

# Critical Thinking

Subcommittee for  
AoL Learning Goal

Nakato Hirakubo

# Definition

- Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

(Michael Scriven & Richard Paul, presented at the 8th Annual International Conference on Critical Thinking and Education Reform, Summer 1987 )

# Bloom's Taxonomy of Critical Thinking

**Knowledge** *of terminology; specific facts; ways and means of dealing with specifics (conventions, trends and sequences, classifications and categories, criteria, methodology); universals and abstractions in a field (principles and generalizations, theories and structures):* arrange, define, describe, duplicate, enumerates, find, identifies, knows, label, list, locate, matches, memorize, name, order, outlines, reads, recall, recognize, records, relate, repeat, reproduce, selects, tell, write.

**Comprehension** *Grasping (understanding) the meaning of informational materials:* classify, compare, comprehends, converts, defends, describe, discuss, distinguish, estimates, explain, express, extends, generalizes, gives, identify, indicate, infers, interprets, locate, outline, paraphrase, predict, recognize, report, restate, review, rewrites, select, summarizes, translate.

**Application** *The use of previously learned information in new and concrete situations to solve problems that have single or best answers:* applies, changes, choose, classify, complete, construct, demonstrate, discovers, dramatize, employ, examine, illustrate, interpret, manipulates, modifies, operate, practice, predicts, prepares, produces, relates, schedule, show, sketch, solve, uses, write.

**Analysis** *The breaking down of informational materials into their component parts, examining (and trying to understand the organizational structure of) such information to develop divergent conclusions by identifying motives or causes, making inferences, and/or finding evidence to support generalizations:* advertise, analyze, appraise, appraise, breaks down, calculate, categorize, compare, contrast, criticize, deconstructs, diagrams, differentiate, discriminate, distinguish, examine, experiment, explain, identifies, illustrates, infers, investigate, outlines, question, relates, selects, separate, separates, test.

**Synthesis** *Creatively or divergently applying prior knowledge and skills to produce a new or original whole:* appraise, argue, arrange, assemble, categorizes, collect, combines, compiles, compose, construct, create, defend, design, develop, devise, evaluate, explains, formulate, generates, imagine, invent, judge, manage, modifies, organize, plan, predict, prepare, propose, rearranges, reconstructs, relates, reorganizes, revises, rewrites, select, set up, summarizes, support, tells, value, write.

**Evaluation** *(On same level as synthesis?): Judging the value of material based on personal values/opinions, resulting in an end product, with a given purpose, without real right or wrong answers:* appraise, argue, assemble, assess, attach, choose, compares, concludes, construct, contrasts, core, create, criticizes, critiques, debate, decide, defends, describes, design, determine, develop, discriminates, discuss, evaluate, explains, formulate, interprets, judge, justify, predict, priorities, rate, recommend, relates, select, summarizes, support, value, verify, write.

**1. Knowledge of terminology; specific facts;**

- To define, describe, duplicate, enumerates, recognize....

**2. Comprehension** *understanding the meaning of informational materials:*

- To classify, compare, comprehend, distinguish, estimate, explain, generalize, outline, summarizes, translate.

**3. Application** *The use of previously learned information in new and concrete situations to solve problems*

- To apply, change, choose, classify, complete, construct, demonstrate, solve.

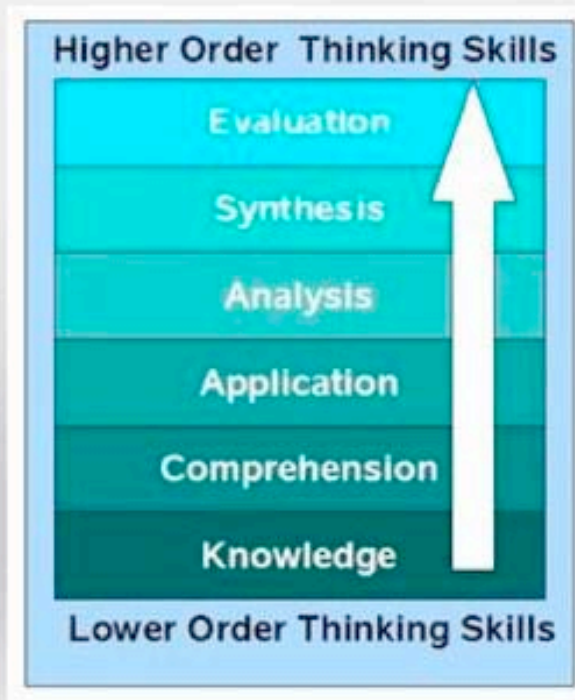
- 4. Analysis:** *The breaking down of informational materials into their component parts, examining such information to develop divergent conclusions*
  - To analyze, appraise, break down, calculate, categorize, compare, contrast, differentiate.
- 5. Synthesis:** *Creatively or divergently applying prior knowledge and skills to produce a new or original whole:*
  - To arrange, assemble, categorize, combine, compile, compose, construct.
- 6. Evaluation:** *Judging the value of material based on personal values/opinions*
  - To appraise, argue, assemble, assess, attach, choose, compare, conclude, construct, design, determine, develop



