

### What does it mean to be a “CRA School”?

As a Teacher	As a School
<p>Include an IAKT in each project or problem unit to ensure regular practice on at least some of the Knowledge and Thinking Outcomes. <i>This is a general recommendation regardless of CRA or not.</i></p> <p>Implement two IAKTs over the course of the year that fully align to the Knowledge and Thinking and Written Communication Rubrics. Assess students’ work against the combined rubrics. <i>Doing this is what constitutes a CRA.</i></p> <p>Create opportunities for students to get feedback on and revise their work towards a college-ready standard.</p> <p>Cultivate personal expertise in your discipline’s rubrics and scoring with those rubrics through calibration trainings locally and through NTN.</p>	<p>Teachers are committed to the “As a Teacher” items and are supported in that work.</p> <p>Staff systematically engages in Looking At Student Work (LASW) protocols and activities as a key part of their professional learning.</p> <p>Quality of student work is a key internal indicator of instructional effectiveness.</p> <p>Students are engaged in conversations about readiness standards and growth over time.</p> <p>Critique, revision, and reflection are key elements of school culture.</p> <p>One or more teachers in each core area are working with NTN to become “calibrated scorers.”</p> <p>Processes are in place to collect and monitor important CRA data.</p>

### What are some key questions that we are working on together?

As a Teacher	As a School
<p>Which projects/problem units to use for your CRA? (Includes both content fit and time of year)</p> <p>What scaffolding – including support for understanding rubric language – do your students need during their work on and around the CRA?</p> <p>How do you want to use the work students generate during the CRA for their grade? You might focus grades on a subset of indicators and you should find ways of grading that are manageable and promote a growth mindset.</p> <p>How will you map the outcomes for your course in ways that allow for growth and ensure that you go deep on critical content?</p>	<p>How will you help students understand the assessment of their work at a college-ready standard?</p> <p>What role do you want CRA evidence to play in your graduate profile, if any?</p> <p>How will you collect student performance data on their CRA tasks across courses and over the course of their career?</p> <p>What is the relationship between your schools use of CRA and state and district initiatives?</p> <p>How will you navigate the larger assessment landscape in your school, district, state?</p>

## NTN Knowledge and Thinking Rubric for ELA Analysis, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline.



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	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>ARGUMENT</b> <i>What is the evidence that the student can develop an argument?</i>	<ul style="list-style-type: none"> <li>Argument is unclear or underdeveloped</li> <li>Makes unclear or irrelevant claims</li> <li>One claim dominates the argument and alternative or counterclaims are absent</li> <li>Draws superficial connections or conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a somewhat clear, but general argument that reflects passive reading or thinking</li> <li>Makes relevant claims</li> <li>Briefly alludes to questions or alternative interpretations when appropriate</li> <li>Draws general or broad connections or conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear, well developed argument that demonstrates engaged reading and critical thinking</li> <li>Makes relevant claims that support the argument</li> <li>Acknowledges questions, counterclaims, or alternative interpretations when appropriate</li> <li>Makes specific connections and draws meaningful conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear, well developed, and convincing argument that demonstrates engaged reading and original critical thinking</li> <li>Makes relevant and significant claims that support the argument</li> <li>Acknowledges and responds to questions, counterclaims, or alternative interpretations to sharpen the argument when appropriate</li> <li>Makes insightful connections, draws meaningful conclusions and raises important implications</li> </ul>
<b>EVIDENCE</b> <i>What is the evidence that the student can support the argument?</i>	<ul style="list-style-type: none"> <li>Refers to limited textual evidence (reasons, examples, or quotations) relevant to argument</li> <li>Makes no reference to the author's point of view or purpose in a text</li> </ul>		<ul style="list-style-type: none"> <li>Relies on one or two reasons, examples, or quotations relevant to argument</li> <li>Briefly notes the author's point of view or purpose in a text</li> </ul>		<ul style="list-style-type: none"> <li>Refers to detailed textual evidence (reasons, examples, and quotations) relevant to argument</li> <li>Determines the author's point of view or purpose in a text and its impact on overall meaning</li> </ul>		<ul style="list-style-type: none"> <li>Refers to most important textual evidence (reasons, examples, and quotations) relevant to argument</li> <li>Evaluates author's point of view or purpose in a text and its impact on overall meaning and credibility of ideas</li> </ul>
<b>ANALYSIS</b> <i>What is the evidence that the student can analyze evidence?</i>	<ul style="list-style-type: none"> <li>Demonstrates minimal understanding of text(s)</li> <li>Summarizes but does not analyze or evaluate ideas or claims</li> <li>Makes no reference to author's choices to support central ideas or claims</li> </ul>		<ul style="list-style-type: none"> <li>Demonstrates a basic understanding of text(s)</li> <li>Summarizes and attempts to analyze the central ideas or claims</li> <li>Briefly refers to the author's choices (e.g., language use, literary/rhetorical devices, organization) that support central ideas of claims</li> </ul>		<ul style="list-style-type: none"> <li>Demonstrates comprehensive understanding of text(s) including both explicit and inferred meanings</li> <li>Analyzes the central ideas or sequence of events and their development over the course of the text(s)</li> <li>Analyzes how author's choices made by the author (e.g., language use, literary/rhetorical devices, organization) support central ideas or claims</li> </ul>		<ul style="list-style-type: none"> <li>Demonstrates comprehensive and critical understanding of text(s), including both explicit and inferred meanings</li> <li>Analyzes and evaluates complex ideas or sequence of events and explains how individuals, ideas, or events interact and develop over the course of the text(s)</li> <li>Analyzes how author's choices (e.g., language use, literary/rhetorical devices, organization) support central ideas or claims and the effectiveness of the text</li> </ul>

## NTN Knowledge and Thinking Rubric for ELA Research or Argumentation, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline.



