Mathematics Learning Progressions




When students are expected to demonstrate the knowledge, skills, and abilities described by an eligible content or standard-No VMC is currently vailable.

- Whe vailable.

| Content Code | Eligible Content | Grades |  |  |  |  |  |  |  | Algebra I |  | Algebra II |  | Geometry |  |
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|  |  | к | 1 | 2 | 3 | 45 | 6 | 7 | 8 | $\begin{array}{\|c\|} \hline \text { Module } 1 \\ \text { Operations and } \\ \text { Linear Functions \& } \end{array}$ | $\begin{gathered} \text { Module 2 } \\ \begin{array}{c} \text { Linear functions } \\ \text { and Data } \end{array} \\ \hline \text { and } \end{gathered}$ | Module $\mathbf{1}$ <br> Numbers Systems <br> and Data Analysis | $\begin{gathered} \text { Module 2 } \\ \text { Non-Linear } \\ \text { Expressions and } \end{gathered}$ | Module $\mathbf{1}$ Geometric Properties and | $\begin{gathered} \text { Module } \mathbf{2} \\ \text { Geometrical } \\ \text { Reasoning } \end{gathered}$ |
| Algebraic Concepts: Functional Representations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M03.8.0.3.1.5 | Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 104.8.0.3.1.1 | Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. |  |  |  |  | $\bullet$ |  |  |  |  |  |  |  |  |  |
| N04.8.0.3.1.2 | Deter mine the missing elements in a function tabele (limitit to,+- or $\times$ and to whole numbers or money |  |  |  |  | - |  |  |  |  |  |  |  |  |  |
| M004.8.3.3.1.3 | Determine the rule for a function given a table (limit to,+- , or $\times$ and to whole numbers). |  |  |  |  | $\bullet$ |  |  |  |  |  |  |  |  |  |
| M00.8.0.2.1.1. | Generate two numerical patterns using two given rules. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| N05.8.0.2.1.2 | dentify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| N06.8.E.3.1.2 | Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| N08.8.E.2.1.2 | Use similar right triangles to show and explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Derive the equation $y=m x$ for a line through the origin and the equation $y=m x+b$ for a line intercepting the vertical axis at $b$. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| M00. $\mathrm{F}_{\text {F. } 1.1 .1}$ | Dotermine whethera relation is faunction. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| M08. PF.1.1.2 | Compare properties of two functions, each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions). |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| N08. 8.5 .1 .13 | Interpret the equation $y=m x+b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| N08. F F.2.1.1 | Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| $\underline{12.2 .2 .1 .}$ | Create, interpret, and/or use the equation, graph, or table of a linear function. |  |  |  |  |  |  |  |  |  | $\bigcirc$ |  |  |  |  |
| 112.1.2.2 | Translate from one representation of a linear function to another (i.e., graph, table, and equation). |  |  |  |  |  |  |  |  |  | $\bigcirc$ |  |  |  |  |
| 11.2.2.1. | dentify, describe, and/or use constant rates of change. |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |
| 11.2.2.1.2 | Apply the concept of linear rate of change (slope) to solve problems. |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |
| 11.2.2.1.3 | Write or identify a linear equation when given <br> - the graph of the line, <br> - two points on the line, or <br> - the slope and a point on the line. <br> Note: Linear equation may be in point-slope, <br> standard, and/or slope-intercept form. |  |  |  |  |  |  |  |  |  | - |  |  |  |  |
| 11.2.2.1.4 | Determine the slope and/or $y$-intercept represented by a linear equation or graph. |  |  |  |  |  |  |  |  |  | $\bigcirc$ |  |  |  |  |
| M08. P F.2.1.2 | Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally. |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
| 11.2.1.1.1 | Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |
| 112.1.1.2 | Determine whether a relation is a function, given a set of points or a graph. |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |
| 11.2.1.1.3 | Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22.1.3.2.1 | Determine how a change in one variable relates to a change in a second variable (e.g., $y=4 / x$; if $x$ doubles, what happens to $y$ ?) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22.2.1.1.1 | Analyze a set of data for the existence of a pattern, and represent the pattern with a rule algebraically and/or graphically. |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |
| 22.2.1.1.2 | dentify and/or extend a pattern as either an arithmetic or geometric sequence (e.g., given a geometric sequence, find the 20th term). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22.2.1.1.3 | Determine the domain, range, or inverse of a relation. |  |  |  |  |  |  |  |  |  |  |  | $\bigcirc$ |  |  |
| 22.2.1.1.4 | dentify and/or determine the characteristics of an exponential, quadratic, or polynomial function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |




| M08.E.E.3.1.3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| M08. .E.E.3.14 | Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection inspection. |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11.1.2.1. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M08. .E.E.3.1.5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| -1.1.2.2.2 | interpret solutions to problems in the context of <br> he problem situation <br> Note: Limit systems to two linear equations. |  |  |  |  |  |  |  |  |  |  |  |  |  |
| -1.1.3.2.1 | Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. |  |  |  |  |  |  |  |  |  |  |  |  |  |
| -11.3.2.2 | iterpret solutions to problems in the context of <br> the problem situation. <br> Note: Limit systems to two linear inequalities. |  |  |  |  |  |  |  | - |  |  |  |  |  |
| 22.1.1.11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22.1.1.1.2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $2{ }^{2.1 .1 .1 .3}$ | Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms). |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22.1.1.14 | Write, solve, and/or apply linear or exponential growth or decay (including problem situations). |  |  |  |  |  |  |  |  |  | - |  |  |  |




| M08.C-G.1.1.1 | Identify and apply properties of rotations, reflections, and translations. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| M08.C-G.1.1.2 | Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M08.C-G.1.1.3 ${ }^{\text {a }}$ | Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M08.C-G. G.1.1.4 | Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M08.C.-G.2.1.3 | Apply the Pythagorean theorem to find the distance between two points in a coordinate system. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ¢9.2.1.2.1 | Calculate the distance and/or midpoint between two points on a number line or on a coordinate plane. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9.2.1.2.2 | Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations). |  |  |  |  |  |  |  |  |  |  |  |  |  |  |





