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## Glossary: An Educator's Guide to Critical Thinking Terms and Concepts

**accurate:** Free from errors, mistakes, or distortion. *Correct* connotes little more than absence of error; *accurate* implies a positive exercise of one to obtain conformity with fact or truth; *exact* stresses perfect conformity to fact, truth, or some standard; *precise* suggests minute accuracy of detail. Accuracy is an important goal in critical thinking, though it is almost always a matter of degree. It is also important to recognize that making mistakes is an essential part of learning and that it is far better that students make their own mistakes, than that they parrot the thinking of the text or teacher. It should also be recognized that some distortion usually results whenever we think within a point of view or frame of reference. Students should think with this awareness in mind, with some sense of the limitations of their own, the text's, the teacher's, the subject's perspective. See *perfections of thought*.

**ambiguous:** A sentence having two or more possible meanings. Sensitivity to ambiguity and vagueness in writing and speech is essential to good thinking. *A continual effort to be clear and precise in language usage is fundamental to education.* Ambiguity is a problem more of sentences than of individual words. Furthermore, not every sentence that can be construed in more than one way is problematic and deserving of analysis. Many sentences are clearly intended one way; any other construal is obviously absurd and not meant. For example, "Make me a sandwich." is never seriously intended to request metamorphic change. It is a poor example for teaching genuine insight into critical thinking. For an example of a problematic ambiguity, consider the statement, "Welfare is corrupt." Among the possible meanings of this sentence are the following: Those who administer welfare programs take bribes to administer welfare policy unfairly; Welfare policies are written in such a way that much of the money goes to people who don't deserve it rather than to those who do; A government that gives money to people who haven't earned it

corrupts both the giver and the recipient. If two people are arguing about whether or not welfare is corrupt, but interpret the claim differently, they can make little or no progress; they aren't arguing about the same point. Evidence and considerations relevant to one interpretation may be irrelevant to others.

**analyze:** To break up a whole into its parts, to examine in detail so as to determine the nature of, to look more deeply into an issue or situation. *All learning presupposes some analysis of what we are learning*, if only by categorizing or labelling things in one way rather than another. Students should continually be asked to analyze their ideas, claims, experiences, interpretations, judgments, and theories and those they hear and read. See *elements of thought*.

**argue:** There are two meanings of this word that need to be distinguished: 1) to argue in the sense of *to fight* or to emotionally disagree; and 2) to give reasons for or against a proposal or proposition. In emphasizing critical thinking, we continually try to get our students to move from the first sense of the word to the second; that is, we try to get them to see the importance of *giving reasons* to support their views without getting their egos involved in what they are saying. This is a fundamental problem in human life. To argue in the critical thinking sense is to use logic and reason, and to bring forth facts to support or refute a point. It is done in a spirit of cooperation and good will.

**argument:** A reason or reasons offered for or against something, the offering of such reasons. This term refers to a discussion in which there is disagreement and suggests the use of logic and bringing forth of facts to support or refute a point. See *argue*.

**to assume:** To take for granted or to presuppose. Critical thinkers can and do make their assumptions explicit, assess them, and correct them. Assumptions can vary from the mundane to the problematic: I heard a scratch at the door. I got up to let the cat in. I *assumed* that only the cat makes that noise, and that he makes it only when he wants to be let in. Someone speaks gruffly to me. I feel guilty and hurt. I assume he is angry *at me*, that he is only angry at me when I do something bad, and that if he's angry at me, he dislikes me. *Notice that people often equate making assumptions with making false assumptions.* When people say, "Don't assume", this is what they mean. In fact, we cannot avoid making assumptions and some are justifiable. (For instance, we have assumed that people who buy this book can read English.) Rather than saying "Never assume", we say, "Be aware of and careful about the assumptions you make, and be ready to examine and critique them." See *assumption, elements of thought*.

**assumption:** A statement accepted or supposed as true without proof or demonstration; an unstated premise or belief. *All human thought and experience is based on assumptions.* Our thought must begin with something we take to be true in a particular context. We are typically unaware of what we assume and therefore rarely question our assumptions. Much of what is wrong with human thought can be found in the uncritical or unexamined assumptions that underlie it. For example, we often experience the world in such a way as to assume that we are observing things just as they are, as though we were seeing the world without the filter of a point of view. People we disagree with, of course, we recognize as *having a point of view*. One of the key dispositions of critical thinking is the

on-going sense that as humans we always think within a perspective, that we virtually never experience things totally and absolutistically. There is a connection, therefore, between thinking so as to be *aware of our assumptions* and being *intellectually humble*.

**authority:** 1) The power or supposed right to give commands, enforce obedience, take action, or make final decisions. 2) A person with much knowledge and expertise in a field, hence reliable. Critical thinkers recognize that ultimate authority rests with reason and evidence, since it is only on the assumption that purported experts have the backing of reason and evidence that they rightfully gain authority. Much instruction discourages critical thinking by encouraging students to believe that whatever the text or teacher says is true. As a result, students do not learn how to assess authority. See *knowledge*.

**bias:** A mental leaning or inclination. We must clearly distinguish two different senses of the word 'bias'. One is neutral, the other negative. In the neutral sense we are referring simply to the fact that, *because of one's point of view, one notices some things rather than others*, emphasizes some points rather than others, and thinks in one direction rather than others. This is not in itself a criticism because *thinking within a point of view is unavoidable*. In the negative sense, we are implying *blindness or irrational resistance to weaknesses within one's own point of view* or to the strength or insight within a point of view one opposes. Fairminded critical thinkers try to be aware of their bias (in sense one) and try hard to avoid bias (in sense two). Many people confuse these two senses. Many confuse bias with emotion or with evaluation, perceiving any expression of emotion or any use of evaluative words to be biased (sense two). Evaluative words that can be justified by reason and evidence are not biased in the negative sense. See *criteria, evaluation, judgment, opinion*.

**clarify:** To make easier to understand, to free from confusion or ambiguity, to remove obscurities. *Clarity* is a fundamental perfection of thought and *clarification* a fundamental aim in critical thinking. Students often do not see why it is important to write and speak clearly, why it is important to *say what you mean and mean what you say*. The key to clarification is *concrete, specific examples*. See *accurate, ambiguous, logic of language, vague*.

**concept:** An idea or thought, especially a generalized idea of a thing or of a class of things. Humans think within concepts or ideas. *We can never achieve command over our thoughts unless we learn how to achieve command over our concepts or ideas*. Thus we must learn how to identify the concepts or ideas we are using, contrast them with alternative concepts or ideas, and clarify what we include and exclude by means of them. For example, most people say they believe strongly in democracy, but few can clarify with examples what that word does and does not imply. *Most people confuse the meaning of words with cultural associations*, with the result that 'democracy' means to people whatever we do in running our government — any country that is different is undemocratic. We must distinguish the concepts implicit in the English language from the psychological associations surrounding that concept in a given social group or culture. The failure to develop this ability is a major cause of uncritical thought and selfish critical thought. See *logic of language*.

**conclude/conclusion:** To decide by reasoning, to infer, to deduce; the last step in a reasoning process; a judgment, decision, or belief formed after investigation or reasoning. All beliefs, decisions, or actions are based on human thought, but rarely as the result of conscious reasoning or deliberation. *All that we believe is, one way or another, based on conclusions that we have come to during our lifetime.* Yet, we rarely monitor our thought processes, we don't critically assess the conclusions we come to, to determine whether we have sufficient grounds or reasons for accepting them. People seldom recognize when they have come to a conclusion. They confuse their conclusions with evidence, and so cannot assess the reasoning that took them from evidence to conclusion. Recognizing that *human life is inferential*, that we continually come to conclusions about ourselves and the things and persons around us, is essential to thinking critically and reflectively.

**consistency:** To think, act, or speak in agreement with what has already been thought, done, or expressed; to have intellectual or moral integrity. Human life and thought is filled with inconsistency, hypocrisy, and contradiction. We often say one thing and do another, judge ourselves and our friends by one standard and our antagonists by another, lean over backwards to justify what we want or negate what does not serve our interests. Similarly, we often confuse desires with needs, treating our desires as equivalent to needs, putting what we want above the basic needs of others. *Logical and moral consistency are fundamental values of fairminded critical thinking.* Social conditioning and native egocentrism often obscure social contradictions, inconsistency, and hypocrisy. See *personal contradiction, social contradiction, intellectual integrity, human nature.*

**contradict/contradiction:** To assert the opposite of; to be contrary to, go against; a statement in opposition to another; a condition in which things tend to be contrary to each other; inconsistency; discrepancy; a person or thing containing or composed of contradictory elements. See *personal contradiction, social contradiction.*

**criterion (criteria, pl):** A standard, rule, or test by which something can be judged or measured. Human life, thought, and action are based on human values. The standards by which we determine whether those values are achieved in any situation represent criteria. Critical thinking depends upon making explicit the standards or criteria for rational or justifiable thinking and behavior. See *evaluation.*

**critical listening:** A mode of monitoring how we are listening so as to maximize our accurate understanding of what another person is saying. By understanding the logic of human communication — that *everything spoken expresses point of view*, uses some ideas and not others, has implications, etc. — critical thinkers can listen so as to enter sympathetically and analytically into the perspective of others. See *critical speaking, critical reading, critical writing, elements of thought, intellectual empathy.*

**critical person:** One who has mastered a range of intellectual skills and abilities. If that person generally uses those skills to advance his or her own selfish interests, that person is a critical thinker only in a weak or qualified sense. If that person generally uses those skills fairmindedly, entering empathically into the points of view of others, he or she is a critical thinker in the strong or fullest sense. See *critical thinking.*

**critical reading:** *Critical reading is an active, intellectually engaged process in which the reader participates in an inner dialogue with the writer. Most people read uncritically and so*

miss some part of what is expressed while distorting other parts. A critical reader realizes the way in which *reading, by its very nature, means entering into a point of view other than our own*, the point of view of the writer. A critical reader actively looks for assumptions, key concepts and ideas, reasons and justifications, supporting examples, parallel experiences, implications and consequences, and any other structural features of the written text, to interpret and assess it accurately and fairly. See *elements of thought*.

