

What Activities and Assignments Promote Critical Thinking?

Presented by:
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“Active” Critical Thinking Verbs by Level of Cognitive Operation in Bloom’s and Anderson & Krathwohl’s Taxonomies

Application/Applying

| | |
|---------------|-------------|
| apply | illustrate |
| break down | interpret |
| calculate | make use of |
| choose | manipulate |
| compute | operate |
| demonstrate | practice |
| determine | schedule |
| dramatize | sketch |
| employ | solve |
| give examples | use |
| utilize | |

Analysis/Analyzing

| | |
|---------------|----------------------|
| analyze | distill |
| calculate | distinguish |
| categorize | divide |
| classify | examine |
| compare | experiment |
| contrast | identify assumptions |
| criticize | induce |
| deduce | inspect |
| derive | investigate |
| differentiate | model |
| discriminate | probe |
| discuss | question |
| dissect | simplify |
| | test |

Synthesis/Creating

| | |
|------------|-----------|
| adapt | imagine |
| arrange | infer |
| assemble | integrate |
| build | invent |
| change | make up |
| collect | manage |
| compose | modify |
| conclude | originate |
| construct | organize |
| create | plan |
| design | posit |
| develop | predict |
| discover | prepare |
| estimate | produce |
| extend | propose |
| formulate | set up |
| forward | suppose |
| generalize | theorize |

Evaluation/Evaluating

| | |
|-----------|------------|
| agree | dispute |
| appraise | evaluate |
| argue | judge |
| assess | justify |
| award | prioritize |
| challenge | persuade |
| choose | rank |
| conclude | rate |
| convince | recommend |
| criticize | rule on |
| critique | score |
| debate | select |
| decide | support |
| defend | validate |
| discount | value |
| discredit | verify |
| disprove | weight |

DISCIPLINE-RELEVANT CT SKILLS/OUTCOMES

Common CT Skills/Outcomes/Assessments in the Basic and Applied Sciences

Which fit your prospective CT course?

- Interpret quantitative relationships in graphs, tables, charts, etc.
- Analyze situations/data to identify problems.
- Identify and summarize the problem/question at issue (and/or the source's position).
- Categorize problems to identify the appropriate algorithms.
- Integrate information/data to solve a problem.
- Assess alternative solutions and implement the optimal one(s).
- Explain how new information can change the definition of a problem or its optimal solution.
- Evaluate hypotheses for consistency with established facts.
- Develop and justify one's own hypotheses, interpretations, or positions.
- Identify the limitations of one's own hypotheses, interpretations, or positions.
- Identify, analyze, and evaluate key assumptions and the influence of context.
- Evaluate the appropriateness of procedures for investigating a question of causation.
- Evaluate data for consistency with established facts, hypotheses, or methods.
- Separate factual information from inferences.
- Separate relevant from irrelevant information.
- Identify alternative positions/interpretations of the data or observations.
- Evaluate competing causal explanations.
- Explain the limitations of correlational data.
- Evaluate evidence and identify both reasonable and inappropriate conclusions.
- Identify and evaluate implications.
- Identify new information that might support or contradict a hypothesis.

Any other CT skills/outcomes/assessments for your scientific field?

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Common CT Skills/Outcomes/Assessments in Technical/Problem Solving Fields
(in addition to some of the above)

Which fit your prospective CT course?

- Separate relevant from irrelevant info.
- Analyze situations/data to identify problems.
- Categorize problems to identify the appropriate algorithms.
- Integrate information/data to solve a problem.
- Assess alternative solutions and implement the optimal one(s).
- Explain how new info can change the definition of a problem or its optimal solution.

Any other CT skills/outcomes/assessments for your technical/problem-solving field?

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-
-

Common CT Skills/Outcomes/Assessments in Rhetorical Fields
(humanities, some areas in social sciences)

Which fit your prospective CT course?

- Determine the relevance of information for evaluating an argument or conclusion.
- Separate facts from opinions and inferences.
- Recognize flaws, inconsistencies, and logical fallacies in an argument.
- Evaluate competing interpretations, explanations, evidence, and conclusions.
- Communicate complex ideas effectively.