	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>ARGUMENT</b> <i>What is the evidence that the student can develop an argument?</i>	<ul style="list-style-type: none"> <li>Argument is unclear or underdeveloped</li> <li>Makes unclear or irrelevant claims</li> <li>Discussion of questions or counterclaims (when appropriate) is unclear or absent</li> <li>Does not explain background and context of topic/issue</li> <li>Draws superficial connections or conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a somewhat clear, but general argument that reflects passive reading or thinking</li> <li>Makes relevant claims</li> <li>Briefly alludes to a questions or counterclaims when appropriate</li> <li>Somewhat explains background and context of topic/issue</li> <li>Draws general or broad connections or conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear and well-developed argument that demonstrates engaged reading and critical thinking</li> <li>Makes relevant claims that support the argument</li> <li>Acknowledges questions or counterclaims when appropriate</li> <li>Explains background and context of topic/issue</li> <li>Makes specific connections and draws meaningful conclusions</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear, well developed, and convincing argument that demonstrates engaged reading and original critical thinking</li> <li>Makes relevant and significant claims that support the argument</li> <li>Acknowledges and responds to questions or counterclaims to sharpen the argument when appropriate</li> <li>Thoroughly explains background and context of topic/issue</li> <li>Makes insightful connections and draws meaningful conclusions, and raises important questions</li> </ul>
<b>EVIDENCE</b> <i>What is the evidence that the student can support the argument?</i>	<ul style="list-style-type: none"> <li>Refers to evidence from few sources; some sources may not be relevant to argument</li> <li>Limited use of information and/or examples</li> <li>Makes note of a general difference in perspectives among authors on a topic without specific details (when appropriate)</li> </ul>		<ul style="list-style-type: none"> <li>Refers to limited evidence (print/digital) relevant to argument</li> <li>Information and/or examples are used to illustrate one author's point of view</li> <li>Briefly notes and dismisses inconsistent information or a difference among authors on the same topic (when appropriate)</li> </ul>		<ul style="list-style-type: none"> <li>Refers to detailed evidence (print/digital) relevant to argument</li> <li>Information and/or examples are used to illustrate multiple authors' point(s) of view</li> <li>Discusses inconsistent information or a difference among authors on the same topic (when appropriate)</li> </ul>		<ul style="list-style-type: none"> <li>Refers to extensive and comprehensive evidence (print/digital) relevant to argument</li> <li>Information and/or examples are used to illustrate multiple authors' point(s) of view and justify the argument</li> <li>Weights and evaluates inconsistent information or a difference among authors on the same topic (when appropriate)</li> </ul>
<b>ANALYSIS</b> <i>What is the evidence that the student can analyze evidence?</i>	<ul style="list-style-type: none"> <li>Restates information from multiple sources.</li> <li>Expresses broad agreement with a source's perspective without assessing the strength or limitation of the source.</li> </ul>		<ul style="list-style-type: none"> <li>Summarizes evidence from multiple sources related to the argument.</li> <li>Minimally addresses the strength or limitation of one important source (when appropriate).</li> </ul>		<ul style="list-style-type: none"> <li>Synthesizes evidence from multiple sources related to the argument</li> <li>Assesses the strengths or limitations of most important sources to support the argument or claims (when appropriate)</li> </ul>		<ul style="list-style-type: none"> <li>Synthesizes and critiques evidence from multiple sources related to the argument</li> <li>Assesses the strengths and limitations of most important sources to support or refute argument or claims (when appropriate)</li> </ul>

## NTN Knowledge and Thinking Rubric for History/Social Science Research or Inquiry, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline.