Benjamin S. Bloom  
1913-1999

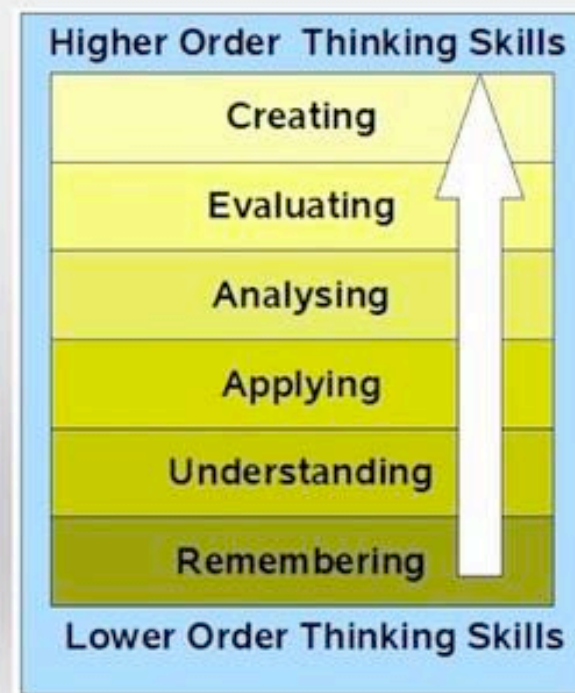
# The Revised Bloom's Taxonomy

1956



Bloom, B., Englehart, M. Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*. New York, Toronto: Longmans, Green.

2001



Anderson, L. & Krathwohl (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

# Student Learning Objectives for Critical Thinking

1. To identify the essential question, issue, and/or problem.
2. To gather data relevant to the essential question, issue, and/or problem.
3. To interpret appropriate data effectively.
4. To recognize and evaluate assumptions, major alternative points of view and related theories, principles, and ideas relevant to the question, issue, and/or problem.
5. To develop informed conclusions/solutions.
6. To articulate implications and consequences that emerge from the conclusions/solutions.
7. To communicate any or all parts of the above process in written or oral form.

<http://www.tstc.edu/docs/4606.pdf>

# Personal characteristics of the effective critical thinker (Facione, 1990)

## **(1) inquisitiveness**

- (2) desire to be well informed
- (3) eagerness to use critical thinking
- (4) trust in reasoned inquiry
- (5) self confidence

## **(6) open mindedness**

## **(7) flexible in considering alternatives**

## **(8) understanding of opinions**

## **(9) fair-mindedness**

- (10) honesty in self appraisal
- (11) prudence in suspending

## **(12) making or altering judgments, and**

## **(13) willingness to consider and revise views.**



# People who think critically

- **attempt to live rationally, reasonably, empathically.**
- **keenly aware of the inherently flawed nature of human thinking when left unchecked.**
- **are strive to diminish the power of their egocentric and sociocentric tendencies.**
- use the intellectual tools that critical thinking offers – concepts and principles that enable them to analyze, assess, and improve thinking.
- work diligently to develop the intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice and confidence in reason.

A well-cultivated critical thinker would: (Facione, 1990)

- (1) raise vital questions and problems, formulating them clearly and precisely
- (2) gather and assesses relevant information, using abstract ideas to interpret it effectively
- (3) come to well-reasoned conclusions and solutions, testing them against relevant criteria and standards
- (4) think open-mindedly within alternative systems of thought, recognizing and assessing, as needs be, their assumptions, implications, and practical consequences
- (5) communicate effectively with others in figuring out solutions to complex problems

# Critical Thinking Rubric

**(Washington State University)**

**1) Identifies and summarizes the **problem/question** at issue (and/or the source's position).**

Emerging

Does not identify and summarize the problem, is confused or identifies a different and inappropriate problem.

Does not identify or is confused by the issue, or represents the issue inaccurately.

Mastering

Identifies the main problem and subsidiary, embedded, or implicit aspects of the problem, and identifies them clearly, addressing their relationships to each other.

Identifies not only the basics of the issue, but recognizes nuances of the issue.

**2) Identifies and presents the STUDENT'S OWN **hypothesis, perspective and position** as it is important to the analysis of the issue.**

Emerging

Addresses a single source or view of the argument and fails to clarify the established or presented position relative to one's own. Fails to establish other critical distinctions.

Mastering

Identifies, appropriately, one's own position on the issue, drawing support from experience, and information not available from assigned sources.

**3) Identifies and considers OTHER salient **perspectives and positions** that are important to the analysis.**

Emerging

Deals only with a single perspective and fails to discuss other possible perspectives, especially those salient to the issue.

Mastering

Addresses perspectives noted previously, and additional diverse perspectives drawn from outside information.

**4) Identifies and assesses the key **assumptions**.**

Emerging

Does not surface the assumptions and ethical issues that underlie the issue, or does so superficially.

Mastering

Identifies and questions the validity of the assumptions and addresses the ethical dimensions that underlie the issue.

**5) Identifies and assesses the quality of **supporting data/evidence** and provides additional data/evidence related to the issue.**

Emerging

Merely repeats information provided, taking it as truth, or denies evidence without adequate justification. Confuses associations and correlations with cause and effect.

Does not distinguish between fact, opinion, and value judgments.

Mastering

Examines the evidence and source of evidence; questions its accuracy, precision, relevance, completeness.

Observes cause and effect and addresses existing or potential consequences.

Clearly distinguishes between fact, opinion, & acknowledges value judgments.

**6) Identifies and considers the influence of the **context** on the issue.**

Emerging

Discusses the problem only in egocentric or sociocentric terms.

Does not present the problem as having connections to other contexts-cultural, political, etc.

Mastering

Analyzes the issue with a clear sense of scope and context, including an assessment of the audience of the analysis.

Considers other pertinent contexts.

**7) Identifies and assesses **conclusions, implications and consequences**.**

Emerging

Fails to identify conclusions, implications, and consequences of the issue or the key relationships between the other elements of the problem, such as context, implications, assumptions, or data and evidence.

Mastering

Identifies and discusses conclusions, implications, and consequences considering context, assumptions, data, and evidence.

Objectively reflects upon their own assertions.