# Alignment of 21<sup>st</sup> Century Rigor, Virginia MATH SOL, Revised Bloom's Taxonomy, Depth of Knowledge and Research-based Instructional/Assessment Strategies (incl. TEI)



Purpose: The intended purpose of this correlation is to align the context of the *Standards of Learning* with the <u>Depth of Thinking</u> (Webb) and the <u>Type of Thinking</u> (Revised Bloom.) This document provides teachers and administrators with a starting point for planning for the instruction and assessment of each standard. Teachers and administrators are encouraged to use the question cues and the research-based strategies from *Classroom Instruction that Works, Vol. 2* and *Transforming Classroom Grading* to plan instructional and assessment activities that focus student behaviors and thinking in the appropriate cognitive domain.

Prepared for the Teachers of Virginia's 21<sup>st</sup> Century Students by

Daniel Mulligan, Ed. D.

2013 – 2014

#### Cognitive Rigor Matrix for Comprehensive Mathematics Assessment

Dopth of Thinking	DOK Level 1	DOK Level 2	DOK Level 3	DOK Level 4
Depth of Thinking				
(Webb)+Type of	Recall &	Basic Skills & Concepts	Strategic Thinking &	Extended
Thinking (Bloom)	Reproduction		Reasoning	Thinking
REMEMBER	<ul> <li>Recall, conversions, terms, facts</li> </ul>			
UNDERSTAND	<ul> <li>Evaluate an expression</li> <li>Locate points on a grid or number on a number line</li> <li>Solve a one-step equation</li> <li>Represent math relationships in words, pictures, or symbols</li> </ul>	<ul> <li>Specify, explain relationships</li> <li>Make basic inferences or logical predictions from data/observations</li> <li>Use models/diagrams to explain concepts</li> <li>Make and explain estimates</li> </ul>	<ul> <li>Use concepts to solve non- routine problems</li> <li>Use supporting evidence to justify conjectures, generalize, or connect ideas</li> <li>Explain reasoning when more than one response is possible</li> <li>Explain phenomena in terms of concepts</li> </ul>	<ul> <li>Relate mathematical concepts to other content areas, other domains</li> <li>Develop generalizations of the results obtained and the strategies used and apply them to new problem situations</li> </ul>
APPLY	<ul> <li>Follow simple procedures</li> <li>Calculate, measure, apply a rule (e.g. rounding)</li> <li>Apply algorithm or formula</li> <li>Solve linear equations</li> <li>Make conversions</li> </ul>	<ul> <li>Select a procedure and perform it</li> <li>Solve routine problems applying multiple concepts or decision points</li> <li>Retrieve information to solve a problem</li> <li>Translate between representations</li> </ul>	<ul> <li>Design investigation for a specific purpose or research question</li> <li>Use reasoning, planning, and supporting evidence</li> <li>Translate between problem &amp; symbolic notation when not a direct translation</li> </ul>	<ul> <li>Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results</li> </ul>
ANALYZE	<ul> <li>Retrieve information from a table or graph to answer a question</li> <li>Identify a pattern/trend</li> </ul>	<ul> <li>Categorize data, figures</li> <li>Organize, order data</li> <li>Select appropriate graph and organize &amp; display data</li> <li>Interpret data from a simple graph</li> <li>Extend a pattern</li> </ul>	<ul> <li>Compare information with or across data sets or texts</li> <li>Analyze and draw conclusions from data, citing evidence</li> <li>Generalize a pattern</li> <li>Interpret data from complex graph</li> </ul>	<ul> <li>Analyze multiple sources of evidence or data sets</li> </ul>
EVALUATE			<ul> <li>Cite evidence and develop a logical argument</li> <li>Compare/contrast solution methods</li> <li>Verify reasonableness</li> </ul>	<ul> <li>Apply understanding in a novel way, provide argument or justification for the new application</li> </ul>
CREATE	<ul> <li>Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept</li> </ul>	<ul> <li>Generalize conjectures or hypotheses based on observations or prior knowledge and experience</li> </ul>	<ul> <li>Develop an alternative solution</li> <li>Synthesize information within one data set</li> </ul>	<ul> <li>Synthesize information across multiple sources or data sets</li> <li>Design a model to inform and solve a practical or abstract solution</li> </ul>

