<table>
<tr><th colspan="2">Strand: Patterns, Functions, and Algebra</th></tr>
<tr><td colspan="2">6.14 The student will
a) represent a practical situation with a linear inequality in one variable; and
b) solve one-step linear inequalities in one variable, involving addition or subtraction, and graph the solution on a number line.</td></tr>
<tr><th colspan="2">Suggested Pacing</th></tr>
<tr><td colspan="2">First Nine Weeks-6 Instructional Days</td></tr>
<tr><th colspan="2">Spiraling Standards</th></tr>
<tr><td>No prior standards</td><td>7.13 The student will solve one- and two-step linear inequalities in one variable, including practical problems, involving addition, subtraction, multiplication, and division, and graph the solution on a number line.
8.18 The student will solve multistep linear inequalities in one variable with the variable on one or both sides of the inequality symbol, including practical problems, and graph the solution on a number line.
A.5 The student will a) solve multistep linear inequalities in one variable algebraically and represent the solution graphically; b) represent the solution of linear inequalities in two variables graphically;</td></tr>
<tr><th>Essential Questions</th><th>Common Misconceptions</th></tr>
<tr><td>6.14a</td><td>• Like with equations, students often don’t recognize multiplication and division when solving inequalities.</td></tr>
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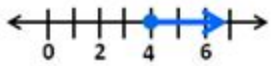
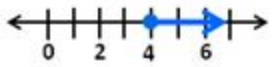
• How can you compare and contrast the process for solving an equation and inequality. • How can you represent an inequality in a model? Picture? **6.14b** • How can you compare and contrast the solutions to an equation and inequalities. • When are inequalities used in the real world? • How can we tell if a solution should be graphed with an open or closed circle? • How can we tell if a number is a solution from looking at the graph? Equation? • How do the properties contribute to solving inequalities?	• When solving inequalities, students fail to recall the integer rules which will cause them to arrive at the wrong solution. • Like with equations, students do not utilize the substitution strategy to confirm the possible values of the variable. • Students struggle with the meaning of the inequality symbols which will cause the solution to be graphed incorrectly.
Understanding the Standard	**Essential Knowledge and Skills**
• The solution set to an inequality is the set of all numbers that make the inequality true. • Inequalities can represent practical situations. ample: Jaxon works at least 4 hours per week mowing lawns. Write an inequality representing this situation and graph the solution  $x \geq 4$ or $4 \leq x$ dents might then be asked: "Would Jaxon ever work 3 hours in a week? 6 hours? • The variable in an inequality may represent values that are limited by the context of the problem or situation. Example: if the variable represents all children in a classroom who are	**The student will use problem solving, mathematical communication, mathematical reasoning, connections and representation to** • Given a verbal description, represent a practical situation with a one-variable linear inequality. (a) • Apply properties of real numbers and the addition or subtraction property of inequality to solve a one-step linear inequality in one variable, and graph the solution on a number line. Numeric terms being added or subtracted from the variable are limited to integers. (b)

taller than 36 inches, the variable will be limited to have a minimum and maximum value based on the heights of the children. Students are not expected to represent these situations with a compound inequality (e.g., 36 < x < 70) but only recognize that the values satisfying the single inequality (x > 36) will be limited by the context of the situation. ● Inequalities using the < or > symbols are represented on a number line with an open circle on the number and a shaded line over the solution set. Example: When graphing $x < 4$, use an open circle above the 4 to indicate that the 4 is not included.  ● Inequalities using the or ≥ symbols are represented on a number line with a closed circle on the number and shaded line in the direction of the solution set. Example: When graphing $x \geq 4$ fill in the circle above the 4 to indicate that the 4 is included.  ● It is important for students to see inequalities written with the variable before the inequality symbol and after. Example: $x > 5$ is not the same relationship as $5 > x$. However, $x > 5$ is the same relationship as $5 < x$. ● A one-step linear inequality may include, but not be limited to, inequalities such as the following: $2 + x > 5$; $y - 3 - 6$; a $-(-4) \geq 11$.	● Given the graph of a linear inequality with integers, represent the inequality two different ways (e.g., $x < -5$ or $-5 > x$) using symbols. (b) ● Identify a numerical value(s) that is part of the solution set of a given inequality. (a, b)

