

Critical Thinking

Here is a list of "critical thinking" reasoning abilities originally developed by Arnold Arons. What additions or deletions would you add to the list for your students?

1. **Consciously raising the questions "What do we know. . . ? How do we know. . . ? Why do we accept or believe. . . ? What is the evidence for. . . ?" when studying some body of material or approaching a problem.**
2. **Being clearly and explicitly aware of gaps in available information. Recognizing when a conclusion is reached or a decision made in absence of complete information and being able to tolerate the ambiguity and uncertainty. Recognizing when one is taking something on faith without having examined the "How do we know. . . ? Why do we believe. . . ?" questions.**
3. **Discriminating between observation and inference, between established fact and subsequent conjecture.**
4. **Recognizing that words are symbols for ideas and not the ideas themselves. Recognizing the necessity of using only words of prior definition, rooted in shared experience, in forming a new definition and in avoiding being misled by technical jargon.**
5. **Probing for assumption (particularly the implicit, unarticulated assumptions) behind a line of reasoning.**
6. **Drawing inferences from data, observations, or other evidence and recognizing when firm inferences cannot be drawn. This subsumes a number of processes such as elementary syllogistic reasoning (e.g., dealing with basic propositional "if. . .then" statements), correlational reasoning, recognizing when relevant variables have or have not been controlled.**
7. **Performing hypothetico-deductive reasoning; that is, given a particular situation, applying relevant knowledge of principles and constraints and visualizing, in the abstract, the plausible outcomes that might result from various changes one can imagine to be imposed on the system.**
8. **Discriminating between inductive and deductive reasoning; that is, being aware when an argument is being made from the particular to the general or from the general to the particular.**
9. **Testing one's own line of reasoning and conclusions for internal consistency and thus developing intellectual self-reliance.**
10. **Developing self-consciousness concerning one's own thinking and reasoning processes.**

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