# Revised 22-23 Mathematics - Frederick County Public Schools

## Graduation Competencies and Performance Standards Overview 22-23

(Revised 8/2022)

## Mathematics Graduation Competency 1: Precision
Make sense of, persevere, and attend to precision in the solving of problems.

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| 1A | Analyze and/or compare a range of representations and strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, data representations and verbal models to understand information, identify constraints, plan solutions, gain insights, and make sense of problems. |
| 1B | Communicate mathematically using appropriate levels of precision with language, symbols and/or calculations that reflect the precision of the problem context. |

## Mathematics Graduation Competency 2: Reasoning
Reason abstractly and quantitatively.

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| 2A | Decontextualize mathematical problems. |
| 2B | Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense. |
| 2C | Analyze properties, representations, and/or quantities involved in a problem to ensure reasonableness. |

## Mathematics Graduation Competency 3: Formal Argument
Construct viable arguments and critique the reasoning of others.

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|---|---|
| 3A | Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations. |
| 3B | Construct and present formal mathematical arguments using appropriate representations and/or definitions, with logical reasoning progressions to support one's own problem solution or to respond to another's problem solution. |

## Mathematics Graduation Competency 4: Modeling
Model with mathematics and use appropriate tools strategically.

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| 4A | Using prior mathematical knowledge and context-specific quantities and assumptions, develop an appropriate representation to show mathematical relationships, solve problems based on those relationships, and examine the results in context. |
| 4B | Select appropriate tools strategically to solve mathematical tasks/problems efficiently. |

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## Mathematics Graduation Competency 5: Structure
Look for and make use of structure and express regularity in repeated reasoning.

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| 5A | Make and communicate a conclusion about the context of a situation utilizing patterns and/or structure from multiple perspectives using correct mathematical notation and terminology. |
| 5B | Use patterns, structures, and/or repeated calculations to generate a rule or conclusion that can be justified mathematically. |

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| Mathematics Graduation Competency 1: **Precision** |
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| Make sense of, persevere, and attend to precision in the solving of problems. |

| | |
|---|---|
| 1A | Analyze and/or compare a range of representations and strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, data representations and verbal models to understand information, identify constraints, plan solutions, gain insights, and make sense of problems. |
| 1B | Communicate mathematically using appropriate levels of precision with language, symbols and/or calculations that reflect the precision of the problem context. |

### Performance Standards Scoring Criteria for Competency 1

| Performance Standards | 1 - Emergent | 2 - Approaching | 3 - Proficient | 4 - Exemplary |
|---|---|---|---|---|
| 1A Analyze and/or compare a range of representations and strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, data representations and verbal models to understand information, identify constraints, plan solutions, gain insights, and make sense of problems. | I can **compare** and **analyze** representations but do not use a problem-solving strategy nor achieve an answer. | I can **compare** and **analyze** representations using a problem-solving strategy **with errors**. | I can **compare** and **analyze** representations and use an effective problem-solving strategy to make sense of problems with **minimal errors.** | I can **compare** and **analyze** representations and use an **effective problem-solving strategy** to make sense of problems. |
| 1B Communicate mathematically using appropriate levels of precision with language, symbols and/or calculations that reflect the precision of the problem context. | I can **calculate** logical answers, but do not communicate appropriate terminology and/or symbols. | I can **calculate** and **communicate** logical answers using appropriate terminology and/or symbols, **but make errors**. | I can **calculate** and **communicate** logical answers using appropriate terminology and/or symbols, but make **minor errors**. | I can **precisely calculate** and **communicate** correct answers using appropriate terminology and/or symbols. |

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| Mathematics Graduation Competency 2: **Reasoning** |
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| Reason abstractly and quantitatively. |

| 2A | Decontextualize mathematical problems. |
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| 2B | Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense. |
| 2C | Analyze properties, representations, and/or quantities involved in a problem to ensure reasonableness. |

| Performance Standards Scoring Criteria for Competency 2 | | | | |
|---|---|---|---|---|
| **Performance Standards** | **1 - Emergent** | **2 - Approaching** | **3 - Proficient** | **4 - Exemplary** |
| 2A Decontextualize mathematical problems. | I can **create** a mathematical representation that makes minimal connection to the problem with **major errors**. | I can **create** a mathematical representation that **connects** the context of the problem to the representation**.** | I can **create an appropriate** mathematical representation that **connects** the context of the problem to the representation with **minor errors.** | I can **create** an appropriate mathematical representation that **accurately connects** the context of the problem to the representation **without errors.** |
| 2B Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense. | I can **identify** a mathematical connection that is relevant but not correct. | I can **explain** a mathematical connection that is **mostly correct and relevant**. | I can **relate** a mathematical connection that is **entirely correct and relevant**. | I can **relate** and **justify** a mathematical connection that is **entirely correct and relevant**. |
| 2C Analyze properties, representations, and/or quantities involved in a problem to ensure reasonableness. | I can partially **analyze** mathematical information. | I can **analyze** mathematical information and **explain** its reasonableness, but do not support it with evidence. | I can **analyze** mathematical information, accurately **assess** its reasonableness, and **support** it with evidence. | I can **analyze** mathematical information, accurately **assess** its reasonableness, **support** it with evidence, and **modify** the answer to address the constraints of the problem. |