	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>INQUIRY<sup>1</sup></b> <i>What is the evidence that the student can ask a historical/social science question?</i>	<ul style="list-style-type: none"> <li>Question's relevance to the topic is unclear</li> <li>Question is too broad or narrow in scope to allow for adequate investigation</li> </ul>		<ul style="list-style-type: none"> <li>Question is relevant to the chosen topic</li> <li>Question is specific and targeted enough to guide initial investigation</li> </ul>		<ul style="list-style-type: none"> <li>Question is relevant and important in relation to the chosen topic</li> <li>Question can be investigated given available resources</li> </ul>		<ul style="list-style-type: none"> <li>Question is relevant and important in relation to the chosen topic</li> <li>Question is specific and challenging and can be investigated given available resources</li> </ul>
<b>ARGUMENT</b> <i>What is the evidence that the student can develop a historical/social scientific argument?</i>	<ul style="list-style-type: none"> <li>Thesis is unclear or underdeveloped</li> <li>Makes unclear or irrelevant claims</li> <li>One claim dominates the argument and alternate or counterclaims are absent</li> </ul>		<ul style="list-style-type: none"> <li>Thesis is relevant to the prompt or research question</li> <li>Makes claims relevant to the thesis</li> <li>Mentions questions or counterclaims</li> </ul>		<ul style="list-style-type: none"> <li>Thesis clearly answers the prompt or research question</li> <li>Makes relevant, specific claims that support the thesis</li> <li>Discusses questions or counterclaims</li> </ul>		<ul style="list-style-type: none"> <li>Thesis is precise and nuanced and clearly answers the prompt or research question</li> <li>Makes relevant, specific, and significant claims that support the thesis</li> <li>Develops and responds to questions or counterclaims to sharpen the argument</li> </ul>
<b>EVIDENCE</b> <i>What is the evidence that the student can select sources and support the argument?</i>	<ul style="list-style-type: none"> <li>One or two credible sources that share perspective are consulted</li> <li>Evidence is over-reliant on one source.</li> <li>Evidence is irrelevant OR absent</li> </ul>		<ul style="list-style-type: none"> <li>Multiple credible sources are consulted</li> <li>Refers to evidence from few sources</li> <li>Evidence, including information and quotations, is included and supports the argument</li> </ul>		<ul style="list-style-type: none"> <li>Sources consulted are credible and vary in perspective OR format (e.g., text, graphic, visual media, etc.)</li> <li>Evidence from relevant primary and secondary sources is used in major parts of the argument</li> <li>Evidence, including information and quotations, is explained to support the argument</li> </ul>		<ul style="list-style-type: none"> <li>A variety of sources, both in perspective AND format (e.g., text, graphic, visual media, etc.) are consulted</li> <li>Evidence from relevant and significant primary and secondary sources is used throughout the argument</li> <li>A synthesis of evidence clearly, accurately, and convincingly supports the argument</li> </ul>

<sup>1</sup> This domain is to be scored only for tasks that require that students design their own projects or tasks.

<b>ANALYSIS</b> <i>What is the evidence that the student can analyze sources?</i>	<ul style="list-style-type: none"> <li>Information from sources is indiscriminately presented as fact</li> <li>One source dominates the argument</li> </ul>		<ul style="list-style-type: none"> <li>Uses the date or origins of a source to pose questions</li> <li>Compares points of view or information from different sources</li> </ul>		<ul style="list-style-type: none"> <li>Uses the date and origins of a source to understand its contents or author's point of view</li> <li>Compares sources and notes discrepancies between them</li> </ul>		<ul style="list-style-type: none"> <li>Uses the dates and origins of sources to understand authors' purposes and perspectives and content of the sources</li> <li>Compares sources, noting discrepancies and challenging them with other information or explaining them</li> </ul>
	<ul style="list-style-type: none"> <li>Historical/social scientific content is absent and/or contains significant inaccuracies</li> <li>Connections to particular historical/social science contexts are absent</li> </ul>		<ul style="list-style-type: none"> <li>Historical/social scientific content is limited but accurate</li> <li>Mentions relevant (e.g. historical, political, social, cultural) contexts in relation to topic</li> </ul>		<ul style="list-style-type: none"> <li>Content is detailed, accurate, and supports the argument</li> <li>Includes a discussion of relevant (e.g. historical, political, social, cultural) contexts</li> </ul>		<ul style="list-style-type: none"> <li>Content is accurate, conveys depth and breadth of knowledge on topic, and seamlessly supports the argument</li> <li>Situates issue in relevant and significant (e.g. historical, political, social, cultural) contexts</li> </ul>

