

Academic Thinking Skills in Tutorial

Understanding how to plan for 21st century skills begins with determining which skills are critical for students to develop. Academic thinking skills are universal skills used across all content areas, though the language and application of these skills will differ based upon the subject. The four academic thinking skills comprise the foundation of the cognitive processes that students develop while learning: apply, analyze, evaluate, and synthesize. These academic thinking skills were culled by analyzing the Advanced Placement® (AP) History Disciplinary Practices and Reasoning Skills (2018), the Common Core Standards for Mathematical Practice (2018), and the Science and Engineering Practices in the *Next Generation Science Standards* (2014) and identifying the prominent skills that overlap in each discipline.

The academic thinking skills (apply, analyze, evaluate, and synthesize) are used in tutorial as overarching skills to help students with the following tutorial tasks:

- Selecting the initial question
 - Guiding student thinking while moving from the initial question to the Tutorial Question
 - Guiding group members while crafting questions for the student presenter
 - Determining what skill is needed to get from the initial question to the Tutorial Question based on the POC, and then to its solution
- 1) *Apply: Students Use the Content From Their Learning* – Tutorial students bring a variety of academic tools and prior knowledge to every tutorial. The background information that these experts already know informs the tutorial process and the direction of the questioning.

Example: Students **apply** concepts from their textbooks, focused notes, classwork, and homework while they prepare for tutorial and during the collaborative inquiry process.

- 2) *Analyze: Students Examine the Content From Their Learning* – Analysis, at its core, is questioning. Inquiry is the core of tutorials. Students and tutors engaging in questioning throughout the tutorial allows for the student presenter to develop a deeper understanding of the concept. Skillful and direct questioning is at the heart of analysis, and a goal for educators is to develop students' understanding of what analysis looks like in different content areas.

Example: Students **analyze** information to make sense of relationships between components/parts in response to questions crafted by group members during the collaborative inquiry process.

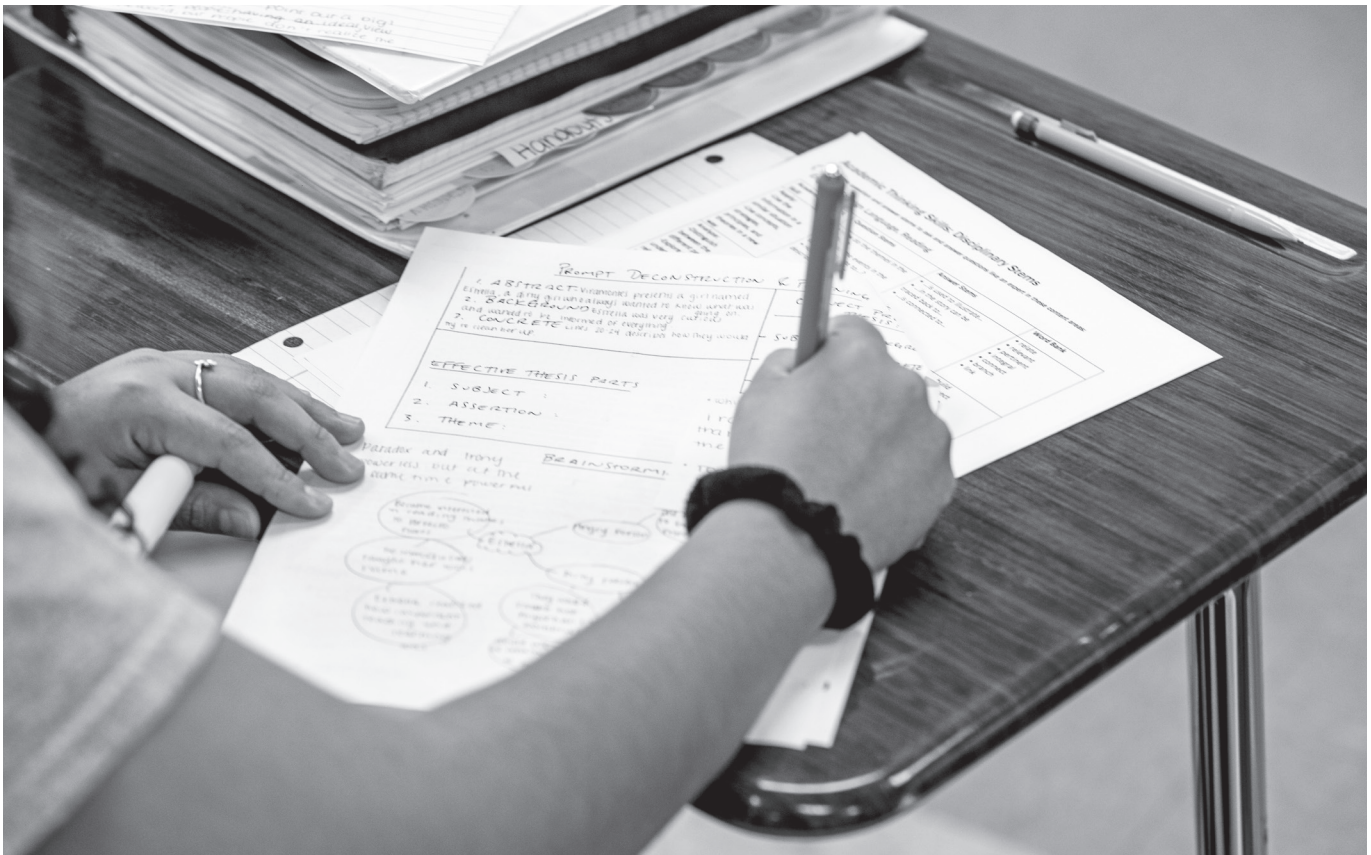
- 3) *Evaluate: Students Assess the Content From Their Learning* – Building upon application of prior knowledge and analysis of new information, evaluation is where students begin to test and apply their knowledge to their Tutorial Question. When group member questioning is combined with academic thinking skills to assess the validity of arguments and create hypotheses based on new information, students are able to demonstrate their understanding of their Point of Confusion.

