



Critical Thinking: Skill Development Framework

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Introduction

Considerable evidence supports the need for learners to develop key personal and social capabilities, also known as ‘soft skills’, ‘future skills’ or ‘21st century skills’. Research shows that employers value these skills, and this will continue to be true, as these skills are the most resistant to automation as technology advances. Incorporating development of these skills into coursework and classroom instruction is often a challenge for instructors due to a lack of support on how to teach and assess these skills. There is also a perception that these skills must be taught separately when in fact they can be integrated into the existing curriculum. To support our content developers and the instructors who use our products, we have built Skill Development Frameworks around several key personal and social capabilities (including **Critical Thinking**).

The Critical Thinking: Skill Development Framework includes a research-based definition of the skill along with relevant sub-skills which are then broken down into detailed sets of ordered indicators that describe how Critical Thinking skills develop from basic to complex levels. We further validated the framework by running panels with external experts in the skill and Pearson content development experts.

In many cases, the indicators in the framework are flexible, in that they can be learned at a range of different ages with supports, scaffolds, and opportunities to learn and experience these skills. At the same time, there are normative developmental trajectories in the social, cognitive, and executive functioning capacities of children (particularly younger children). It is important to keep these developmental milestones in mind when determining which set of indicators is most appropriate for a given learner segment. The indicators can be adapted to support a variety of instructional activities. For example, they can serve as “look-fors” in a behavioral checklist or be used to populate a grading or observation rubric. Additionally, many indicators represent strategies that can be directly taught to learners.

This framework should be used in collaboration with subject matter experts to interpret what these indicators look like in particular disciplines. Consider questions like:

- What kind of evidence do you use in your field?
- What evidence gathering practices are commonly used in your field?
- What does it look like to synthesize evidence in your field?
- What structures and strategies do you use in your field?

Whenever learners have to think about information and use it to draw conclusions or develop a solution, they also have the opportunity to practice and develop critical thinking skills. Being intentional about the content presented to learners can aid in supporting critical thinking. For example, learners should be presented with stimuli (e.g., reading materials, primary source documents) that pose contradictions and inconsistencies and evoke cognitive conflict (i.e., challenge deeply-held assumptions). This type of content will allow for thoughtful and deep discussions that facilitate critical thinking.

It is also important to be mindful of learners’ prior experiences around critical thinking, and what the expectations are for their practice of critical thinking skills. A critical or questioning mindset may not have been taught, or may have been discouraged. Learners who are new to the mindset and strategies involved in critical thinking will need additional supports, scaffolds, and hints.



Glossary and Notes

Critical Thinking

For the purposes of this framework, we define critical thinking as gathering, interpreting, evaluating, or using evidence in a thoughtful, intentional, and critical way.

Mastery

Represents aspirational performance of a highly effective adult or expert, usually in a workplace setting. Even highly effective adults and experts may struggle to display these behaviors in certain contexts.

Accumulate and Interpret

The ability to identify, collect, and make sense of evidence.

● ○ ○ ○ ○
Emerging

● ● ○ ○ ○
Basic

● ● ● ○ ○
Intermediate

● ● ● ● ○
Advanced

● ● ● ● ●
Mastery

Identifying and Understanding Problems (Problem Solving)

Observes and notices inconsistencies, disagreements, problems, something that isn't working, etc.

Attempts to understand the cause of inconsistencies, disagreements, problems, something that isn't working, etc.

Identifies a problem to solve.
Asks basic questions that can help to understand a problem and its causes better.

Uses strategies to guide problem identification.

Breaks down large problems into more manageable sub-problems.

Analyses whether the initial problem identified is actually the right problem to solve.

Uses understanding of an area or discipline to guide problem identification.

Approaches problems from more than one perspective.

Revises or redefines a problem when appropriate.

Articulates one's own assumptions and cognitive biases that may influence problem exploration.

Identifies when taking a new or unexpected perspective could be productive in understanding a problem.

Actively challenges their own assumptions and cognitive biases when exploring a problem.

Collecting Evidence

Finds at least one reason to support a given point.

Identifies basic questions that can drive evidence collection.

Uses strategies (e.g., searching for keywords) to collect information.

Uses evidence to find several reasons to support a given point.

Develops at least one research question to guide the collection of evidence.

Collects evidence using concepts or categories to organize their search.

Identifies which of multiple possible research questions is best suited to gathering relevant evidence.

Develops a useful organizational structure for evidence collection (e.g., sorting by evidence type or observable characteristics).

Uses understanding of a discipline to direct and organize evidence collection.

Collects information, in considerable detail and nuance, from a variety of sources.

Identifies when evidence represents alternative perspectives.

Uses nuanced understanding of a discipline in order to decide when a 'collection of evidence' is sufficient.

Seeks out and considers evidence that represents alternative perspectives.

Accumulate and Interpret

The ability to identify, collect, and make sense of evidence.

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Emerging

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Advanced

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Mastery

Evaluating Evidence

Distinguishes between fact and opinion.

Understands that there are different sources of information (e.g., print, visual, web-based, people, observation).

