

# Which Math Skills Are Students Missing?

A Study of the Math Skill Gaps Most Prevalent  
Among Elementary and Middle School Students

## FOREWORD

Wouldn't it be great if all math students in a classroom came with the same experiences and same motivation to learn? It's a nice thought, but the reality is that there is a wide range of skills and readiness in every classroom. Teachers are faced with the challenge of making sure that every student is at grade level or above by the end of the school year. Combined with growing class sizes and changing standards and curriculum, this expectation for teachers today is overwhelming. The believed solution is to simply differentiate instruction. To do this well requires teachers to have a deep understanding of the curriculum, strong classroom management skills, and use assessment well.

Teachers also need to access the scope and sequence of skills before and after each particular grade level. Allowing students to grow in their academic endeavors as seen in academic gains should be the goal for all students regardless of where they start at the beginning of a unit of study. Integration of technology to support the learning as well as classroom management procedures, are critical for optimized student learning. Having a tool available to communicate any skill gaps helps teachers to better understand and plan strategically. Individualized instruction can be very difficult to manage, especially with a large class and a wide range of mathematically ability.

The use of web-based support materials in a [blended learning environment](#) can be an effective way to better fill in the missing skills and extend the learning of those working below and above grade level. Avon Intermediate School East has implemented Ascend Math for several years for the primary purpose of extending the learning for those students at or above grade level. Further analysis of recent statewide testing indicates that not only the amount of time spent using the program, but the leveling up and teacher intervention based on the reports are crucial to attain this growth. This was true for students who are below or on grade level as well.

We have found that Ascend Math has multiple uses, and it can be a very helpful tool to reduce skill gaps if implemented well. There are multiple reports and resources. Its flexibility is its greatest attribute.

Dr. Brian Scott, Principal of Avon Intermediate School East

## Introduction

What do students in need of math intervention have in common? Which skill gaps appear most frequently? Which are unique? Can students be effectively taught in small groups working on common objectives? When is individualized instruction warranted?

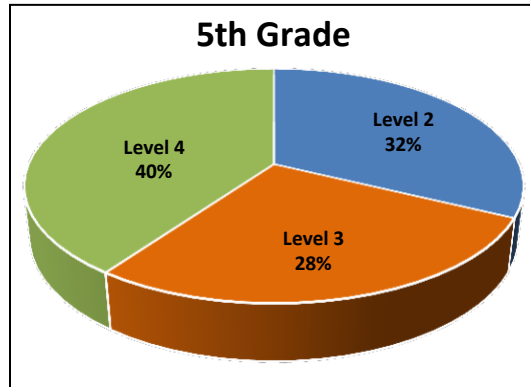
Since 2005, Ascend Education has gathered data on student math performance. For this study, 18,000 students identified for intervention were given a computer adaptive level placement test. This included students nationwide representing a wide diversity of demographics. The level placement test found each student's lowest functional level in math. At least 82% of these students had skill gaps below their current grade level. The study focused on these students.

Each student was provided a series of pre-assessments on objectives beginning at their functional grade level according to the level placement test. In this way, each student's individual math skill gaps were identified, captured and compiled for this report.

Data was examined for students from grades 2-8. However, only data for students in the fifth and seventh grades are included in this premiere version of the study. The data from more grades will be shared in future releases.

In-depth study continues, however, it would appear that this large case study conducted nationwide would strongly support the need for individualized instruction and study for each student identified for math intervention.

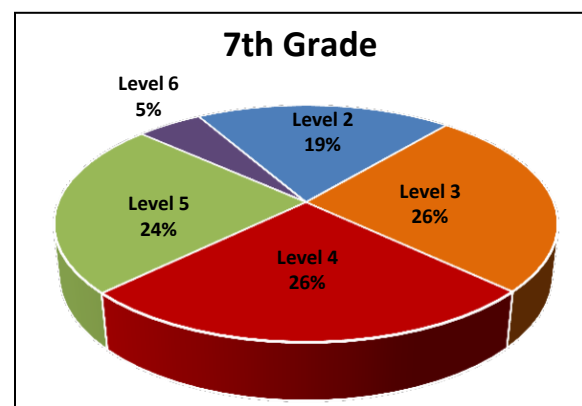
## About the Data



Grade 7 students in the study were widely dispersed. Only 5% had skill gaps just one grade below level. The remaining students were split almost evenly with their lowest skill gap from two to five grades below the seventh grade level.