## NTN Knowledge and Thinking Rubric for Math Problem Solving, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline.



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	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>PROBLEM SOLVING</b> <i>What is the evidence that the student understands the problem and the mathematical strategies that can be used to arrive at a solution?</i>	<ul style="list-style-type: none"> <li>Does not provide a model</li> <li>Ignores given constraints</li> <li>Uses few, if any, problem solving strategies</li> </ul>		<ul style="list-style-type: none"> <li>Creates a limited model to simplify a complicated situation</li> <li>Attends to some of the given constraints</li> <li>Uses inappropriate or inefficient problem solving strategies</li> </ul>		<ul style="list-style-type: none"> <li>Creates a model to simplify a complicated situation</li> <li>Analyzes all given constraints, goals and definitions</li> <li>Uses appropriate problem solving strategies</li> </ul>		<ul style="list-style-type: none"> <li>Creates a model to simplify a complicated situation and identifies limitations of model</li> <li>Analyzes all given constraints, goals and definitions and implied assumptions</li> <li>Uses novel problem solving strategies and/or strategic use of tools</li> </ul>
<b>REASONING AND PROOF</b> <i>What is the evidence that the student can apply mathematical reasoning/procedures in an accurate and complete manner?</i>	<ul style="list-style-type: none"> <li>Provides incorrect solutions without justifications</li> <li>No evidence of monitoring for reasonableness</li> <li>Results are not interpreted in terms of context</li> </ul>		<ul style="list-style-type: none"> <li>Provides partially correct solutions or correct solution without logic or justification</li> <li>Monitors for reasonableness in final answer</li> <li>Results are interpreted partially or incorrectly in terms of context</li> </ul>		<ul style="list-style-type: none"> <li>Constructs logical, correct, complete solution</li> <li>Monitors for reasonableness in final answer and adapts appropriately</li> <li>Results are interpreted correctly in terms of context</li> </ul>		<ul style="list-style-type: none"> <li>Constructs logical, correct, complete solution with justifications</li> <li>Monitors for reasonableness, identifies sources of error, and adapts appropriately</li> <li>Interprets results correctly in terms of context, indicating the domain to which a solution applies</li> </ul>
<b>CONNECTIONS</b> <i>What is the evidence that the student understands the relationships between the concepts, procedures, and/or real-world applications inherent in the problem?</i>	<ul style="list-style-type: none"> <li>Does not identify the underlying mathematical structures of the given problem</li> <li>Little or no evidence of applying previous math knowledge to given problem</li> </ul>		<ul style="list-style-type: none"> <li>Identifies the underlying mathematical structures of the given problem</li> <li>Applies previous math knowledge to given problem but may include reasoning or procedural errors</li> </ul>		<ul style="list-style-type: none"> <li>Identifies the underlying mathematical structures and makes connections to similar problems set in different contexts</li> <li>Applies and extends math previous knowledge correctly to given problem</li> </ul>		<ul style="list-style-type: none"> <li>Identifies and generalizes the underlying mathematical structures of the given problem to other seemingly unrelated problems or applications</li> <li>Applies and extends previous knowledge correctly to given problem; makes appropriate use of derived results</li> </ul>
<b>COMMUNICATION AND REPRESENTATION</b> <i>What is the evidence that the student can communicate mathematical ideas to others?</i>	<ul style="list-style-type: none"> <li>Uses representations (diagrams, tables, graphs, formulas) in ways that confuse the audience</li> <li>Uses incorrect definitions or inaccurate representations</li> </ul>		<ul style="list-style-type: none"> <li>Uses representations (diagrams, tables, graphs, formulas), though correct, do not help the audience follow the chain of reasoning; extraneous representations may be included</li> <li>Uses imprecise definitions or incomplete representations with missing units of measure or labeled axes</li> </ul>		<ul style="list-style-type: none"> <li>Uses multiple representations (diagrams, tables, graphs, formulas) to help the audience follow the chain of reasoning</li> <li>With few exceptions, uses precise definitions and accurate representations including units of measure and labeled axes</li> </ul>		<ul style="list-style-type: none"> <li>Uses multiple representations (diagrams, tables, graphs, formula) and key explanations to enhance the audience's understanding of the solution; only relevant representations are included</li> <li>Uses precise definitions and accurate representations including units of measure and labeled axes; uses formal notation</li> </ul>



## NTN Knowledge and Thinking Rubric for Scientific Research, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline



### INITIATING THE INQUIRY

*What is the evidence that the student can formulate questions and models that can be explored by scientific investigations as well as articulate a testable hypothesis?*

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>ASKING QUESTIONS</b>	<ul style="list-style-type: none"> <li>Formulates a general scientific question</li> <li>Provides limited or irrelevant content information</li> </ul>		<ul style="list-style-type: none"> <li>Formulates a specific scientific question</li> <li>Provides general content information that is related to the question</li> </ul>		<ul style="list-style-type: none"> <li>Formulates a specific and empirically testable scientific question</li> <li>Provides specific and relevant content information to support the question</li> </ul>		<ul style="list-style-type: none"> <li>Formulates a specific, testable, and challenging scientific question</li> <li>Provides specific and relevant content information to provide insight into the inquiry</li> </ul>
<b>DEVELOPING AND USING MODELS</b>	<ul style="list-style-type: none"> <li>Drawings, diagrams, or models relevant to the investigation includes major conceptual or factual errors, or are missing</li> <li>Discussion on limitations or accuracy of model as a representation of the system or process is flawed or missing</li> </ul>		<ul style="list-style-type: none"> <li>Constructs generally accurate drawings, diagrams, or models to represent the process or system to be investigated</li> <li>Makes note of limitations or accuracy of model as a representation of the system or process</li> </ul>		<ul style="list-style-type: none"> <li>Constructs accurate drawings, diagrams, or models to represent the process or system to be investigated</li> <li>Explains limitations and accuracy of model as a representation of the system or process</li> </ul>		<ul style="list-style-type: none"> <li>Constructs accurate and detailed drawings, diagrams, or models to represent the process or system to be investigated and provides an explanation of the representation</li> <li>Explains limitations and accuracy of model as a representation of the system or process and discusses how the model might be improved</li> </ul>
<b>STATING A HYPOTHESIS (WHEN APPROPRIATE)</b>	<ul style="list-style-type: none"> <li>Articulates a prediction that has limited relationship to the question under investigation</li> </ul>		<ul style="list-style-type: none"> <li>Articulates a relevant prediction of the expected results, but variables are unclearly stated</li> </ul>		<ul style="list-style-type: none"> <li>Articulates a hypothesis about the investigated question, with a basic and accurate description of the variables ("if.. then...")</li> </ul>		<ul style="list-style-type: none"> <li>Articulates a hypothesis about the investigated question, with accurate and specific explanation of the relationship between variables ("if.. then...because")</li> </ul>

## PLANNING AND CARRYING OUT INVESTIGATIONS

*What is the evidence that the student can design and perform investigations to explore natural phenomena?*