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| Mathematics Graduation Competency 3: Formal Argument |
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| Construct viable arguments and critique the reasoning of others. |

| 3A | Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations. |
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| 3B | Construct and present formal mathematical arguments using appropriate representations and/or definitions, with logical reasoning progressions to support one's own problem solution or to respond to another's problem solution. |

| Performance Standards Scoring Criteria for Competency 3 | | | | |
|---|---|---|---|---|
| **Performance Standards** | **1 - Emergent** | **2 - Approaching** | **3 - Proficient** | **4 - Exemplary** |
| 3A Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations. | I can **explain** my strategy and/or thinking. | I can **accurately explain some** of my strategy and/or thinking. | I can **accurately explain all** of my strategy and/or thinking. | I **can accurately explain and justify** my strategy and/or thinking. |
| 3B Construct and present formal mathematical arguments using appropriate representations and/or definitions, with logical reasoning progressions to support one's own problem solution or to respond to another's problem solution. | I can **make** a mathematical claim.<br><br>(about their own claim or a claim about someone else's work) | I can **make** a mathematical claim **and support** it with evidence **or** reasoning.<br><br>(about their own claim or a claim about someone else's work) | I can **make** a mathematical claim **and support** it with **accurate** evidence **and** reasoning. | I can **make** a mathematical claim **and support** it with **logical** and accurate evidence and reasoning. |

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| Mathematics Graduation Competency 4: **Modeling** |
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| Model with mathematics and use appropriate tools strategically. |

| 4A | Using prior mathematical knowledge and context-specific quantities and assumptions, develop an appropriate representation to show mathematical relationships, solve problems based on those relationships, and examine the results in context. |
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| 4B | Select appropriate tools strategically to solve mathematical tasks/problems efficiently. |

**Performance Standards Scoring Criteria for Competency 4**

| Performance Standards | 1 - Emergent | 2 - Approaching | 3 - Proficient | 4 - Exemplary |
|---|---|---|---|---|
| 4A Using prior mathematical knowledge and context-specific quantities and assumptions, develop an appropriate representation to show mathematical relationships, solve problems based on those relationships, and examine the results in context. | I can **develop** a representation to show relationships, but **do not solve and/or examine** the results in context. | I can **develop** a representation to show relationships, **solve** problems, and **examine** results **with errors**. | I can **develop** an **appropriate** representation to show relationships, **solve** problems, and **examine** the results **in context** with **minor errors.** | I can **develop** an **appropriate** representation to show relationships, **solve** problems, and **accurately examine** the results **in context.** |
| 4B Select appropriate tools strategically to solve mathematical tasks/problems efficiently. | I can select a tool, but **cannot** solve the mathematical problem. | I can select an **appropriate** tool to **solve** the given mathematical problem efficiently, but with **major** errors. | I can select an **appropriate** tool to solve the given mathematical problem **efficiently,** but with **minor** errors. | I can select an **appropriate** tool to solve the given mathematical problem **efficiently** and **correctly**. |

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| Mathematics Graduation Competency 5: Structure |
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| Look for and make use of structure and express regularity in repeated reasoning. |

| 5A | Make and communicate a conclusion about the context of a situation utilizing patterns and/or structure from multiple perspectives using correct mathematical notation and terminology. |
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| 5B | Use patterns, structures, and/or repeated calculations to generate a rule or conclusion that can be justified mathematically. |

| Performance Standards Scoring Criteria for Competency 5 | | | | |
|---|---|---|---|---|
| **Performance Standards** | **1 - Emergent** | **2 - Approaching** | **3 - Proficient** | **4 - Exemplary** |
| 5A Make and communicate a conclusion about the context of a situation utilizing patterns and/or structure from multiple perspectives using correct mathematical notation and terminology | I can **synthesize** information from patterns or structures, but formulate an **incorrect** conclusion about the context of a situation and do not use sufficient mathematical notation and terminology. | I can **synthesize** information from patterns or structures to formulate a **partially accurate** conclusion about the context of a situation, but do not use sufficient mathematical notation and terminology. | I can **synthesize** information from patterns or structures to formulate an **accurate** conclusion about the context of a situation using mathematical notation and terminology, but make **errors**. | I can **synthesize** information from patterns or structures to formulate an **accurate** conclusion about the context of a situation using **correct** mathematical notation and terminology. |
| 5B.Use patterns, structures, and/or repeated calculations to generate a rule or conclusion that can be justified mathematically. | I can **generate** a rule or conclusion using patterns, structures, and/or repeated calculations, but **do not justify** it. | I can **generate** and **justify** a rule or conclusion using patterns, structures and/or repeated calculations with **errors**. | I can **accurately generate** and **justify** a rule or conclusion using **appropriate** patterns, structures and/or repeated calculations with **minimal errors**. | I can **accurately generate** and **justify** a rule or conclusion using **appropriate** patterns, structures, and/or repeated calculations. |