Example: Students **evaluate** their critical thinking process in pursuit of a deeper understanding of the concept addressed in their Point of Confusion.

- 4) *Synthesize: Students Create New Content From Their Learning* – Synthesis is the most difficult academic thinking skill. As emerging content experts, students need to be exposed to different ideas and the complexities of the discipline. Only then can they predict new outcomes, create new ideas, and engage in rich discourse with the content. The tutorial process provides students with the opportunity to go deeper in their learning of concepts with their peers.





Example: Students **synthesize** the tutorial group’s thinking, information offered from resources, steps taken, and new learning about their Tutorial Question in the 60-Second Synthesis to close the collaborative inquiry process.

Content experts are not just those who know a lot; they are individuals who build upon the works of others to provide new insight into the world. It is important for students to understand that the goal of learning is to prepare them to enter the real world with the ability to change it for the better. Nurturing and refining the academic thinking skills required to create and innovate is what it means to develop college- and career-ready students.



Costa's, Bloom's, and Academic Thinking Skills Crosswalk

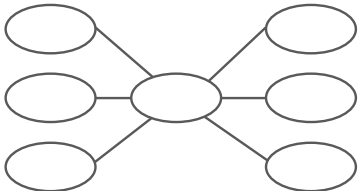
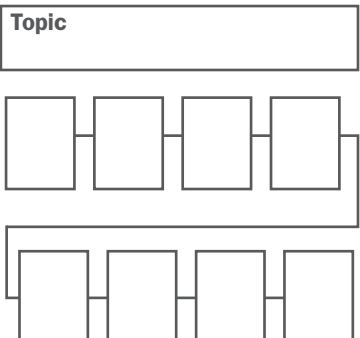
This table is a crosswalk of Costa's Levels of Thinking and Bloom's Taxonomy with the four academic thinking skills for 21st century learners.