Adapted from the SMARTER Balance Assessment Item Specifications by Dan Mulligan, 2013

#### MATH K

## Virginia 2009 Math Standards of Learning, Revised Bloom's Taxonomy,

and Research-Based Strategies for Increasing Student Achievement in the 21<sup>st</sup> Century

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Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind- mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses	Generating & Testing Hypotheses
Instructional Strategies	Questions, Cues, & Advance Organizers Homework & Practice	Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Generating & Testing Hypotheses Cooperative Learning	Similarities & Differences Summarizing & Note Taking	Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	K.1, K.2, K.4, K.5, K.7, K.8, K.11, K.12	K.2, K.3, K.4, K.5, K.7, K.9, K.10, K.11, K.12, K.15, K.16	K.6, K.9, K.11, <mark>K.13, K.14,</mark> K.15	K.1, K.4, K.10, K.11, <mark>K.13, K.14,</mark> K.15, K.16	<b>K.4, K.5, K.7, K.11,</b> <b>K.16</b> Dan	K.1, K.2, K.16 Mulligan,, flexiblecreativity.com

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Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses Similarities & Differences	Generating & Testing Hypotheses
Strategies	Questions, Cues, & Advance Organizers Homework & Practice	Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Generating & Testing Hypotheses Cooperative Learning	Similarities & Differences Summarizing & Note Taking	Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	1.1, 1.3, 1.5, 1.7, 1.11, 1.12, 1.17, 1.18	1.2, 1.6, 1.7, 1.11, 1.15, 1.17	1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.13, 1.14	1.1, 1.2, 1.3, 1.4, 1.5, 1.8, 1.10, 1.11, 1.12, 1.13, 1.15, 1.16, 1.17, 1.18	<b>1.4, 1.14, 1.16</b> Dar	1.13, 1.17, 1.18 Mulligan, flexiblecreativity.com

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Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework & Practice	Nonlinguistic Representation Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	2.12, <mark>2.17,</mark> 2.22	2.1, 2.2, 2.3, 2.5, 2.7, 2.12, 2.13, 2.14, 2.16, 2.20	2.1, 2.4, 2.6, 2.7, 2.8, 2.10, 2.11, 2.13, 2.15, 2.16, 2.17, 2.18, 2.21	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.22	<b>2.4, 2.6, 2.7, 2.8, 2.9,</b> <b>2.10, 2.18, 2.19, 2.20</b>	2.8, 2.15, 2.18, 2.20, 2.21 Mulligan, flexiblecreativity.com

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Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework & Practice	Nonlinguistic Representation Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	3.5, 3.8, 3.13, 3.14, 3.17, 3.18,	3.1, 3.5, 3.11, 3.12, 3.14, 3.15, 3.17, 3.18, 3.19, 3.20,	3.1, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.15, 3.17, 3.19,	3.1, 3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.14, 3.16, 3.17, 3.20	3.1, 3.4, 3.16, 3.17, 3.18, 3.19, 3.20, Da	<b>3.6, 3.17,</b> Mulligan, flexiblecreativity.com

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Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework & Practice	Nonlinguistic Representation Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies NNS CE M G	Forced-Choice TEI Short Written Response <b>4.1, 4.12</b>	Forced-Choice TEI Short Written Response Essay 4.1, 4.2, 4.3, 4.6, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16	Performance Assessment Essay / TEI Teacher Observation Forced Choice 4.1, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.13, 4.14, 4.16	TEI Essay Short Written Response Performance Assessment 4.1, 4.2, 4.3, 4.4, 4.5, 4.7, 4.8, 4.10, 4.11, 4.13, 4.14, 4.15	Performance Assessment Essay Oral report TEI 4.3, 4.4, 4.6, 4.7, 4.8, 4.11, 4.13, 4.14, 4.16	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report <b>4.15</b>
PS PFA					Dar	n Mulligan, flexiblecreativity.com

