



## Standards in Essential Need of Support Middle Mathematics

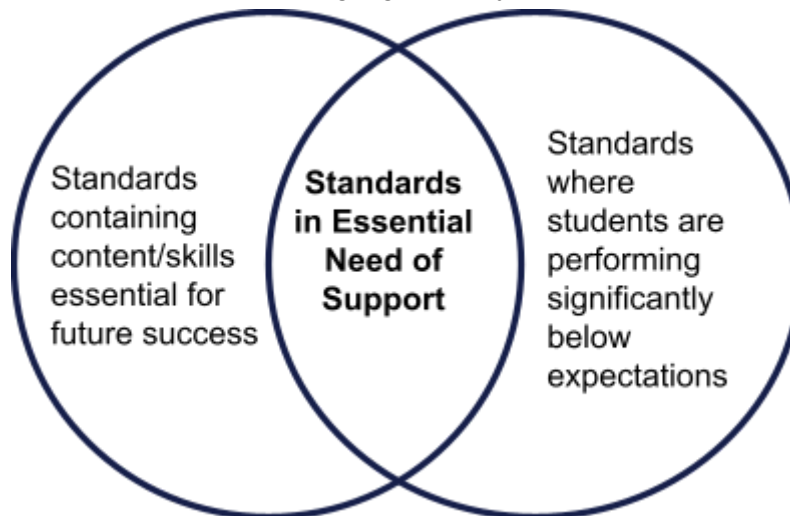
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The Indiana Department of Education (IDOE) will identify the Indiana Academic Standards (“standards”) in essential need of support for Mathematics and English/language arts (kindergarten through grade eight) each year. This document provides information about these standards and resources to support their use in local schools, including:

- [What are Standards in Essential Need of Support \(SENS\)?](#)
- [How did IDOE identify SENS?](#)
- [How should schools use SENS?](#)
- [What is the timeline for updating SENS as student performance changes?](#)
- [Who should schools contact for support about SENS?](#)
- [What are major trends of identified needs?](#)
- [What are the SENS \(and supporting resources\) for mathematics for the 2022-2023 school year?](#)

### What are Standards in Essential Need of Support (SENS)?

SENS are standards which contain content and skills essential for student success **and** for which data indicate students are performing significantly below expectations.



SENS are **not** content priorities alone, nor are they intended to remove standards from teaching and learning plans. Some standards may contain important content and skills, but students are performing well; therefore, the standards are not identified as in essential need of support. Other standards may be performing significantly below expectations but do not include highest priority content; therefore, the standards are not identified as in essential need of support.



# Indiana Department of Education

Dr. Katie Jenner, Secretary of Education

## How did IDOE Identify SENS?

IDOE began with a quantitative, data-driven process to identify an initial list of SENS. The quantitative process considered content priorities, as defined by Indiana educator committees, identified in the assessment blueprints and performance data (from ILEARN and interim/benchmark assessments). Then, Indiana educator content experts reviewed the initial list of identified standards and provided qualitative feedback from current classroom experience. Schools may access templates for English/language arts and mathematics and the accompanying process documents to support a local application of the process, if desired. Template documents address grades three through eight only as kindergarten through grade two use data compiled from various interim assessment providers which are not available to all school corporations.

### Overview of SENS Identification Process

Quantitative Identification Steps	Identify grade-level content priorities using Indiana educator decisions reflected in grade-level ILEARN blueprints.* Assign higher values for higher priority.
	Identify next-grade-level content priorities using the priority of the vertically aligned standard reflected in the next-grade-level ILEARN blueprints.* Assign higher values for higher priority.
	Identify the proficiency level acquired for that standard on the most recent ILEARN assessment.* Assign higher values for lower performance.
	Compare the performance of each standard on ILEARN with data from interim assessment providers and adjust for discrepancies, as needed.
	Add all the values assigned to the standards for a total indicator. Identify the top 10-15 (using natural breaks found in the final values as a guide) as SENS.
Qualitative Review	Content-area experts review identified SENS for overall themes and to ensure they align with current classroom experiences. Outliers or standards which are “borderline” are reviewed to determine the level of support needed.
	Confirm findings with interim/benchmark assessment data.
	Finalize list of SENS based on all data and reviews.

\*For special considerations related to grades kindergarten, one, two, and eight, refer to the template and process document.

## How Should Schools Use SENS?

Schools should consider how they can provide additional support for these standards and how they may engage in a similar identification process at the local level to determine any local variations.