Any other CT skills/outcomes/assessments for your rhetorical field?

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-
-

Common CT Skills/Outcomes/Assessments Distinctive to the Arts

Which fit your prospective CT course?

- Identify alternative artistic interpretations.
- Determine how well an artistic interpretation is supported by evidence contained in a work.
- Recognize the salient features or themes in works of art.
- Evaluate work of art according to criteria.
- Compare and contrast different works to provide evidence of change or growth.
- Infer the historical context (time, place, artist, motivation, etc.) of a work of art from its characteristics, and justify one's inference.
- Create a respectable piece of art.

Any other CT skills/outcomes/assessments for the arts?

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-
-

OPERATIONAL TERMS/THINKING VERBS IN CRITICAL THINKING

Do Your Students Know What They Mean?

Analyze: Break something down into parts, such as a theory into its components, a process into its stages, or an event into its causes. Analysis involves characterizing the whole, identifying its parts, and showing how the parts interrelate.

Apply: Decide which generally established principles, approaches, knowledge, theories, laws, or concepts are relevant to a new situation or problem, then using them to clarify that situation or to solve that problem.

Assess/Criticize/Critique/Evaluate: Determine or judge the degree to which something meets or fails to meet certain criteria. If not provided in the question, develop criteria for making judgments.

Categorize/Classify: Sort into major, general groups or categories that you name or identify.

Compare/Contrast: Identify the important similarities and/or differences between two or more elements in order to reveal something significant about them. Emphasize similarities if the command is to compare and differences if it is to contrast.

Create/Devise: Put together, organize, or reorganize elements to make a new approach, product, or solution.

Defend/Justify: Give good reasons to support a position and to explain how/why something happened.

Define/Identify: Give the key characteristics by which a concept, thing, or event can be understood. Place it in a general class, then distinguish it from other members of that class.

Describe: Give the characteristics by which an object, action, process, person, or concept can be recognized or visualized.

Develop: Create, elaborate on, or make more effective, detailed, or usable.

Discuss/Examine: Debate, argue, and evaluate the various sides of an issue.

Explain/Justify: Give the basic principles of or reasons for something; make it intelligible. Explanation may involve relating the unfamiliar to the more familiar.

Generate: Think up or brainstorm good ideas or alternatives.

Infer: Logically conclude on the basis of what is known.

Interpret/Explain: State what you think the author/speaker of a quotation or statement means and why.

Illustrate: Use a concrete example to explain or clarify the essential attributes of a problem or concept; or clarify a point using a diagram, chart, table, or other graphic.

List/Enumerate: Give the essential points one by one, in a logical order if applicable. It may be helpful to number the points.

Outline/Review/State: Organize a description under main points and subordinate points, omitting minor details and classifying the elements or main points.

Predict: Infer from facts and knowledge what will happen on the future.

Propose: Suggest or present for consideration.

Prove/Validate: Establish that something is true by citing factual evidence or giving clear, logical reasons.

Summarize: Briefly restate the main points.

Synthesize: Put together elements in a new way so as to make a novel theory, approach, product, or solution.

Trace: Describe the course or progress of a phenomenon, trend, or development.

References

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

Ellis, D. (2000) *Becoming a Master Student* (9th ed.). Boston: Houghton Mifflin.

Moss, A., & Holder, C. (1988). *Improving Student Learning: A Guidebook for Faculty in All Disciplines*. Dubuque, IA: Kendall/Hunt.

Nilson, L.B. (2010). *Teaching at Its Best: A Research-Based Resource for College Instructors* 3rd ed. San Francisco: Jossey-Bass.

Questions/Tasks to Give Students Practice in CT Skills

What does this mean? How should we understand it? How can we make sense of it?

How did you come to that interpretation?

How can we best characterize/categorize/classify this?

What do you think the author(s) intends in this statement?

Is this statement fact or opinion, and why?

How would you compare and contrast these concepts/causes/effects/claims/conclusions?

What is the hypothesis in this study?

How credible is the author's claim?

How much can we trust what this person claims?

How strong are the arguments? What are some counter-arguments?