**critical society:** A society which rewards adherence to the values of critical thinking and hence *does not use indoctrination and inculcation as basic modes of learning* (rewards reflective questioning, intellectual independence, and reasoned dissent). Socrates is not the only thinker to imagine a society in which independent critical thought became embodied in the concrete day-to-day lives of individuals; William Graham Sumner, North America's distinguished anthropologist, explicitly formulated the ideal:

The critical habit of thought, if usual in a society, will pervade all its mores, because it is a way of taking up the problems of life. Men educated in it cannot be stampeded by stump orators and are never deceived by dithyrambic oratory. They are slow to believe. They can hold things as possible or probable in all degrees, without certainty and without pain. They can wait for evidence and weigh evidence, uninfluenced by the emphasis or confidence with which assertions are made on one side or the other. They can resist appeals to their dearest prejudices and all kinds of cajolery. Education in the critical faculty is the only education of which it can be truly said that it makes good citizens. (*Folkways*, 1906)

Until critical habits of thought pervade our society, however, there will be a tendency for schools as social institutions to transmit the prevailing world view more or less uncritically, to transmit it as reality, not as a picture of reality. Education for critical thinking, then, requires that the school or classroom become a microcosm of a critical society. See *didactic instruction, dialogical instruction, intellectual virtues, knowledge*.

**critical thinking:** 1) Disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. 2) Thinking that displays mastery of intellectual skills and abilities. 3) The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible. Critical thinking can be distinguished into two forms: "selfish" or "sophistic", on the one hand, and "fairminded", on the other. In thinking critically we use our command of the elements of thinking to adjust our thinking successfully to the logical demands of a type or mode of thinking. See *critical person, critical society, critical reading, critical listening, critical writing, perfections of thought, elements of thought, domains of thought, intellectual virtues*.

**critical writing:** To express ourselves in language requires that we arrange our ideas in some relationships to each other. When accuracy and truth are at issue, then we must understand what our thesis is, how we can support it, how we can elaborate it to make it intelligible to others, what objections can be raised to it from other points of view, what the limitations are to our point of view, and so forth. *Disciplined writing requires disciplined thinking; disciplined thinking is achieved through disciplined writing*. See *critical listening, critical reading, logic of language*.

**critique:** An objective judging, analysis, or evaluation of something. The purpose of critique is the same as the purpose of critical thinking: to appreciate strengths as well as weaknesses, virtues as well as failings. *Critical thinkers critique in order to redesign, remodel, and make better.*

**cultural association:** Undisciplined thinking often reflects associations, personal and cultural, absorbed or uncritically formed. If a person who was cruel to me as a child had a particular tone of voice, I may find myself disliking a person who has the same tone of voice. Media advertising juxtaposes and joins logically unrelated things to influence our buying habits. Raised in a particular country or within a particular group within it, we form any number of mental links which, if they remain unexamined, unduly influence our thinking. See *concept, critical society.*

**cultural assumption:** Unassessed (often implicit) belief adopted by virtue of upbringing in a society. Raised in a society, we unconsciously take on its point of view, values, beliefs, and practices. At the root of each of these are many kinds of assumptions. Not knowing that we perceive, conceive, think, and experience within assumptions we have taken in, we take ourselves to be perceiving “things as they are”, not “things as they appear from a cultural vantage point”. Becoming aware of our cultural assumptions so that we might critically examine them is a crucial dimension of critical thinking. It is, however, a dimension almost totally absent from schooling. Lip service to this ideal is common enough; a realistic emphasis is virtually unheard of. See *ethnocentricity, prejudice, social contradiction.*

**data:** Facts, figures, or information from which conclusions can be inferred, or upon which interpretations or theories can be based. As critical thinkers we must make certain to distinguish hard data from the inferences or conclusions we draw from them.

**dialectical thinking:** Dialogical thinking (thinking within more than one perspective) conducted to test the strengths and weaknesses of opposing points of view. (Court trials and debates are, in a sense, dialectical.) When thinking dialectically, reasoners pit two or more opposing points of view in competition with each other, developing each by providing support, raising objections, countering those objections, raising further objections, and so on. Dialectical thinking or discussion can be conducted so as to “win” by defeating the positions one disagrees with — using critical insight to support one’s own view and point out flaws in other views (associated with critical thinking in the restricted or weak sense), or fairly-mindedly, by conceding points that don’t stand up to critique, trying to integrate or incorporate strong points found in other views, and using critical insight to develop a fuller and more accurate view (associated with critical thinking in the fuller or strong sense). See *monological problems.*

**dialogical instruction:** Instruction that fosters dialogical or dialectic thinking. Thus, when considering a question, the class brings all relevant subjects to bear and considers the perspectives of groups whose views are not canvassed in their texts — for example, “What did King George think of the *Declaration of Independence*, the Revolutionary War, the Continental Congress, Jefferson and Washington, etc.?” or, “How would an economist analyze this situation? A historian? A psychologist? A geographer?” See *critical society, didactic instruction, higher order learning, lower order learning, Socratic questioning, knowledge.*

**dialogical thinking:** Thinking that involves a dialogue or extended exchange between different points of view or frames of reference. Students learn best in dialogical situations, in circumstances in which they continually express their views to others and try to fit other's views into their own. See *Socratic questioning, monological thinking, multilogical thinking, dialectical thinking*.

**didactic instruction:** Teaching by telling. In didactic instruction, the teacher directly tells the student what to believe and think about a subject. The student's task is to remember what the teacher said and reproduce it on demand. In its most common form, this mode of teaching falsely assumes that one can directly give a person knowledge without that person having to think his or her way to it. It falsely assumes that knowledge can be separated from understanding and justification. It confuses the ability to *state* a principle with *understanding* it, the ability to *supply* a definition with *knowing* a new word, and the act of *saying* that something is important with *recognizing* its importance. See *critical society, knowledge*.

**domains of thought:** Thinking can be oriented or structured with different issues or purposes in view. *Thinking varies in accordance with purpose and issue*. Critical thinkers learn to discipline their thinking to take into account the nature of the issue or domain. We see this most clearly when we consider the difference between issues and thinking within different academic disciplines or subject areas. Hence, mathematical thinking is quite different from, say, historical thinking. Mathematics and history, we can say then, represent different domains of thought. See the *logic of questions*.

**egocentricity:** A tendency to view everything in relationship to oneself; to confuse immediate perception (how things *seem*) with reality. One's desires, values, and beliefs (seeming to be self-evidently correct or superior to those of others) are often uncritically used as the norm of all judgment and experience. Egocentricity is one of the fundamental impediments to critical thinking. As one learns to think critically in a strong sense, one learns to become more rational, and less egocentric. See *human nature, strong sense critical thinker, ethnocentrism, sociocentrism, personal contradiction*.

**elements of thought:** All thought has a universal set of elements, each of which can be monitored for possible problems: Are we clear about our *purpose or goal*? about the *problem or question at issue*? about our *point of view or frame of reference*? about our *assumptions*? about the *claims* we are making? about the *reasons or evidence* upon which we are basing our claims? about our *inferences and line of reasoning*? about the *implications and consequences* that follow from our reasoning? Critical thinkers develop skills of identifying and assessing these elements in their thinking and in the thinking of others.

**emotion:** A feeling aroused to the point of awareness, often a strong feeling or state of excitement. When our egocentric emotions or feelings get involved, when we are excited by infantile anger, fear, jealousy, etc., our objectivity often decreases. Critical thinkers need to be able to monitor their egocentric feelings and use their rational passions to reason themselves into feelings appropriate to the situation as it really is, rather than to how it seems to their infantile ego. Emotions and feelings themselves are not irrational; however, it is common for people to feel strongly when their ego is stimulated.

One way to understand the goal of strong sense critical thinking is as the attempt to develop rational feelings and emotions at the expense of irrational, egocentric ones. See *rational passions, intellectual virtues*.

**empirical:** Relying or based on experiment, observation, or experience rather than on theory or meaning. *It is important to continually distinguish those considerations based on experiment, observation, or experience from those based on the meaning of a word or concept or the implications of a theory.* One common form of uncritical or selfish critical thinking involves distorting facts or experience in order to preserve a preconceived meaning or theory. For example, a conservative may distort the facts that support a liberal perspective to prevent empirical evidence from counting against a theory of the world that he or she holds rigidly. Indeed, within all perspectives and belief systems many will distort the facts before they will admit to a weakness in their favorite theory or belief. See *data, fact, evidence*.

**empirical implication:** That which follows from a situation or fact, not due to the logic of language, but from experience or scientific law. The redness of the coil on the stove empirically implies dangerous heat.

**ethnocentricity:** A tendency to view one's own race or culture as central, based on the deep-seated belief that one's own group is superior to all others. Ethnocentrism is a form of egocentrism extended from the self to the group. Much uncritical or selfish critical thinking is either egocentric or ethnocentric in nature. ('Ethnocentrism' and 'sociocentrism' are used synonymously, for the most part, though 'sociocentricity' is broader, relating to *any* group, including, for example, sociocentricity regarding one's profession.) The "cure" for ethnocentrism or sociocentrism is empathic thought within the perspective of opposing groups and cultures. Such empathic thought is rarely cultivated in the societies and schools of today. Instead, many people develop an empty rhetoric of tolerance, saying that others have different beliefs and ways, but without seriously considering those beliefs and ways, what they mean to those others, and their reasons for maintaining them.

**evaluation:** To judge or determine the worth or quality of. *Evaluation has a logic and should be carefully distinguished from mere subjective preference.* The elements of its logic may be put in the form of questions which may be asked whenever an evaluation is to be carried out: 1) Are we clear about *what precisely we are evaluating?*; 2) Are we clear about *our purpose?* Is our purpose legitimate?; 3) Given our purpose, what are the *relevant criteria or standards* for evaluation?; 4) Do we have *sufficient information* about that which we are evaluating? Is that *information relevant to the purpose?*; and 5) Have we *applied our criteria accurately and fairly to the facts* as we know them? Uncritical thinkers often treat evaluation as mere preference or treat their evaluative judgments as direct observations not admitting of error.

**evidence:** The data on which a judgment or conclusion might be based or by which proof or probability might be established. Critical thinkers distinguish the evidence or raw data upon which they base their interpretations or conclusions from the inferences and assumptions that connect data to conclusions. Uncritical thinkers treat their conclusions as something given to them in experience, as something they directly observe in the world. As a result, they find it difficult to see why anyone might disagree with their con-

clusions. After all, the truth of their views is, they believe, right there for everyone to see! Such people find it difficult or even impossible to describe the evidence or experience without coloring that description with their interpretation.