## Results of Level Placement Test

Forty percent of grade 5 students in the study had skill gaps one grade below level. Another 28% had their lowest skill gap two grades below level. Nearly one third had their lowest skill gap three grades below the fifth grade level.



## Rankings

In this study, you will find the rankings of the most common skill gaps for these two grades within each level. For example, the first page is devoted to the 40% of fifth grade students with gaps one grade below level. Each page will be devoted to a single grade and functional grade level listing the most common skill gaps in that level. Although we chose to focus on the top 20-25, the list of skill gaps often runs much deeper. Complete listings will be provided in a future release.

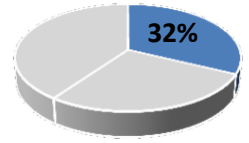
## Study of Gaps in Scope and Sequence

Given that students are starting at different levels on different gaps it looks challenging at best for a teacher to make significant progress using small group instruction alone. To provide a better feel for this challenge each page also includes a listing of the objectives from that level in their proper scope and sequence. In this chart, you can easily observe the percentage of students still needing to master each objective in the level. In the interest of space, we chose to focus on the first 25 objectives for each grade level's sequence. Complete tables will be made available in a future release.

# Grade 5 Students

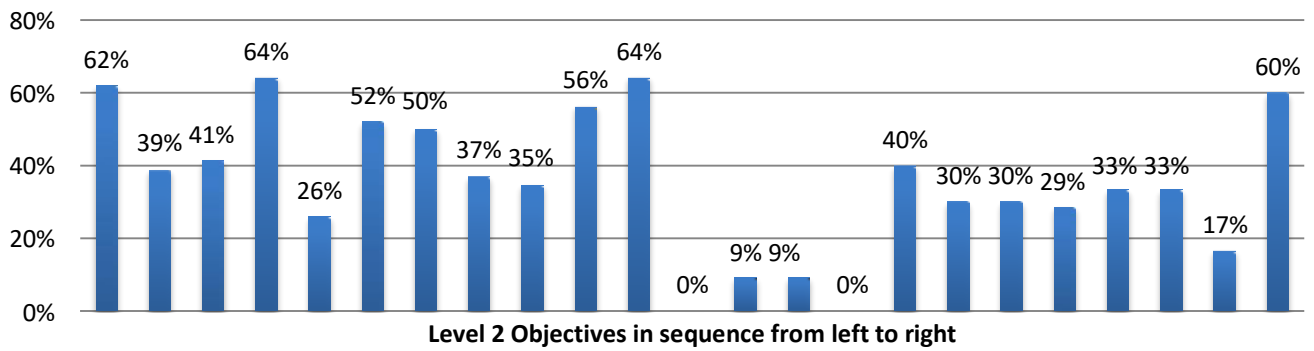
Ranking of skill gaps for students placed at grade level 2

Level 2



Rank	Unit	Objective	%
1	Introduction to Addition	Even Numbers as a Sum of Equal Addends	64%
2	Introduction to Measurement	Picture and Bar Graph	64%
3	Introduction to Patterns	Introduction to Number Line Diagrams Using Whole Numbers	62%
4	Elementary Measurement	Modeling Time on a Number Line Diagram	60%
5	Introduction to Measurement	Foundations of Measurement	56%
6	Introduction to Money	Counting Money, Applications	52%
7	Introduction to Money	Making Change	50%
8	Introduction to Addition	Addition of Objects, Arrays and Equations	41%
9	Introduction to Odd and Even	Patterns with Numbers	40%
10	Introduction to Addition	Addition of Objects Using Arrays	39%
11	Introduction to Money	Counting Money, Review	37%
12	Introduction to Money	Money, Intro	35%
13	Elementary Subtraction	Vertical Subtraction, 2-Digit	33%
14	Elementary Subtraction	Vertical Subtraction, 3-Digit	33%
15	Introduction to Odd and Even	Skip Counting by 2s	30%
16	Introduction to Odd and Even	Skip Counting by 3s	30%
17	Introduction to Odd and Even	Odd and Even, Application	29%
18	Introduction to Money	Counting Money	26%
19	Introduction to Place Value	Place Value, Hundreds	17%
20	Elementary Addition	2-Digit Addition, 3-Digit Answers	9%
21	Elementary Addition	3-Digit Addition, 3-Digit Answers	9%
22	Elementary Addition	2-Digit Addition, 2-Digit Answers	0%
23	Introduction to Odd and Even	Odd and Even	0%