What errors in reasoning can you find (logical fallacies, faulty statistical reasoning)?

What are you claiming/concluding?

Why did you make this claim/come to this conclusion?

What assumptions are you making to come to that conclusion?

If you assumed XXX, how might your claim/conclusions change?

What are the consequences of accepting this claim/conclusion?

Given what we know so far, what conclusions can we draw? What can we rule out?

What other conclusions satisfy the evidence?

Given what we now know, how confident can we be in our conclusion?

What does/do this evidence/these data imply? Do we have our facts right?

What is/are the evidence/arguments pro and con?

What additional information do we need to answer this question/resolve this issue?

What are some alternatives that we have not yet explored?

What were the specific results/findings of the investigation/research?

How did you conduct that analysis?

How did you reason out this issue?

Why do you think that was the best answer/solution?

How good is your evidence?

What important evidence might be missing?

What additional evidence do you need?

Can you reconcile these two apparently conflicting conclusions?

How would you prioritize the problems and rank them on seriousness and urgency?

How would you assess the degrees of likelihood and uncertainty?

How would you relate this new knowledge/discovery to what you already know?

What analogy might help you solve this problem?

How can you communicate your findings/conclusion using graphics?

How can you put together information from various sources to synthesize a new interpretation/claim/conclusion?

What alternative makes the most sense, and why?

What is the central issue/problem?

How can this information/these observations be classified?

How do you know whether the relationship is causal or spurious?

What patterns in the data can you recognize?

In what sequential order did these happenings occur, and what are your reasons?

How can you best describe the relationships between the elements (e.g., cause and effect, sequential, spurious, process)?

What outcome/future trends can you predict/extrapolate/estimate from the available evidence?

Adapted from Bonwell, C. (2012). A disciplinary approach for teaching critical thinking. *The National Teaching and Learning Forum*, 21(2), 1-7; Halpern, D.F. Teaching critical thinking skills across the curriculum. Webinar produced by Starlink and broadcast live December 1, 2004; and Insight Assessment. (2009). *Test Manual for the California Critical Thinking Skills Test*.

Task Prompts That Give Students Step-by-Step Practice in Increasingly More Advanced CT Skills

Step 1: Identify the Problem, Relevant Information, and Uncertainties (low cognitive complexity tasks)

- ✓ identify problem and acknowledge reasons for enduring uncertainty and the absence of a single “correct” solution
 - ✓ identify relevant information and uncertainties embedded in the information (may include “stacking up” relevant reasons and evidence to support some solution or conclusion).
- Explain why people disagree about _____.
 - Explain why _____ can’t be known with certainty.
 - Identify aspects of _____ in which uncertainty is a major factor.
 - Explain why even an expert about _____ can’t predict with certainty what will happen when _____.
 - Create a list of information that might be useful in thinking about _____.
 - Create a list of issues related to _____.
 - Create of list of different points of view related to _____.
 - Identify a range of possible solutions to _____.
 - Sort pieces of information to identify reasons and evidence that support a given solution to _____.
-

Step 2: Explore Interpretations and Connections (moderate cognitive complexity tasks)

- ✓ interpret information
 - ✓ recognize and control for own biases
 - ✓ articulate assumptions and reasoning associated with alternative points of view
 - ✓ qualitatively interpret evidence from a variety of points of view
 - ✓ organize information in meaningful ways to encompass problem complexities
- Discuss the strengths and weaknesses of a particular piece of evidence related to _____.
 - Interpret and discuss the quality of evidence related to _____.
 - Interpret and evaluate the quality of the same body of evidence related to _____ from different points of view.
 - Compare and contrast the arguments related to two or more solutions to _____.
 - Identify and discuss the implications of assumptions and preferences related to one or more points of view about _____.
 - Identify and discuss the implications of your own experiences and preferences for how you think about _____.
 - Develop one or more ways to organize information and analyses to help you think more thoroughly about _____.