**explicit:** Clearly stated and leaving nothing implied; *explicit* is applied to that which is so clearly stated or distinctly set forth that there should be no doubt as to the meaning; *exact* and *precise* in this connection both suggest that which is strictly defined, accurately stated, or made unmistakably clear; *definite* implies precise limitations as to the nature, character, meaning, etc. of something; *specific* implies the pointing up of details or the particularizing of references. Critical thinking often requires the ability to be explicit, exact, definite, and specific. Most students cannot make what is *implicit* in their thinking *explicit*. This deficiency hampers their ability to monitor and assess their thinking.

**fact:** What actually happened, what is true; verifiable by empirical means; distinguished from interpretation, inference, judgment, or conclusion; the raw data. There are distinct senses of the word 'factual': "True" (as opposed to "claimed to be true"); and "empirical" (as opposed to conceptual or evaluative). You may make many "factual claims" in one sense, that is, claims which can be verified or disproven by observation or empirical study, but I must evaluate those claims to determine if they are true. People often confuse these two senses, even to the point of accepting as true, statements which merely "seem factual", for example, "29.23 % of Americans suffer from depression." Before I accept this as true, I should assess it. I should ask such questions as "How do you know? How *could* this be known? Did you merely ask people if they were depressed and extrapolate those results? How exactly did you arrive at this figure?" Purported facts should be assessed for their accuracy, completeness, and relevance to the issue. Sources of purported facts should be assessed for their qualifications, track records, and impartiality. Education which stresses retention and repetition of factual claims stunts students' desire and ability to assess alleged facts, leaving them open to manipulation. Activities in which students are asked to "distinguish fact from opinion" often confuse these two senses. They encourage students to *accept as true* statements which merely "look like" facts. See *intellectual humility, knowledge*.

**fair:** Treating both or all sides alike without reference to one's own feelings or interests; *just* implies adherence to a standard of rightness or lawfulness without reference to one's own inclinations; *impartial* and *unbiased* both imply freedom from prejudice for or against any side; *dispassionate* implies the absence of passion or strong emotion, hence, connotes cool, disinterested judgment; *objective* implies a viewing of persons or things without reference to oneself, one's interests, etc.

**faith:** 1) Unquestioning belief in anything. 2) Confidence, trust, or reliance. A critical thinker does not accept faith in the first sense, for every belief is reached on the basis of some thinking, which may or may not be justified. Even in religion one believes in one religion rather than another, and in doing so implies that there are good reasons for accepting one rather than another. A Christian, for example, believes that there are good reasons for not being an atheist, and Christians often attempt to persuade non-Christians to change their beliefs. In some sense, then, everyone has confidence in the capacity of his or her own mind to judge rightly on the basis of good reasons, and does not believe simply on the basis of blind faith.

***fallacy/fallacious:*** An error in reasoning; flaw or defect in argument; an argument which doesn't conform to rules of good reasoning (especially one that appears to be sound). Containing or based on a fallacy; deceptive in appearance or meaning; misleading; delusive.

***higher order learning:*** Learning through exploring the foundations, justification, implications, and value of a fact, principle, skill, or concept. *Learning so as to deeply understand.* One can learn in keeping with the rational capacities of the human mind or in keeping with its irrational propensities, cultivating the capacity of the human mind to discipline and direct its thought through commitment to intellectual standards, or one can learn through mere association. Education for critical thought produces higher order learning by helping students actively think their way to conclusions; discuss their thinking with other students and the teacher; entertain a variety of points of view; analyze concepts, theories, and explanations in their own terms; actively question the meaning and implications of what they learn; compare what they learn to what they have experienced; take what they read and write seriously; solve non-routine problems; examine assumptions; and gather and assess evidence. Students should learn each subject by engaging in thought within that subject. They should learn history by thinking historically, mathematics by thinking mathematically, etc. See *dialogical instruction, lower order learning, critical society, knowledge, principle, domains of thought.*

***human nature:*** The common qualities of all human beings. People have both a primary and a secondary nature. Our primary nature is spontaneous, egocentric, and strongly prone to irrational belief formation. It is the basis for our instinctual thought. People need no training to believe what they want to believe: what serves their immediate interests, what preserves their sense of personal comfort and righteousness, what minimizes their sense of inconsistency, and what presupposes their own correctness. People need no special training to believe what those around them believe: what their parents and friends believe, what is taught to them by religious and school authorities, what is repeated often by the media, and what is commonly believed in the nation in which they are raised. People need no training to think that those who disagree with them are wrong and probably prejudiced. People need no training to assume that their own most fundamental beliefs are self-evidently true or easily justified by evidence. People naturally and spontaneously identify with their own beliefs. They experience most disagreement as personal attack. The resulting defensiveness interferes with their capacity to empathize with or enter into other points of view.

On the other hand, *people need extensive and systematic practice to develop their secondary nature, their implicit capacity to function as rational persons.* They need extensive and systematic practice to recognize the tendencies they have to form irrational beliefs. They need extensive practice to develop a dislike of inconsistency, a love of clarity, a passion to seek reasons and evidence and to be fair to points of view other than their own. People need extensive practice to recognize that they indeed have a point of view, that they live inferentially, that they do not have a direct pipeline to reality, that it is perfectly possible to have an overwhelming inner sense of the correctness of one's views and still be wrong. See *intellectual virtues.*

***idea:*** Anything existing in the mind as an object of knowledge or thought; *concept* refers to generalized idea of a class of objects, based on knowledge of particular instances of the class;

*conception*, often equivalent to concept, specifically refers to something conceived in the mind or imagined; *thought* refers to any idea, whether or not expressed, that occurs to the mind in reasoning or contemplation; *notion* implies vagueness or incomplete intention; *impression* also implies vagueness of an idea provoked by some external stimulus. Critical thinkers are aware of what ideas they are using in their thinking, where those ideas came from, and how to assess them. See *clarify*, *concept*, *logic*, *logic of language*.

***imply/implication***: A claim or truth which follows from other claims or truths. One of the most important skills of critical thinking is the ability to distinguish between what is actually implied by a statement or situation from what may be carelessly inferred by people. Critical thinkers try to *monitor their inferences to keep them in line with what is actually implied* by what they know. When speaking, critical thinkers *try to use words that imply only what they can legitimately justify*. They recognize that there are established word usages which generate established implications. To say of an act that it is murder, for example, is to imply that it is intentional and unjustified. See *clarify*, *precision*, *logic of language*, *critical listening*, *critical reading*, *elements of thought*.

***infer/inference***: An inference is a step of the mind, an intellectual act by which one concludes that something is so in light of something else's being so, or seeming to be so. If you come at me with a knife in your hand, I would probably infer that you mean to do me harm. Inferences can be strong or weak, justified or unjustified. Inferences are based upon assumptions. See *imply/implication*.

***insight***: The ability to see and clearly and deeply understand the inner nature of things. Instruction for critical thinking fosters insight rather than mere performance; it cultivates the achievement of deeper knowledge and understanding through insight. *Thinking one's way into and through a subject leads to insights* as one synthesizes what one is learning, relating one subject to other subjects and all subjects to personal experience. Rarely is insight formulated as a goal in present curricula and texts. See *dialogical instruction*, *higher order learning*, *lower order learning*, *didactic instruction*, *intellectual humility*.

***intellectual autonomy***: Having rational control of one's beliefs, values, and inferences. The ideal of critical thinking is to learn to think for oneself, to gain command over one's thought processes. Intellectual autonomy does not entail willfulness, stubbornness, or rebellion. It entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform. See *know*, *knowledge*.

***(intellectual) confidence or faith in reason***: Confidence that in the long run *one's own higher interests and those of humankind at large will best be served by giving the freest play to reason* — by encouraging people to come to their own conclusions through a process of developing their own rational faculties; faith that (with proper encouragement and cultivation) people can learn to think for themselves, form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason, and become reasonable, despite the deep-seated obstacles in the native character of the human mind and in society. Confidence in reason is developed through experiences in which one reasons one's way to insight, solves problems

through reason, uses reason to persuade, is persuaded by reason. Confidence in reason is undermined when one is expected to perform tasks without understanding why, to repeat statements without having verified or justified them, to accept beliefs on the sole basis of authority or social pressure.

**intellectual courage:** The willingness to face and fairly assess ideas, beliefs, or viewpoints to which we have not given a serious hearing, regardless of our strong negative reactions to them. This courage arises from the recognition that *ideas considered dangerous or absurd are sometimes rationally justified* (in whole or in part), and that *conclusions or beliefs espoused by those around us or inculcated in us are sometimes false or misleading*. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned". Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd and some distortion or falsity in some ideas strongly held in our social group. It takes courage to be true to our own thinking in such circumstances. Examining cherished beliefs is difficult, and the penalties for non-conformity are often severe.

**intellectual empathy:** Understanding the need to imaginatively put oneself in the place of others to genuinely understand them. We must recognize our egocentric tendency to identify truth with our immediate perceptions or longstanding beliefs. Intellectual empathy correlates with the ability to accurately reconstruct the viewpoints and reasoning of others and to *reason from premises, assumptions, and ideas other than our own*. This trait also requires that we remember occasions when we were wrong, despite an intense conviction that we were right, and consider that we might be similarly deceived in a case at hand.

**intellectual humility:** Awareness of the limits of one's knowledge, including sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias and prejudice in, and limitations of one's viewpoint. Intellectual humility is based on the recognition that *no one should claim more than he or she actually knows*. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into the strengths or weaknesses of the logical foundations of one's beliefs.

**intellectual integrity:** Recognition of the need to be true to one's own thinking, to be consistent in the intellectual standards one applies, to hold oneself to the same rigorous standards of evidence and proof to which one holds one's antagonists, to practice what one advocates for others, and to honestly admit discrepancies and inconsistencies in one's own thought and action. This trait develops best in a supportive atmosphere in which people feel secure and free enough to honestly acknowledge their inconsistencies, and can develop and share realistic ways of ameliorating them. It requires honest acknowledgment of the difficulties of achieving greater consistency.