	Costa's Levels of Thinking	Bloom's Taxonomy	Academic Thinking Skills
Higher-Order Thinking Skills	<p>Level 3 – OUTPUT</p> <p>Applying Information:</p> <p>Applying and evaluating actions, solutions, and connections made in order to predict</p>	<p>Creating</p> <p>Can the students:</p> <ul style="list-style-type: none"> • Create/generate new ideas, products, or points of view • Combine ideas/thoughts to develop an innovative idea, solution, or way of thinking 	 <p>SYNTHESIZE</p>
		<p>Evaluating</p> <p>Can the students:</p> <ul style="list-style-type: none"> • Justify a stand or decision • Judge the value of an idea, item, or technique by creating and applying standards/criteria 	 <p>EVALUATE</p>
	<p>Level 2 – PROCESSING</p> <p>Processing Information:</p> <p>Making sense out of information; processing the information gathered by making connections and creating relationships</p>	<p>Analyzing</p> <p>Can the students:</p> <ul style="list-style-type: none"> • Distinguish between the different components/parts • Explore and understand relationships between the components/parts 	 <p>ANALYZE</p>
		<p>Applying</p> <p>Can the students:</p> <ul style="list-style-type: none"> • Use the information in a similar situation • Apply learned concepts, strategies, principles, and theories in a new way 	 <p>APPLY</p>

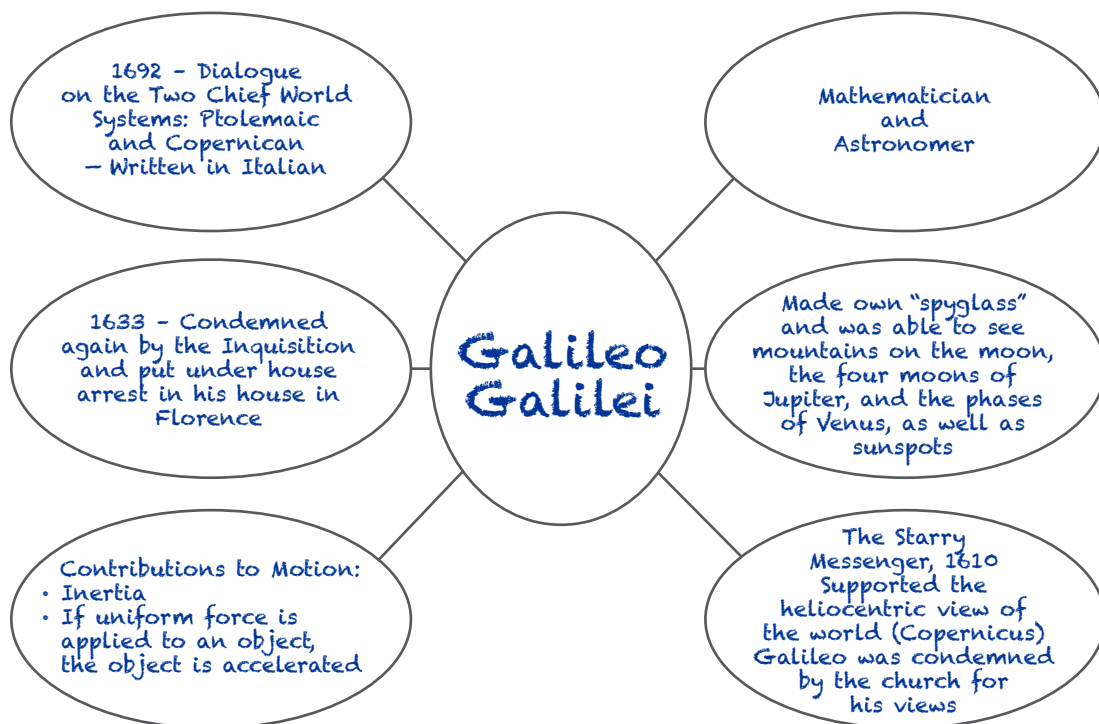
Adapted from Comparison by Andrew Churches at <http://edorigami.wikispaces.com> and http://www.odu.edu/educ/rovbau/Bloom/blooms_taxonomy.html

