

# **HESS COGNITIVE RIGOR MATRIX** (READING CRM):



## Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction	Webb's DOK Level 2 Skills & Concepts	Webb's DOK Level 3 Strategic Thinking/Reasoning	Webb's DOK Level 4 Extended Thinking	
Remember  Retrieve knowledge from long-term memory, recognize, recall, locate, identify	o Recall, recognize, or locate basic facts, terms, details, events, or ideas explicit in texts o Read words orally in connected text with fluency & accuracy	Use these Hess CRM curricular examples with most close reading or listening assignments or assessments in any content area.			
Understand  Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion), predict, compare/contrast, match like ideas, explain, construct models	o Identify or describe literary elements (characters, setting, sequence, etc.) o Select appropriate words when intended meaning/definition is clearly evident o Describe/explain who, what, where, when, or how o Define/describe facts, details, terms, principles o Write simple sentences	Specify, explain, show relationships; explain why (e.g., cause-effect)     Give non-examples/examples     Summarize results, concepts, ideas     Make basic inferences or logical predictions from data or texts     Identify main ideas or accurate generalizations of texts     Locate information to support explicit-implicit central ideas	o Explain, generalize, or connect ideas using supporting evidence (quote, example, text reference) o Identify/ make inferences about explicit or implicit themes o Describe how word choice, point of view, or bias may affect the readers' interpretation of a text o Write multi-paragraph composition for specific purpose, focus, voice, tone, & audience	o Explain how concepts or ideas specifically relate to other content domains (e.g., social, political, historical) or concepts o Develop generalizations of the results obtained or strategies used and apply them to new problem-based situations	
Apply  Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	O Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning of words O Apply rules or resources to edit spelling, grammar, punctuation, conventions, word use O Apply basic formats for documenting sources	Use context to identify the meaning of words/phrases     Obtain and interpret information using text features     Develop a text that may be limited to one paragraph     Apply simple organizational structures (paragraph, sentence types) in writing	<ul> <li>Apply a concept in a new context</li> <li>Revise final draft for meaning or progression of ideas</li> <li>Apply internal consistency of text organization and structure to composing a full composition</li> <li>Apply word choice, point of view, style to impact readers' /viewers' interpretation of a text</li> </ul>	o Illustrate how multiple themes (historical, geographic, social, artistic, literary) may be interrelated o Select or devise an approach among many alternatives to research a novel problem	
Analyze  Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)	o Identify whether specific information is contained in graphic representations (e.g., map, chart, table, graph, T-chart, diagram) or text features (e.g., headings, subheadings, captions) o Decide which text structure is appropriate to audience and purpose	o Categorize/compare literary elements, terms, facts/details, events o Identify use of literary devices o Analyze format, organization, & internal text structure (signal words, transitions, semantic cues) of different texts o Distinguish: relevant-irrelevant information; fact/opinion o Identify characteristic text features; distinguish between texts, genres	Analyze information within data sets or texts     Analyze interrelationships among concepts, issues, problems     Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to create or critique a text     Use reasoning, planning, and evidence to support inferences	Analyze multiple sources of evidence, or multiple works by the same author, or across genres, time periods, themes     Analyze complex/abstract themes, perspectives, concepts     Gather, analyze, and organize multiple information sources     Analyze discourse styles	
Evaluate  Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique	"UG" – unsubstantiated generalizations = stating an opinion without providing any support for it!		Cite evidence and develop a logical argument for conjectures     Describe, compare, and contrast solution methods     Verify reasonableness of results     Justify or critique conclusions drawn	o Evaluate relevancy, accuracy, & complete- ness of information from multiple sources o Apply understanding in a novel way, provide argument or justification for the application	
Create  Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce	o Brainstorm ideas, concepts, problems, or perspectives related to a topic , principle, or concept	o Generate conjectures or hypotheses based on observations or prior knowledge and experience	o Synthesize information within one source or text o Develop a complex model for a given situation o Develop an alternative solution	o Synthesize information across multiple sources or texts o Articulate a new voice, alternate theme, new knowledge or perspective	



## **HESS COGNITIVE RIGOR MATRIX** (HEALTH AND PHYSICAL EDUCATION):



Applying (Hess's Interpretation of) Depth of Knowledge to Porter's Cognitive Demand Categories