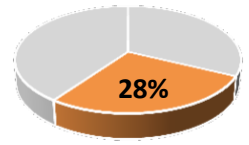
## Objectives in Sequence Showing Student % with Gap



# Grade 5 Students

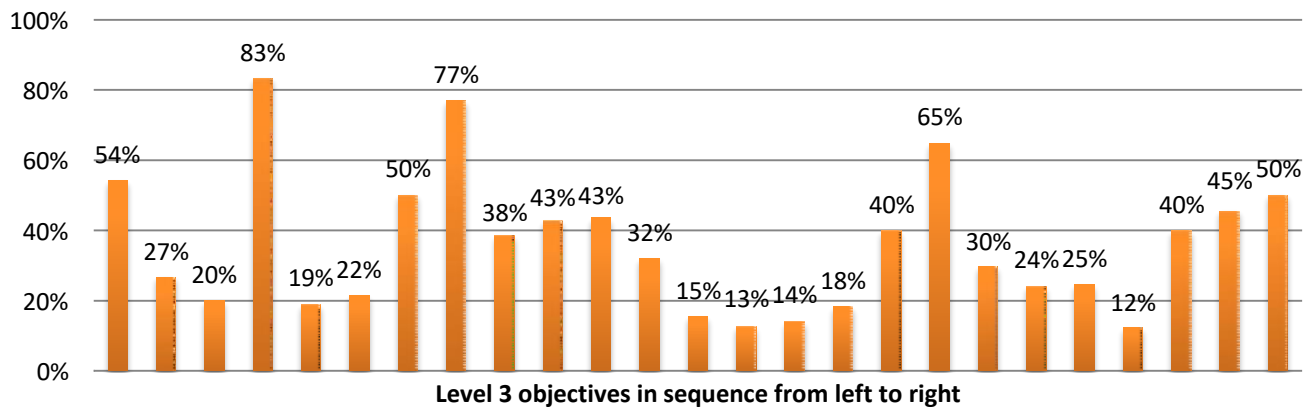
Ranking of skill gaps for students placed at grade level 3

Level 3



Rank	Unit	Objective	%
1	Whole Number Addition and Subtraction	Properties of Addition with Whole Numbers	88%
2	Whole Numbers	Whole Numbers and Place Value	83%
3	Elementary Multiplication	The Concept of Perimeter and Area Models Connected to Addition	77%
4	Elementary Measurement	Measurement	76%
5	Whole Number Addition and Subtraction	Modeling Addition and Subtraction of Whole Numbers	75%
6	Whole Number Multiplication and Division	Properties of Multiplication with Whole Numbers	73%
7	Elementary Division	Understanding Division	65%
8	Whole Numbers	Greater Than & Less Than	54%
9	Elementary Addition and Subtraction	2&3 Digit Subtraction	50%
10	Elementary Multiplication and Division with Two or More Digits	Modeling Multiplication and Division with Unknowns	50%
11	Elementary Measurement	Time	50%
12	Whole Number Multiplication and Division	Properties of Division	50%
13	Fractions Concepts	Understanding Unit Fractions Using Area Models	50%
14	Elementary Multiplication and Division with Two or More Digits	Multiplication and Division using Associative and Distributive Properties	45%
15	Whole Number Multiplication and Division	Multiplying Whole Numbers	44%
16	Elementary Multiplication	Interpreting Products of Whole Numbers Using Multiples of 10	43%
17	Elementary Multiplication	Understanding Multiplication	43%
18	Elementary Division	Foundations of Division	40%
19	Elementary Multiplication and Division with Two or More Digits	Relationship Between Multiplication and Division with Unknown-Factors	40%
20	Elementary Multiplication	Conceptual Multiplication Applications	38%