**intellectual perseverance:** Willingness and consciousness of the need to pursue intellectual insights and truths despite difficulties, obstacles, and frustrations; firm adherence to rational principles despite irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time in order to achieve deeper understanding or insight. This trait is undermined when teachers and

others continually provide the answers, do students' thinking for them or substitute easy tricks, algorithms, and short cuts for careful, independent thought.

**intellectual sense of justice:** Willingness and consciousness of the need to entertain all viewpoints sympathetically and to assess them with the same intellectual standards, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community, or nation; implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

**intellectual virtues:** The traits of mind and character necessary for right action and thinking; the traits of mind and character essential for fairminded rationality; the traits that distinguish the narrowminded, self-serving critical thinker from the openminded, truth-seeking critical thinker. These *intellectual traits are interdependent*. Each is best developed while developing the others as well. They cannot be imposed from without; they must be cultivated by encouragement and example. People can come to deeply understand and accept these principles by analyzing their experiences of them: learning from an unfamiliar perspective, discovering you don't know as much as you thought, and so on. They include: intellectual sense of justice, intellectual perseverance, intellectual integrity, intellectual humility, intellectual empathy, intellectual courage, (intellectual) confidence in reason, and intellectual autonomy.

**interpret/interpretation:** To give one's own conception of, to place in the context of one's own experience, perspective, point of view, or philosophy. Interpretations should be distinguished from the facts, the evidence, the situation. (I may interpret someone's silence as an expression of hostility toward me. Such an interpretation may or may not be correct. I may have projected my patterns of motivation and behavior onto that person, or I may have accurately noticed this pattern in the other.) The best interpretations take the most evidence into account. Critical thinkers recognize their interpretations, distinguish them from evidence, consider alternative interpretations, and reconsider their interpretations in the light of new evidence. *All learning involves personal interpretation, since whatever we learn we must integrate into our own thinking and action.* What we learn must be given a meaning by us, must be meaningful to us, and hence involves interpretive acts on our part. Didactic instruction, in attempting to directly implant knowledge in students' minds, typically ignores the role of personal interpretation in learning.

**intuition:** The direct knowing or learning of something without the conscious use of reasoning. We sometimes seem to know or learn things without recognizing how we came to that knowledge. When this occurs, we experience an inner sense that what we believe is true. The problem is that sometimes we are correct (and have genuinely experienced an intuition) and sometimes we are incorrect (having fallen victim to one of our prejudices). A critical thinker does not blindly accept that what he or she thinks or believes but cannot account for is necessarily true. A critical thinker realizes how easily we confuse intuitions and prejudices. Critical thinkers may follow their inner sense that something is so, but only with a healthy sense of intellectual humility.

There is a second sense of 'intuition' that is important for critical thinking, and that is the meaning suggested in the following sentence: "To develop your critical thinking abili-

ties, it is important to develop your critical thinking *intuitions*.” This sense of the word is connected to the fact that we can learn concepts at various levels of depth. If we learn nothing more than an abstract definition for a word and do not learn how to apply it effectively in a wide variety of situations, one might say that we end up with no *intuitive* basis for applying it. We lack the insight into how, when, and why it applies. Helping students to develop critical thinking intuitions is helping them gain the practical insights necessary for a ready and swift application of concepts to cases in a large array of circumstances. We want critical thinking to be “intuitive” to our students, ready and available for immediate translation into their everyday thought and experience.

**irrational/irrationality:** 1) Lacking the power to reason. 2) Contrary to reason or logic. 3) Senseless, absurd. Uncritical thinkers have failed to develop the ability or power to reason well. Their beliefs and practices, then, are often contrary to reason and logic, and are sometimes senseless or absurd. It is important to recognize, however, that in societies with irrational beliefs and practices, it is not clear whether challenging those beliefs and practices — and therefore possibly endangering oneself — is rational or irrational. Furthermore, suppose one’s vested interests are best advanced by adopting beliefs and practices that are contrary to reason. Is it then rational to follow reason and negate one’s vested interests or follow one’s interests and ignore reason? These very real dilemmas of everyday life represent on-going problems for critical thinkers. Selfish critical thinkers, of course, face no dilemma here because of their consistent commitment to advance their narrow vested interests. Fairminded critical thinkers make these decisions self-consciously and honestly assess the results.

**irrational learning:** All rational learning presupposes rational assent. And, though we sometimes forget it, not all learning is automatically or even commonly rational. *Much that we learn in everyday life is quite distinctively irrational.* It is quite possible — and indeed the bulk of human learning is unfortunately of this character — *to come to believe any number of things without knowing how or why.* It is quite possible, in other words, to believe for irrational reasons: because those around us believe, because we are rewarded for believing, because we are afraid to disbelieve, because our vested interest is served by belief, because we are more comfortable with belief, or because we have ego identified ourselves, our image, or our personal being with belief. In all of these cases, our beliefs are without rational grounding, without good reason and evidence, without the foundation a rational person demands. We become rational, on the other hand, to the extent that our beliefs and actions are grounded in good reasons and evidence; to the extent that we recognize and critique our own irrationality; to the extent that we are not moved by bad reasons and a multiplicity of irrational motives, fears, and desires; to the extent that we have cultivated a passion for clarity, accuracy, and fairmindedness. These global skills, passions, and dispositions, integrated into behavior and thought, characterize the rational, the educated, and the critical person. See *higher and lower order learning, knowledge, didactic instruction.*

**judgment:** 1) The act of judging or deciding. 2) Understanding and good sense. A person has good judgment when they typically judge and decide on the basis of understanding and good sense. Whenever we form a belief or opinion, make a decision, or act, we do so on

the basis of implicit or explicit judgments. All thought presupposes making judgments concerning what is so and what is not so, what is true and what is not. To cultivate people's ability to think critically is to foster their judgment, to help them to develop the habit of judging on the basis of reason, evidence, logic, and good sense. Good judgment is developed, not by merely learning about principles of good judgment, but by frequent practice judging and assessing judgments.

**justify/justification:** The act of showing a belief, opinion, action, or policy to be in accord with reason and evidence, to be ethically acceptable, or both. Education should foster reasonability in students. This requires that both teachers and students develop the disposition to ask for and give justifications for beliefs, opinions, actions, and policies. Asking for a justification should not, then, be viewed as an insult or attack, but rather as a normal act of a rational person. Didactic modes of teaching that do not encourage students to question the justification for what is asserted fail to develop a thoughtful environment conducive to education.

**know:** To have a clear perception or understanding of, to be sure of, to have a firm mental grasp of; *information* applies to data that are gathered in any way, as by reading, observation, hearsay, etc. and does not necessarily connote validity; *knowledge* applies to any body of facts gathered by study, observation, etc. and to the ideas inferred from these facts, and connotes an *understanding* of what is known. Critical thinkers need to distinguish knowledge from opinion and belief. See *knowledge*.

**knowledge:** The act of having a clear and justifiable grasp of what is so or of how to do something. Knowledge is based on understanding or skill, which in turn are based on thought, study, and experience. 'Thoughtless knowledge' is a contradiction. 'Blind knowledge' is a contradiction. 'Unjustifiable knowledge' is a contradiction. Knowledge implies justifiable belief or skilled action. Hence, when students blindly memorize and are tested for recall, they are not being tested for knowledge. *Knowledge is continually confused with recall in present-day schooling.* This confusion is a deep-seated impediment to the integration of critical thinking into schooling. *Genuine knowledge is inseparable from thinking minds.* We often wrongly talk of knowledge as though it could be divorced from thinking, as though it could be gathered up by one person and given to another in the form of a collection of sentences to remember. When we talk in this way, we forget that *knowledge*, by its very nature, *depends on thought.* Knowledge is produced by thought, analyzed by thought, comprehended by thought, organized, evaluated, maintained, and transformed by thought. Knowledge can be *acquired only* through thought. Knowledge exists, properly speaking, only in minds that have comprehended and justified it through thought. Knowledge is not to be confused with belief nor with symbolic representation of belief. Humans easily and frequently believe things that are false or believe things to be true without knowing them to be so. A book contains knowledge only in a derivative sense, only because minds can thoughtfully read it and through that process gain knowledge.

**logic:** 1) Correct reasoning or the study of correct reasoning and its foundations. 2) The relationships between propositions (supports, assumes, implies, contradicts, counts against, is relevant to, ...). 3) The system of principles, concepts, and assumptions that underlie any discipline, activity, or practice. 4) The set of rational considerations that bear upon

the truth or justification of any belief or set of beliefs. 5) The set of rational considerations that bear upon the settlement of any question or set of questions. The word 'logic' covers a range of related concerns all bearing upon the question of rational justification and explanation. *All human thought and behavior is to some extent based on logic* rather than instinct. Humans try to figure things out using ideas, meanings, and thought. Such intellectual behavior inevitably involves "logic" or considerations of a logical sort: some sense of what is relevant and irrelevant, of what supports and what counts against a belief, of what we should and should not assume, of what we should and should not claim, of what we do and do not know, of what is and is not implied, of what does and does not contradict, of what we should or should not do or believe. *Concepts have a logic* in that we can investigate the conditions under which they do and do not apply, of what is relevant or irrelevant to them, of what they do or don't imply, etc. *Questions have a logic* in that we can investigate the conditions under which they can be settled. *Disciplines have a logic* in that they have purposes and a set of logical structures that bear upon those purposes: assumptions, concepts, issues, data, theories, claims, implications, consequences, etc. The concept of logic is a seminal notion in critical thinking. Unfortunately, it takes a considerable length of time before most people become comfortable with its multiple uses. In part, this is due to people's failure to monitor their own thinking in keeping with the standards of reason and logic. This is not to deny, of course, that logic is involved in all human thinking. It is rather to say that the logic we use is often implicit, unexpressed, and sometimes contradictory. See *knowledge, higher and lower order learning, the logic of a discipline, the logic of language, the logic of questions*.

