

## Reasoning Skills

1. Hello. This presentation will address critical thinking strategies and ways to integrate them into the content areas. I am Alicia Foy, Literacy in the Content Areas and Gifted specialist at the Florida Department of Education in the Bureau of Standards and Instructional Support. The skills and strategies presented here come from many resources that you will find at the end of this presentation, including Rutgers Free On-Demand Webinar, "Critical Thinking Strategies for Gifted Learners".
2. The objectives for this presentation are to discuss the student cycle for development of reasoning skills, that is, what do the students need when developing reasoning skills to find success. The next objective is to offer ideas for teachers when planning for the student cycle of skills development. Reasoning skills will be presented in key areas along with ideas for integrating the strategies into the content areas. The skills we will look at include analogies, relevancy, evaluation of statements and sources, and questioning skills. Our final objective will be to see examples of integration of the reasoning skills into the content areas.
3. When developing reasoning skills students need explicit instruction; a step-by-step introduction to the new skill. The skill needs to be modeled by the teacher with intentions of a gradual release as students get accustomed to using the new skill. Practice with known content standards will help the student develop the new skill without the burden of learning new content. Once the skill is set, application of the skill to a real-world, authentic task can be attempted and practiced. A commitment to a continuum of practice of the skills throughout the years will ensure that students are provided the opportunity to develop their critical reasoning and thinking skills.
4. Teachers and administrators have the chance to create a cycle of reasoning skills that could impact all students through their school careers. A district or individual school could commit to researching and developing a list of reasoning strategies that could be implemented across the grades. The cycle could include having a certain grade level introduce and practice one reasoning strategy throughout the year. The next year the cycle would continue with practice of the already learned skill and introduction of another. A commitment to the continuum year by year would help students continue the practice of the previously learned skill by applying it to the new year's content knowledge. Modeled practice with a new reasoning skill would develop a second reasoning skill. Continuing the cycle would develop multiple reasoning skills throughout a student's matriculation. During professional development or PLCs, teachers could plan horizontally and practice how to model the different strategies so there is commonality in teaching. Vertical planning would ensure that the cycle is being used as the grade levels progress. Lesson plans would include authentic applications for students to use their critical thinking skills.

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5. Next, let's delve into some of the reasoning skills.
6. Analogies are often used to develop reasoning because of the nuance in the relationship between words. Analogies use a known relationship and apply it to something new. There are multiple strategies that can be used to develop this thinking skill. There have been many resources developed that teachers can use in the classroom to offer extensive practice with low, moderate and high level analogies from elementary to high school.
7. The following examples are just a quick snapshot of the many ways analogical thinking skills are used in the content areas. The use of similes, metaphors and hyperbole in reading and writing helps develop this reasoning skill. In math, the relationships between algebra, patterns and function tables require analogical thinking skills. In science, cause and effect, and in social studies/history, fact and opinion are all ways to develop analogical thinking and reasoning skills. The use of graphic organizers supports and develops analogical thinking.
8. Understanding what is relevant or irrelevant requires explicit teaching and practice. Determining what the problem is that needs to be solved, or what the question is that needs to be answered requires modeling with multiple resources from multiple content areas. Going through a passage sentence by sentence to establish if it is necessary support for the main question or thesis requires time and commitment from the teacher. It requires time for students to think through their own reasoning. One strategy for determining if a sentence is relevant is to change the sentence into a question. This sometimes helps a reader determine if it is relevant. Another strategy is to ask what the purpose of the sentence is to help a student find its meaning and relate it to the problem or question.
9. Using annotation, text marking and close reading strategies are ways to help students remember and also visualize their thinking about a text. Using graphic organizers such as a two or three column category table, or a question/answer relationship strategy can help determine relevancy of facts that are provided in a passage. Note-taking practice helps a student organize and develop listening for relevant information skills. Careful modeling of the strategies by the teacher and taking the time to develop this relevancy reasoning skill is necessary. This skill also can be developed when determining credibility of sources and determining bias. Another integration strategy is to have the students generate problems or paragraphs that include irrelevant information and practice with other students in their class. The link at the bottom is a Florida

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Department of Education work page with practice questions that focus on unrelated sentences in a paragraph.

10. [CLICK] Questioning is a reasoning skill that requires application of prior knowledge related to new knowledge to clarify, challenge, or present a point of view or opinion. They can be open-ended or evidence-based among many others. For this reason, there must be multiple opportunities for practice with this reasoning skill. Along with the types of questions, there are levels of questions. Literal, interpretive and applied levels of questions can be used with any question type.
11. Evaluation can be considered a form of questioning. Secondary students are required to evaluate statements to determine if they are position, argument or evidence-based. Sources must also be evaluated as to whether they are fact or opinion, biased, a primary or secondary source and what level of reliability and credibility they hold. Performing these analytical determinations allows for increased reasoning skill development.
12. There are many strategies for integrating questioning skills into the content areas. Starting with an ethical or moral discussion will offer plenty of opportunities for students to pose questions of others for justification of ideas and beliefs. Using a graphic organizer for developing questions and note taking will be helpful. Having classroom expectations in place for the questioning sessions will be necessary. Socratic seminars and the fishbowl strategy are specifically designed for developing questioning skills and evidence-based responses. Using Bloom's question stems will help students develop higher order questioning skills which will lead to higher reasoning skills. (A link to Bloom's taxonomy question starters can be found on the resources slide.) The reciprocal questioning strategy helps students analyze a passage or problem and design questions directed to the teacher. This strategy can be done in small groups so that the questions are discussed and edited before asking the teacher their direct questions. All of these strategies help develop reasoning skills and can be used across the content areas.
13. Using graphic organizers to categorize evaluations is beneficial when determining types of sources. This simple table allows for comparison of different texts and how they answer certain questions. It allows for evaluation of credibility and opinion of each of the texts. Shanahan has many valuable resources for use in developing evaluation reasoning skills. The website can be found on the resources slide.
14. As a reflection on what you have just heard, take a moment to ask yourself these questions. Would the cycle for development of reasoning skills be something that would benefit your students? How could you implement the start-up and planning of a cycle for development of reasoning skills?

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Which of the strategies presented here could you model, practice and integrate into your teaching?

15. <https://gifteded.rutgers.edu/free-demand-webinars>  
<https://www.johnzola.com/teaching-strategies>  
<https://education.illinoisstate.edu/downloads/casei/5-02-Revised%20Blooms.pdf> <http://www.readingeducator.com/strategies/request.htm>  
<https://shanahanonliteracy.com/publications/using-writing-to-improve-reading>

16. Please help to improve our professional development. If you would please take the time to complete the survey, it would be greatly appreciated. Thank you.

17. If you have any further questions, please contact me at the Florida Department of Education.