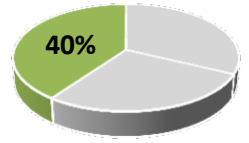
### Objectives in Sequence Showing Student % with Gap



# Grade 5 Students

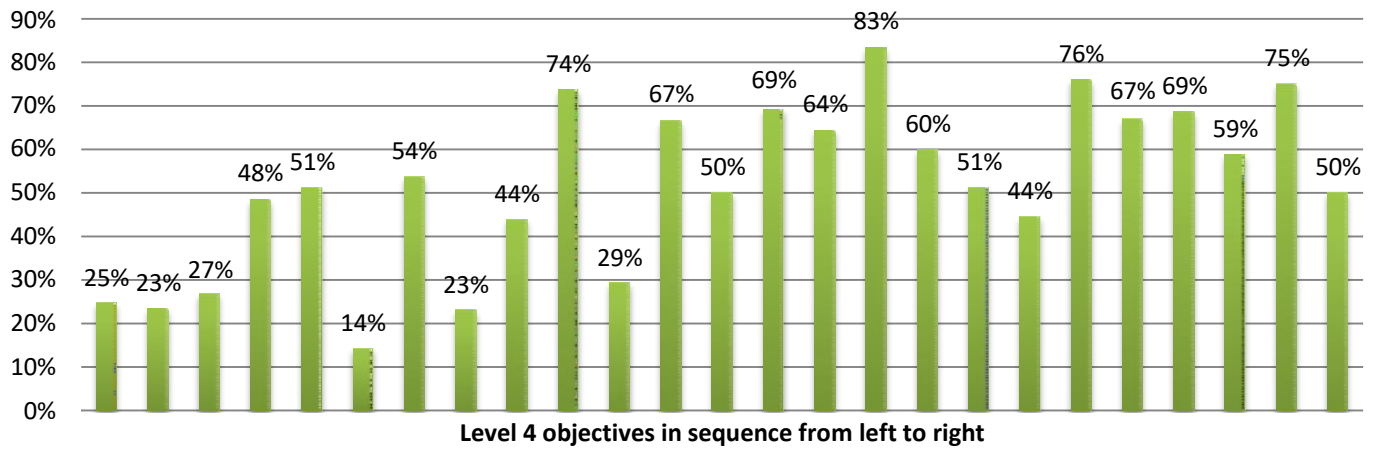
Ranking of skill gaps for students placed at grade level 4

Level 4



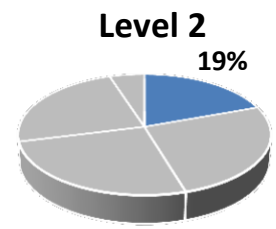
Rank	Unit	Objective	%
1	Whole Number Multiplication and Division	Guess and Check	83%
2	Fractions Concepts	Comparing Fractions Using Area Models	76%
3	Fractions Operations	Adding & Subtracting Fractions	75%
4	Elementary Multiplication and Division with Two or More Digits	Multiplication and Division with Unknown Factors	74%
5	Whole Number Multiplication and Division	Mental Math	69%
6	Fractions Operations	Multiplying a Fraction by a Whole Number Using Area Models	69%
7	Fractions Concepts	Line Plots to Display Fractional Data	67%
8	Whole Number Addition and Subtraction	Associative and Commutative Properties	67%
9	Metric and Customary Systems of Measurement	Length, Capacity and Weight	67%
10	Geometry Concepts	Symmetry	67%
11	Whole Number Multiplication and Division	Modeling Multiplication of Whole Numbers	64%
12	Whole Number Multiplication and Division	Division with Remainders	60%
13	Fractions Operations	Modeling Addition and Subtraction of Fractions	59%
14	Geometry Concepts	Angles and Triangles	57%
15	Elementary Division	Foundations of Division Using Area Models	54%
16	Whole Number Factors and Multiples	Factor Pairs	51%
17	Elementary Multiplication	Foundation of Multiplication Using Place Value	51%
18	Whole Number Multiplication and Division	Distributive Property, Using Place Value Strategies	50%
19	Decimals Operations	Understanding Decimals	50%
20	Decimals Operations	Comparing Decimals to Hundredths	50%