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
DESIGNING THE INVESTIGATION	<ul style="list-style-type: none"> <li>Experimental design is not aligned to the testable question</li> <li>Discussion of how the model can guide or inform the design or an aspect of the design is missing</li> </ul>		<ul style="list-style-type: none"> <li>Experimental design is related but not explicitly aligned to testable question</li> <li>States in general terms how model was used to guide, inform, or test the design or an aspect of the design</li> </ul>		<ul style="list-style-type: none"> <li>Aligns experimental design with testable question</li> <li>Explains how model was used to guide, inform, or test the design, or an aspect of the design</li> </ul>		<ul style="list-style-type: none"> <li>Explains the alignment between the experimental design and the testable question</li> <li>Explains how model was used to guide, inform, or test the design, or an aspect of the design</li> </ul>
IDENTIFYING VARIABLES	<ul style="list-style-type: none"> <li>Identifies variables of investigation but confuses dependent and independent variables</li> <li>Makes no connection between the experimental design and variables</li> </ul>		<ul style="list-style-type: none"> <li>Accurately identifies the relevant independent and dependent variables</li> <li>States how the experimental design will control relevant independent variables</li> </ul>		<ul style="list-style-type: none"> <li>Accurately identifies and explains why dependent and independent are in the investigation</li> <li>Explains how the experimental design will control relevant independent variables</li> </ul>		<ul style="list-style-type: none"> <li>Accurately identifies and explains why the variables are dependent and independent in the investigation and identifies possible confounding variables and their potential effects</li> <li>Explains how the experimental design will control relevant independent variables, and the possible confounding variables or effects</li> </ul>
DEVELOPING PROCEDURES	<ul style="list-style-type: none"> <li>Includes vague or incomplete lab procedures; or uses inappropriate tools, instruments, or types of measurement</li> <li>Amount of data to be collected is omitted</li> </ul>		<ul style="list-style-type: none"> <li>Describes lab procedures including tools/ instruments used, but is not clear or detailed enough to be replicated</li> <li>States the amount of data to be collected with no rationale</li> </ul>		<ul style="list-style-type: none"> <li>Describes detailed, clear, and replicable lab procedures including tools /instruments and types of measurements gathered</li> <li>Provides a rationale for the appropriate amount of data needed to produce reliable measurements</li> </ul>		<ul style="list-style-type: none"> <li>Describes detailed, clear, and replicable lab procedures including rationale for using the tools /instruments and types of measurements gathered</li> <li>Provides a rationale for the appropriate amount of data needed to produce reliable measurements</li> </ul>
COLLECTING DATA	<ul style="list-style-type: none"> <li>Gathers data from a single trial of the experiment</li> <li>Limitations or precision of data are not mentioned</li> </ul>		<ul style="list-style-type: none"> <li>Gathers data from several repetitions of the experiment that are clearly outside the reasonable range</li> <li>Mentions limitation or precision of data</li> </ul>		<ul style="list-style-type: none"> <li>Gathers data from several repetitions of the experiment that are not consistent within a reasonable range</li> <li>Explains limitation or precision of data</li> </ul>		<ul style="list-style-type: none"> <li>Gathers data from several repetitions of the experiment that are consistent within a reasonable range</li> <li>Explains limitation or precision of data and impact on conclusions</li> </ul>



## REPRESENTING ANALYZING, AND INTERPRETING THE DATA

*What is the evidence that the student can organize, analyze, and interpret the data?*

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>USING MATHEMATICS AND COMPUTATIONAL THINKING (WHEN APPROPRIATE)</b>	<ul style="list-style-type: none"> <li>Expresses relationships and quantities (units) using mathematical conventions with major errors</li> <li>Evaluation of whether the mathematical computation results “make sense” is omitted</li> </ul>		<ul style="list-style-type: none"> <li>Expresses relationships and quantities (units) using mathematical conventions with minor errors</li> <li>Makes note of whether the mathematical computation results “makes sense” without reference to the expected outcome</li> </ul>		<ul style="list-style-type: none"> <li>Accurately expresses relationships and quantities (units) using appropriate mathematical conventions</li> <li>Explains whether the mathematical/computation results “make sense” in relationship to the expected outcome</li> </ul>		<ul style="list-style-type: none"> <li>Accurately and consistently expresses relationships and quantities (units) using appropriate mathematical conventions</li> <li>Consistently evaluates whether the mathematical/computation results “make sense” in relationship to the expected outcome</li> </ul>
<b>ANALYZING THE DATA</b>	<ul style="list-style-type: none"> <li>Analyzes data using inappropriate methods or with major errors or omissions</li> <li>Consistency of outcome with initial hypothesis, when appropriate, is not compared</li> </ul>		<ul style="list-style-type: none"> <li>Accurately analyzes data using appropriate methods with minor omissions</li> <li>Compares consistency of outcome with initial hypothesis, when appropriate</li> </ul>		<ul style="list-style-type: none"> <li>Accurately analyzes data in using appropriate and systematic methods to identify patterns</li> <li>Compares consistency of outcome with initial hypothesis when appropriate and identifies possible sources of error</li> </ul>		<ul style="list-style-type: none"> <li>Accurately analyzes data in using appropriate and systematic methods to identify and explain patterns</li> <li>Compares and explains consistency of outcome with initial hypothesis, when appropriate and explains possible sources of error and impact of errors</li> </ul>
<b>GENERATING INTERPRETATIONS</b>	<ul style="list-style-type: none"> <li>Inferences drawn from data are absent</li> <li>Makes no mention of variables needing further investigation</li> </ul>		<ul style="list-style-type: none"> <li>Draws inferences from data without discussing strengths or weaknesses</li> <li>Makes note of variables that need further investigation</li> </ul>		<ul style="list-style-type: none"> <li>Explains the strengths OR weaknesses of the inferences drawn from data using grade appropriate techniques</li> <li>Suggests relationships or interactions between variables worth further investigation</li> </ul>		<ul style="list-style-type: none"> <li>Explains the strengths AND weaknesses of the inferences drawn from data using grade appropriate techniques</li> <li>Suggests relationships or interactions between variables worth further investigation and poses new analysis or study</li> </ul>

