**2016 Mathematics Vertical Articulation Grades K – Algebra II SOL by Strand Concepts**

**NNS = Number and Number Sense; C&E = Computation and Estimation; M&G = Measurement and Geometry; P&S = Probability and Statistics; PFA = Patterns, Functions, and Algebra**

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| **NNS- STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Number Identification and Representation | [K.1ab](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=8); [K.3abcd](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=11); [K.4ab](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=12) | [1.1abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=8); [1.2a](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=10); [1.3](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=11); [1.5ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=14) | [2.1ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=8); [2.2ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=10); [2.3ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=11) | [3.1a](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=8) | [4.1a](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=8) |  |  |  |  |  |  |  |
| Whole Number and Decimal Rounding |  |  | [2.1d](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=8) | [3.1b](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=8) | [4.1c](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=8); [4.3b](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=11) | [5.1](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=8) |  |  |  |  |  |  |
| Rational Numbers - Compare and Order | [K.2ab](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=10) | [1.2bc](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=10) | [2.1c](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=8); [2.4c](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=12) | [3.1c](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=8); [3.2c](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=10) | [4.1b](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=8); [4.2a](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=9); [4.3c](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=11) | [5.2b](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=9) | [6.2b](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=11); [6.3b](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=14) | [7.1bc](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=8) | [8.1](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=8) |  |  |  |
| Rational Number Equivalencies | [K.5](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=14) | [1.4ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=12) | [2.4ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=12) | [3.2ab](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=10) | [4.2bc](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=9); [4.3ad](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=11) | [5.2a](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=9) | [6.1](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=8); [6.2a](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=11) |  |  |  |  |  |
| Number Sets and Characteristics |  |  | [2.2c](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=10) |  |  | [5.3ab](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=10) | [6.3ac](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=14) | [7.1e](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=8) | [8.2](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=9) |  |  |  |
| Exponents/Squares/Square Roots |  |  |  |  |  |  | [6.4](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=15) | [7.1ad](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=8) | [8.3ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=10) | [A.3bc](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=9) |  |  |
| **C&E- STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Fluency - Whole Number Operations |  | [1.7ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=19) | [2.5b](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=16) | [3.4c](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=18) | [4.4a](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=14) |  |  |  |  |  |  |  |
| Whole Number Estimation and Operations |  |  | [2.5a](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=16); [2.6ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=18) | [3.3a](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=14); [3.4a](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=18) | [4.4bc](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=14) | [5.7](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=23) |  |  |  |  |  |  |
| Rational Number Estimation and Operations |  |  |  |  | [4.5ab](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=22); [4.6a](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=24) | [5.5a](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=18) | [6.5a](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=17); [6.6ac](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=19) |  |  |  |  |  |
| Practical Applications – Whole Numbers | [K.6](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=16) | [1.6](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=16) | [2.6c](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=18) | [3.3b](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=14); [3.4bd](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=18) | [4.4d](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=14) |  |  |  |  |  |  |  |
| Practical Applications -Rational Numbers and Proportional Reasoning  |  |  |  | [3.5](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=23) | [4.5c](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=22); [4.6b](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=24) | [5.4](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=13); [5.5b](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=18); [5.6ab](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=20) | [6.5bc](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=17); [6.6b](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=19) | [7.2](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=12); [7.3](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=13) | [8.4](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=12) |  |  |  |
| **M&G- STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Money | [K.7](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=19) | [1.8](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=23) | [2.7ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=24) | [3.6abc](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=26) |  |  |  |  |  |  |  |  |
| Time | [K.8](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=20) | [1.9ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=24) | [2.9](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=26); [2.10ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=27) | [3.9abc](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=29) | [4.9](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=30) | [5.11](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=30) |  |  |  |  |  |  |
| Length, Weight/Mass, Liquid Volume, and Temperature | [K.9](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=21) | [1.10](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=25) | [2.8ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=25); [2.11](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=28) | [3.7ab](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=27); [3.10](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=30) | [4.8abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=28) | [5.9ab](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=28) |  |  |  |  |  |  |
| Area, Perimeter, and Circumference |  |  |  | [3.8ab](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=28) | [4.7](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=27) | [5.8ab](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=26) | [6.7abc](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=22) |  | [8.10](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=21) |  |  |  |
| Volume and Surface Area |  |  |  |  |  |  |  | [7.4ab](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=17) | [8.6ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=15) |  | [G.13](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=25); [G.14abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=27) |  |

