

Richmond Public Schools
Curriculum Framework
Algebra I

Strand: Statistics	
<p>A.8 The student, given a data set or practical situation, will analyze a relation to determine whether a direct or inverse variation exists, and represent a direct variation algebraically and graphically and an inverse variation algebraically.</p>	
<p> EOC Algebra I assessments will include a <u>Desmos Calculator</u></p>	
Suggested Pacing	
<p>Fourth Nine Weeks- Direct/Inverse Variation A.8 5 blocks</p>	
Related Standards	
<p>Spiral down</p> <p>N/A</p>	<p>Spiral up</p> <p>AII.10 The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.</p>
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> ● How can you determine whether a direct variation exists in a data set or practical situation? <i>Determining if direct variation exists in a data set there must be a proportional relationship between two quantities, as one value increase so does the other.</i> ● How can you determine whether an inverse variation exists in a data set or practical situation? <i>Determining if inverse variation exists in a data set there must be a inversely proportional relationship between two quantities as one value increases the other value decreases.</i> 	<ul style="list-style-type: none"> ● Determining difference between a inverse or a direct variation relationship. ● Students struggle with identifying if a set of ordered pairs or table of values represent a direct variation and/or inverse variation. ● Student have trouble simplifying ratios to determine if the relationship is direct.

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<ul style="list-style-type: none"> ● What is the difference between direct and inverse variation? <i>Direct variation is a relationship between two quantities where one value increases the other increases. Inverse variation is a inversely proportional relationship between two quantities, as one value increase the other value decreases.</i> ● How do you write an equation for a direct variation? <i>The equation for direct variation situation is $y=kx$.</i> ● How do you write an equation for an inverse variation? <i>The equation for inverse variation is $y=\frac{k}{x}$.</i> ● How do you graph an equation representing a direct variation? <i>Graphing direct variation starts at the origin and moves outwards at a constant rate of change.</i> 	
Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> ● Practical problems may be represented and solved by using direct variation or inverse variation. ● A direct variation represents a proportional relationship between two quantities. The statement “y is directly proportional to x” is translated as $y = kx$. ● The constant of proportionality (k) in a direct variation is represented by the ratio of the dependent variable to the independent variable and can be referred to as the constant of variation. ● A direct variation can be represented by a line passing through the origin. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Given a data set or practical situation, determine whether a direct variation exists. ● Given a data set or practical situation, determine whether an inverse variation exists. ● Given a data set or practical situation, write an equation for a direct variation.

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<ul style="list-style-type: none"> ● An inverse variation represents an inversely proportional relationship between two quantities. The statement “y is inversely proportional to x” is translated as $y = \frac{k}{x}$. ● The constant of proportionality (<i>k</i>) in an inverse variation is represented by the product of the dependent variable and the independent variable and can be referred to as the constant of variation. ● The value of the constant of proportionality is typically positive when applied in practical situations. 	<ul style="list-style-type: none"> ● Given a data set or practical situation, write an equation for an inverse variation. ● Given a data set or practical situation, graph an equation representing a direct variation. 												
Vocabulary	Instructional Activities Organized by Learning Objective												
Direct Variation Inverse Variation Proportion Independent Variable Dependent Variable Origin Constant Ratio Constant of Variation Slope	<p>Virginia Department of Education</p> <p>Textbook <u>Virginia Glencoe, Algebra I</u>, ©2012, Carter, et al, McGraw-Hill School Education Group, page(s) 180 – 186, 669 – 675</p> <p>Eureka</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="4" style="text-align: center; padding: 5px;">Eureka - (Insert Lesson Title)</th> </tr> <tr> <th style="width: 25%; padding: 5px;">Eureka Grade</th> <th style="width: 25%; padding: 5px;">Module</th> <th style="width: 25%; padding: 5px;">Topic</th> <th style="width: 25%; padding: 5px;">Lesson(s)</th> </tr> </thead> <tbody> <tr> <td style="height: 30px;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Eureka - (Insert Lesson Title)				Eureka Grade	Module	Topic	Lesson(s)				
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Eureka Grade	Module	Topic	Lesson(s)										
Assessment													
<p>RPS PowerSchool Unit Test – RPS A.8 Common Assessment Test ID#:</p> <p>Mastery Check: Direct/Inverse A</p>	<p>Notes Website- Direct and Inverse Variation</p>												

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[Direct/Inverse B](#)
[Direct/Inverse C](#)
[Direct/Inverse D](#)

[Student Performance Analysis](#)

Powerpoint- [Direct Variation](#), [Direct/Inverse Variation](#)
Khan Academy -[Direct/inverse variation](#)

Resources

- **Print**
Virginia End-of-Course Coach, © 2012, Triumph Learning,
Algebra I, page(s) 182 - 191
- **Technology-based**
Quizizz
[Direct Variation](#)
[Determining Direct or Inverse Variation](#)

Station Activities

Station 1

[Graphic Organizer](#) - Direct Variation (Students will work independently to explain Function Table, Graph and Equation)

Station 2

[Direct Variation](#) - True or False Students can complete the interactive activity online or teacher can print worksheet and make task cards.

Station 3

[Direct and Inverse Variation Sort](#)

Station 4

[TIC TAC TOE](#)

Cross-Curricular Connections

Tiered Differentiations

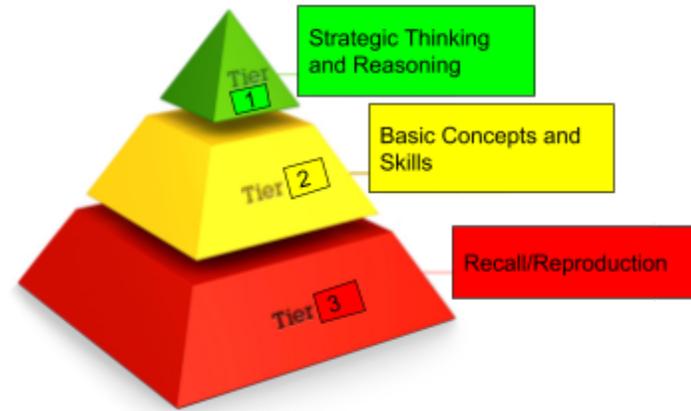
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History: Economics curriculum covers supply and demand which is a direct variation. This can be used as an example to solve for the constant as well as discuss what a direct variation graph tells a business or consumer about a product.

Real-world examples of direct and inverse variations: Amount of cars on a thruway and speed the cars are traveling at. Amount of time students spend studying and score on an assessment. Amount of air in a balloon and the volume of the balloon. Etc



Tier 3 Activity: Recall and Reproduction

Identify the [graphs of direct and inverse variation](#)

Recognize [direct and inverse equations](#)

Tier 2 Activity: Basic Concepts and Skills

Teacher will create variety of data sets and practical problems and students will write an equation for a direct variation.

Teacher will create variety of data sets and practical problems and students will graph an equation representing a direct variation given a data set or practical situation.

Tier 1 Activity: Strategic Thinking and Reasoning

Teacher will create variety of data sets and practical problems and students will analysis data using graphing calculators, or practical situations, to determine the existence of direct and/or inverse relationship between two variables.