## CONSTRUCTING EVIDENCE-BASED ARGUMENTS AND COMMUNICATING CONCLUSIONS

*What is the evidence that the student can articulate evidence-based explanations and effectively communicate conclusions?*

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>CONSTRUCTING EVIDENCE-BASED ARGUMENTS</b>	<ul style="list-style-type: none"> <li>Argument is missing or unclear; supporting data or scientific theory are missing</li> <li>Counterclaim (possible weaknesses in scientific arguments or in their own argument) is missing</li> </ul>		<ul style="list-style-type: none"> <li>Constructs a scientific argument and mentions data OR acceptable scientific content or theory but does not explain how it supports the claim</li> <li>Identifies a counterclaim (possible weaknesses in scientific arguments or in one's own argument) without mentioning evidence</li> </ul>		<ul style="list-style-type: none"> <li>Constructs a scientific argument, explaining how data and acceptable scientific content or theory support the claim</li> <li>Identifies a counterclaim (possible weaknesses in scientific arguments or in one's own argument) using evidence</li> </ul>		<ul style="list-style-type: none"> <li>Constructs and evaluates a scientific argument explaining how data and acceptable scientific content or theory support the claim</li> <li>Explains and evaluates a counterclaim (possible strengths and weaknesses in scientific arguments or in one's own argument) using evidence</li> </ul>
<b>COMMUNICATING FINDINGS</b>	<ul style="list-style-type: none"> <li>Attempts to use multiple representations to communicate conclusions with inaccuracies or major inconsistencies with the evidence</li> <li>Implies conclusions with no discussion of limitations</li> </ul>		<ul style="list-style-type: none"> <li>Uses multiple representations (words, tables, diagrams, graphs and/or mathematical expression) to communicate conclusions with minor inconsistencies with the evidence</li> <li>States conclusions and general discussion of limitations</li> </ul>		<ul style="list-style-type: none"> <li>Uses multiple representations (words, tables, diagrams, graphs, and/or mathematical expressions) to communicate clear conclusions consistent with the evidence</li> <li>Explains conclusions with specific discussion of limitations</li> </ul>		<ul style="list-style-type: none"> <li>Uses multiple representations (words, tables, diagrams, graphs, and/or mathematical expressions) to communicate clear and specific conclusions consistent with the evidence</li> <li>Explains conclusions and impact of limitations or unanswered questions</li> </ul>
<b>FOLLOWING CONVENTIONS</b>	<ul style="list-style-type: none"> <li>Uses language and tone inappropriate to the purpose and audience</li> <li>Attempts to follow the norms and conventions of scientific writing with major, consistent errors, for example in the use of scientific/technical terms, quantitative data, or visual representations</li> </ul>		<ul style="list-style-type: none"> <li>Uses language and tone appropriate to the purpose and audience with minor lapses</li> <li>Follows the norms and conventions of scientific writing with consistent minor errors, for example in the use of scientific or technical terms, quantitative data, or visual representations</li> </ul>		<ul style="list-style-type: none"> <li>Uses language and tone appropriate to the purpose and audience</li> <li>Follows the norms and conventions of scientific writing, including accurate use of scientific/technical terms, quantitative data, and visual representations</li> </ul>		<ul style="list-style-type: none"> <li>Uses language and tone appropriate to the purpose and audience</li> <li>Consistently follows the norms and conventions of scientific writing, including accurate use of scientific/technical terms, quantitative data, and visual representations</li> </ul>

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## NTN Knowledge and Thinking Rubric for Science Argumentation, Grade 12

The ability to reason, problem-solve, develop sound arguments or decisions, and create new ideas by using appropriate sources and applying the knowledge and skills of a discipline.