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<p>Consider additional support for the standards.</p>	<ul style="list-style-type: none"> <li>● Should additional time be allotted in curricular plans?</li> <li>● Should the order that content is taught be reconsidered?</li> <li>● Are there content-area themes that need support which should be considered throughout the school year?</li> <li>● Is professional learning needed to support teachers as they unpack the standard and provide instruction?</li> <li>● Is the standard being taught to the level of rigor required?</li> <li>● Are additional supports or resources needed to support the instruction of the identified standards?</li> <li>● Are all students in the class or grade in need of additional support of the identified standards? How should differentiated support be provided?</li> </ul>
<p>Consider local application of the process.</p>	<ul style="list-style-type: none"> <li>● Is local student performance showing the same areas of need as statewide student performance?*</li> <li>● Can schools and districts engage with one another to learn from each other if there are differences?</li> </ul>

\*Schools can apply the process described under the header “How Did IDOE Identify SENS?” to their own ILEARN and interim/benchmark data sets to see how local performance may impact the identification of SENS for a specific school or corporation. Template documents are available to streamline the process.

## What is the Timeline for Updating SENS as Student Performance Changes?

IDOE will perform the statewide SENS analysis every year as soon as final ILEARN data is available. Updates to SENS are scheduled to publish each August.

## Who Should Schools Contact for Support about SENS?

The Office of Teaching and Learning and the Office of Student Assessment jointly identify SENS and support the response to these needs. Contact the Office of Teaching and Learning at [teachingandlearning@doe.in.gov](mailto:teachingandlearning@doe.in.gov).



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## What are the Major Trends of Identified Needs?

During the SENS identification process, themes of need appeared across elementary and middle school mathematics.

### Mathematics

- Number Sense involves understanding, expressing, and using fractions, rational, and irrational numbers.
- Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations
- Measurement: Use estimation, conversions, and appropriate tools to measure length, weight, temperature, capacity, and volume in appropriate units of measurement to solve problems
- Polygons: Identify, classify, create and apply characteristics of polygons to solve problems.
- Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.
- Data Analysis: Use collected data to construct and interpret patterns between variables.

## SENS and Supporting Resources for Middle School Mathematics

<u>Grade 6</u>	<u>Grade 7</u>	<u>Grade 8</u>
6.AF.1	7.AF.1	8.AF.1
6.AF.3	7.AF.2	8.AF.2
6.AF.5	7.AF.4	8.AF.4
6.AF.6	7.AF.5	8.AF.5
6.AF.10	7.AF.7	8.AF.6
6.C.1	7.C.1	8.C.1
6.C.3	7.C.2	8.DSP.1
6.C.4	7.C.6	8.DSP.2
6.C.6	7.C.8	8.DSP.3
6.DS.4	7.DSP.3	8.GM.2
6.GM.4	7.DSP.5	8.GM.8
6.NS.1	7.GM.4	8.GM.9
6.NS.2	7.GM.6	
6.NS.3	7.NS.2	
6.NS.5	7.NS.3	

Academic Standard	Resources to Understand and Support Instruction	ILEARN Item Specifications	Connection to Themes of Need
<b>Grade 6</b>			
<p><b>6.AF.1</b> Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in geometry and other real-world problems.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Expressions and Equations</a></li> <li>• <a href="#">Algebraic Expressions</a></li> <li>• <a href="#">Illustrative Mathematics: Families of Triangles</a></li> <li>• <a href="#">Replace and Continue</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>6.AF.3</b> Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Express Yourself</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>6.AF.5</b> Solve equations of the form <math>x + p = q</math>, <math>x - p = q</math>, <math>px = q</math>, and <math>x/p = q</math> fluently for cases in which <math>p</math>, <math>q</math> and <math>x</math> are all nonnegative rational numbers. Represent real world problems using equations of these forms and solve such problems.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework What is the Meaning of X?</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>

<p><b>6.AF.6</b> Write an inequality of the form <math>x &gt; c</math>, <math>x \geq c</math>, <math>x &lt; c</math>, or <math>x \leq c</math>, where <math>c</math> is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Recognize inequalities have infinitely many solutions and represent solutions on a number line diagram.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Illustrative Mathematics: Fishing Adventures 1</a></li> <li>• <a href="#">Out of Sorts: Sorting Solutions to Inequalities</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>6.AF.10</b> Use variables to represent two quantities in a proportional relationship in a real-world problem ; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework How Are We Related?</a></li> <li>• <a href="#">Doing the One Step with Equations</a></li> <li>• <a href="#">We Have the Same Birthday</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	
<p><b>6.C.1</b> Divide multi-digit whole numbers fluently using a standard algorithmic approach.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Multiplying and Dividing Fluently: Sixth</a></li> <li>• <a href="#">Dividing Multi-Digit Numbers</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations</p>
<p><b>6.C.2</b> Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Multiplying and Dividing Fluently: Sixth and Seventh</a></li> <li>• <a href="#">Adding and Subtracting Fluently: Sixth and</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations</p>