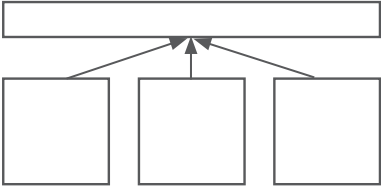
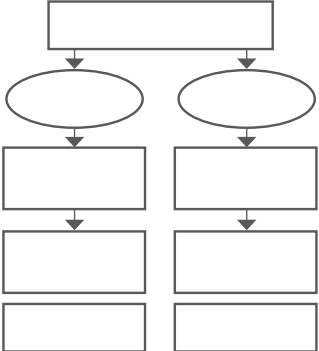
Academic Thinking Skills Graphic Organizers

Note to Students: This is only a selected sample of graphic organizers. You may use any graphic organizer that helps you to visually organize and explain your thinking.

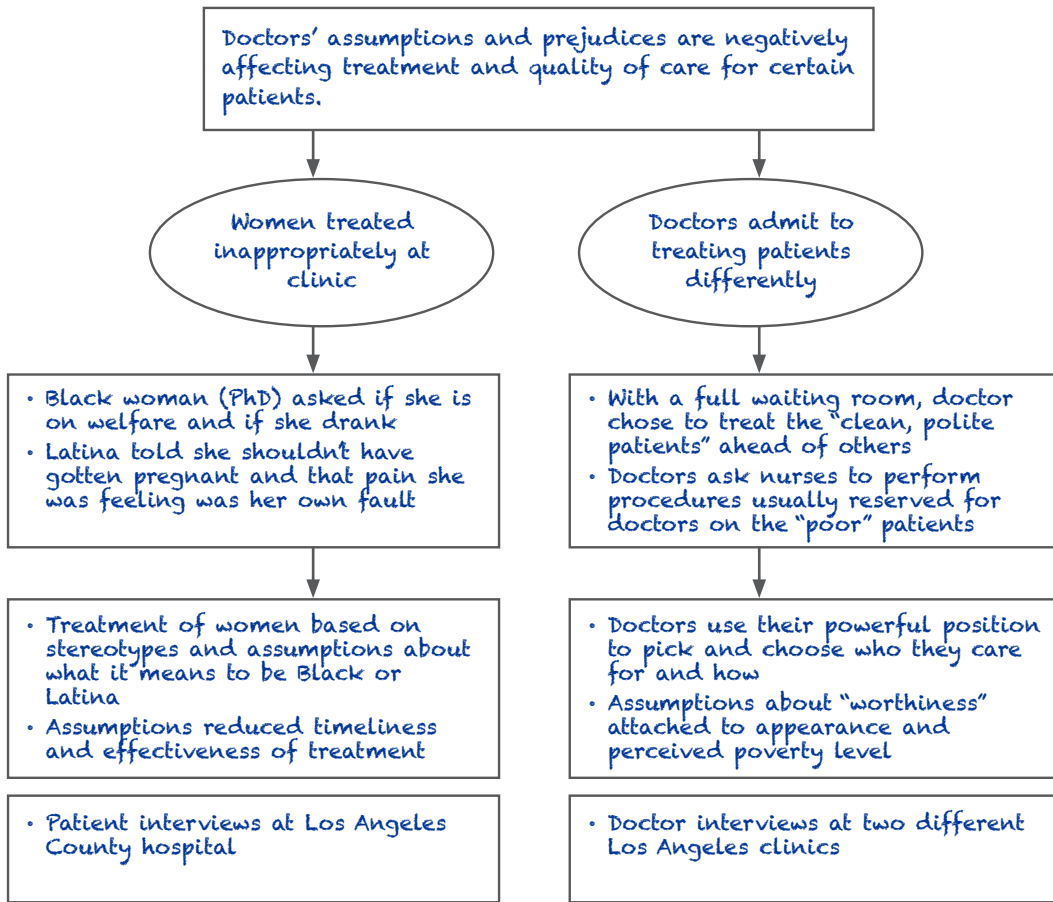
Academic Thinking Skills	Guiding Questions	Graphic Organizer Ideas
<p>Apply (Utilize)</p> <ul style="list-style-type: none"> Contextualize the broader ideas, themes, historical, or geographical significance of a text. Apply concepts from a text to implement an action or create a product. 	<ul style="list-style-type: none"> What other concepts help contextualize the main event or idea? What steps need to be involved to implement ____? What details should be included for each step? What is being described in the sequence? 	<p>Descriptive Bubble</p>  <p>Chronological</p> 