Step 3: Prioritize Alternatives and Communicate Conclusions (high cognitive complexity tasks)

- ✓ after thorough analysis, develop and use reasonable guidelines for prioritizing factors to
 - ✓ consider and choosing among solution options
 - ✓ communicate appropriately for a given audience and setting
- Prepare and defend a solution to _____.
 - Identify which issues you weighed more heavily than other issues in arriving at your conclusion about _____.
 - Explain how you prioritized issues in reaching a solution to _____.
 - Describe how the solution to _____ might change, given different priorities on important issues.
 - Explain how you would respond to arguments that support other reasonable solutions to _____.
 - Identify the most important information needs of the audience for communicating your recommendation about _____.
 - Explain how you designed your memo/presentation/report _____ to communicate effectively to your audience.
 - Describe how you would communicate differently about _____ in different settings.

Step 4: Integrate, Monitor, and Refine Strategies for Re-addressing the Problem (highest cognitive complexity tasks)

- ✓ acknowledge and explain limitations of endorsed solution
 - ✓ integrate skills in on-going process for generating and using information to monitor strategies and make reasonable modifications
- Describe the limitations of your proposed solution to _____.
 - Explain the implications of limitations to your proposed solution to _____.
 - Describe conditions under which you would reconsider your solution to _____.
 - Explain how conditions might change in the future, resulting in a possible change in the most reasonable solution to _____.
 - Develop strategies for generating new information about _____.
 - Establish a plan for monitoring the performance of your recommended solution to _____.
 - Establish a plan for addressing the problem strategically over time.

©2001, Susan K. Wolcott and Cindy L. Lynch. Permission is granted to reproduce this information for noncommercial purposes. Please cite this source: Wolcott, S. K., & Lynch, C. L. (2001). Task Prompts for Different Levels in Steps for Better Thinking [Online]. Available: <http://www.WolcottLynch.com>. Steps for Better Thinking evolved from ideas presented in King and Kitchener's (1994) reflective judgment model of cognitive development and Fischer's (Fischer & Bidell, 1998) dynamic skill theory.

Selected Bibliography (Partially Annotated) on Critical Thinking

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Review of Educational Research, 78*(4), 1102-1134. Available at http://www.jstor.org/stable/40071155?seq=1#page_scan_tab_contents

Main finding: To develop critical skills in students in a course, instructors must have the explicit goal of developing those skills as well as training in ways to do so. Critical thinking does not progress by accident or within the typical course.

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2014). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*. Available at <http://rer.sagepub.com/content/early/2014/09/25/0034654314551063.full>

Main finding: List of activities that are most effective in promoting critical thinking skills.

Bloom, B., & Associates. (1956). *Taxonomy of educational objectives*. New York: David McKay. Models at <http://www.edpsycinteractive.org/topics/cognition/bloom.html> and <http://www.celt.iastate.edu/teaching-resources/effective-practice/revised-blooms-taxonomy/>

Braun, N. M. (2004). Critical thinking in the business curriculum. *Journal of Education for Business, 79*(4), 232-236.

Nora Braun of Augsburg College points out that in the business world, making decisions is a daily occurrence. Discussions, debates, and guided questioning are some of the techniques that should be used in business courses to classify and evaluate the enormous quantity of available information.

Brookfield, S. D. (2013). Webpage with access to resources and activities for teaching critical thinking. http://stephenbrookfield.com/Dr._Stephen_D._Brookfield/Workshop_Materials.html

In-class exercises at

http://www.stephenbrookfield.com/Dr._Stephen_D._Brookfield/Workshop_Materials_files/Developing_Critical_Thinkers.pdf, pp. 17-44.

Brookfield, S. D. (2012). *Teaching for critical thinking: Tools and techniques to help students question their assumptions*. San Francisco: Jossey-Bass. Chapter 1, What is critical thinking? available at http://stephenbrookfield.com/Dr._Stephen_D._Brookfield/Articles_and_Interviews_files/Ch%201%20What%20is%20Critical%20Thinking.pdf

Brookfield, S. D. (1997). Assessing critical thinking. *New Directions for Adult and Continuing Education*, No. 75, Fall, 17-29.

Browne, M. N., & Keeley, S. M. (2010). *Asking the right questions: A guide to critical thinking* (9th ed.). Prentice Hall, NJ.