***the logic of a discipline:*** The notion that every technical term has logical relationships with other technical terms, that some terms are logically more basic than others, and that every discipline relies on concepts, assumptions, and theories, makes claims, gives reasons and evidence, avoids contradictions and inconsistencies, has implications and consequences, etc. Though all students study disciplines, most are ignorant of the logic of the disciplines they study. This severely limits their ability to grasp the discipline as a whole, to think independently within it, to compare and contrast it with other disciplines, and to apply it outside the context of academic assignments. Typically now, students do not look for seminal terms as they study an area. They do not strive to translate technical terms into analogies and ordinary words they understand or distinguish technical from ordinary uses of terms. They do not look for the basic assumptions of the disciplines they study. Indeed, on the whole, they do not know what assumptions are nor why it is important to examine them. What they have in their heads exists like so many BB's in a bag. Whether one thought supports or follows from another, whether one thought elaborates another, exemplifies, presupposes, or contradicts another, are matters students have not learned to think about. They have not learned to use thought to understand thought, which is another way of saying that they have not learned how to use thought to gain knowledge. *Instruction for critical thinking cultivates the students' ability to make explicit the logic of what they study*. This emphasis gives depth and breath to study and learning. It lies at the heart of the differences between lower order and higher order learning. See *knowledge*.

***the logic of language:*** For a language to exist and be learnable by persons from a variety of cultures, it is necessary that *words have definite uses and defined concepts that transcend*

*particular cultures.* The English language, for example, is learned by many peoples of the world unfamiliar with English or North American cultures. Critical thinkers must learn to use their native language with precision, in keeping with educated usage. Unfortunately, many students do not understand the significant relationship between precision in language usage and precision in thought. Consider, for example, how most students relate to their native language. If one questions them about the meanings of words, their account is typically incoherent. They often say that people have their own meanings for all the words they use, not noticing that, were this true, we could not understand each other. Students speak and write in vague sentences because they have no rational criteria for choosing words — they simply write whatever words pop into their heads. They do not realize that every language has a highly refined logic one must learn in order to express oneself precisely. They do not realize that even words similar in meaning typically have different implications. Consider, for example, the words explain, expound, explicate, elucidate, interpret, and construe. *Explain* implies the process of making clear and intelligible something not understood or known. *Expound* implies a systematic and thorough explanation, often by an expert. *Explicate* implies a scholarly analysis developed in detail. *Elucidate* implies a shedding of light upon by clear and specific illustration or explanation. *Interprete* implies the bringing out of meanings not immediately apparent. *Construe* implies a particular interpretation of something whose meaning is ambiguous. See *clarify, concept*.

***the logic of questions:*** The range of rational considerations that bear upon the settlement of a given question or group of questions. A critical thinker is adept at analyzing questions to determine what, precisely, a question asks and how to go about rationally settling it. A critical thinker recognizes that different kinds of questions often call for different modes of thinking, different kinds of considerations, and different procedures and techniques. Uncritical thinkers often confuse distinct questions and use considerations irrelevant to an issue while ignoring relevant ones.

***lower order learning:*** Learning by rote memorization, association, and drill. There are a variety of forms of lower order learning in the schools which we can identify by understanding the relative *lack of logic informing them*. Paradigmatically, lower order learning is learning by sheer association or rote. Hence students come to think of history class, for example, as a place where you hear names, dates, places, events, and outcomes; where you try to remember them and state them on tests. Math comes to be thought of as numbers, symbols, and formulas — mysterious things you mechanically manipulate as the teacher told you in order to get the right answer. Literature is often thought of as uninteresting stories to remember along with what the teacher said is important about them. Consequently, students leave with a jumble of undigested fragments, scraps left over after they have forgotten most of what they stored in their short-term memories for tests. Virtually never do they grasp the logic of what they learn. Rarely do they relate what they learn to their own experience or critique each by means of the other. Rarely do they try to test what they learn in everyday life. Rarely do they ask “Why is this so? How does this relate to what I already know? How does this relate to what I am learning in other classes?” To put the point in a nutshell, very few students think of what they are learning as worthy of being arranged logically in their minds or have the slightest idea of how to do so. See *didactic instruction, monological and multilogical problems and thinking*.

**monological (one-dimensional) problems:** Problems that can be solved by reasoning exclusively within one point of view or frame of reference. For example, consider the following problems: 1) Ten full crates of walnuts weigh 410 pounds, whereas an empty crate weighs 10 pounds. How much do the walnuts alone weigh?; and 2) In how many days of the week does the third letter of the day's name immediately follow the first letter of the day's name in the alphabet? I call these problems and the means by which they are solved "monological". They are settled within one frame of reference with a definite set of logical moves. When the right set of moves is performed, the problem is settled. The answer or solution proposed can be shown by standards implicit in the frame of reference to be the "right" answer or solution. *Most important human problems are multilogical rather than monological*, nonatomic problems inextricably joined to other problems, with some conceptual messiness to them and very often with important values lurking in the background. When the problems have an empirical dimension, that dimension tends to have a controversial scope. In multilogical problems, it is often arguable how some facts should be considered and interpreted, and how their significance should be determined. When they have a conceptual dimension, there tend to be arguably different ways to pin the concepts down. Though life presents us with predominantly multilogical problems, schooling today over-emphasizes monological problems. Worse, and more frequently, present instructional practices treat multilogical problems as though they were monological. The posing of multilogical problems, and their consideration from multiple points of view, play an important role in the cultivation of critical thinking and higher order learning.

**monological (one-dimensional) thinking:** Thinking that is conducted exclusively within one point of view or frame of reference: figuring out how much this \$67.49 pair of shoes with a 25% discount will cost me; learning what signing this contract obliges me to do; finding out when Kennedy was elected President. A person can think monologically whether or not the question is genuinely monological. (For example, if one considers the question, "Who caused the Civil War?" only from a Northerner's perspective, one is thinking monologically about a multilogical question.) The strong sense critical thinker avoids monological thinking when the question is multi-logical. Moreover, higher order learning requires multi-logical thought, even when the problem is monological (for example, learning a concept in chemistry), since students must explore and assess their original beliefs to develop insight into new ideas.

**multilogical (multi-dimensional) problems:** Problems that can be analyzed and approached from more than one, often from conflicting, points of view or frames of reference. For example, many ecological problems have a variety of dimensions to them: historical, social, economic, biological, chemical, moral, political, etc. A person comfortable thinking about multilogical problems is comfortable thinking within multiple perspectives, in engaging in dialogical and dialectical thinking, in practicing intellectual empathy, in thinking across disciplines and domains. See *monological problems, the logic of questions, the logic of disciplines, intellectual empathy, dialogical instruction*.

**multilogical thinking:** Thinking that sympathetically enters, considers, and reasons within multiple points of view. See *multilogical problems, dialectical thinking, dialogical instruction*.

**national bias:** Prejudice in favor of one's country, its beliefs, traditions, practices, image, and world view; a form of sociocentrism or ethnocentrism. It is natural, if not inevitable, for

people to be favorably disposed toward the beliefs, traditions, practices, and world view within which they were raised. Unfortunately, this favorable inclination commonly becomes a form of prejudice: a more or less rigid, irrational ego-identification which significantly distorts one's view of one's own nation and the world at large. It is manifested in a tendency to mindlessly take the side of one's own government, to uncritically accept governmental accounts of the nature of disputes with other nations, to uncritically exaggerate the virtues of one's own nation while playing down the virtues of "enemy" nations. National bias is reflected in the press and media coverage of every nation of the world. Events are included or excluded according to what appears significant within the dominant world view of the nation, and are shaped into stories to validate that view. Though constructed to fit into a particular view of the world, the stories in the news are presented as neutral, objective accounts, and uncritically accepted as such because people tend to uncritically assume that their own view of things is the way things really are. To become responsible critically thinking citizens and fairminded people, students must practice identifying national bias in the news and in their texts, and to broaden their perspective beyond that of uncritical nationalism. See *ethnocentrism, sociocentrism, bias, prejudice, world view, intellectual empathy, critical society, dialogical instruction, knowledge.*

**opinion:** A belief, typically one open to dispute. Sheer unreasoned opinion should be distinguished from reasoned judgment — beliefs formed on the basis of careful reasoning. See *evaluation, judgment, justify, know, knowledge, reasoned judgment.*

**the perfections of thought:** Thinking, as an attempt to understand the world as it is, has a natural excellence or fitness to it. This excellence is manifest in its *clarity, precision, specificity, accuracy, relevance, consistency, logicalness, depth, completeness, significance, fairness, and adequacy.* These perfections are general canons for thought; they represent legitimate concerns irrespective of the discipline or domain of thought. To develop one's mind and discipline one's thinking with respect to these standards *requires extensive practice and long-term cultivation.* Of course, achieving these standards is a relative matter and varies somewhat among domains of thought. Being *precise* while doing mathematics is not the same as being precise while writing a poem, describing an experience, or explaining a historical event. Furthermore, one perfection of thought may be periodically incompatible with the others: adequacy to purpose. Time and resources sufficient to thoroughly analyze a question or problem is all too often an unaffordable luxury. Also, since the social world is often irrational and unjust, because people are often manipulated to act against their interests, and because skilled thought often serves vested interest, thought adequate to these manipulative purposes may require *skilled violation of the common standards for good thinking.* Skilled propaganda, skilled political debate, skilled defense of a group's interests, skilled deception of one's enemy may require the violation or selective application of any of the above standards. Perfecting one's thought as an instrument for success in a world based on power and advantage differs from perfecting one's thought for the apprehension and defense of fairminded truth. *To develop one's critical thinking skills merely to the level of adequacy for social success is to develop those skills in a lower or weaker sense.*

**personal contradiction:** An inconsistency in one's personal life, wherein one says one thing and does another, or uses a double standard, judging oneself and one's friends by an easier standard than that used for people one doesn't like; typically a form of hypocrisy accompanied by self-deception. Most personal contradictions remain unconscious. People too often ignore the difficulty of becoming intellectually and morally consistent, preferring instead to merely admonish others. Personal contradictions are more likely to be discovered, analyzed, and reduced in an atmosphere in which they can be openly admitted and realistically considered without excessive penalty. See *egocentricity, intellectual integrity*.

**perspective (point of view):** Human thought is relational and selective. It is impossible to understand any person, event, or phenomenon from every vantage point simultaneously. Our purposes often control how we see things. Critical thinking requires that this fact be taken into account when analyzing and assessing thinking. This is not to say that human thought is incapable of truth and objectivity, but only that human truth, objectivity, and insight is virtually always limited and partial, virtually never total and absolute. The hard sciences are themselves a good example of this point, since qualitative realities are systematically ignored in favor of quantifiable realities.