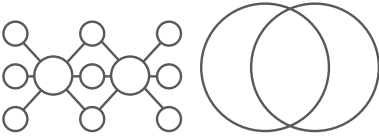
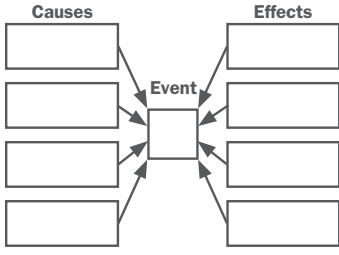
Descriptive Bubble Student Sample



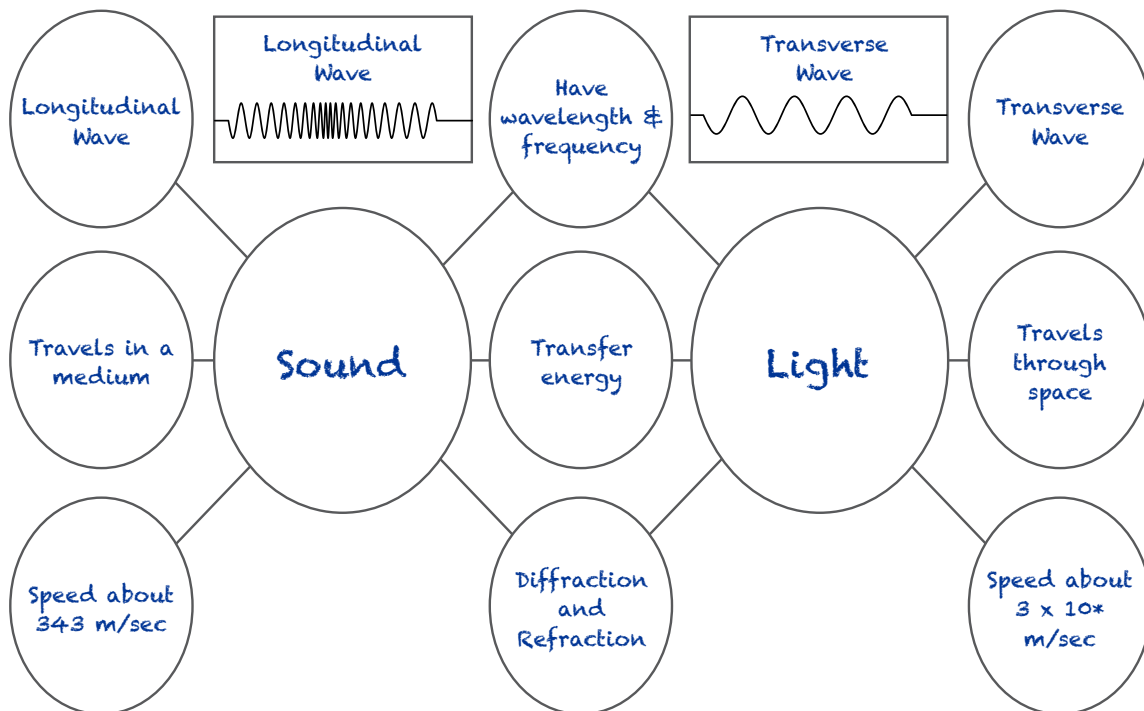
Academic Thinking Skills	Guiding Questions	Graphic Organizer Ideas
<p>Analyze (Examine)</p> <ul style="list-style-type: none"> Analyze the use of evidence in a text, or critique reasoning. Analyze the structure of a text and/or how an author's choices create a central theme, idea, or other meaning in a text. Identify patterns of continuity or changes in a text. Analyze errors in a text or a process. 	<ul style="list-style-type: none"> What were the main ideas in support of the claim/reasoning? How did the author structure the claim/idea? How did _____ change over time? Where are the errors or misapplication of logic? 	<p>Main Idea/Details</p>  <p>Claim and Evidence</p> 