• Solving an equation or inequality involves a process of determining which value(s) from a specified set, if any, make the equation or inequality a true statement. Substitution can be used to determine whether a given value(s) makes an equation or inequality true. • Properties of real numbers and properties of inequality can be used to solve inequalities, justify solutions, and express simplification. Students should use the following properties, where appropriate, to further develop flexibility and fluency in problem solving (limitations may exist for the values of a, b, or c in this standard): – Commutative property of addition: $a + b = b + a$. – Commutative property of multiplication: $a \cdot b = b \cdot a$. - Subtraction and division are neither commutative nor associative. – Identity property of addition (additive identity property): $a + 0 = a$ *and* $0 + a = a$. – Identity property of multiplication (multiplicative identity property): $a \cdot 1 = a$ *and* $1 \cdot a = a$. - The additive identity is zero (0) because any number added to zero is the number. The multiplicative identity is one (1) because any number multiplied by one is the number. There are no identity elements for subtraction and division.	

- Inverses are numbers that combine with other numbers and result in identity elements (e.g., 5 + (–5) = 0; · 5 = 1). – Inverse property of addition (additive inverse property): $a + (-a) = 0$ *and* $(-a) + a = 0$. – Inverse property of multiplication (multiplicative inverse property): $a \cdot \frac{1}{a} = 1$ *and* $\frac{1}{a} \cdot a = 1$. - Zero has no multiplicative inverse. ——Multiplicative property of zero: $a \cdot 0 = 0$ *and* $0 \cdot a = 0$.	
Vocabulary	**Instructional Activities Organized by Learning Objective**
inequality variable greater than less than greater than or equal to less than or equal to open circle closed circle solution set commutative property of addition commutative property of multiplication identity property of addition identity property of multiplication inverses	Textbook Virginia Math Connects, Course 1, ©2012, Glencoe/McGraw-Hill page(s) 387-391 and 396-401 (addition and subtraction), pages 392-(write and graph) Virginia Math Connects, Course 2, ©2012, Price, et al, McGraw-Hill School Education Group 1: One Step Inequalities, page(s) 242 -248. Notes 6.13 Revised Interactive Notes Resources ● Print Virginia Coach New SOL Edition Lesson 28, page 212-218

<table>
<tr><td>inverse property of addition
inverse property of multiplication
multiplicative property of zero
addition property of inequality
subtraction property of inequality
multiplication property of inequality
division property of inequality
substitution property</td><td rowspan="2">Open Up - Unit 6 Lesson 13-14

● Technology-based
BrainPop
Graphing and Solving Inequalities

Gizmo Lesson –
Exploring Linear Inequalities in one Variable
Solving Linear Inequalities in one Variable

Station Activities
Virginia Department of Education Lesson Plan(s):
Inequalities
Interactive Skills Practice:
● Inequality Match- Students will match the inequality graph with two solutions.
● Inequality Match- Students will match a graph, solution and practical situation of the one step inequality.
● Inequality Sort- Students will drag the graph or solution that represents the inequality.
● Additional Practice- Students will solve various inequality problems when given a situation, graph or solution.
● Matching- Students solve one step linear inequalities and find the graph to make a match.</td></tr>
<tr><td>Assessment</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Cross-Curricular Connections</td><td>Tiered Differentiations</td></tr>
<tr><td></td><td>● Suggested manipulatives: number lines, algebra tiles, cups and counters, balance scale, cut out arrows,</td></tr>
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	● Students should be given opportunities to use an open number line and a cut out arrow to practice representing solutions to inequalities. ● To reinforce solution sets, write an inequalities on the board and give students a card with a number on it. Students stand if their card is a solution to the given inequality. ● Have students pull values from the graph to prove and disprove the arrow is in the correct location and pointing in the proper direction.