**precision:** The quality of being accurate, definite, and exact. The standards and modes of precision vary according to subject and context. See *the logic of language, elements of thought*.

**prejudice:** A judgment, belief, opinion, point of view — favorable or unfavorable — formed before the facts are known, resistant to evidence and reason, or in disregard of facts which contradict it. Self-announced prejudice is rare. Prejudice almost always exists in obscured, rationalized, socially validated, functional forms. It enables people to sleep peacefully at night even while flagrantly abusing the rights of others. It enables people to get more of what they want, or to get it more easily. It is often sanctioned with a superabundance of pomp and self-righteousness. Unless we recognize these powerful tendencies toward selfish thought in our social institutions, even in what appear to be lofty actions and moralistic rhetoric, we will not face squarely the problem of prejudice in human thought and action. Uncritical and selfishly critical thought are often prejudiced. Most instruction in schools today, because students do not think their way to what they accept as true, tends to give students prejudices rather than knowledge. For example, partly as a result of schooling, people often accept as authorities those who liberally sprinkle their statements with numbers and intellectual-sounding language, however irrational or unjust their positions. This prejudice toward pseudo-authority impedes rational assessment. See *insight, knowledge*.

**premise:** A proposition upon which an argument is based or from which a conclusion is drawn. A starting point of reasoning. For example, one might say, in commenting on someone's reasoning, "You seem to be reasoning from the premise that everyone is selfish in everything they do. Do you hold this belief?"

**principle:** A fundamental truth, law, doctrine, value, or commitment, upon which others are based. Rules, which are more specific, and often superficial and arbitrary, are based on principles. Rules are more algorithmic; they needn't be understood to be followed. Principles must be understood to be appropriately applied or followed. Principles go to the heart of the matter. Critical thinking is dependent on principles, not rules and proce-

dures. Critical thinking is principled, not procedural, thinking. Principles cannot be truly grasped through didactic instruction; they must be practiced and applied to be internalized. See *higher order learning, lower order learning, judgment*.

**problem:** A question, matter, situation, or person that is perplexing or difficult to figure out, handle, or resolve. Problems, like questions, can be divided into many types. Each has a (particular) logic. See *logic of questions, monological problems, multilogical problems*.

**problem-solving:** Whenever a problem cannot be solved formulaically or robotically, critical thinking is required: first, to determine the nature and dimensions of the problem, and then, in the light of the first, to determine the considerations, points of view, concepts, theories, data, and reasoning relevant to its solution. Extensive practice in independent problem-solving is essential to developing critical thought. Problem-solving is rarely best approached procedurally or as a series of rigidly followed steps. For example, problem-solving schemas typically begin, "State the problem." Rarely can problems be precisely and fairly stated prior to analysis, gathering of evidence, and dialogical or dialectical thought wherein several provisional descriptions of the problem are proposed, assessed, and revised.

**proof (prove):** Evidence or reasoning so strong or certain as to demonstrate the truth or acceptability of a conclusion beyond a reasonable doubt. How strong evidence or reasoning have to be to demonstrate what they purport to prove varies from context to context, depending on the significance of the conclusion or the seriousness of the implications following from it. See *domain of thought*.

**rational/rationality:** That which conforms to principles of good reasoning, is sensible, shows good judgment, is consistent, logical, complete, and relevant. Rationality is a summary term like 'virtue' or 'goodness'. It is manifested in an unlimited number of ways and depends on a host of principles. There is some ambiguity in it, depending on whether one considers only the logicalness and effectiveness by which one pursues one's ends, or whether it includes the assessment of ends themselves. There is also ambiguity in whether one considers selfish ends to be rational, even when they conflict with what is just. Does a rational person have to be just or only skilled in pursuing his or her interests? Is it rational to be rational in an irrational world? See *perfections of thought, irrational/irrationality, logic, intellectual virtues, weak sense critical thinking, strong sense critical thinking*.

**rational emotions/passions:** R. S. Peters has explained the significance of the affective side of reason and critical thought in his defense of the necessity of "rational passions":

There is, for instance, the hatred of contradictions and inconsistencies, together with the love of clarity and hatred of confusion without which words could not be held to relatively constant meanings and testable rules and generalizations stated. A reasonable man cannot, without some special explanation, slap his sides with delight or express indifference if he is told that what he says is confused, incoherent, and perhaps riddled with contradictions.

Reason is the antithesis of arbitrariness. In its operation it is supported by the appropriate passions which are mainly negative in character — the hatred of irrelevance, special pleading, and arbitrary fiat. The more developed emotion of indignation is aroused when some excess of arbitrariness is perpetuated in a situation where people's interests and claims are at stake. The positive side of this is the passion for fairness and impartial consideration of claims ....

A man who is prepared to reason must feel strongly that he must follow the arguments and decide things in terms of where they lead. He must have a sense of the givenness of the impersonality of such considerations. In so far as thoughts about persons enter his head they should

be tinged with the respect which is due to another who, like himself, may have a point of view which is worth considering, who may have a glimmering of the truth which has so far eluded himself. A person who proceeds in this way, who is influenced by such passions, is what we call a reasonable man.

**rational self:** Our character and nature to the extent that we seek to base our beliefs and actions on good reasoning and evidence. Who we are, what our true character is, or our predominant qualities are, is always somewhat or even greatly different from who we *think* we are. Human egocentrism and accompanying self-deception often stand in the way of our gaining more insight into ourselves. We can develop a rational self, become a person who gains significant insight into what our true character is, only by reducing our egocentrism and self-deception. Critical thinking is essential to this process.

**rational society:** See *critical society*.

**reasoned judgment:** Any belief or conclusion reached on the basis of careful thought and reflection, distinguished from mere or unreasoned opinion on the one hand, and from sheer fact on the other. Few people have a clear sense of which of their beliefs are based on reasoned judgment and which on mere opinion. Moral or ethical questions, for example, are questions requiring reasoned judgment. One way of conceiving of subject-matter education is as developing students' ability to engage in reasoned judgment in accordance with the standards of each subject.

**reasoning:** The mental processes of those who reason; especially the drawing of conclusions or inferences from observations, facts, or hypotheses; the evidence or arguments used in this procedure. A critical thinker tries to develop the capacity to transform thought into reasoning at will, or rather, the ability to make his or her inferences explicit, along with the assumptions or premises upon which those inferences are based. Reasoning is a form of explicit inferring, usually involving multiple steps. When students write a persuasive paper, for example, we want them to be clear about their reasoning.

**reciprocity:** The act of entering empathically into the point of view or line of reasoning of others; learning to think as others do and by that means sympathetically assessing that thinking. (Reciprocity requires creative imagination as well as intellectual skill and a commitment to fairmindedness.)

**relevant:** Bearing upon or relating to the matter at hand; *relevant* implies close logical relationship with, and importance to, the matter under consideration; *germane* implies such close natural connection as to be highly appropriate or fit; *pertinent* implies an immediate and direct bearing on the matter at hand (a pertinent suggestion); *apposite* applies to that which is both relevant and happily suitable or appropriate; *applicable* refers to that which can be brought to bear upon a particular matter or problem. Students often have problems sticking to an issue and distinguishing information that bears upon a problem from information that does not. Merely reminding students to limit themselves to relevant considerations fails to solve this problem. The usual way of teaching students the term 'relevant' is to mention only clear-cut cases of relevance and irrelevance. Consequently, students do not learn that not everything that *seems* relevant is, or that some things which *do not seem* relevant are. Sensitivity to (ability to judge) relevance can only be developed with continual practice —

practice distinguishing relevant from irrelevant data, evaluating or judging relevance, arguing for and against the relevance of facts and considerations.

**self-deception:** Deceiving one's self about one's true motivations, character, identity, etc. One possible definition of the human species is "The Self-Deceiving Animal". Self-deception is a fundamental problem in human life and the cause of much human suffering. Overcoming self-deception through self-critical thinking is a fundamental goal of strong sense critical thinking. See *egocentric, rational self, personal contradiction, social contradiction, intellectual virtues*.

**social contradiction:** An inconsistency between what a society preaches and what it practices. In every society there is some degree of inconsistency between its image of itself and its actual character. Social contradiction typically correlates with human self-deception on the social or cultural level. Critical thinking is essential for the recognition of inconsistencies, and recognition is essential for reform and eventual integrity.

**sociocentricity:** The assumption that one's own social group is inherently and self-evidently superior to all others. When a group or society sees itself as superior, and so considers its views as correct or as the only reasonable or justifiable views, and all its actions as justified, there is a tendency to presuppose this superiority in all of its thinking and thus, to think closedmindedly. All dissent and doubt are considered disloyal and rejected without consideration. Few people recognize the sociocentric nature of much of their thought.

**Socratic questioning:** A mode of questioning that deeply probes the meaning, justification, or logical strength of a claim, position, or line of reasoning. Socratic questioning can be carried out in a variety of ways and adapted to many levels of ability and understanding. See *elements of thought, dialogical instruction, knowledge*.

**specify/specific:** To mention, describe, or define in detail; limiting or limited; specifying or specified; precise; definite. Student thinking, speech, and writing tend to be vague, abstract, and ambiguous rather than specific, concrete, and clear. Learning how to state one's views specifically is essential to learning how to think clearly, precisely, and accurately. See *perfections of thought*.

**strong sense critical thinker:** One who is predominantly characterized by the following traits: 1) an ability to question deeply one's own framework of thought; 2) an ability to reconstruct sympathetically and imaginatively the strongest versions of points of view and frameworks of thought opposed to one's own; and 3) an ability to reason dialectically (multilogically) in such a way as to determine when one's own point of view is at its weakest and when an opposing point of view is at its strongest. Strong sense critical thinkers are not routinely blinded by their own points of view. They know they have points of view and therefore recognize on what framework of assumptions and ideas their own thinking is based. They realize the necessity of putting their own assumptions and ideas to the test of the strongest objections that can be leveled against them. Teaching for critical thinking in the strong sense is teaching so that students explicate, understand, and critique their own deepest prejudices, biases, and misconceptions, thereby discovering and contesting their own egocentric and sociocentric tendencies. Only if we contest our inevitable egocentric and sociocentric habits of thought, can we hope to think in a genuinely rational fashion.

Only dialogical thinking about basic issues that genuinely matter to the individual provides the kind of practice and skill essential to strong sense critical thinking.