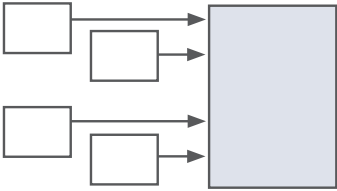
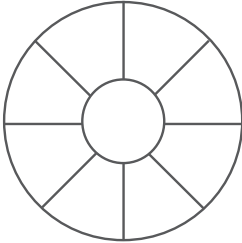
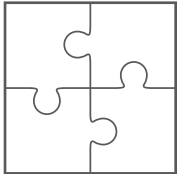
Claim and Evidence Student Sample



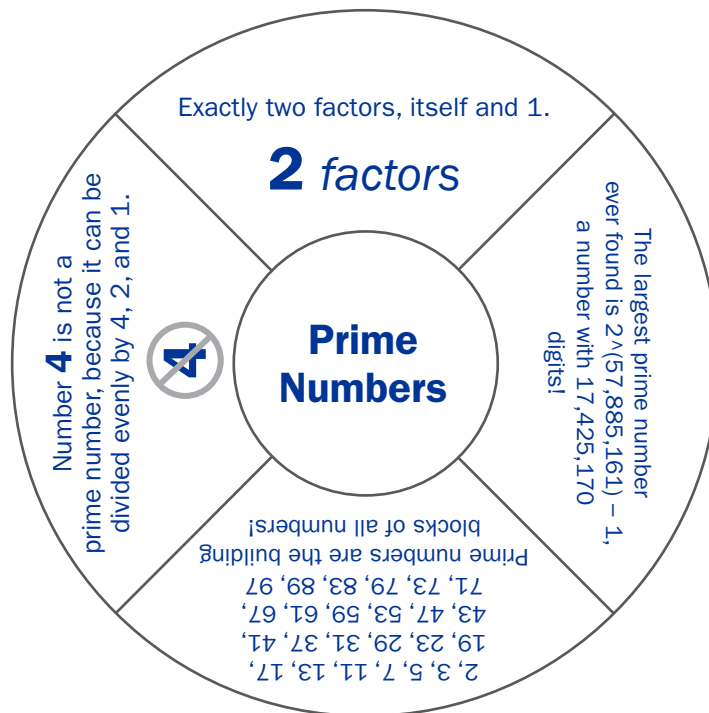
Academic Thinking Skills	Guiding Questions	Graphic Organizer Ideas										
<p>Evaluate (Access)</p> <ul style="list-style-type: none"> Assess cause and effect relationships within a text. Compare ideas or perspectives found in a text. Assess the validity of an argument in a text. Justify reasoning in a text. Make a judgement based on information in the text. Categorize ideas, events, themes, and data by relevant characteristics. 	<ul style="list-style-type: none"> What is being compared and contrasted? What categories of characteristics or attributes are used to compare and contrast these concepts? What are the important elements or factors that cause this effect? What is the claim/proposition and the evidence presented? What reasoning is given using the evidence? 	<p>Compare and Contrast Bubble</p>  <p>Cause and Effect</p>  <p>Deciding</p> <table border="1" data-bbox="901 861 1396 1102"> <tr> <td>My Problems →</td> <td></td> </tr> <tr> <td>I Think That →</td> <td></td> </tr> <tr> <td>I'll Find Out By →</td> <td></td> </tr> <tr> <td>I Found Out That →</td> <td></td> </tr> <tr> <td>Conclusions →</td> <td></td> </tr> </table>	My Problems →		I Think That →		I'll Find Out By →		I Found Out That →		Conclusions →	
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Compare and Contrast Student Sample