## Objectives in Sequence Showing Student % with Gap

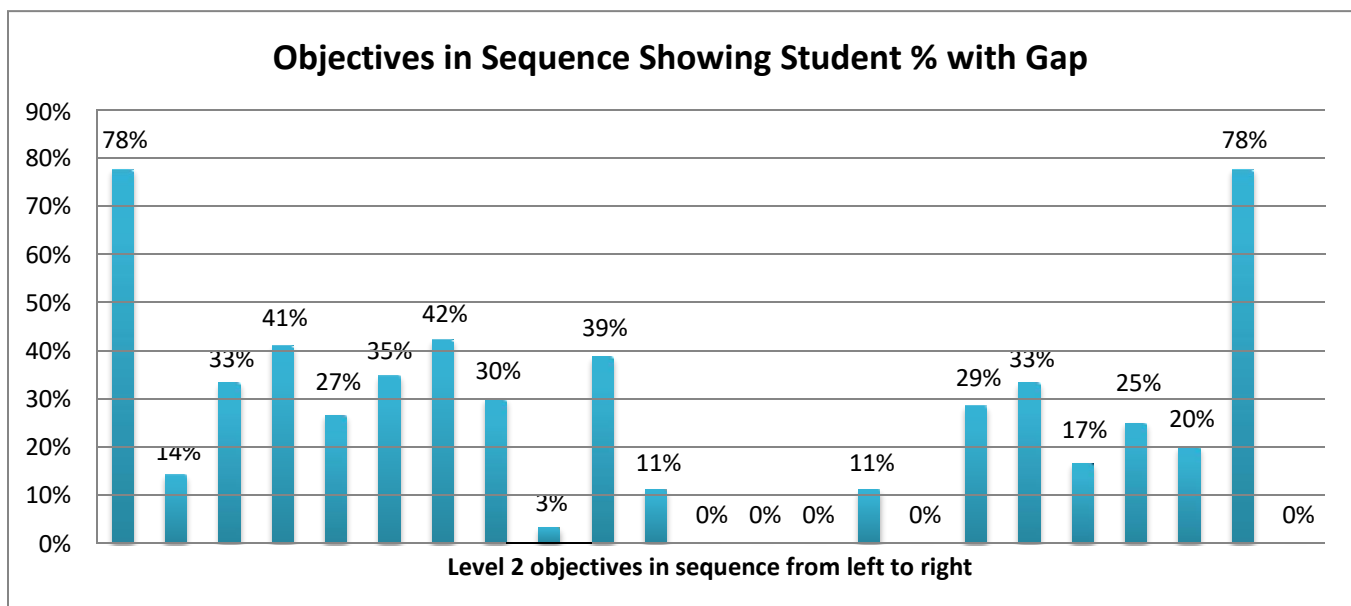


# Grade 7 Students

Ranking of skill gaps for students placed at grade level 2

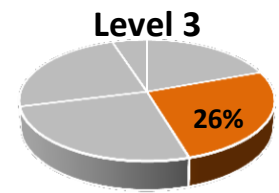


Rank	Unit	Objective	%
1	Introduction to Patterns	Introduction to Number Line Diagrams Using Whole Numbers	78%
2	Elementary Measurement	Modeling Time on a Number Line Diagram	78%
3	Introduction to Money	Making Change	42%
4	Introduction to Addition	Even Numbers as a Sum of Equal Addends	41%
5	Introduction to Measurement	Picture and Bar Graph	39%
6	Introduction to Money	Counting Money, Applications	35%
7	Introduction to Addition	Addition of Objects, Arrays and Equations	33%
8	Introduction to Odd and Even	Odd and Even, Application	33%
9	Introduction to Money	Counting Money, Review	30%
10	Introduction to Odd and Even	Skip Counting by 3s	29%
11	Introduction to Money	Counting Money	27%
12	Elementary Subtraction	Vertical Subtraction, 3-Digit	25%
13	Introduction to Place Value	Place Value, Hundreds	20%
14	Elementary Subtraction	Vertical Subtraction, 2-Digit	17%
15	Introduction to Addition	Addition of Objects Using Arrays	14%
16	Elementary Addition	2-Digit Addition, 2-Digit Answers	11%
17	Introduction to Odd and Even	Patterns with Numbers	11%
18	Introduction to Money	Money, Intro	3%
19	Elementary Addition	2-Digit Addition, 3-Digit Answers	0%
20	Elementary Addition	3-Digit Addition, 3-Digit Answers	0%
21	Introduction to Odd and Even	Odd and Even	0%
22	Introduction to Odd and Even	Skip Counting by 2s	0%
23	Geometry Concepts	Understanding Shapes and their Attributes	0%

