Critical Thinking in the Classroom: Desktop Reference

How do I integrate critical thinking into my students' learning experiences?

(Created by NYCSD staff to support our administrators and teachers with the integration of critical thinking into our instruction and assessment practices.)

What is critical thinking? Critical thinking is analyzing ideas, data, textual evidence, and/or objects to make inferences, draw conclusions, establish patterns, or solve problems.

Why is it important that I develop my students' ability to think critically? Asking deep, probing questions before we accept ideas as worthy is an intellectual framework that results in improvements and innovation. Not only are employers looking for this in their work force, but being able to think critically creates critical consumers that can question the bias of information. Critical thinking is essential in helping students develop skills to ensure that they are college, career, and life ready.

Categories	**Learning Outcomes** ***Student can ...***	**Looks/Sounds Like**	**Instructional Strategies (Teach toward, Assess for CT)**
Information & Discovery	define the problem, determine appropriate research resources, decipher information, and ask meaningful questions	-Collecting and assessing information	Reciprocal Peer Questioning (Peer Review) Socratic Seminar Scenario Analysis (Inferencing) Graphic Organizer Evaluating the validity of resources (CRAAP Test) Chalk Talk (Collaborative Feedback) Think Aloud Debate 5 Whys Editing/Revising Work 3-2-1-Reflection Journaling (Low Stakes/Level 1) Self-Correction (Reflection) Text Dependent Analysis Compare/Contrast Assimilate/Accommodate New Info Analysis from Different Perspective
Interpretation & Analysis	evaluate the accuracy, relevance, and completeness of information and classify a wide variety of information	-Comparing and classifying information	
Problem Solving, Solution Finding	determine the components of a problem and identify the appropriate steps to develop multiple solutions	-Analyzing and describing how parts of a whole interact with each other -Drawing complex connections between problems/ideas	
Constructing Arguments, Reasoning	draw logical conclusions, develop a position and support it with a variety of credible and unbiased resources based on clear and concise evidence	-Offering multiple solutions (right or wrong) to a problem -Engaging in open-ended thinking to identify, define, and solve problems or questions -Offering generalizations that relate to the problem or question	
Self Reflection, Agency	analyze, evaluate, and reflect on her/his thinking processes	-Identifying and correcting errors -Analyzing or questioning own thinking to ensure accuracy	

Instructional Strategy Resources

Thank you to our KG-12 professional staff and administration for your time, effort, and insight in creating this reference. The instructional strategies/learning activities on the pages that follow will help us teach toward the development of critical thinking skills within our students.

<table>
<tr><th colspan="2">Strategy: Reciprocal Peer Questioning
Critical Thinking Category: Information and Discovery</th></tr>
<tr><td>Description:</td><td>Reciprocal Peer Questioning provides students with higher order open-ended questions to prompt a focused discussion in a small group setting. Students use the generic prompts to generate specific content-based questions.</td></tr>
<tr><td>Action Steps:</td><td>The teacher delivers a mini-lesson and then provides students with a list of open-ended questions that encourage synthesis, comparison and contrast, and application to other contexts.
Explain why/how _____.
Why is _____ happening?
What if _____?
What conclusions can I draw about _____?
What is the best _____ and why?
How does _____ affect _____?
What is the difference between _____ and _____?
How would I use _____ to _____?
What are the strengths and weaknesses of _____?
What is a new example of _____?
What are the implications of _____?
How does _____ apply to everyday life?
Students individually prepare several content-specific questions using the open-ended prompts.

Students form small groups and take turns asking their questions and discussing possible answers.</td></tr>
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Strategy: Socratic Seminar ***Critical Thinking Category: Information and Discovery***	
Description:	The goal of a **Socratic Seminar** is for students to help each other understand the ideas, issues, and values reflected in a specific text. Through a process of listening, questioning, making meaning, and finding common ground, students work toward a shared understanding rather than trying to prove a particular argument.
Action Steps:	In a Socratic Seminar, students are responsible for facilitating a discussion around ideas in the text rather than asserting opinions. 1. The teacher selects a text that provides several avenues for interpretation and discussion. 2. Students prepare for the seminar by reading and annotating the text. 3. The class sets norms to govern the discussion. 4. Students discuss the text, beginning with an open-ended question. 5. Students reflect on the seminar and evaluate their performance.

