TOOL 1

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	o Specify, explain, show relationships; explain why (e.g., cause-effect) o Give non-examples/examples o Summarize results, concepts, ideas o Make basic inferences or logical predictions from data or texts o Identify main ideas or accurate generalizations of texts o 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	o Use context to identify the meaning of words/phrases o Obtain and interpret information using text features o Develop a text that may be limited to one paragraph o Apply simple organizational structures (paragraph, sentence types) in writing	o Apply a concept in a new context o Revise final draft for meaning or progression of ideas o Apply internal consistency of text organization and structure to composing a full composition o Apply word choice, point of view, style to impact readers' /viewers' interpretation of a text	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	o Analyze information within data sets or texts o Analyze interrelationships among concepts, issues, problems o Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to create or critique a text o Use reasoning, planning, and evidence to support inferences	o Analyze multiple sources of evidence, or multiple works by the same author, or across genres, time periods, themes o Analyze complex/abstract themes, perspectives, concepts o Gather, analyze, and organize multiple information sources o 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!		o Cite evidence and develop a logical argument for conjectures o Describe, compare, and contrast solution methods o Verify reasonableness of results o Justify or critique conclusions drawn	o Evaluate relevancy, accuracy, & completeness 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

Tool 5B

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*	DOK Level 4 **Extended Thinking** Relating or developing complex ideas using multi sources *and evidence*
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	o Define terms, principles, concepts o Describe how to perform a routine skill or task o Use words, visuals, or symbols to represent basic ideas, movements, procedures, etc.	o Explain concepts: show or predict relationships (if–then, cause–effect); provide examples and non-examples o Observe and interpret teacher or student demonstrations o Summarize a concept, series of events, movements, or a result	o Use evidence (data, examples, source, observations) to justify an interpretation of a result or performance o Locate or reproduce supporting evidence for results of effectiveness of a plan (e.g., exercise or diet routine) o 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	o Safely demonstrate or use appropriate tools or equipment o Execute or repeat basic skills or procedures (e.g., follow step-by-step directions or pattern) o Demonstrate a basic skill sequence, movement pattern, etc., with smooth transitions	o Make observations; collect and record data and observations (e.g., health diary, skills progress) o Select and use appropriate tool or equipment for a given task o Complete routine tasks in a fitness assessment	o Plan, execute, and evaluate multistep procedures (a dance routine, football play, rules of a new game, etc.) o Test effects and trends of using different activities by observing and collecting data (e.g., exercise or diet routines) o Select and plan how to use a combination of movements to achieve a desired effect	o 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) o Test effects of different variables on performance (e.g., applied to a new situation)
Apply Concepts/ Make Connections	o Apply rules or score-keeping of a game or simple routine o Apply appropriate content-specific vocabulary or terms to tasks o 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)	o Revise a plan (self, peer) based on feedback and evidence o Use concepts to explain phenomena or research or medical advances (e.g., use of steroids, drugs, food choices) o Investigate how an event or advancement led to a new perspective or outcome	o Apply and adapt information and concepts to real-world situations o Integrate ideas from multiple sources to extend an idea or solve a problem with an alternative solution o 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.)	o Analyze data in order to recognize patterns or draw conclusions based on evidence (e.g., batting averages, areas needing remediation) o Identify faulty arguments, strategies, or misrepresentations of data or media message o Defend the selection of criteria used to critique or develop a performance or product	o Research a topic in-depth, evaluating relevancy, accuracy, and completeness of information from multiple sources or perspectives o 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 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	○ 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	○ Evaluate an expression ○ Locate points on a grid or number on number line ○ Solve a one-step problem ○ Represent math relationships in words, pictures, or symbols ○ Read, write, compare decimals in scientific notation	○ 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 ○ Use & show reasoning, planning, and evidence ○ 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 ○ Identify 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 assignments, assessments, or inquiry activities in social studies, history, civics, geography, economics, or humanities.		
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion, predict, observe, compare–contrast, match like ideas, explain, construct models	o Select appropriate words or terms when intended meaning is clearly evident o Describe or explain who, what, where, when, or how o Define facts, details, terms, principles o Locate or identify symbols that represent . . . o Raise related questions for possible investigation	o Specify, explain, illustrate relationships; explain why (e.g., cause–effect) o Provide and explain nonexamples and examples o Summarize results, concepts, main ideas, generalizations o Make basic inferences or logical predictions (using data or text) o 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	o Apply basic formats for documenting sources o Apply use of reference materials and tools for gathering information (e.g., key word searches)	o Use context to identify the meaning of words or phrases o Interpret information using text features (diagrams, data tables, captions, etc.) o 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, diagram) or text features (e.g., heading, subheading, captions)	o 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 o Draw inferences about social, historical, cultural contexts portrayed in (literature, arts, film, political cartoons, primary sources) o 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?)	o Analyze multiple sources of evidence across time periods, themes, issues o Analyze diverse, complex, or abstract perspectives o Gather, analyze, and organize information from multiple sources o Analyze discourse styles or bias in speeches, legal briefs, etc., across time or authors o 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!		o Develop a logical argument for conjectures, citing evidence o Verify reasonableness of results of others o Critique conclusions drawn, evidence used, credibility of sources	o Evaluate relevancy, accuracy, and completeness of information using multiple sources o Apply understanding in a novel way, provide argument or justification for the application o 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, problems, or perspectives related to a topic, principle, or concept	o Generate testable conjectures or hypotheses based on observations, prior knowledge, and/or artifacts	o Synthesize information within one source or text o Develop a complex model or symbol for a given issue o Develop and support an alternative solution	o Synthesize information across multiple sources or texts o Articulate a new voice, alternate theme, new knowledge, or new perspective o Create historical fiction drawing on sources

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TOOL 4

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	o Analyze/find evidence of how a combination of elements or principles are used to achieve a desired effect o Analyze narrative art work, using supporting evidence to interpret setting, characters, action, conflict, etc. o 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	o Recognize or describe choreographic forms, elements of art or music, principles of design, etc. when presented in isolation o 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