The authors highlight the applicability of critical thinking skills to life experiences extending far beyond the classroom. Critical thinking habits and attitudes are transferrable to consumer, medical, legal, and general ethical choices, to the benefit of the thinker.

Burbach, M., Matkin, G., & Fritz, S. (2004). Teaching critical thinking in an introductory leadership course utilizing active learning strategies: A confirmatory study. *College Student Journal, 38*(3), 482-493.

Although educators disagree on the definition of critical thinking, they do concur that critical thinking should be the main goal of a course. This study in an introductory level college leadership course finds that students improve their critical thinking skills through active learning.

Facione, P. A. (2015 update). Critical thinking: What it is and why it counts. Available at http://www.insightassessment.com/pdf_files/what&why2006.pdf

Facione, P. A. (2011). *Think critically*. Upper Saddle River, NJ: Prentice Hall. Written from a philosophical perspective, this critical thinking textbook emphasizes the application of critical thinking to the real world and offers positive examples of critical thinking. Chapters cover inductive, deductive, comparative, ideological, and empirical reasoning.

Facione, P. A. (1990). Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. Research Findings and Recommendations. Available at <http://files.eric.ed.gov/fulltext/ED315423.pdf>

Facione, N. C., & Facione, P. A. (2008). *Critical thinking and clinical judgment in the health sciences: An international teaching anthology*. Millbrae, CA: California Academic Press.

Facione, N. C., & Facione, P. A. (2007). *Thinking and reasoning in human decision making*. Millbrae, CA: California Academic Press.

Facione, N. C., & Facione, P. A. (2001). Analyzing explanations for seemingly irrational choices. *International Journal of Applied Philosophy*, 15(2), 267-86.

Facione, P. A., & Facione, N. C. (2007). Talking critical thinking. *Change: The Magazine of Higher Education*, 39(March-April), 38-44.

Facione, P. A., Facione, N. C., & Giancarlo, C. (2000). The disposition toward critical thinking: Its character, measurement, and relationship to critical thinking skills, *Journal of Informal Logic*, 20(1), 61-84.

Fisher, A. (2001). *Critical thinking: An introduction*. New York: Cambridge University Press. Fisher aims to teach the basic skills or competencies displayed in good critical thinkers: the ability to interpret, analyze and evaluate ideas and arguments.

Hale, J. (2011). [Analyzing the thinking process: Interview with Diane Halpern](http://psychcentral.com/blog/archives/2011/04/24/analyzing-the-thinking-process-interview-with-diane-halpern/) at <http://psychcentral.com/blog/archives/2011/04/24/analyzing-the-thinking-process-interview-with-diane-halpern/>

Highlight of Halpern's approach to critical thinking

Halpern, D. F. (2003). *Thought and knowledge: An introduction to critical thinking* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Halpern, D. F. (1999). Teaching for critical thinking: Helping college students develop the skills and dispositions of a critical thinker. *New Directions for Teaching and Learning*, No.80, Winter, 69-74.

Diane Halpern, a professor of psychology at California State University, proposes a four-part model to teach critical thinking. The model includes strategies to help students recognize when a certain thinking skill is needed and metacognitively monitor their thinking processes.

Insight Assessment. (2013). California Critical Thinking Skills Tests® Scales, Description. Available at <http://www.insightassessment.com/Products/Products-Summary/Critical-Thinking-Skills-Tests/California-Critical-Thinking-Skills-Test-CCTST>

Insight Assessment. (2013). Sample items from the California Critical Thinking Skills Test® (CCTST®) at https://www.insightassessment.com/Resources/node_1487

Macpherson, K. (1999). The development of critical thinking skills in undergraduate supervisory management units. *Assessment & Evaluation in Higher Education*, 24(3), 273-284.

Nilson, L. B. (1997). Critical thinking as an exercise in courage. *The National Teaching and Learning Forum*, (6)2, 1-4.

This article reviews many of the logical fallacies that interfere with critical thinking and goes beyond in revealing how “psycho-logical” fallacies – that is, psychological defense mechanisms – also obstruct critical thinking. In other words, critical thinking depends upon mental/emotional health.