Porter 's Cognitive Demand Categories	DOK Level 1 Recall and Reproduction Having the knowledge required; do not need to "figure it out"	DOK Level 2 Connect or Apply Skills and Concepts Making connections among skills or concepts or decisions (e.g., about approach, tools)	DOK Level 3 Strategic Thinking/Abstract Reasoning Complex and Abstract; Exploring multiple solution paths; Justifying with evidence	<b>DOK Level 4 Extended Thinking</b> Relating or developing complex ideas using multi sources <i>and evidence</i>
Memorize	o Recall or identify basic facts, terms, definitions, skills, rules, principles, concepts, symbols o Acquire new terms, vocabulary, etc.	Use these Hess CRM Curricular Examples with most assignments, assessments, or learning activities for Health and Physical Education.  See also the Hess CRM for Fine Arts with examples for dance.		
Communicate Understanding	Define terms, principles, concepts     Describe how to perform a routine skill or task     Use words, visuals, or symbols to represent     basic ideas, movements, procedures, etc.	Explain concepts: show or predict relationships (if-then, cause-effect); provide examples and non-examples     Observe and interpret teacher or student demonstrations     Summarize a concept, series of events, movements, or a result	Use evidence (data, examples, source, observations) to justify an interpretation of a result or performance     Locate or reproduce supporting evidence for results of effectiveness of a plan (e.g., exercise or diet routine)     Create a personal plan when given criteria	o Share results of comparing different plans (e.g., compare exercise or diet routines) using data and evidence from multiple sources or data sets o Explain how a concept relates across content domains or to "big ideas" (e.g., systems, patterns)
Perform Procedures	Safely demonstrate or use appropriate tools or equipment     Execute or repeat basic skills or procedures (e.g., follow step-by-step directions or pattern)     Demonstrate a basic skill sequence, movement pattern, etc., with smooth transitions	Make observations; collect and record data and observations (e.g., health diary, skills progress)     Select and use appropriate tool or equipment for a given task     Complete routine tasks in a fitness assessment	Plan, execute, and evaluate multistep procedures (a dance routine, football play, rules of a new game, etc.)     Test effects and trends of using different activities by observing and collecting data (e.g., exercise or diet routines)     Select and plan how to use a combination of movements to achieve a desired effect	Design and conduct a performance     (e.g., exercise or dance routine) using multiple sources or resources, and/or given constraints (e.g., use of space)     Test effects of different variables on performance (e.g., applied to a new situation)
Apply Concepts/ Make Connections	Apply rules or score-keeping of a game or simple routine     Apply appropriate content-specific vocabulary or terms to tasks     Brainstorm ideas, problems, or perspectives related to a situation, scenario, or observation	o Create an infographic or visual to show connections or to summarize key ideas (e.g., cause-effect, heart rate-activity type, warm up-cool down, healthy or unhealthy) o Explain connections among concepts or skills in a given context (e.g., movement or open space concepts, health benefits)	Revise a plan (self, peer) based on feedback and evidence     Use concepts to explain phenomena or research or medical advances (e.g., use of steroids, drugs, food choices)     Investigate how an event or advancement led to a new perspective or outcome	Apply and adapt information and concepts to real-world situations     Integrate ideas from multiple sources to extend an idea or solve a problem with an alternative solution     Trace the evolution of (game, drug, etc.) from past to present, citing sources used
Analyze Information	o Identify, describe, match, or name parts in a diagram or visual (e.g., muscle groups or skeletal system) or patterns o Determine which skill, rule, or principle applies to a given situation o Record performance data	o Compare-contrast routines, skill sets, or qualities (e.g., use T-chart, graphic organizer for locomotor-nonlocomotor) o Generate questions and make predictions based on observations or information o Classify types of (movements, sports, symptoms, examples, etc.)	Analyze data in order to recognize patterns or draw conclusions based on evidence (e.g., batting averages, areas needing remediation)     Identify faulty arguments, strategies, or misrepresentations of data or media message     Defend the selection of criteria used to critique or develop a performance or product	Research a topic in-depth, evaluating relevancy, accuracy, and completeness of information from multiple sources or perspectives     Analyze evidence and recommend the most effective course of action for intended purpose (e.g., food, fitness)

online resources

Available for download at resources.corwin.com/HessToolkit and www.karin-hess.com/free-resources