New Tech Network

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>ARTICULATING A SCIENCE-RELATED ISSUE</b> <i>What is the evidence that the student can articulate a clear issue and explain its scientific context?</i>	<ul style="list-style-type: none"> <li>The scientific, social or technological significance of the issue is missing, vague, or unclear</li> <li>Scientific content is limited and/or contains inaccuracies</li> <li>Does not situate the issue within any other context</li> </ul>		<ul style="list-style-type: none"> <li>The scientific, social or technological significance of the issue is clear, but lends itself to readily available answers</li> <li>Scientific content is limited but accurate</li> <li>Makes references to another context</li> </ul>		<ul style="list-style-type: none"> <li>The scientific, social, or technological, significance of the issue is thoughtful and lends itself to a challenging research project</li> <li>Scientific content is clear, detailed and relevant</li> <li>Situates issue in a cultural, historical, and/or global context</li> </ul>		<ul style="list-style-type: none"> <li>The scientific, technological or social significance of the issue is thought-provoking and lends itself to a challenging and interesting research project</li> <li>Scientific content is clear, detailed, accurate, and relevant, and conveys depth and breadth of knowledge on the topic</li> <li>Situates the issue within their genres: cultural, historical, global context and elaborates on the significance of the issue in these contexts</li> </ul>
<b>ARGUMENT</b> <i>What is the evidence that the student can develop an argument?</i>	<ul style="list-style-type: none"> <li>Argument is unclear or underdeveloped</li> <li>Makes unclear or irrelevant claims</li> <li>One claim dominates the argument and alternative or counterclaims are absent</li> </ul>		<ul style="list-style-type: none"> <li>Makes a somewhat clear, but general argument</li> <li>Makes relevant claims</li> <li>Briefly alludes to questions or counterclaims</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear and well developed argument</li> <li>Makes relevant claims that support the argument</li> <li>Acknowledges questions or counterclaims</li> </ul>		<ul style="list-style-type: none"> <li>Makes a clear, well developed, precise, and nuanced argument</li> <li>Makes relevant and significant claims that support the argument</li> <li>Acknowledges and responds to questions or counterclaims to sharpen the argument</li> </ul>

<b>EVIDENCE</b> <i>What is the evidence that the student can support the argument?</i>	<ul style="list-style-type: none"><li>• Refers to evidence from few sources; some sources may not be relevant</li><li>• Limited use of data and/or examples</li><li>• Makes note of a general difference in perspectives on a topic without specific details</li></ul>		<ul style="list-style-type: none"><li>• Refers to limited evidence (textual, experimental, or multimedia) relevant to argument</li><li>• Data and/or examples are used to illustrate one point of view</li><li>• Briefly notes and dismisses inconsistent information or a difference among authors on the same topic</li></ul>		<ul style="list-style-type: none"><li>• Refers to sufficient and detailed evidence (textual, experimental, or multi-media) relevant to argument</li><li>• Data and/or examples are used to illustrate varying points of view</li><li>• Discusses inconsistent information and differences among authors on the same topic</li></ul>		<ul style="list-style-type: none"><li>• Refers to extensive and comprehensive evidence (textual, experimental, or multimedia) relevant to argument</li><li>• Data and/or examples are used to illustrate different points of view and justify the claim</li><li>• Weighs and evaluates inconsistent information and differences among authors on the same topic</li></ul>
<b>ANALYSIS</b> <i>What is the evidence that the student can analyze evidence?</i>	<ul style="list-style-type: none"><li>• Restates information from multiple sources</li><li>• Expresses broad agreement with a source's perspective without assessing the strength or limitation of the source</li></ul>		<ul style="list-style-type: none"><li>• Summarizes evidence from multiple sources related to the argument</li><li>• Minimally addresses the strength or limitation of one important source</li></ul>		<ul style="list-style-type: none"><li>• Synthesizes evidence from multiple sources related to the argument</li><li>• Assesses the strengths or limitations of most important sources to support the argument or claims</li></ul>		<ul style="list-style-type: none"><li>• Synthesizes and critiques evidence from multiple sources related to the argument</li><li>• Assesses the strengths and limitations of most important sources to support or refute the argument or claim</li></ul>
<b>CONCLUSION</b> <i>What is the evidence that the student can draw logical and sound conclusions?</i>	<ul style="list-style-type: none"><li>• Conclusions are stated vaguely or generally, or are implausible</li><li>• Conclusions are overstated or overdrawn</li></ul>		<ul style="list-style-type: none"><li>• Conclusions are logical, and generally plausible; no further implications are raised</li><li>• Briefly notes limitations or unanswered questions</li></ul>		<ul style="list-style-type: none"><li>• Conclusions are logical and well supported; raises plausible implications</li><li>• Discusses limitations and/or unanswered questions</li></ul>		<ul style="list-style-type: none"><li>• Conclusions are logical, well supported, and insightful, and raise important implications</li><li>• Discusses limitations, unanswered questions, and/or considers alternative explanations</li></ul>

## NTN Written Communication Rubric, Grade 12

The ability to effectively communicate knowledge and thinking through writing by organizing and structuring ideas and using discipline appropriate language and conventions.