Nosich, G. M. (2009). *Learning to think things through: A guide to critical thinking across the curriculum* (4th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Built on Richard Paul's model of critical thinking, this book is written for students to help them learn how to think critically in any subject matter, with an emphasis on the elements of reasoning, standards, and critical thinking processes. It presents instruction and exercises that actively involve students in their own learning, highlight the power and relevance of the discipline of the course, and make connections to other fields.

Paul, R., & Elder, L. (2013). Critical thinking: Teaching students how to study and learn, Part III. *Journal of Developmental Education*, 26(3), 36-37. Available at <http://www.criticalthinking.org/pages/how-to-study-and-learn-part-three/515>

Richard Paul, director of research and professional development at the Center for Critical Thinking at Sonoma State University, has written extensively in the field of critical thinking. He and Linda Elder have co-authored many articles on critical thinking which “prove” by polls and surveys taken that educators generally do not know what critical thinking is, or how to teach it. Three templates provided in this article are well written and would be beneficial in most classes. They help students analyze the logic of articles, essays, or chapters. Each template consists of eight questions asking the main purpose, the key question, the most important information, the main references or conclusions, the key idea, the main assumptions of the material, the implications, and the main point of view. By using these templates when reading an article or chapter, students will better understand critical thinking as a process that enable s them to identify and evaluate information. Specifically, a critical thinking approach to reading equips students to know:

- how to analyze the logic of an article, essay, or chapter
- how to figure out the logic of a textbook
- how to evaluate an author’s reasoning.

The authors focus on critical thinking as a process and encourage readers to work through the templates so they can help students learn to analyze and assess information in written materials. These techniques transfer quite easily to other topics and disciplines. They first appeared in:

Paul, R., & Elder, L. (2001). *The thinker's guide to how to study and learn*. Dillon Beach, CA: Foundation for Critical Thinking.

Many other teaching resources are available free at www.criticalthinking.org, and these are especially important:

<http://www.criticalthinking.org/pages/our-concept-and-definition-of-critical-thinking/411>

<http://www.criticalthinking.org/pages/a-sample-assignment-format/438>

<http://www.criticalthinking.org/pages/critical-thinking-development-a-stage-theory/483>

<http://www.criticalthinking.org/pages/the-state-of-critical-thinking-today/523>

<http://www.criticalthinking.org/pages/universal-intellectual-standards/527>

<http://www.criticalthinking.org/pages/valuable-intellectual-traits/528>

<http://www.criticalthinking.org/pages/study-of-38-public-universities-and-28-private-universities-to-determine-faculty-emphasis-on-critical-thinking-in-instruction/598>

Pierce, W. (2007). Titles and annotations of documents from Prince George Community College.

Available at <http://academic.pg.cc.md.us/~wpeirce/MCCCTR/annotat1.html>

In addition to links to ideas for critical thinking assignments and activities, there is a valuable site with examples of critical thinking rubrics and advice for developing one's own:

<http://academic.pg.cc.md.us/~wpeirce/MCCCTR/Designingrubricsassessingthinking.html>

Pierce, W. (2007). WWW links to resources for teaching reasoning and critical thinking. Available at

<http://academic.pg.cc.md.us/~wpeirce/MCCCTR/links~1.html>

While a compilation this old has some broken links, those that are still alive are very good.

Perry, W. G. (1968). *Forms of intellectual and ethical development in the college years: A scheme*. New York: Holt, Rinehart & Winston. Models at http://home.ubalt.edu/ub02Z36/Perry_Stages_ACRL-MD.pdf, <http://www.cse.buffalo.edu/~rapaport/perry.positions.html>, http://perrynetwork.org/?page_id=2%3E

Roth, M. S. (2010, January 3). Beyond critical thinking. *Chronicle of Higher Education*. Available at <http://chronicle.com/article/Beyond-Critical-Thinking/63288/>

Roth observes that the teaching of critical thinking tends to focus on criticism – seeing through or undermining statements – and cautions against creating a class of self-satisfied debunkers. When critical thinking means being a critical unmasker, students may become too good at showing how things do not make sense, which may diminish their capacity to find or create meaning and direction in the books they read and the world in which they live. Roth endorses finding ways to teach students to open themselves to the emotional and cognitive power of history and literature, even though these fields may initially rub them the wrong way or seem foreign. He concludes that we should allow students to see the value-laden practices of a particular culture so they can understand how these values are legitimated. We should also encourage them to cultivate the willingness and ability to learn from material they might otherwise reject or ignore.

