

CRITICAL THINKING STANDARDS



Definition: Evaluate, analyse, critique disparate pieces of information to one cohesive whole and be able to defend that position.

Beginner to Expert categories	Beginner*	Novice**	Competent***	Proficient#	Expert##
	Students in the early stages can	Students in the middle stages can	Graduates of this course can	Graduates as new professionals can	Graduates as experienced professionals can
1. Identify issues	Identify the broad issues related to a central problem	Identify specific issues/elements related to a central problem	Identify a central problem without ambiguity, by integration of specific concepts	Independently identify a central problem without ambiguity, by integration of broad and specific concepts	Provide a leadership role in identifying a central problem without ambiguity, by integration of broad and specific concepts, with accuracy and clarity
2. Gather evidence	Gather generalised evidence from limited sources. Evidence is not necessarily effective, relevant, or reliable.	Gather evidence from a range of primary sources. Evidence is more effective, relevant, and reliable.	Effectively gather relevant evidence from reputable sources.	Independently gather relevant, core evidence from reputable sources using credible databases. Identify specific issues/sources most relevant to the central problem	Provide a leadership role to effectively gather relevant core and peripheral evidence from reputable sources using credible databases. Identify specific issues/sources most relevant to the central problem
3. Analyse evidence	List others' assumptions and conclusions within a limited context	Summarise others' assumptions and conclusions, and clarify differences within a range of contexts	Identify and evaluate own and others' assumptions and several relevant contexts when presenting a position	Independently identify and evaluate own and others' assumptions and several relevant contexts when presenting a position	Provide a leadership role in identifying and evaluating own and others' assumptions and several relevant contexts when presenting a position
4. Synthesise and formulate an opinion/hypothesis	Develop a hypothesis/opinion based upon limited and unsubstantiated evidence	Formulate a clear/focussed hypothesis which is broadly defensible, based upon some evidence	Formulate a hypothesis/opinion that is defensible, based upon appropriate evidence	Independently formulate a hypothesis/opinion and a plan to be able to test the hypothesis that is defensible, based upon appropriate evidence	Provide a leadership role in formulating a hypothesis/opinion and a plan to be able to test the hypothesis that is defensible, based upon appropriate evidence
5. Defend opinion or position	Express opinion without substantiation	Express opinion with limited/partial substantiation	Coherently defend the expressed opinion with appropriate data and literature	Independently develop and defend a coherent opinion with appropriate data and literature	Provide a leadership role in the development and defence of a coherent opinion
6. Conclusions and implications	Summarise current state of knowledge	Summarise and interpret current state of knowledge	Summarise and interpret current state of knowledge and the implications of findings	Independently develop conclusions and identify implications of findings	Provide a leadership role in developing conclusions and identifying implications of findings
Exemplars	(see over page)	(see over page)	(see over page)	(see over page)	(see over page)

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Exemplars	Beginner*	Novice**	Competent***	Proficient#	Expert##
1. Identify issues	Vague summary paragraph introducing the topic, for example, in a prac report, using non-specialist language <u>Examples:</u> a. "I'm going to work on an enzyme" b. Learner Driver	Summary paragraph outlining specific issues introducing the topic, for example, in a prac report, using language of the discipline <u>Examples:</u> a. "I'm going to work on lactate dehydrogenase" b. Driver on P-Plates	Clear, concise summary paragraph introducing the topic, for example, in a prac report, using language of the discipline <u>Examples:</u> a. "I'm going to work on lactate dehydrogenase and identify specific issues associated with this enzyme" b. Driver with Open Licence	Clear, concise summary paragraph that identifies gaps in knowledge and critical/essential concepts, and identifies the direction in which to move next <u>Example:</u> A Professional Driver eg truck driver, racing car driver	Clear, concise summary paragraph that identifies gaps in knowledge and critical/essential concepts, correlates and compares this with information from other sources to consider the broader implications and potential novel approaches. The Expert doesn't just look at standard paradigms but looks "outside the box" <u>Example:</u> A Driving Instructor
2. Gather evidence	The Beginner is not confident they have the answer <u>Examples</u> of limited sources are textbooks and internet	The Novice knows where to go/ which sources to access, but can't find the answer <u>Examples</u> of primary sources are journal articles and reviews	If someone is Competent, they can find the answer; they know who to ask and what references to use An <u>example</u> of a tool for finding reputable sources is Medline	If someone is Proficient, they know the answer without constant reference to references	If someone is an Expert they are the resource. They know the answer and can lead and teach others strategies for achieving the answer
4. Synthesise and formulate an opinion/hypothesis	Hypothesis based on observation <u>Examples:</u> a. The plants are green b. Heart rate increases during exercise c. Microbes cause disease	Hypothesis based on broad, causal reasoning <u>Examples:</u> a. The plants are green due to the presence of chlorophyll b. Changes in cardiovascular and nervous systems cause and increase in heart rate during exercise c. Infection with pathogenic microbes causes disease	Hypothesis based on specific, testable evidence <u>Examples:</u> a. The plants are green due to the presence of chlorophyll A & B b. Increased sympathetic drive and increased venous return cause an increase in heart rate during exercise c. Infection with pathogenic microbes in a susceptible host causes disease	Hypothesis based on specific, testable evidence which has sufficient clarity and rigor to justify a research proposal	Hypothesis may be novel and consider previously unexplored potential solutions based on specific, testable evidence which has sufficient clarity and rigor to justify a grant application, leading to acceptance by peer review
6. Conclusions and implications	Concluding paragraph summarises facts and theories	Concluding paragraph evaluates quality of current facts and theories	Concluding paragraph evaluates quality of current facts and theories, and their potential use	Concluding paragraph evaluates quality of current facts and theories, and their potential use, and identifies issues requiring further investigation	Concluding paragraph evaluates quality of current facts and theories, and their potential use, and identifies novel and/or previously unexplored opportunities/ alternate hypotheses for application

Definitions of different levels:

Beginner* (end of first year)	– has an introductory, overall understanding of concepts and theory, with a limited ability to apply
Novice** (end of second year)	– has detailed understanding of concepts and theory with a limited ability to apply
Competent*** ("good" graduates i.e. the minimum level of achievement at the end of a 3-year undergraduate degree)	– is able to integrate and apply concepts and theory
Proficient# (1 st couple of years after graduation)	– is able to operate independently without supervision. Someone practicing in their profession or undertaking a PhD
Expert## (5-10 years after graduation)	– is able to lead/direct a group to a high standard and solve difficult issues. A leading academic in a University setting or someone in a managerial position in a professional setting