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	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT College Ready	P/A	ADVANCED College Level
<b>ORGANIZATION</b> <i>What is the evidence that the student can organize and structure ideas for effective communication?</i>	<ul style="list-style-type: none"> <li>Argument/thesis/controlling idea is unclear or not evident throughout the text</li> <li>Ideas and evidence are disorganized, underdeveloped, or loosely sequenced making relationships unclear</li> <li>No transitions are used</li> <li>Conclusion, when appropriate, is absent or restates the introduction or prompt.</li> </ul>		<ul style="list-style-type: none"> <li>Argument/thesis/controlling idea is evident but not consistently present throughout text</li> <li>Ideas and evidence are organized but not sufficiently developed or logically sequenced to show relationships</li> <li>Transitions connect ideas with minor lapses</li> <li>Conclusion, when appropriate, goes beyond the introduction.</li> </ul>		<ul style="list-style-type: none"> <li>Argument/thesis/controlling idea is presented clearly and consistently throughout text</li> <li>Ideas and evidence (including claims and counterclaims, as appropriate) are developed and logically sequenced to show clear relationships</li> <li>Transitions connect ideas</li> <li>Conclusion, when appropriate, follows from or supports the argument.</li> </ul>		<ul style="list-style-type: none"> <li>Argument/thesis/controlling idea is presented clearly and consistently throughout text, and drives the organization of the text</li> <li>Ideas are fully developed and logically sequenced to present a coherent whole</li> <li>Transitions guide the reader through the development and reasoning of the claim/controlling idea</li> <li>Conclusion, when appropriate, is logical and raises important implications.</li> </ul>
<b>LANGUAGE AND CONVENTIONS</b> <i>What is the evidence that the student can use language skillfully to communicate ideas?</i>	<ul style="list-style-type: none"> <li>Language, style, and tone are inappropriate to the purpose and audience.</li> <li><b>Attempts to follow</b> the norms and conventions of writing in the discipline/genre with <b>major, consistent errors</b></li> <li>Has an accumulation of errors in grammar, usage, and mechanics that distracts or interferes with meaning</li> <li>When appropriate for the task, textual citation is missing or incorrect</li> </ul>		<ul style="list-style-type: none"> <li>Language, style, and tone are appropriate to the purpose and audience with minor lapses.</li> <li>Follows the norms and conventions of writing in the discipline/genre with <b>consistent minor errors</b></li> <li>Has some minor errors in grammar, usage, and mechanics that partially distract or interfere with meaning</li> <li>When appropriate for the task, cites textual evidence with some minor errors</li> </ul>		<ul style="list-style-type: none"> <li>Language, style, and tone are appropriate to the purpose and audience*</li> <li>Follows the norms and conventions of writing in the discipline/genre**</li> <li>Is generally free of distracting errors in grammar, usage, and mechanics</li> <li>When appropriate for the task, cites textual evidence consistently and accurately</li> </ul>		<ul style="list-style-type: none"> <li>Language, style, and tone are tailored to the purpose and audience.</li> <li><b>Consistently</b> follows the norms and conventions of writing in the discipline/genre</li> <li>Is free from errors in grammar, usage, and mechanics</li> <li>When appropriate for the task, cites textual evidence consistently and accurately</li> </ul>

## IAKT Task Checklist

Category	Requirements for an IAKT
Core Content and Alignment with College and Career Ready Standards	<p><b>First, be sure that...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Task addresses content central to the discipline and class</li> <li><input type="checkbox"/> Task requires students to think deeply about content, e.g. engaging students in application/analysis/synthesis</li> <li><input type="checkbox"/> Task is appropriately challenging, addressing content suitable to the grade level and student learning trajectory</li> <li><input type="checkbox"/> Task requires students to go beyond prior knowledge to use evidence from their learning/text(s) in their response</li> </ul> <p><b>An Exceptional IAKT also:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Addresses big ideas or enduring understandings central to the discipline</li> <li><input type="checkbox"/> Engages students in complex, higher order thinking skills important to the discipline</li> </ul>
Skill Assessment	<ul style="list-style-type: none"> <li><input type="checkbox"/> Task is substantial enough to allow assessment of students' Knowledge and Thinking and Written Communication skills</li> <li><input type="checkbox"/> <b>If the task is a CRA:</b> Task is substantial enough to allow assessment of students' skills on the entire Knowledge and Thinking and Written Communication rubrics.</li> <li><input type="checkbox"/> Task requires an individual written product or a written product with a substantial individual component even when students are working in groups, allowing assessment of individual skills</li> </ul>
Task Prompt Clarity	<ul style="list-style-type: none"> <li><input type="checkbox"/> Task prompt: includes a driving question (when appropriate), what students will be reading or considering, and active verb/s to describe how students will be processing and writing about information. <i>Templates help with this item.</i></li> <li><input type="checkbox"/> Task is understandable as written, i.e. prompt wording is clear and concise</li> </ul> <p><b>An Exceptional IAKT is also:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Worded precisely to give students a clear purpose for writing and unambiguous directions</li> </ul>
Authenticity and Engagement	<ul style="list-style-type: none"> <li><input type="checkbox"/> Task moves students on a trajectory towards the kinds of reading, writing, and thinking about content done by professionals and experts in the discipline</li> <li><input type="checkbox"/> Task is integrated into the project: completing the task helps students meet the content or product goals of the project</li> <li><input type="checkbox"/> Task allows for students to make important choices</li> <li><input type="checkbox"/> Task allows for diverse responses, as appropriate</li> <li><input type="checkbox"/> Content can be made meaningful for students, connecting to their lives, needs of community, important topics, etc.</li> </ul> <p><b>An Exceptional IAKT also:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Engages students for the same purposes, in the same writing types, and for the same audiences as professionals who write about the content</li> <li><input type="checkbox"/> Is essential to completing the overall project successfully</li> </ul>

**If you're also assessing the scaffolding:**

Task Scaffolding	<ul style="list-style-type: none"><li><input type="checkbox"/> Scaffolding is carefully designed to support students in the development of targeted skills</li><li><input type="checkbox"/> Scaffolding is organized and sequenced to guide students through procedural and cognitive demands of the task</li><li><input type="checkbox"/> Scaffolding is interactive, differentiated, promotes discourse, and/or uses models</li><li><input type="checkbox"/> Scaffolding supports student agency in meeting the demands of a challenging task</li><li><input type="checkbox"/> Resources/texts are appropriate to the task demands and are varied in complexity and type to meet the needs of diverse students</li></ul>
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