Strategy: Scenario Analysis ***Critical Thinking Category: Information and Discovery***	
Description:	In a **Scenario Analysis**, the teacher presents a real or hypothetical situation and asks students to imagine that they have assumed the central role. Students create a list of inferences, decide which inferences can be verified by research or inquiry, and give an alternate view of the scenario.
Action Steps:	The teacher presents a real or hypothetical scenario related to the content or skills of the curriculum. Students imagine that they have assumed the central role and analyze the scenario as follows: 1. Define the problem within the scenario. 2. Make inferences based on relevant information. 3. Separate certainties from uncertainties. 4. Develop alternate views of the scenario. 5. Use the alternate views to develop next steps.

Strategy: Graphic Organizers ***Critical Thinking Category: Interpretation and Analysis***	
Description:	A **Graphic Organizer** is a visual display that demonstrates relationships between facts, concepts, or ideas. A graphic organizer guides students' thinking as they complete and extend a visual map or diagram.
Suggestions for Use:	Graphic organizers are tools for visualizing and organizing information. Webs, concept maps, and Venn diagrams are types of graphic organizers used to enhance critical thinking skills. Because graphic organizers are often used as templates for students to fill in using content knowledge, graphic organizers provide many benefits including: • Helping students structure writing • Assisting students in making decisions • Helping students classify and communicate ideas • Allowing students to examine relationships • Guiding students in demonstrating their thinking processes • Facilitating brainstorming • Allowing students to organize essential concepts and ideas

Strategy: CRAAP Test Analysis ***Critical Thinking Category: Interpretation and Analysis***	
Description:	The **CRAAP Test Analysis** is a list of questions that helps students evaluate information they collect from various sources. The CRAAP test assesses a source's currency, relevance, authority, accuracy, and purpose.
Criteria:	Criteria will be more or less important depending on the context, situation, or need. • **C**urrency: The timeliness of the information. • **R**elevance: The importance of the information to the specific need. • **A**uthority: The source of the information. • **A**ccuracy: The reliability, truthfulness, and correctness of the content. • **P**urpose: The reason the information exists.

Strategy: Chalk Talk ***Critical Thinking Category: Reasoning/Constructing Arguments***	
Description:	A **Chalk Talk** is a silent way to do reflection, generate ideas, check on learning, develop projects, or solve problems. Because it is done completely in silence, it gives students a change of pace and encourages thoughtful contemplation.
Action Steps:	1. The teacher explains that a Chalk Talk is a silent activity. No one may talk. Anyone may add to the Chalk Talk as they please. Students may comment on others' ideas by drawing a connecting line to the comment. 2. The teacher writes a relevant question in a circle on the board. 3. The teacher either hands a piece of chalk or marker to everyone, or places several pieces of chalk or markers at the board and hands several to people at random. 4. Students write as they feel ready. There are likely to be long silences—that is natural, so allow plenty of wait time before deciding it is over. 5. How the teacher chooses to interact with the Chalk Talk influences its outcome. The teacher can stand back and let it unfold or expand thinking by: • Writing questions about students' comments • Adding his/her own reflections or ideas • Connecting two interesting ideas/comments together with a line and adding a question mark 6. When it's done, it's done!

Strategy: Think-Aloud ***Critical Thinking Category: Reasoning/Constructing Arguments***	
Description:	A **Think-Aloud** is a strategy for 'eavesdropping' on someone's thinking. The purpose of the Think-Aloud strategy is to model for students how critical readers construct meaning.
Action Steps:	1. The teacher begins by modeling his or her thinking while working through a problem or a text. The teacher focuses on critical points that may be confusing for students. 2. The teacher introduces the assigned text or problem and discusses the purpose of the Think-Aloud strategy. The teacher presents a set of questions to support thinking aloud. a. What do I know about this topic? b. What do I think I will learn? c. Do I have a clear picture in my head about this information? d. What more can I do to understand this? e. What were the most important points? f. What new information did I learn? g. How does it fit with what I already know? 3. Students practice the technique and receive structured feedback. 4. The teacher reads the text or presents the problem aloud as students follow along silently. At certain points, the teacher stops and "thinks-aloud" the answers to some of the pre-selected questions. 5. The teacher demonstrates how critical readers and thinkers monitor understanding by rereading a sentence or component, looking ahead to clarify, and/or searching for context clues. Students gradually learn to offer answers to the questions as the teacher leads the think-aloud.