Students need to develop all critical thinking skills in dialogical settings to achieve ethically rational development, that is, genuine fairmindedness. If critical thinking is taught simply as atomic skills separate from the empathic practice of entering into points of view that students are fearful of or hostile toward, they will simply find additional means of rationalizing prejudices and preconceptions, or convincing people that their point of view is the correct one. They will be transformed from vulgar to sophisticated (but not to strong sense) critical thinkers.

**teach:** The basic inclusive word for the imparting of knowledge or skills. It usually connotes some individual attention to the learner; *instruct* implies systematized teaching, usually in some particular subject; *educate* stresses the development of latent faculties and powers by formal, systematic teaching, especially in institutions of higher learning; *train* implies the development of a particular faculty or skill or instruction toward a particular occupation, as by methodical discipline, exercise, etc. See *knowledge*.

**theory:** A systematic statement of principles involved in a subject; a formulation of apparent relationships or underlying principles of certain observed phenomena which has been verified to some degree. Often without realizing it, we form theories that help us make sense of the people, events, and problems in our lives. Critical thinkers put their theories to the test of experience and give due consideration to the theories of others. Critical thinkers do not take their theories to be facts.

**think:** The general word meaning to exercise the mental faculties so as to form ideas, arrive at conclusions, etc.; *reason* implies a logical sequence of thought, starting with what is known or assumed and advancing to a definite conclusion through the inferences drawn; *reflect* implies a turning of one's thoughts back on a subject and connotes deep or quiet continued thought; *speculate* implies a reasoning on the basis of incomplete or uncertain evidence and therefore stresses the conjectural character of the opinions formed; *deliberate* implies careful and thorough consideration of a matter in order to arrive at a conclusion. Though everyone thinks, few people think critically. We don't need instruction to think; we think spontaneously. We need instruction to learn how to discipline and direct our thinking on the basis of sound intellectual standards. See *elements of thought*, *perfections of thought*.

**truth:** Conformity to knowledge, fact, actuality, or logic: a statement proven to be or accepted as true, not false or erroneous. Most people uncritically assume their views to be correct and true. Most people, in other words, assume themselves to possess the truth. Critical thinking is essential to avoid this, if for no other reason.

**uncritical person:** One who has not developed intellectual skills (naive, conformist, easily manipulated, dogmatic, easily confused, unclear, closedminded, narrowminded, careless in word choice, inconsistent, unable to distinguish evidence from interpretation). Uncriticalness is a fundamental problem in human life, for when we are uncritical we nevertheless think of ourselves as critical. The first step in becoming a critical thinker consists in recognizing that we are uncritical. Teaching for insight into uncriticalness is an important part of teaching for criticalness.

**vague:** Not clearly, precisely, or definitely expressed or stated; not sharp, certain, or precise in thought, feeling, or expression. Vagueness of thought and expression is a major obstacle to the development of critical thinking. We cannot begin to test our beliefs until we recognize clearly what they are. We cannot disagree with what someone says until we are clear about what they mean. Students need much practice in transforming vague thoughts into clear ones. See *ambiguous, clarify, concept, logic, logic of questions, logic of language*.

**verbal implication:** That which follows, according to the logic of the language. If I say, for example, that someone used flattery on me, I *imply* that the compliments were insincere and given only to make me feel positively toward that person, to manipulate me against my reason or interest for some end. See *imply, infer, empirical implication, elements of thought*.

**weak sense critical thinkers:** 1) Those who do not hold themselves or those with whom they ego-identify to the same intellectual standards to which they hold "opponents". 2) Those who have not learned how to reason empathically within points of view or frames of reference with which they disagree. 3) Those who tend to think monologically. 4) Those who do not genuinely accept, though they may verbally espouse, the values of critical thinking. 5) Those who use the intellectual skills of critical thinking selectively and self-deceptively to foster and serve their vested interests (at the expense of truth); able to identify flaws in the reasoning of others and refute them; able to shore up their own beliefs with reasons.

**world view:** All human action takes place within a way of looking at and interpreting the world. As schooling now stands, very little is done to help students to grasp how they are viewing the world and how those views determine the character of their experience, their interpretations, their conclusions about events and persons, etc. In teaching for critical thinking in a strong sense, we make the discovery of one's own world view and the experience of other people's world views a fundamental priority. See *bias, interpret*.

# Recommended Readings in Critical Thinking

## *The General Case for Critical Thinking*

- Bailin, Sharon. *Achieving Extraordinary Ends: An Essay of Creativity*. Kluwer-Academic Publishers, Norwell, MA, 1988.
- Baron, Joan and Robert Sternberg. *Teaching Thinking Skills: Theory and Practice*. W. H. Freeman Co., New York, NY, 1987.
- Glaser, Edward M. *An Experiment in the Development of Critical Thinking*. AMS Press, New York, NY, reprint of 1941 edition.
- Mill, John Stuart. *On Liberty*. AHM Publishing Corp., Arlington Heights, IL., 1947.
- Paul, Richard W., et al. *Critical Thinking Handbook: K–3. A Guide to Remodelling Lesson Plans in Language Arts, Social Studies, and Science*. The Center for Critical Thinking and Moral Critique, Rohnert Park, CA, 1987.
- Paul, Richard W., et al. *Critical Thinking Handbook: 4<sup>th</sup>–6<sup>th</sup>. A Guide to Remodelling Lesson Plans in Language Arts, Social Studies, and Science*. The Center for Critical Thinking and Moral Critique, Rohnert Park, CA, 1987.
- Paul, Richard W., et al. *Critical Thinking Handbook: 6<sup>th</sup>–9<sup>th</sup>. A Guide to Remodelling Lesson Plans in Language Arts, Social Studies, and Science*. The Center for Critical Thinking and Moral Critique, Rohnert Park, CA, 1989.
- Paul, Richard W., et al. *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction*. The Center for Critical Thinking and Moral Critique, Rohnert Park, CA, 1989.
- Paul, Richard. *Critical Thinking: How to Prepare Students for a Rapidly Changing World*. Foundation for Critical Thinking, Santa Rosa, CA, 1993.
- Paul, Richard. *Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World*. Foundation for Critical Thinking, Santa Rosa, CA, 1995.
- Resnick, Lauren. *Education and Learning to Think*. National Academy Press, Washington, D.C., 1987.
- Scheffler, Israel. *Reason and Teaching*. Hackett Publishing, Indianapolis, IN, 1973.
- Siegel, Harvey. *Educating Reason: Rationality, Critical Thinking, & Education*. Routledge Chapman & Hall, Inc., New York, NY, 1988.
- Sumner, William G. *Folkways*. Ayer Co., Publishing, Salem, NH, 1979.

## *Critical Thinking Pedagogy*

- Brookfield, Stephen D. *Developing Critical Thinkers*. Jossey-Bass, San Francisco, CA, 1987.
- Costa, Arthur L. *Developing Minds: A Resource Book for Teaching Thinking*. A.S.C.D., Alexandria, VA, 1985.
- D'Angelo, Edward. *The Teaching of Critical Thinking*. B. R. Grüner, N. V., Amsterdam, 1971.
- Goodlad, John. *A Place Called School*. McGraw-Hill, New York, 1984.
- Hanford, George. *Life With the SAT: Assessing Our Young People and Our Times*. College Board Publications, New York, NY, 1991.
- Lipman, Matthew. *Ethical Inquiry*. Institute for the Advancement of Philosophy for Children, Upper Montclair, N.J., 1977.
- Lipman, Matthew. *Harry Stottlemeier's Discovery*. Institute for the Advancement of Philosophy for Children, Upper Montclair, N.J., 1982.
- Lipman, Matthew. *Lisa*. Institute for the Advancement of Philosophy for Children, Upper Montclair, N.J., 1976.
- Lipman, Matthew. *Mark*. Institute for the Advancement of Philosophy for Children, Upper Monclair, N.J., 1980.
- Lipman, Matthew, Ann M. Sharp, and Frederick S. Oscanyan. *Philosophical Inquiry*. University Press of America, Lanham, Maryland, 1979.
- Lipman, Matthew, and Ann M. Sharp. *Philosophy in the Classroom*. 2<sup>nd</sup> edition, Temple University Press, Philadelphia, PA, 1980.
- Lipman, Matthew. *Social Inquiry*. Institute for the Advancement of Philosophy for Children, Upper Montclair, N.J.,

1980.

- Meyers, Chet. *Teaching Students to Think Critically: A Guide for Faculty in all Disciplines*. Jossey-Bass, San Francisco, CA, 1986.
- Raths, Louis. *Teaching for Thinking: Theories, Strategies, and Activities for the Classroom*. 2<sup>nd</sup> edition, Teachers College Press, New York, NY, 1986.
- Sizer, Theodore R. *Horace's Compromise: The Dilemma of the American High School*. Houghton Mifflin, Boston, 1984.