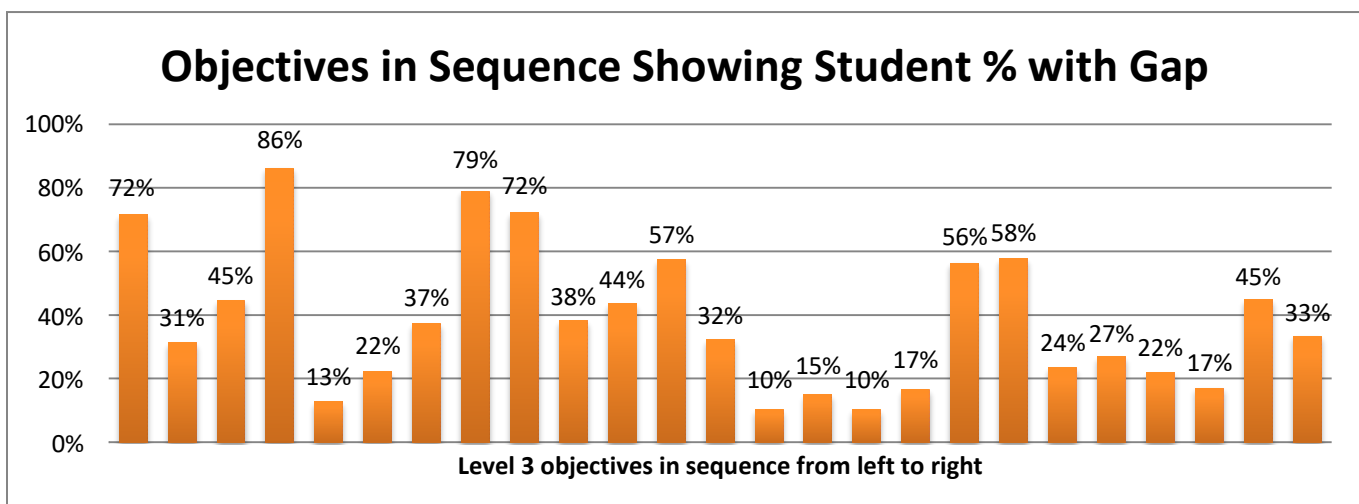


# Grade 7 Students

Ranking of skill gaps for students placed at grade level 3



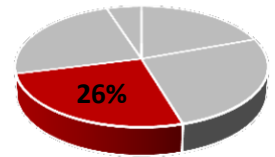
Rank	Unit	Objective	%
1	Whole Numbers	Whole Numbers and Place Value	86%
2	Elementary Measurement	Measurement	80%
3	Elementary Multiplication	The Concept of Perimeter and Area Models Connected to Addition	79%
4	Elementary Multiplication	Applications of Multiplication Using Area Models	72%
5	Whole Numbers	Greater Than & Less Than	72%
6	Whole Number Addition and Subtraction	Properties of Addition with Whole Numbers	67%
7	Fractions Concepts	Understanding Fractions	60%
8	Elementary Division	Understanding Division	58%
9	Elementary Multiplication	Interpreting Products of Whole Numbers Using Multiples of 10	57%
10	Elementary Multiplication and Division with Two or More Digits	Modeling Multiplication and Division with Unknowns	57%
11	Elementary Measurement	Time	57%
12	Whole Number Addition and Subtraction	Modeling Addition and Subtraction of Whole Numbers	57%
13	Elementary Division	Foundations of Division	56%
14	Whole Number Multiplication and Division	Properties of Multiplication with Whole Numbers	54%
15	Elementary Multiplication and Division with Two or More Digits	Finding 2 Digit Quotients	54%
16	Whole Number Multiplication and Division	Multiplying Whole Numbers	50%
17	Whole Number Multiplication and Division	Properties of Division	50%
18	Fractions Concepts	Understanding Unit Fractions Using Area Models	50%
19	Statistics	Introduction to Bar Graphs	50%
20	Elementary Multiplication and Division with Two or More Digits	Relationship Between Multiplication and Division with Unknown-Factors	45%