Strategy: Debate ***Critical Thinking Category: Reasoning/Constructing Arguments***	
Description:	Using **Debates** in the classroom can help students understand complex issues, grasp essential critical thinking skills, and refine presentation skills.
Action Steps:	The Lincoln-Douglas Debate format is a one-to-one debate, in which two sides of an issue are examined. Students start with a statement of purpose/policy. (For example, "School uniforms should be required in all schools.") The student who agrees with the statement (the *Affirmative*) begins the debate, which is structured in this way: 1. Affirmative position debater presents constructive points. (6 min) 2. Negative position debater cross-examines the affirmative points. (3 min) 3. Negative position debater presents constructive points. (7 min) 4. Affirmative position debater cross-examines the negative points. (3 min) 5. Affirmative position debater offers first rebuttal. (4 min) 6. Negative position debater offers rebuttal. (6 min) 7. Affirmative position debater offers second rebuttal. (3 min)

Strategy: Connect-Extend-Challenge ***Critical Thinking Category: Reasoning/Constructing Arguments***	
Description:	The **Connect-Extend-Challenge** routine helps students make connections between new ideas and prior knowledge. It also encourages them to consider ongoing questions and dilemmas as they reflect on what they are learning. This routine works well with a whole class, in small groups, or individually.
Action Steps:	The natural place to use the Connect-Extend-Challenge routine is after students have learned something new. CONNECT: How are the ideas and information you learned CONNECTED to what you already knew? EXTEND: What new information did you learn that EXTENDED or pushed your thinking in new directions? CHALLENGE: What is still CHALLENGING or confusing for you to understand? What questions, wonderings, or puzzles do you now have? The teacher keeps a visible record of students' ideas. The teacher continually adds new ideas to the lists and revisits the ideas and questions as students' understanding around a topic develops.

Strategy: Tuning Protocol ***Critical Thinking Category: Problem Solving/Solution Finding***	
Description:	The **Tuning Protocol** is a critique tool used to gather focused feedback and fine-tune developing projects or ideas. This collaborative reflection helps students design and refine their ideas and supports higher quality student performance.
Action Steps:	1. Presenter Overview - (7 minutes) Presenter explains the project (product, process, content) and presents an issue that he or she would like the group to focus on. *Group may only listen.* 2. Clarifying Questions - (3 minutes) The group has an opportunity to ask clarifying questions in order to get information that may have been omitted and would help them better understand the project or issue. *Responses should be short or yes/no.* 3. Probing Questions - (3 minutes) Participants ask probing questions to push the presenter's thinking and gain better understanding of the project or issue. The presenter responds. *Remember, no advice in disguise. Probing questions should not be in the form of "Have you considered..?"* 4. Group Discussion – (5 minutes) The presenter sits quietly, physically pulls back from the group, and listens. The presenter should take notes as the participants discuss with one another and share warm and cool feedback. *Do not involve the presenter in this step.* 5. Presenter Reflection – (5 minutes) The presenter speaks about what he or she got out of the listening experience. *Participants are silent*. 6. Debrief and Closing the Loop – (2 minutes) The presenter and participants debrief on the tuning protocol and facilitation. *Did we stick to the protocol? Were there moments we strayed off task?* In closing the loop, each person can share one take away from the experience.

Strategy: 5 Whys ***Critical Thinking Category: Problem Solving/Solution Finding***	
Description:	The **5 Whys** technique is a simple, but powerful, tool for quickly uncovering the root of a problem. When a problem occurs, you uncover its nature and source by asking "why" no fewer than five times.
Action Steps:	1. When students consider a problem, they simply keep asking the question "why" until they reach the underlying source of the problem, and until a counter-measure becomes apparent. • A counter-measure is an action or a set of actions that seeks to prevent the problem arising again, while a solution just seeks to deal with the situation. 2. Each time students ask "why," they look for an answer that is grounded in fact. This prevents the 5 Whys from generating a number of possible causes and, sometimes, creating more confusion. 3. Students keep asking "why" until they feel confident that they have identified the root cause of the problem and can continue no further. At this point, an appropriate counter-measure should become evident.

Strategy: 6 Thinking Hats ***Critical Thinking Category: Problem Solving/Solution Finding***	
Description:	The **6 Thinking Hats** strategy exposes learners to six different styles of thinking and helps them look at a problem from six different perspectives. The 6 Thinking Hats approach can be used to address almost any problem-solving activity students might encounter in the classroom.
Criteria:	Assigning each thinking style a color serves as a visual cue to help students recognize the thinking skill they are using. The six different hats students might wear, and the kinds of thinking they represent, are briefly described below: • White Hat - Discuss the facts and other objective information about the problem. • Red Hat - Share feelings and emotions about the issue. • Black Hat - Present negative aspects, or worst-case scenarios, regarding the situation. • Yellow Hat - Consider positives, or advantages, of the situation. • Green Hat - Consider creative ideas by looking at the problem in a new way. • Blue Hat - Sum up all the previous thinking.