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Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework &	Nonlinguistic Representation Similarities & Differences Summarizing & Note	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning
	Practice	Taking Questions, Cues & Advance Organizers		Taking	Setting Objectives & Providing Feedback Nonlinguistic Representation	Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	5.3, 5.9,	5.2, 5.3, 5.5, 5.7, 5.9, <mark>5.16</mark> , 5.17, 5.18, 5.19	5.1, 5.4, 5.5, 5.6, 5.7, 5.8, 5.11, 5.14, 5.15, 5.16,	5.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.10, 5.11, 5.12, 5.14, 5.15, 5.16, 5.17,	5.4, 5.5, 5.8, 5.13, 5.14, 5.15, 5.18, 5.19 Da	<b>5.3, 5.4, 5.5, 5.8,</b> <b>5.13, 5.18,</b> Mulligan, flexiblecreativity.com

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Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework & Practice	Nonlinguistic Representation Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies NNS	Forced-Choice TEI Short Written Response 6.1, 6.3, 6.5,	Forced-Choice TEI Short Written Response Essay 6.2, 6.3, 6.5, 6.8,	Performance Assessment Essay / TEI Teacher Observation Forced Choice 6.2, 6.3, 6.4, 6.6,	TEI Essay Short Written Response Performance Assessment 6.1, 6.2, 6.3, 6.5,	Performance Assessment Essay Oral report TEI <b>6.1, 6.2, 6.10,</b>	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report <b>6.4, 6.6, 6.7, 6.10,</b>
CE M G PS PFA	6.11, 6.13,	6.11, 6.12,	6.7, 6.8, 6.10, 6.12,	6.9, 6.10, 6.12, 6.13,	Da	n Mulligan, flexiblecreativity.com

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Research- Based	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses	Generating & Testing Hypotheses
Instructional Strategies	Questions, Cues, & Advance Organizers Homework & Practice	Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Generating & Testing Hypotheses Cooperative Learning	Similarities & Differences Summarizing & Note Taking	Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	7.1, 7.2, 7.5, 7.6, 7.8, 7.9, 7.12, 7.15, 7.16,	7.1, 7.2, 7.4, 7.6, 7.7, 7.8, 7.9, 7.11, 7.12, 7.13, 7.14, 7.15,	7.3, 7.4, <b>7.5</b> , <b>7.6</b> , <b>7.8</b> , <b>7.9</b> , <b>7.10</b> , <b>7.11</b> , 7.13, 7.14, 7.15, 7.16,	7.1, 7.2, 7.3, 7.5, 7.7, 7.8, 7.11, 7.13, 7.16,	<b>7.9, 7.11,</b> Da	7.3, 7.4, 7.5, 7.8, 7.14, Mulligan, flexiblecreativity.com

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Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses	Generating & Testing Hypotheses
Instructional Strategies	Questions, Cues, & Advance Organizers Homework & Practice	Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Generating & Testing Hypotheses Cooperative Learning	Similarities & Differences Summarizing & Note Taking	Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic	Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Representation Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
NNS CE M G PS PFA	8.1, 8.2, 8.5, 8.6, 8.8, 8.10, 8.16, 8.17,	8.1, 8.2, 8.4, 8.5, 8.6, 8.7, 8.11, 8.12, 8.14, 8.15, 8.16, 8.17,	8.3, 8.4, 8.6, 8.7, 8.8, 8.10, 8.11, 8.12, 8.14, 8.15, 8.17,	8.2, 8.3, 8.7, 8.9, 8.12, 8.13, 8.14, 8.15, 8.16,	<b>8.7, 8.10, 8.13,</b> Da	8.3, 8.7, 8.9, Mulligan, flexiblecreativity.com

#### **ALGEBRA I**

#### A Virginia 2009 Math Standards of Learning, Revised Bloom's Taxonomy, 2013 and Research-Based Strategies for Increasing Student Achievement in the 21<sup>st</sup> Century

	<b>_</b>					
Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research-	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses	Generating & Testing Hypotheses
Based Instructional Strategies	Questions, Cues, & Advance Organizers Homework & Practice	Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Generating & Testing Hypotheses Cooperative Learning	Similarities & Differences Summarizing & Note Taking	Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
EO EI F S	A.2, A.4, A.6, A.7,	A.1, A.2, A.3, A.4, A.6, <mark>A.9</mark> ,	A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.11,	A.2, A.4, A.5, A.6, A.7, A.9, A.10,	A.4, A.5, A.8, A.9, A.11, Dar	A.1, A.4, A.8, A.9, A.11, Mulligan, flexiblecreativity.com