	<a href="#">Seventh</a>		
<p><b>6.C.3</b> Solve real world problems with positive fractions and decimals by using one or two operations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: How Many Batches/What Fraction of a Batch?</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations
<p><b>6.C.4</b> Compute quotients of positive fractions and solve real-world problems involving division of fractions by fractions. Use a visual fraction model and/or equation to represent these calculations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Real-World Multiplication and Division Problems: Sixth Grade</a></li> <li>• <a href="#">Divide and Conquer Fractions</a></li> <li>• <a href="#">Split Me Up</a></li> <li>• <a href="#">Edible Cookie Dough</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations
<p><b>6.C.6</b> Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Open Middle: Order of Operations</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations
<p><b>6.DS.4</b> Summarize numerical data sets in relation to their</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Open Middle: Mean, Median, and</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Data Analysis: Use collected data to construct and interpret patterns between variables.

<p>context in multiple ways, such as: report the number of observations; describe the nature of the attribute under investigation, including how it was measured and its units of measurement; determine quantitative measures of center (mean and/or median) and spread (range and interquartile range); describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Range 2 Illustrative Mathematics: Average Number of Siblings</a></li> <li>• <a href="#">Toying with Measures of Center</a></li> </ul>		
<p><b>6.GM.4</b> Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Illustrative Mathematics: Finding Areas of Polygons</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Polygons: Identify, classify, create and apply characteristics of polygons to solve problems.</p>
<p><b>6.NS.1</b> Understand that positive and negative numbers are used to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge). Use positive and negative numbers to represent and compare quantities in real-world contexts, explaining the meaning of 0 in each situation.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Illustrative Mathematics: Mile High</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8</p>



<p><b>6.NS.2</b> Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself (e.g., <math>-(-3) = 3</math>), and that 0 is its own opposite.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Integers on the Number Line 2</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8</p>
<p><b>6.NS.3</b> Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: It's Warmer in Miami</a></li> <li>• <a href="#">Life with Lily: Ordering and Comparing Rational Numbers</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8</p>
<p><b>6.NS.5</b> Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8</p>
<b>Grade 7</b>			
<p><b>7.AF.1</b> Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring out a</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Adding It Up</a></li> <li>• <a href="#">Construction Zone</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>

<p>common number (e.g., given <math>2x - 10</math>, create an equivalent expression <math>2(x - 5)</math>). Justify each step in the process.</p>			
<p><b>7.AF.2</b> Solve equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math> fluently, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Equality Explorer</a></li> <li>• <a href="#">What's the Magic Number?</a></li> </ul>	<a href="#">I LEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>7.AF.4</b> Define slope as vertical change for each unit of horizontal change and recognize that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Slope Between Points on a Line</a></li> </ul>	<a href="#">I LEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>7.AF.5</b> Graph a line given its slope and a point on the line. Find the slope of a line given its graph.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Slope Between Points on a Line</a></li> </ul>	<a href="#">I LEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>
<p><b>7.AF.7</b> Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Cider versus Juice</a></li> <li>• <a href="#">Are You in a Relationship?</a></li> </ul>	<a href="#">I LEARN Item Specifications</a>	<p>Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.</p>

<p><b>7.C.1</b> Understand <math>p + q</math> as the number located a distance <math> q </math> from <math>p</math>, in the positive or negative direction, depending on whether <math>q</math> is positive or negative. Show on a number line that a number and its opposite have a sum of 0 (are additive inverses). Find and interpret sums of rational numbers in real-world contexts.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Differences of Integers</a></li> <li>• <a href="#">When Opposites Attract</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations</p>
<p><b>7.C.2</b> Understand subtraction of rational numbers as adding the additive inverse, <math>p - q = p + (-q)</math>. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Differences of Integers</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations</p>
<p><b>7.C.6</b> Use proportional relationships to solve ratio and percent problems with multiple operations (e.g. simple interest, tax, markups, markdowns, gratuities, conversions within and across measurement systems, and percent increase and decrease).</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: How Fast is Usain Bolt?</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations.</p>
<p><b>7.C.8</b> Solve real-world problems with rational numbers by using one or two operations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Real-World Multiplication and Division Problems:Seventh/</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Computation: Use models, strategies, algorithms, and properties to understand,</p>

	<ul style="list-style-type: none"> <li>• <a href="#">Eighth Real-World Addition and Subtraction Problems: Seventh/Eighth Club Budget</a></li> </ul>		represent, and solve problems involving the four operations.
<p><b>7.DSP.3</b> Find, use, and interpret measures of center (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Illustrative Mathematics: College Athletes</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Data Analysis: Use collected data to construct and interpret patterns between variables.
<p><b>7.DSP.5</b> Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Understand that a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. Understand that a probability of 1 indicates an event certain to occur and a probability of 0 indicates an event impossible to occur. Identify probabilities of events as impossible, unlikely, equally likely, likely, or certain.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	
<p><b>7.GM.4</b> Solve real-world and other mathematical problems</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework Angle Relationships Scavenger Hunt</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Polygons: Identify, classify, create and apply characteristics of polygons to solve problems.