Strategy: K-S-H Peer Critique ***Critical Thinking Category: Self-Reflection/Agency***	
Description:	**Kind, Specific, Helpful (K-S-H) Peer Critique** is a method of providing feedback in a way that demonstrates progress and encourages resilience. If properly modeled, it can have a strong, positive impact on students' ability to give each other constructive feedback.
Criteria:	*"I like…* *I wonder if you could… so that…* *What if…?"* Kind (but honest): *What excites you about my work?* It helps students to be 'kind, but honest' by focusing them on the work, not on the student. Helpful (so that): *What bores, confuses, or troubles you about my work?* If students cannot see how their feedback will help improve the work, they should not give it. Specific (be precise): *What should I consider doing to improve my work?* The more precise the feedback is, the easier it is to act on. Students should zoom in on details and offer specific advice for improving these details.

Strategy: 3-2-1 Reflection ***Critical Thinking Category: Self-Reflection/Agency***	
Description:	The **3-2-1 Reflection** strategy provides a structure for students to record their own comprehension and summarize their learning. It also gives teachers the opportunity to identify areas that need re-teaching, as well as areas of student interest.
Action Steps:	Three: After the lesson, the teacher has each student record three things he or she learned from the lesson. Two: Next, the teacher prompts students to record two things that they found interesting in the lesson and that they'd like to learn more about. One: Then, the teacher has students record one question they still have about the material. Review: The most important step is for the teacher to review the students' responses. The teacher can use this information to help develop future lessons and determine if any of the material needs to be taught again.

Strategy: Low-Stakes Writing ***Critical Thinking Category: Information and Discovery***	
Description:	**Low-Stakes Writing** is a tool to increase students' comfort with expressing their ideas and to empower student voice. A defining element of low-stakes writing is that it is typically ungraded. This creates more investment in student learning and puts value on student thought, expression, and learning, rather than punctuation, grammar, or getting a correct answer the first time.
Suggestions for Use:	1. Create open questions. 2. Differentiate learning through group work. 3. Use challenge questions instead of giving traditional feedback. 4. Have your students share their low-stakes writing.

Strategy: SCAMPER ***Critical Thinking Category: Interpretation and Analysis***	
Description:	**SCAMPER** is a creative, easy-to-use brainstorming technique that helps generate new ideas or improve existing ones.
Action Steps:	1. State the problem you would like to solve or the idea you would like to develop. 2. Ask questions using the SCAMPER checklist to guide you: a. **S**ubstitute: Think about substituting part of your problem, product, or process for something else. b. **C**ombine: Think about combing two or more parts of your probortunity (problem + opportunity) to achieve a different product or enhance synergy. c. **A**dapt: Think about which parts of the problem, product, or process could be adapted to remove the probortunity or change the nature of it. d. **M**odify: Think about changing all or part of the current situation or distorting it in an unusual way. e. **P**ut to Another Use: Think of how you might be able to put your current solution, product, or process to other purposes, or think of what you could reuse from somewhere else in order to solve your probortunity. f. **E**liminate: Think of what might happen if you eliminated various parts of the product, process, or probortunity. g. **R**everse: Think of what you would do if part of your probortunity or process worked in reverse or was done in a different order. 3. Look at the answers you came up with. Do any stand out as viable solutions? Could you use any of them to create a new product or develop an existing one? If any ideas seem viable, then explore them further.

Critical Thinking Assessment Resource

One common method for assessing Critical Thinking Skills in our students is through the utilization of performance tasks. Performance tasks require students to construct an original response rather than simply recognize or find a correct answer. The Stanford University Center for Assessment and Learning has an online collection of high-quality performance tasks and resources. These curated materials have been collected from educators across the United States and have been reviewed by experts in the field. Through this link, **http://www.performanceassessmentresourcebank.org/**, you can access these performance tasks in math, English/language arts, science, and history/social studies. To become comfortable with this resource, you are encouraged to look at the authentic and relevant performance task titled, "Rising Cost of College Tuition." It can be accessed by going to the previously mentioned link, clicking on "performance tasks" and then entering *Math, Grade 8, and Algebra 1* into the search fields located on the left.

Performance tasks help us to measure many of the eight skills and dispositions within our profile of a graduate, which are essential for success in college, career, and life. The tasks can, but do not need to be multi-disciplinary to be effective. Performance tasks do not undermine our content, but instead enable us and our students to go deeper into the content through the transfer of learning to relevant and authentic problems.

You will find that much of our recent professional development aligns very well with the practice of using performance tasks. It's important that we are careful not to get lost in the project details, but instead remain focused on what we want students to be able to do with their learning (student learning outcomes).

Thank you again for taking time in June 2019 to build this resource document!

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