Hess' Cognitive Rigor Matrix & Curricular Examples: Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions – M-Sci

Revised Bloom's	Webb's DOK Level 1	Webb's DOK Level 2	Webb's DOK Level 3	Webb's DOK Level 4
Taxonomy	Recall & Reproduction	Skills & Concepts	Strategic Thinking/ Reasoning	Extended Thinking
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Recall, observe, & recognize facts, principles, properties     Recall/ identify conversions among representations or numbers (e.g., customary and metric measures)			
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion (such as from examples given), predict, compare/contrast, match like ideas, explain, construct models	<ul> <li>Evaluate an expression</li> <li>Locate points on a grid or number on number line</li> <li>Solve a one-step problem</li> <li>Represent math relationships in words, pictures, or symbols</li> <li>Read, write, compare decimals in scientific notation</li> </ul>	Specify and explain relationships (e.g., non-examples/examples; cause-effect)     Make and record observations     Explain steps followed     Summarize results or concepts     Make basic inferences or logical predictions from data/observations     Use models /diagrams to represent or explain mathematical concepts     Make and explain estimates	Use concepts to solve non-routine problems     Explain, generalize, or connect ideas using supporting evidence     Make and justify conjectures     Explain thinking when more than one response is possible     Explain phenomena in terms of concepts	Relate mathematical or scientific concepts to other content areas, other domains, or other concepts     Develop generalizations of the results obtained and the strategies used (from investigation or readings) and apply them to new problem situations
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	Follow simple procedures     (recipe-type directions)     Calculate, measure, apply a rule     (e.g., rounding)     Apply algorithm or formula (e.g.,     area, perimeter)     Solve linear equations     Make conversions among     representations or numbers, or     within and between customary     and metric measures	Select a procedure according to criteria and perform it Solve routine problem applying multiple concepts or decision points Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps Translate between tables, graphs, words, and symbolic notations (e.g., graph data from a table) Construct models given criteria	Design investigation for a specific purpose or research question     Conduct a designed investigation     Use concepts to solve non-routine problems <u>Use &amp; show reasoning, planning, and evidence</u> Translate between problem & symbolic notation when not a direct translation	Select or devise approach among many alternatives to solve a problem     Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct	Retrieve information from a table or graph to answer a question ldentify whether specific information is contained in graphic representations (e.g., table, graph, T-chart, diagram)     Identify a pattern/trend	Categorize, classify materials, data, figures based on characteristics     Organize or order data     Compare/ contrast figures or data     Select appropriate graph and organize & display data     Interpret data from a simple graph     Extend a pattern	Compare information within or across data sets or texts     Analyze and draw conclusions from data, citing evidence     Generalize a pattern     Interpret data from complex graph     Analyze similarities/differences between procedures or solutions	Analyze multiple sources of evidence     analyze complex/abstract themes     Gather, analyze, and evaluate information
Evaluate  Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique			Cite evidence and develop a logical argument for concepts or solutions     Describe, compare, and contrast solution methods     Verify reasonableness of results	Gather, analyze, & evaluate information to draw conclusions     Apply understanding in a novel way, provide argument or justification for the application
Create Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce	Brainstorm ideas, concepts, or perspectives related to a topic	Generate conjectures or hypotheses based on observations or prior knowledge and experience	Synthesize information within one data set, source, or text     Formulate an original problem given a situation     Develop a scientific/mathematical model for a complex situation	Synthesize information across multiple sources or texts     Design a mathematical model to inform and solve a practical or abstract situation