Considers the reliability of different sources of information based on simple heuristics or intuition.

Evaluates evidence based on the accuracy of the content and quantity of information.

Determines whether evidence is relevant to a given topic.

Distinguishes between reliable and unreliable sources of evidence.

Evaluates evidence based on credibility of the source (including authority/expertise, timeliness, and cognitive bias).

Determines whether evidence is useful for achieving particular task goals.

Uses understanding of a discipline to evaluate evidence quality.

Verifies and checks sources cited in evidence when assessing evidence quality.

Evaluates the relevance of evidence based on disciplinary or theoretical significance in a discipline.

Organizing, Summarizing, and Interpreting Evidence

Identifies common information between multiple sources of evidence that are presented in similar ways.

Identifies differences in/ across information from multiple sources of evidence that are presented in similar ways.

Coherently summarizes information presented in similar ways across a small set of sources of evidence.

Identifies common information, between multiple sources of evidence, that is presented in fundamentally different ways (i.e., text vs. image; scientific article vs. newspaper article).

Uses an existing structure to organize and summarize evidence from different sources (or multiple types of evidence).

Recognizes when a piece of evidence is/is not consistent with their current summarization of existing evidence.

Interprets across a small set of evidence in order to draw simple logical conclusions.

Creates or adapts a structure to organize and summarize evidence from different sources (or multiple types of evidence).

Interprets across multiple sources of evidence with fundamentally different perspectives in order to draw logical conclusions.

Updates their summary or interpretation based on new or contradictory evidence.

Knows when a 'collection' of evidence is sufficient/ consistent enough to draw strong, more finalized conclusions.

Uses an understanding of the source material to provide context for a conclusion.

Create

The ability to create or justify something using reasoning and/or evidence.

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Emerging

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Basic

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Intermediate

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Advanced

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Mastery

Composing Arguments

States a position or claim, supported by at least one relevant reason or relevant piece of evidence.

Supports opinions with multiple reasons or pieces of evidence.
Explains why specific evidence supports a given point.
Constructs extended arguments that appeal to specific evidence.

Composes arguments that are well supported by evidence and incorporate logical reasoning.
Explains how different claims and pieces of evidence relate to one another and support an overall argument.

Seeks out other perspectives, common rebuttals, and counter-evidence when composing arguments.

Takes into consideration an understanding of the broader context of a given discipline when composing arguments.

Generating Solutions (Problem Solving)

Identifies at least one relevant solution to a specific problem.

Identifies several possible solutions for a specific problem.

Uses strategies to guide solution generation processes.

Uses creative-thinking strategies to support the generation of new, unique, or innovative solution ideas.

Iterates and adapts solution ideas as more information is gathered, or as the problem is understood better.
Explicitly takes new or unexpected perspectives to support the generation of creative solution ideas.
Provides a comprehensive justification for why one solution is the most suitable for a specific problem.

Testing Hypotheses

Identifies a hypothesis to explain observed facts or a specific phenomenon.

Identifies a prediction from a given hypothesis (e.g., the seeds planted near a light source will grow more).
Proposes simple tests to determine whether a prediction is true.

Follows protocols with established procedures to gather evidence about a prediction.
Determines whether experiment results do or do not support a hypothesis.

Proposes novel experiments and procedures designed to gather evidence about a prediction.
Controls for threats to validity (e.g., the presence of confounding variables) when generating experimental procedures.
Uses evidence to explain why a hypothesis is or is not supported.

Proposes novel experiments and procedures that determine which of alternative, competing hypotheses best fits the observed data.

Critique

The ability to critique something by identifying strengths and weaknesses, taking into account different criteria for evaluation.



Emerging

Describes the quantity of evidence (e.g., compares two sets of evidence to determine which has more).

Identifies evidence that is consistent with their prior knowledge.



Basic

Evaluates the relevance and sufficiency of evidence used to support an argument.

Evaluates the relevance and sufficiency of information used to develop a method.

Broadly distinguishes between strong and weak arguments.



Intermediate

Evaluates arguments based on the soundness of reasoning.

Evaluates methods based on the soundness of thinking used to develop the method.

Identifies points or elements within an argument or method that are weak and likely subject to rebuttal.



Advanced

Generates a critique or rebuttal of an argument or method.

Attends to their own opinions and cognitive biases when offering a critique and evaluation of something.



Mastery

Evaluates an argument or method, accounting for usefulness and appropriateness across contexts.

Improve

The ability to articulate a plan for how something can be improved



Emerging

Makes basic improvements based on specific feedback.



Basic

Generates ideas for improvement based on general feedback.
Uses feedback received in one situation to make improvements in a separate but similar situation.



Intermediate

Self-identifies areas for improvement and generates ideas for improvement.
Uses feedback received in one situation to make improvements in a completely different situation (e.g., using feedback on study skills to make changes to how you prepare for a sports match).



Advanced

Explains why a proposed change can lead to improvement.
Effectively explains how revisions or changes directly address feedback.



Mastery

Makes improvements that take into account their knowledge of the broader discipline.
Reflects on feedback to improve future work.