#### **College Textbooks (Not Focused on a Specific Discipline)**

- Barker, Evelyn M. *Everyday Reasoning*. Prentice-Hall, Englewood Cliffs, NJ, 1981.
- Barry, Vincent E., and Joel Rudinow. *Invitation to Critical Thinking*. 2<sup>nd</sup> edition, Holt, Rinehart & Winston, New York, NY, 1990.
- Brown, Neil and Stuart Keeley. *Asking the Right Questions: A Guide to Critical Thinking*. 2<sup>nd</sup> edition, Prentice-Hall, Englewood Cliffs, NJ, 1986.
- Capaldi, Nicholas. *The Art of Deception*. 2<sup>nd</sup> edition, Prometheus Books, Buffalo, New York, 1979.
- Cederblom, Jerry. *Critical Reasoning*. 2<sup>nd</sup> edition, Wadsworth Publishing Co., Belmont, CA, 1986.
- Chaffee, John. *Thinking Critically*. 2<sup>nd</sup> edition, Houghton Mifflin, Boston, MA, 1988.
- Damer, T. Edward. *Attacking Faulty Reasoning*. 2<sup>nd</sup> edition, Wadsworth Publishing Co., Belmont, CA, 1995.
- Engel, Morris. *Analyzing Informal Fallacies*. Prentice-Hall, Englewood Cliffs, NJ, 1980.
- Engel, Morris. *With Good Reason: An Introduction to Informal Fallacies*. 3<sup>rd</sup> edition, St. Martin's Press, New York, NY, 1986.
- Fahnestock, Jeanne and Marie Secor. *Rhetoric of Argument*. McGraw-Hill Book Co., New York, NY, 1982.
- Govier, Trudy. *A Practical Study of Argument*. 2<sup>nd</sup> edition, Wadsworth Publishing Co., Belmont, CA, 1988.
- Hitchcock, David. *Critical Thinking: A Guide to Evaluating Information*. Methuan Publications, Toronto, Canada, 1983.
- Hoagland, John. *Critical Thinking*. Vale Press, Newport News, VA, 1984.
- Johnson, Ralph H. and J. A. Blair. *Logical Self-Defense*. 2<sup>nd</sup> edition, McGraw-Hill, New York, NY, 1983.
- Kahane, Howard. *Logic and Contemporary Rhetoric*. 5<sup>th</sup> edition, Wadsworth Publishing Co., Belmont, CA, 1988.
- Meiland, Jack W. *College Thinking: How to Get the Best Out of College*. New American Library, New York, NY, 1981.
- Michalos, Alex C. *Improving Your Reasoning*. Prentice-Hall, Englewood Cliffs, NJ, 1986.
- Miller, Robert K. *Informed Argument*. 2<sup>nd</sup> edition, Harcourt, Brace, Jovanovich, San Diego, CA, 1989.
- Missimer, Connie. *Good Arguments: An Introduction to Critical Thinking*. 2<sup>nd</sup> edition, Prentice-Hall, Englewood Cliffs, NJ, 1986.
- Moore, Brooke N. *Critical Thinking: Evaluating Claims and Arguments in Everyday Life*. 2<sup>nd</sup> edition, Mayfield Publishing Co., Palo Alto, CA, 1989.
- Moore, Edgar. *Creative and Critical Reasoning*. 2<sup>nd</sup> edition, Houghton Mifflin, Boston, MA, 1984.
- Nickerson, Raymond S. *Reflections on Reasoning*. L. Erlbaum, Assoc., Hillsdale, NJ, 1986.
- Scriven, Michael. *Reasoning*. McGraw-Hill Book Co., New York, NY, 1976.
- Seech, Zachary. *Logic in Everyday Life: Practical Reasoning Skills*. Wadsworth Publishing Co., Belmont, CA, 1988.
- Shor, Ira. *Critical Teaching & Everyday Life*. University of Chicago Press, Chicago, IL, 1987.
- Toulmin, Stephen E., Richard Rieke, and Alan Janik. *An Introduction to Reasoning*. Macmillan Publishing Co., New York, NY, 1979.
- Weddle, Perry. *Argument: A Guide to Critical Thinking*. McGraw-Hill, New York, NY, 1978.
- Wilson, John. *Thinking with Concepts*. 4<sup>th</sup> edition, Cambridge University Press, New York, NY, 1987.

#### **Science and Critical Thinking**

- Giere, Ronald N. *Understanding Scientific Reasoning*. Holt, Rinehart, and Winston, New York, NY, 1979. (Out of print.)
- Hatcher, Donald. *Science, Ethics, and Technological Assessment*. American Press, 1995.

Radner, Daisie and Radner, Michael. *Science and Unreason*. Wadsworth, Publishing Co., Belmont, CA, 1982.

***Mathematics and Critical Thinking***

Schoenfeld, Alan. *Mathematical Problem Solving*. Academic Press, Orlando, FL, 1985.

***Language Arts and Critical Thinking***

Adler, Mortimer. *How to Read a Book*. Simon and Schuster, New York, NY, 1972.

Hatcher, Donald. *Reasoning and Writing: An Introduction to Critical Thinking*. Copley Publishing, 1993.

Horton, Susan. *Thinking Through Writing*. Johns Hopkins, Baltimore, MD, 1982.

Kytle, Ray. *Clear Thinking for Composition*. 5<sup>th</sup> edition, McGraw-Hill Book Co., New York, NY, 1987.

Mayfield, Marlys. *Thinking for Yourself: Developing Critical Thinking Skills Through Writing*. Wadsworth Publishing Co., Belmont, CA, 1987.

Rosenberg, Vivian. *Reading, Writing, and Thinking: Critical Connections*. McGraw-Hill Book Co., New York, NY, 1989.

Scull, Sharon. *Critical Reading and Writing for Advanced ESL Students*. Prentice-Hall, Englewood Cliffs, NJ, 1987.

***Critical Thinking and the Media***

Lazere, Donald. *American Media & Mass Culture*. University of California Press, Berkeley, CA, 1987.

***Also of Interest***

Baker, Paul J., and Louis Anderson. *Social Problems: A Critical Thinking Approach*. Wadsworth Publishing Co., Belmont, CA, 1987.

Bloom, Benjamin. *Taxonomy of Educational Objectives*. David McKay Co., Inc., New York, 1956.

Ennis, Robert. *Critical Thinking*. Prentice Hall, 1996.

Goffman, Erving. *Presentation of Self in Everyday Life*. Doubleday & Co., New York, NY, 1959.

Johnson, Ralph. *The Rise of Informal Logic*. Vale Press, Newport News, VA, 1986.

Lappé, Francis Moore. *Rediscovering America's Values*. Ballantine Books, New York, NY, 1989.

Nosich, Gerald. *Reasons and Arguments*. Wadsworth Publishing, Belmont, CA, 1982.

Siegel, Harvey. *Relativism Refuted*. Kluwer-Academic Publishers, Norwell, MA, 1987.

Tavris, Carol. *Anger: The Misunderstood Emotion*. Simon & Schuster, New York, NY, 1987.

Wilson, Barrie. *The Anatomy of Argument*. University Press of America, Lanham, Maryland, 1980.

## Teach for Depth of Understanding

1. Design coverage so that students grasp the fundamental ideas intrinsic to the content.
2. Cover less when more entails that they learn less.
3. Teach students how to assess their own work using those intellectual standards.
4. Focus on fundamental and powerful concepts with high generalizability. Teach students to apply and analyze these concepts.
5. Keep the logic of the most basic concepts in the foreground, continually re-weaving new concepts into the basic ones.
6. Design all activities and assignments so that students must think their way through them.
7. Develop specific strategies for cultivating critical reading, writing, speaking, and listening.
8. Call frequently on students who don't have their hands up.
9. When one student says something, call on other students to summarize in their own words what the first student said (so they actively listen to each other).
10. Frequently divide the class into small groups and have them work together to reason through issues within the discipline (using intellectual standards to assess their reasoning as they do so).
11. Require regular writing for class. But grade using random sampling.
12. Speak less so that they think more.
13. Don't be a mother robin – chewing up the text for the students and putting it into their beaks through lecture.
14. Think aloud in front of your students. Let them hear you thinking, puzzling your way slowly through problems in the subject.
15. Regularly question your students Socratically.
16. Use concrete examples whenever you can to illustrate abstract concepts and thinking.

*Excerpted from "A Miniature Guide on How to Improve Student Learning", page 46-47.*

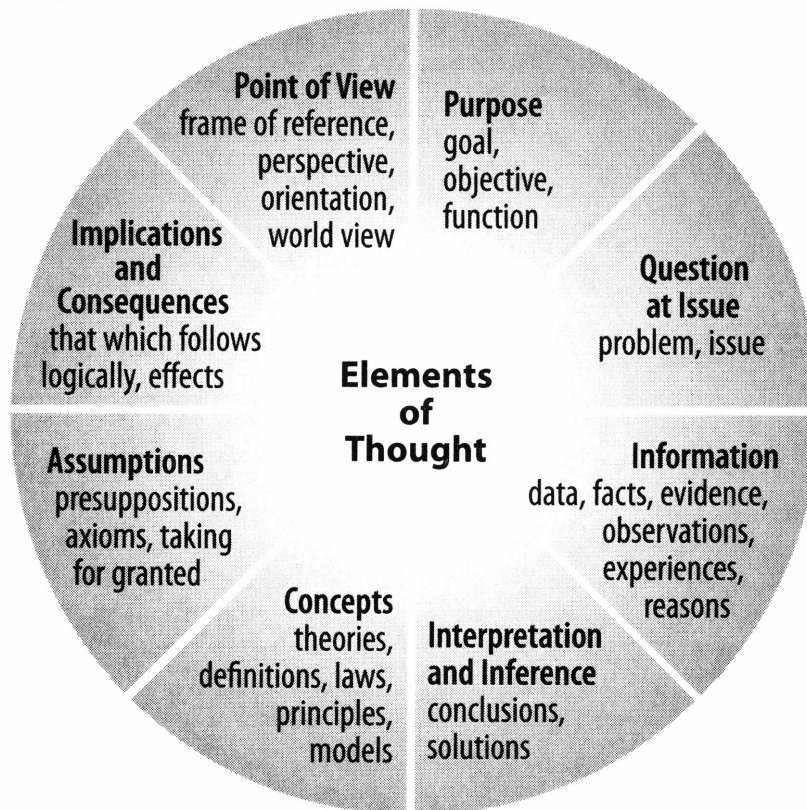
## **Strategies that Foster Student Engagement**

**Use the following tactics during class to ensure that students are actively engaged in thinking about the content. They should be routinely called upon to:**

1. Summarize in their own words what the teacher or a student has said.
2. Elaborate on what has been said.
3. Relate the issue or content to their own knowledge and experience.
4. Give examples to clarify or support what they have said.
5. Make connections between related concepts.
6. Restate the instructions or assignment in their own words.
7. State the question at issue.
8. Describe to what extent their point of view on the issue is different from or similar to the point of view of the instructor, other students, the author, etc.
9. Take a few minutes to put the above responses into written form.
10. Write down the most pressing question on their mind at this point. The instructor then uses the above tactic to help students reason through the questions.
11. Discuss any of the above with a partner and then participate in a group discussion facilitated by the instructor.

*Excerpted from "A Miniature Guide on How to Improve Student Learning", page 36.*

## The Elements of Thought



### Used With Sensitivity to Universal Intellectual Standards

Clarity → Accuracy → Depth → Breadth → Significance  
 Precision  
 Relevance

*Excerpted from "The Thinker's Guide to Critical Thinking Concepts and Tools", page 5.*

## To Analyze Thinking We Must Identify and Question its Elemental Structures