### **HESS COGNITIVE RIGOR MATRIX** (SOCIAL STUDIES/HUMANITIES CRM):



Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall and Reproduction	Webb's DOK Level 2 Skills and Concepts	Webb's DOK Level 3 Strategic Thinking/Reasoning	Webb's DOK Level 4 Extended Thinking
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	o Recall or locate key facts, dates, terms, details, events, or ideas explicit in texts	Use these Hess CRM curricular examples with most assignm activities in social studies, history, civics, geography, eco		± ,
Understand  Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion, predict, observe, comparecontrast, match like ideas, explain, construct models	Select appropriate words or terms when intended meaning is clearly evident     Describe or explain who, what, where, when, or how     Define facts, details, terms, principles     Locate or identify symbols that represent     Raise related questions for possible investigation	Specify, explain, illustrate relationships; explain why (e.g., cause-effect)     Provide and explain nonexamples and examples     Summarize results, concepts, main ideas, generalizations     Make basic inferences or logical predictions (using data or text)     Locate relevant information to support explicit-implicit central ideas	O Explain, generalize, or connect ideas using supporting evidence (quote, example, text reference, data) O Support inferences about explicit or implicit themes O Describe how word choice, point of view, or bias may affect the reader's or viewer's interpretation O Write multi-paragraph composition or essay for specific purpose, focus, voice, tone, and audience	O Explain how concepts or ideas specifically relate to other content domains or concepts (social, political, historical, cultural) O Apply generalizations to new problem-based situations O Use multiple sources to elaborate on how concepts or ideas specifically draw from other content domains or differing concepts (e.g., research paper, arguments of policy: Should this law be passed? What will be the impact of this change?)
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (transfer) to an unfamiliar or nonroutine task	Apply basic formats for documenting sources     Apply use of reference materials and tools for gathering information (e.g., key word searches)	Use context to identify the meaning of words or phrases     Interpret information using text features (diagrams, data tables, captions, etc.)     Apply simple organizational structures (paragraph outline)	o Investigate to determine how a historical, cultural, or political context may be the source of an underlying theme, central idea, or unresolved issue or crisis	o Integrate or juxtapose multiple (historical, cultural) contexts drawn from source materials (e.g., literature, music, historical events, media) with intent to develop a complex or multimedia product and personal viewpoint
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias, point of view, approach/strategy used)	o Identify causes or effects o Describe processes or tools used to research ideas, artifacts, or images reflecting history, culture, tradition, etc. o Identify ways symbols and metaphors are used to represent universal ideas o Identify specific information given in graphics (e.g., map, T-chart, dia- gram) or text features (e.g., heading, subheading, captions)	Compare similarities or differences in processes, methods, styles due to influences of time period, politics, or culture o Distinguish relevant-irrelevant information, fact or opinion; primary from a secondary source     Draw inferences about social, historical, cultural contexts portrayed in (literature, arts, film, political cartoons, primary sources)     Explain, categorize events or ideas in the evolution of across time periods	o Analyze information within data sets or a text (e.g., interrelationships among concepts, issues, problems)  O Analyze an author's viewpoint or potential bias (e.g., political cartoon)  O Use reasoning, planning, and evidence to support or refute inferences in policy or speech  O Use reasoning and evidence to generate criteria for making and supporting an 'argument of judgment' (e.g., Was FDR a great president? Is this a fair law?)	Analyze multiple sources of evidence across time periods, themes, issues     Analyze diverse, complex, or abstract perspectives     Gather, analyze, and organize information from multiple sources     Analyze discourse styles or bias in speechelegal briefs, etc., across time or authors     Compare and contrast conflicting judgments or policies (e.g., Supreme Court decisions)
Evaluate  Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique	"UG"—unsubstantiated generalizations = stating an opinion without providing any support for it!		Develop a logical argument for conjectures, citing evidence     Verify reasonableness of results of others     Critique conclusions drawn, evidence used, credibility of sources	Evaluate relevancy, accuracy, and complete ness of information using multiple sources     Apply understanding in a novel way, provide argument or justification for the application     Critique the historical impact on policy, writings, advances
Create  Reorganize elements into new patterns, structures, or schemas, generate, hypothesize, design, plan, produce	o Brainstorm ideas, concepts, prob- lems, or perspectives related to a topic, principle, or concept	o Generate testable conjectures or hypotheses based on observations, prior knowledge, and/or artifacts	Synthesize information within one source or text     Develop a complex model or symbol for a given issue     Develop and support an alternative solution	Synthesize information across multiple sources or texts     Articulate a new voice, alternate theme, new knowledge, or new perspective     Create historical fiction drawing on sources

online resources &

 $A vailable \ for \ download \ at \ \textbf{resources.com/HessToolkit} \ and \ \textbf{www.karin-hess.com/free-resources}$ 