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| **M&G- STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Point, Line, Line Segment, Ray and Angle - Identify, Describe, Classify and Measure |  |  |  | [3.11](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=31) | [4.10ab](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=31) | [5.12](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=31) |  |  | [8.5](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=14) |  | [G.2ab](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=9) |  |
| Circles and Polygons - Identify and Describe | [K.10ac](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=22) | [1.11ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=26) |  | [3.12abc](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=32) |  | [5.10](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=29); [5.14b](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=33) |  |  |  |  | [G.12](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=24) |  |
| Circles and Polygons – Classify and Measure |  |  | [2.12ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=29) |  | [4.12](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=34) | [5.13ab](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=32) |  | [7.6ab](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=20) | [8.9ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=20) |  | [G.5abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=14); [G.8abc](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=18); [G.9](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=19); [G.10abc](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=22); [G.11abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=23) |  |
| Plane (2-D) and Solid (3-D) Figures - Compare, Contrast, and Construct | [K.10b](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=22) |  | [2.13](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=30) |  | [4.11](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=33) |  |  |  | [8.8](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=19) |  | [G.4abcdefgh](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=12) |  |
| Congruency and Similarity |  |  |  | [3.13](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=33) |  |  | [6.9](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=24) | [7.5](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=18) |  |  | [G.6](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=15); [G.7](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=17) |  |
| Coordinate Plane and Transformations |  |  |  |  |  | [5.14a](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=33) | [6.8ab](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=23) | [7.7](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=23) | [8.7ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=17) |  | [G.3abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2924#page=10) |  |
| **P&S- STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Measures of Central Tendency |  |  |  |  |  | [5.17abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=41) | [6.11ab](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=30) |  |  |  |  | [AII.10](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=21); [AII.11abc](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=22); [AII.12](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=25) |
| Outcomes and Probability |  |  | [2.14](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=33) | [3.14](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=35) | [4.13abc](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=36) | [5.15](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=36) |  | [7.8ab](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=25) | [8.11ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=23) |  |  |  |
| Data Representation and Interpretation | [K.11ab](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=25) | [1.12ab](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=29) | [2.15ab](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=34) | [3.15ab](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=36) | [4.14abc](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=38) | [5.16abc](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=38) | [6.10abc](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=27) | [7.9abc](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=26) | [8.12abc](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=25); [8.13abc](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=27) | [A.9](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=19) |  | [AII.9](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=20) |
| **PFA - STRAND CONCEPT** | **Grade K** | **Grade 1** | **Grade 2** | **Grade 3** | **Grade 4** | **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** | **Related to Algebra I** | **Related to Geometry** | **Related to Algebra II** |
| Equality/Solving Equations  |  | [1.15](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=35) | [2.17](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=39) | [3.17](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=41) | [4.16](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=43) | [5.19bd](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=45) | [6.13](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=42) | [7.12](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=41) | [8.17](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=44) | [A.4abcde](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=10) |  | [AII.3abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=9); [AII.4](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=11) |
| Solving Inequalities |  |  |  |  |  |  | [6.14ab](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=45) | [7.13](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=43) | [8.18](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=47) | [A.5abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=13) |  | [AII.3a](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=9) |
| Algebraic Expressions |  |  |  |  |  | [5.19ac](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=45) |  | [7.11](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=40) | [8.14ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=30) | [A.1ab](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=7); [A.2abc](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=8); [A.3a](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=9) |  | [AII.1abc](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=7); [AII.2](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=8) |
| Proportional and Additive Relationships; Slope; Linear Functions |  |  |  |  |  |  | [6.12abcd](https://www.doe.virginia.gov/home/showpublisheddocument/2996#page=33) | [7.10abcde](https://www.doe.virginia.gov/home/showpublisheddocument/3008#page=31) | [8.16abcde](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=36) | [A.6abc](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=15); [A.8](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=18) |  | [AII.5](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=12) |
| Patterns, Relations and Functions | [K.12](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=28); [K.13](https://www.doe.virginia.gov/home/showpublisheddocument/3036#page=29) | [1.13](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=32); [1.14](https://www.doe.virginia.gov/home/showpublisheddocument/2936#page=33) | [2.16](https://www.doe.virginia.gov/home/showpublisheddocument/2950#page=37) | [3.16](https://www.doe.virginia.gov/home/showpublisheddocument/2960#page=39) | [4.15](https://www.doe.virginia.gov/home/showpublisheddocument/2972#page=42) | [5.18](https://www.doe.virginia.gov/home/showpublisheddocument/2984#page=43) |  |  | [8.15ab](https://www.doe.virginia.gov/home/showpublisheddocument/3020#page=33) | [A.7abcdef](https://www.doe.virginia.gov/home/showpublisheddocument/2868#page=16) |  | [AII.6ab](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=13); [AII.7a-k](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=14); [AII.8](https://www.doe.virginia.gov/home/showpublisheddocument/2880#page=19) |

**2016 Mathematics Vertical Articulation Grades K – Algebra II SOL by Strand Concepts**

**NNS = Number and Number Sense; C&E = Computation and Estimation; M&G = Measurement and Geometry; P&S = Probability and Statistics; PFA = Patterns, Functions, and Algebra**