Academic Thinking Skills	Guiding Questions	Graphic Organizer Ideas
<p>Synthesize (Combine/Condense)</p> <ul style="list-style-type: none"> Synthesize ideas across multiple texts to create new insights, predict future outcomes, draw informed conclusions, generalize from facts, or argue new ideas. 	<ul style="list-style-type: none"> What conclusions or new insights can be made from the details provided? What are the main ideas or topics being described across the sources? What are the qualities of these events, topics, or people contributing to the overall concept? How do the pieces connect? 	<p>Drawing Conclusions</p>  <p>Concept Wheel/Mandela</p>  <p>Puzzle Piece Organizer</p> 

Mandela Student Sample



Literacies Within the Disciplines

What are literacies within the disciplines? The following lists for each of the major content areas can help students learn how to read, write, and think as a content expert. Use this resource to guide your approach to reading your focused notes, writing your TRF, and thinking during the academic conversation in tutorial.

	Read	Write	Think
Science	<p><i>When scientists read, they...</i></p> <ul style="list-style-type: none"> • Ask “Why?” more than “What?” • Interpret data, charts, and illustrations. • Seek to understand concepts and words. • Determine validity of sources and quality of evidence. • Pay attention to details. 	<p><i>When scientists write, they...</i></p> <ul style="list-style-type: none"> • Use precise vocabulary. • Compose in phrases, bullets, graphs, or sketches. • Use passive voice. • Favor exactness over craft or elaboration. • Communicate in a systematic form. 	<p><i>When scientists think, they...</i></p> <ul style="list-style-type: none"> • Tap into curiosity to create questions. • Rely on prior knowledge or research. • Consider new hypotheses or evidence. • Propose explanations. • Create solutions.
History	<p><i>When historians read, they...</i></p> <ul style="list-style-type: none"> • Interpret primary and secondary sources. • Identify bias. • Think sequentially. • Compare and contrast events, accounts, documents, and visuals. • Determine meaning of words within context. 	<p><i>When historians write, they...</i></p> <ul style="list-style-type: none"> • Create timelines with accompanying narratives. • Synthesize information/ evidence from multiple sources. • Emphasize coherent organization of ideas. • Grapple with multiple ideas and large quantities of information. • Create essays based on argumentative principles. 	<p><i>When historians think, they...</i></p> <ul style="list-style-type: none"> • Create narratives. • Rely on valid primary and secondary sources to guide their thinking. • Compare and contrast or ponder causes and effects. • Consider big ideas or inquiries across long periods of time. • Recognize bias.
Math	<p><i>When mathematicians read, they...</i></p> <ul style="list-style-type: none"> • Use information to piece together a solution. • Look for patterns and relationships. • Decipher symbols and abstract ideas. • Ask questions. • Apply mathematical reasoning. 	<p><i>When mathematicians write, they...</i></p> <ul style="list-style-type: none"> • Explain, justify, describe, estimate, or analyze. • Favor calculations over words. • Use precise vocabulary. • Include reasons and examples. • Utilize real-world situations. 	<p><i>When mathematicians think, they...</i></p> <ul style="list-style-type: none"> • Consider patterns. • Utilize previous understandings. • Find connections. • Estimate, generalize, and find exceptions. • Employ mathematical principles.
English Language Arts	<p><i>When students of English read, they...</i></p> <ul style="list-style-type: none"> • Understand how figurative language works. • Find underlying messages that evolve as a theme. • Assume a skeptical stance. • Pay attention to new vocabulary or words used in new ways. • Summarize and synthesize. 	<p><i>When students of English write, they...</i></p> <ul style="list-style-type: none"> • Engage in a process that includes drafting, revising, and editing. • Use mentor texts to aid their writing craft. • Pay attention to organization, details, elaboration, and voice. • Rely on the feedback of others. • Avoid formulaic writing. 	<p><i>When students of English think, they...</i></p> <ul style="list-style-type: none"> • Reflect on multiple texts. • Ask questions of the author. • Consider research or others’ ideas. • Discuss ideas and themes. • Argue both sides of a point.

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