# **HESS COGNITIVE RIGOR MATRIX** (FINE ARTS CRM):



Applying (Hess' Interpretation of) DOK to Artistic Practices

Artistic Practice	DOK Level 1 Recall & Reproduction Having the knowledge required; do not need to "figure it out"	DOK Level 2 Connect or Apply Skills & Concepts Making connections among skills/concepts or decisions (e.g., about approach, tools)	DOK Level 3 Strategic Thinking/Abstract Reasoning Complex & Abstract; Exploring multiple solution paths; Justifying with evidence	DOK Level 4 Extended Thinking Relating/developing complex ideas using multi-sources and evidence	
Perceiving, Performing, & Responding	o Identify/ describe ways art represents what people see, hear, feel, believe o Recall/ describe a variety of instruments, forms, symbols, rhythms, conventions of music O Describe how artists/ dancers might represent o Identify/ describe narrative conventions depicted in the arts	o Show relationships between (dance, music, film, etc.) and other arts forms o Make observations or compare similarities/differences: styles, forms, techniques, etc. o Explain possible reasons for selecting tools, medium, elements, principles, images, etc. o Select a familiar artistic work to perform o Explain the artist's central message	Analyze/find evidence of how a combination of elements or principles are used to achieve a desired effect     Analyze narrative art work, using supporting evidence to interpret setting, characters, action, conflict, etc.     Develop personal response to or interpretation of a work of art	o Analyze more than one performance or product (same composer, time period, theme, etc.) drawing from multiple source materials for the analyses (e.g., different treatments of same theme) o Perform an "old" idea in a new way	
Historical, Social, & Cultural Contexts	O Describe processes used by artists to select/create ideas, images that reflect history, culture, tradition, etc. O Identify ways symbols and metaphors are used to represent universal ideas O Locate symbols that represent O Identify/ describe characteristics and origins of dance/art/music genres	o Draw inferences about social, historical, or cultural contexts portrayed in art/music/dance/theatre/film o Explain or compare how different art forms communicate culture, time period, issues o Compare similarities/ differences in processes, methods, styles due to influences of time period/politics/culture o Explain/trace the evolution of arts forms across time periods	o Analyze how historical/cultural context is applied to develop theme in a performance or product o Plan artworks based on historical, social, political, or cultural theme, concept, or representative style o Apply problem solving strategies used among the arts, humanities, and sciences to solve visual "problems"	o Integrate or juxtapose multiple (historical, cultural) contexts drawn from source materials (e.g., literature, music, historical events, media) with intent to develop a complex/multifaceted performance or product and personal viewpoint	
Creative Expression, Exploration, & Production	o Explore ideas and techniques by manipulating media, materials, tools for different effects (e.g., how color, rhythm, or camera angles create various moods) o Demonstrate a variety of movements, methods, techniques o Locate/compile examples illustrating different approaches (e.g., camera angles; use of white space)	o Select/use tools for specific artistic purposes o Develop a study of by combining elements, aesthetic principles, and/or forms, etc. o Use/apply choreographic forms to communicate ideas, feelings, concepts o Improvise simple rhythmic variations o Create examples or models that represent the same topic, concept, idea, etc.	o Combine elements of (dance, art, music) to create that conveys an intended point of view/specific idea, mood, or theme o Create/compose for a specific purpose, using appropriate processes, tools, techniques o Create narrative art work depicting setting, characters, action, conflict, etc. o Research a given style and develop personal interpretation of it	o Apply multiple sets of criteria to develop and present a complex /multifaceted performance or product (e.g., consistent application of awareness of space, physical discipline, concentration, and projection from rehearsals to performance; development of portfolio showing evolution of ideas/personal style)	
Aesthetics, Criticism, Reflection	Recognize or describe choreographic forms, elements of art or music, principles of design, etc. when presented in isolation     Describe criteria used for executing technical or artistic quality	o Explain ways in which artistic choices (choreographic forms, etc.) might affect performance or audience response o Critique examples and non-examples of a given technique, style, etc.	o Defend the selection of criteria and evidence used to critique the quality or develop a performance or product (e.g., compose a melody, perform improvisation, direct a scene, solve a visual "problem")	o Formulate/ use multiple sets of criteria and evidence to critique a complex /multi-faceted performance or final product o Compile and defend exemplars chosen to depict a theme or style	