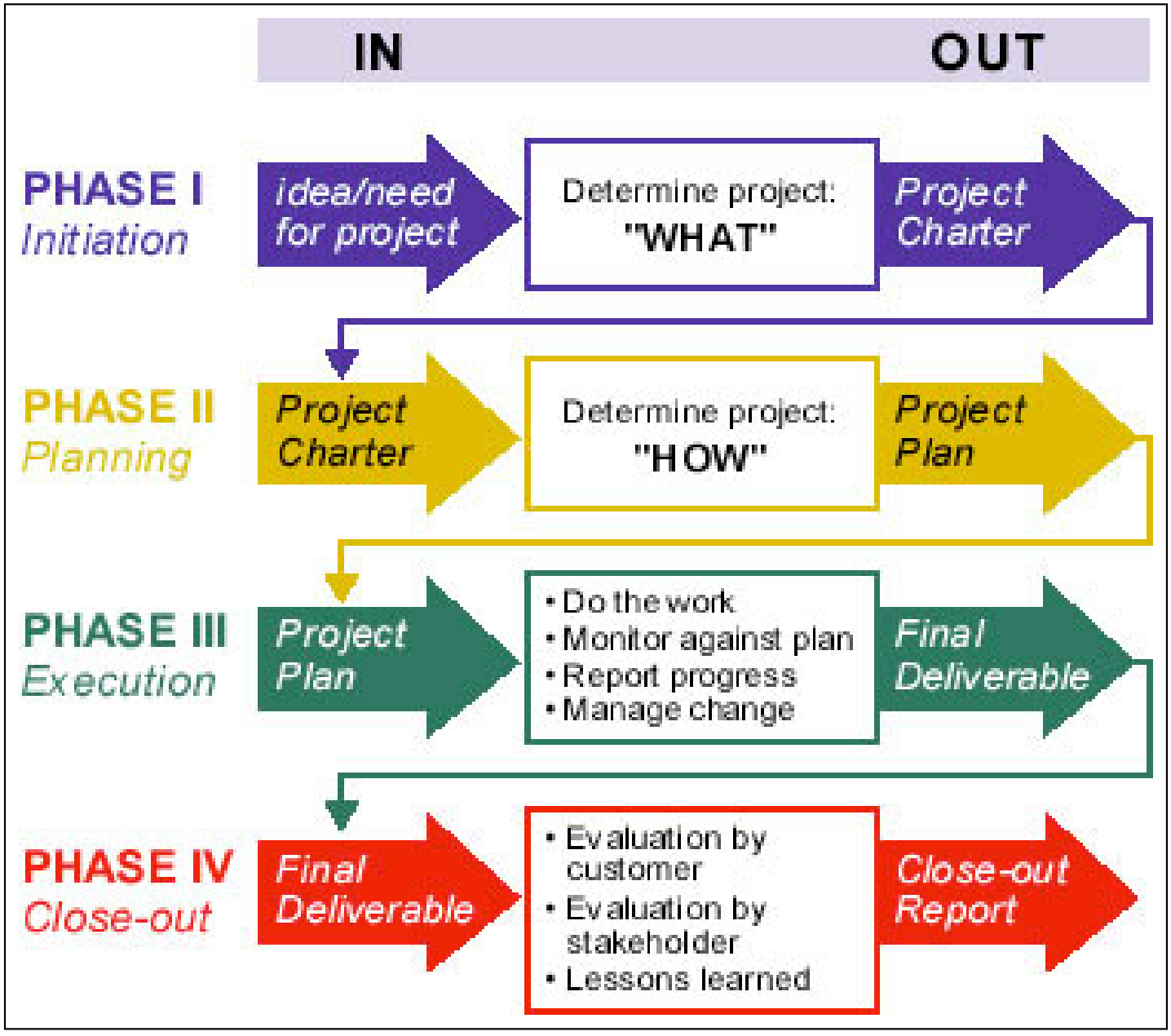


Representations and Models for Abstraction

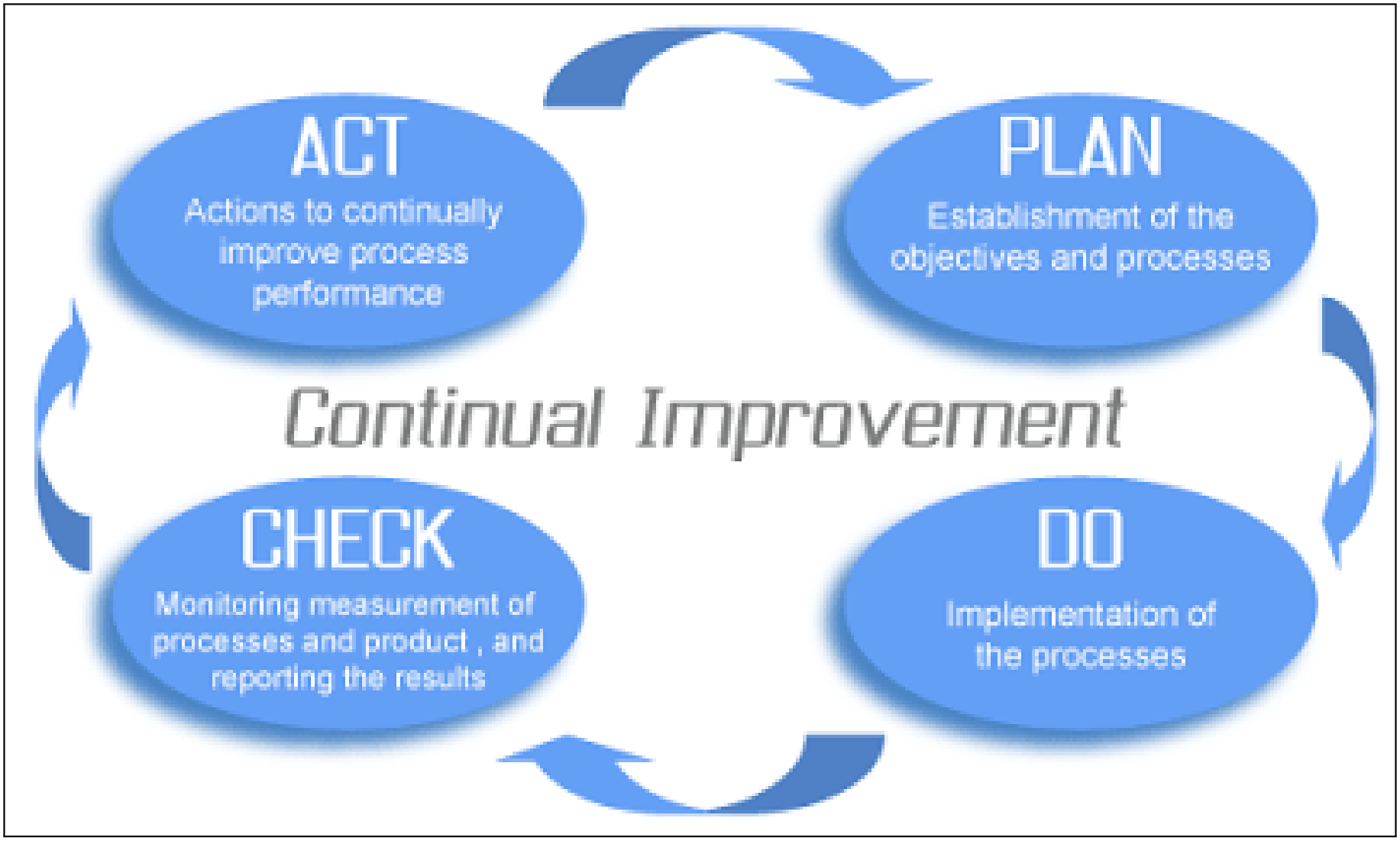


Concrete Representational Abstract (CRA) is a three step instructional approach highly effective in teaching math concepts.
"Doing" stage — manipulate real-world examples
"Seeing" stage — use images to represent entities and relations
"Symbolic" stage — express ideas using symbols, e.g. code

Basic Project Management



PDCA (Plan-Do-Check-Act) Cycle of Process Improvement



THE QUALITY CYCLE

of the European Quality Assurance Reference Framework for Vocational Education and Training

1. Purpose and Plan

Set up clear, appropriate and measurable goals and objectives in terms of policies, procedures, tasks and human resources.

2. Implementation

Establish procedures to ensure the achievement of goals and objectives (e.g. development of partnerships, involvement of stakeholders, allocation of resources, and organisational or operational procedures).

4. Review

Develop procedures in order to achieve the targeted outcomes and/or new objectives; after processing feedback, key stakeholders conduct discussion and analysis in order to devise procedures for change.

3. Assessment and Evaluation

Design mechanisms for the evaluation of achievements and outcomes by collecting and processing data in order to make informed assessment.

Reading

wikipedia

Critical thinking
Bloom's taxonomy
Project management
PDCA

http://fcit.usf.edu/mathvids/strategies/cra.html

Concrete Representational Abstract

http://www.eqavet.eu/index.html

EU Quality Cycle