

## Levels of Cognition

Adapted from the work of Arthur Costa and Bena Kallick, developers of “Habits of Mind” and Robert Swartz, Director of the National Center for Teaching Thinking

### First Order Thinking Processing Ideas

1. Treating facts or ideas as independent entities
  - remembering
  - accumulating facts
  - generating new ideas
2. Simple analysis of collections of facts or ideas
  - classify
  - sequence
  - compare/contrast
  - analogy/metaphor
  - parts/whole reasoning
  - reacting to intellectual input
3. More complex analysis
  - inference
    - causal reasoning
    - generalization
    - prediction
    - analogical reasoning
  - summarizing
  - deduction
    - conditional (if ... then)
    - categorical (some ... all)
  - induction
4. Complex cognitive tasks (systematic thinking)
  - decision making
  - planning
  - calculating
  - problem solving
    - assumptions,
    - order of magnitude estimates
  - speculating (What happens if ...?)
  - modeling and simulation

### Second Order Thinking Evaluating Ideas

1. Assessing the reasonableness of ideas
  - assessing the reliability of information
  - accuracy of observation
  - reliability of sources
2. Evaluating the utility of ideas
3. Testing conclusions with reality
  - uncovering and evaluating assumptions
  - hypothesis and testing
  - identifying reasons and conclusions
4. Reformulating ideas based upon assessment  
(Thesis, Anti-thesis, Synthesis)
5. Examine alternative views
6. Evaluation of the human element in thinking
  - with others – consensus
  - with self – intuition
    - personal feelings
    - affective domain
7. Self-directed inquiry
  - curiosity based learning

### Third Order Thinking Metacognition

1. Understand -- Being aware of the kind of thinking you are doing.
2. Monitor -- Knowing the thinking strategy you are using.
3. Evaluate -- Evaluating the effectiveness of your thinking.
4. Regulate -- Planning how you will do the same kind of thinking the next time it is needed.