using facts about vertical, adjacent, complementary, and supplementary angles.			
<b>7.GM.6</b> Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms.	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">NRICH: Painted Cube</a></li> <li>• <a href="#">Team Volume</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Measurement: Use estimation, conversions, and appropriate tools to measure length, weight, temperature, capacity, and volume in appropriate units of measurement to solve problems
<b>7.NS.2</b> Understand the inverse relationship between squaring and finding the square root of a perfect square whole number. Find square roots of perfect square whole numbers.	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">NRICH: Cycling Squares</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8
<b>7.NS.3</b> Know there are rational and irrational numbers. Identify, compare, and order rational and irrational numbers (e.g. $\sqrt{2}$ , $\sqrt{3}$ , $\sqrt{5}$ , $\pi$ ) and plot them on a number line.	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Sums of rational and irrational numbers</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Number Sense: Understanding, expressing, and using fractions, rational and irrational numbers in grades K-8
<b>Grade 8</b>			
<b>8.AF.1</b> Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Open Middle: Linear Equations in One Variable 2</a></li> <li>• <a href="#">3 Systems in a Row</a></li> <li>• <a href="#">Stacking Cups</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.

equations and inequalities in one variable and solve such problems.			
<p><b>8.AF.2</b> Generate linear equations in one variable with one solution, infinitely many solutions, or no solutions. Justify the classification given.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Open Middle: Solving Equations with Variables on Both Sides</a></li> <li>• <a href="#">What's My Number-Solutions</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.
<p><b>8.AF.4</b> Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Distance</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.
<p><b>8.AF.5</b> Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Introduction to Linear Functions</a></li> <li>• <a href="#">Classifying Functions Activity</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Linear equations and inequalities: Use algebraic reasoning and strategies to represent and solve real-world problems in several contexts.
<p><b>8.AF.6</b> Construct a function to model a linear relationship</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Styrofoam Cups: 3 Act Task</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	Linear equations and inequalities: Use algebraic reasoning and strategies to

<p>between two quantities given a verbal description, table of values, or graph. Recognize in <math>y = mx + b</math> that <math>m</math> is the slope (rate of change) and <math>b</math> is the <math>y</math>-intercept of the graph, and describe the meaning of each in the context of a problem.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Spaghetti Bridges</a></li> </ul>		<p>represent and solve real-world problems in several contexts.</p>
<p><b>8.C.1</b> Solve real-world problems with rational numbers by using multiple operations.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Real-World Multiplication and Division Problems: Seventh/Eighth</a></li> <li>• <a href="#">Real-World Addition and Subtraction Problems: Seventh/Eighth</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Computation: Use models, strategies, algorithms, and properties to understand, represent, and solve problems involving the four operations</p>
<p><b>8.DSP.1</b> Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Scatter plots tasks</a></li> <li>• <a href="#">Scatter, Sort It Out</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Data Analysis: Use collected data to construct and interpret patterns between variables.</p>
<p><b>8.DSP.2</b> Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and describe the model fit by judging the closeness of the data points to the</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Animal Brains</a></li> </ul>	<p><a href="#">ILEARN Item Specifications</a></p>	<p>Data Analysis: Use collected data to construct and interpret patterns between variables.</p>

line.			
<p><b>8.DSP.3</b> Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data. Interpret the slope and y-intercept in context.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Tap Into Teen Minds: Candle Burning 3 Act Task</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Data Analysis: Use collected data to construct and interpret patterns between variables.</p>
<p><b>8.GM.2</b> Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">NRICH: Surface Area and Volume</a></li> <li>• <a href="#">Make Math Moments: Girl Guide Cookies</a></li> <li>• <a href="#">Words Speak Volumes</a></li> <li>• <a href="#">Volumes and Vases</a></li> <li>• <a href="#">What's the Dimension?</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Measurement: Use estimation, conversions, and appropriate tools to measure length, weight, temperature, capacity, and volume in appropriate units of measurement to solve problems</p>
<p><b>8.GM.8</b> Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Three Act Task: Taco Cart</a></li> <li>• <a href="#">When Math Happens: Pythagorean Theorem</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Polygons: Identify, classify, create and apply characteristics of polygons to solve problems.</p>
<p><b>8.GM.9</b> Apply the Pythagorean Theorem to find the distance between two points in a coordinate plane.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Math Framework</a></li> <li>• <a href="#">Illustrative Mathematics: Understand and apply the</a></li> </ul>	<a href="#">ILEARN Item Specifications</a>	<p>Polygons: Identify, classify, create and apply characteristics of polygons to solve problems.</p>



	<a href="#">Pythagorean Theorem</a>		
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