#### GEOMETRY

# **RY** Virginia 2009 Math Standards of Learning, Revised Bloom's Taxonomy,

and Research-Based Strategies for Increasing Student Achievement in the 21<sup>st</sup> Century

Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based Instructional Strategies	Similarities & Differences Questions, Cues, & Advance Organizers Homework & Practice	Nonlinguistic Representation Similarities & Differences Summarizing & Note Taking Questions, Cues & Advance Organizers	Nonlinguistic Representation Generating & Testing Hypotheses Cooperative Learning	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking	Generating & Testing Hypotheses Similarities & Differences Summarizing & Note Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Generating & Testing Hypotheses Summarizing & Note Taking Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies RLT	Forced-Choice TEI Short Written Response G.5, G.10, G.11,	Forced-Choice TEI Short Written Response Essay G.5, G.8, G.10,	Performance Assessment Essay / TEI Teacher Observation Forced Choice <b>G.1, G.2, G.3,</b>	TEI Essay Short Written Response Performance Assessment G.1, G.2, G.3,	Performance Assessment Essay Oral report TEI <b>G.1, G.4, G.6, G.7,</b>	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report <b>G.5, G.8, G.9, G.10,</b>
T PC TDF	G.12, G.13,	G.11, G.12, G.14,	G.6, G.7, G.8, G.9, G.12, G.13,	G.10, G.13, G.14,	<b>G.9, G.11,</b> Dat	G.11, G.13, G.14, Mulligan, flexiblecreativity.com

#### ALGEBRA II

#### **RAII** Virginia 2009 Math Standards of Learning, Revised Bloom's Taxonomy, **2013** and Research-Based Strategies for Increasing Student Achievement in the 21<sup>st</sup> Century

2013-2014

Cognitive Domain	Remembering	Understanding	Applying	Analyzing RIGOR	Evaluating RIGOR	Creating RIGOR
Question Cues	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, googling, highlighting, favorite-ing, social networking	Interpreting, summarizing, inferring, explaining, paraphrasing, classifying, exemplifying, annotating, advanced searching, blog journaling, twittering, commenting	Implementing, carrying out, using, executing, running, loading, playing, operating, uploading for collaboration, sharing, editing	Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, mashing resources, linking, cracking, mind-mapping, tagging	Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, (Blog/vlog) commenting, reviewing, posting, moderating, collaborating, networking, reflecting	Designing, composing, constructing, planning, producing, devising, making, programming, filming, animating, Blogging, Video blogging, mixing, remixing, wiki-ing, publishing, videocasting podcasting, directing
Research- Based	Similarities & Differences	Nonlinguistic Representation	Nonlinguistic Representation	Generating & Testing Hypotheses	Generating & Testing Hypotheses	Generating & Testing Hypotheses
Instructional Strategies	Questions, Cues, & Advance Organizers	Similarities & Differences	Generating & Testing Hypotheses	Similarities & Differences	Similarities & Differences Summarizing & Note	Summarizing & Note Taking
	Homework & Practice	Summarizing & Note Taking Questions, Cues & Advance Organizers	Cooperative Learning	Summarizing & Note Taking	Taking Setting Objectives & Providing Feedback Nonlinguistic Representation	Cooperative Learning Reinforcing Effort & Providing Recognition
Research- Based Assessment Strategies	Forced-Choice TEI Short Written Response	Forced-Choice TEI Short Written Response Essay	Performance Assessment Essay / TEI Teacher Observation Forced Choice	TEI Essay Short Written Response Performance Assessment	Performance Assessment Essay Oral report TEI	Student Self-Assessment Essay Performance Assessment Teacher Observation Oral Report
EO F EI S	All.1, All.2, All.3, All.6, All.7, All.8, All.11,	AII.2, AII.3, AII.7, AII.8, AII.9, AII.10, AII.11, AII.12,	All.4, All.7, All.9, All.10, All.12,	AII.2, AII.3, AII.4, AII.5, AII.6, AII.8, AII.9,	All.1, All.4, All.5, All.7, All.9, All.11,	All.2, All.10,

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Practice Space/notes: