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

Use these Hess CRM curricular examples with most mathematics or science assignments or assessments.

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

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