Seesholtz, M., & Polk, B. (2009, October 10). Two professors, one valuable lesson: How to respectfully disagree. *Chronicle of Higher Education*. Available at <http://chronicle.com/article/Two-Professors-One-Valuable/48901/>

The authors team-taught a course that demonstrated critical thinking through civil discourse: how to engage in a civil debate with the goal of advancing understanding of another's point of view, how to evaluate the validity of that viewpoint, and how to benefit from the new perspectives it opens.

Tremblay, K. R., Jr., & Downey, E. P. (2004). Identifying and evaluating research-based publications: Enhancing undergraduate student critical thinking skills. *Education*, 124(4), 734-740.

Kenneth Tremblay, a faculty member in the Department of Design and Merchandising and School of Social Work at Colorado State University, reports the results of a study conducted on undergraduate students in a research methods course involving critical thinking. In response to a series of questions, students selected and developed an idea, gathered research-based publications, and read and evaluated the literature. In the evaluation process, students developed critical thinking skills as well as inductive and deductive logic reasoning skills.

Willingham, D. T. (2007). Critical thinking: Why is it so hard to teach? *American Educator*, Summer, 8-19. Available at http://www.aft.org/sites/default/files/periodicals/Crit_Thinking.pdf

According to Willingham, no specific set of critical thinking skills actually exists. He believes that techniques can be taught, but they work poorly if taught in a stand-alone way. Students must have some content or domain knowledge before they can apply any technique. Otherwise, it is difficult to get beyond the “surface structure” of a problem and to know when to look more deeply. Willingham argues that the assessments of critical thinking programs used in the last 25 years are limited or flawed, but most show that skilled teaching/coaching and plenty of opportunity for students to practice techniques, especially across dissimilar material, can increase critical thinking abilities.

Wolcott, S. L. (Forthcoming in 2015). Steps for better thinking. Currently under revision; to be available at <http://www.wolcottlynch.com/>

The site provides a stage-based model of critical thinking, teaching tools, working papers, and an online tutorial in teaching critical thinking.

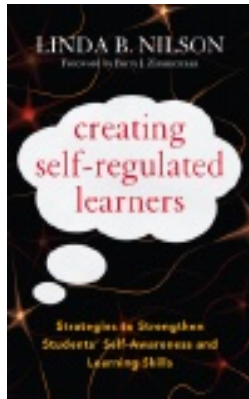
Critical thinking rubrics online:

- AACU’s Critical Thinking VALUE Rubric at <http://www.aacu.org/value/rubrics/critical-thinking>
- St. Philip’s College QEP Critical Thinking Rubric at <http://course1.winona.edu/shatfield/air/QEPrubricpilots042007jo.pdf>
- Facione & Facione’s Holistic Critical Thinking Scoring Rubric at <http://course1.winona.edu/shatfield/air/critical%20thinking%204.pdf>
- Northeastern Illinois University’s General Education Critical Thinking Rubric at <http://course1.winona.edu/shatfield/air/Critical%20Thinking-long.pdf>
- The College of Wooster’s Critical Thinking Sample Rubrics, Domain Specific http://www3.wooster.edu/teagle/critical_rubrics.php
- St. Petersburg College’s Assessment Rubric for Critical Thinking (ARC) Scenarios <http://www.spcollege.edu/criticalthinking/students/rubrics.htm>

Compiled by Linda Nilson, April 2015

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Linda B. Nilson

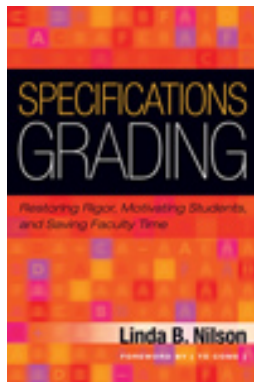
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