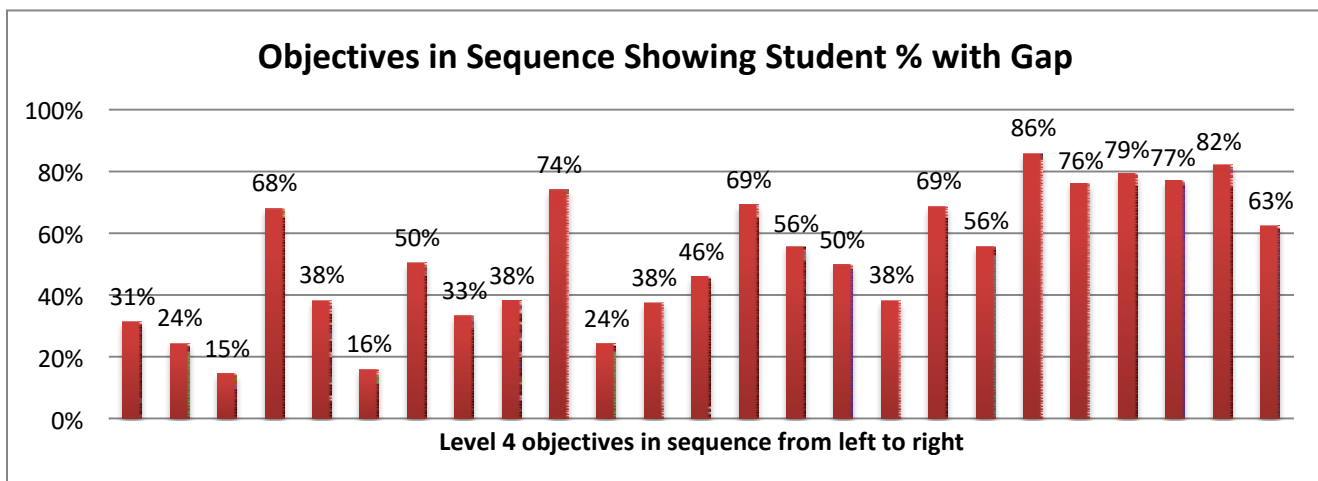
# Grade 7 Students

Ranking of skill gaps for students placed at grade level 4

Level 4



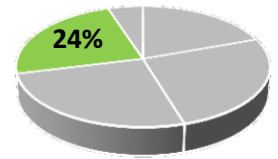
Rank	Unit	Objective	%
1	Fractions Concepts	Comparing Fractions Using Area Models	86%
2	Fractions Operations	Adding & Subtracting Fractions	82%
3	Fractions Operations	Multiplying a Fraction by a Whole Number Using Area Models	79%
4	Fractions Operations	Modeling Addition and Subtraction of Fractions	77%
5	Fractions Concepts	Line Plots to Display Fractional Data	76%
6	Elementary Multiplication and Division with Two or More Digits	Multiplication and Division with Unknown Factors	74%
7	Whole Number Multiplication and Division	Mental Math	69%
8	Whole Number Factors and Multiples	Factor Pairs	69%
9	Geometry Concepts	Symmetry	69%
10	Whole Numbers	Rounding Whole Numbers	68%
11	Metric and Customary Systems of Measurement	Length, Capacity and Weight	66%
12	Decimals Operations	Understanding Decimals	63%
13	Fractions Concepts	Understanding Unit Fractions on a Number Line Diagram	56%
14	Whole Number Multiplication and Division	Modeling Multiplication of Whole Numbers	56%
15	Geometry Concepts	Introduction to Symmetry	55%
16	Geometry Concepts	Angles and Triangles	55%
17	Elementary Division	Foundations of Division Using Area Models	50%
18	Whole Number Multiplication and Division	Guess and Check	50%
19	Geometry Concepts	Shapes and Their Attributes	50%
20	Geometry Concepts	Geometry Terms: Angles and Lines	48%



# Grade 7 Students

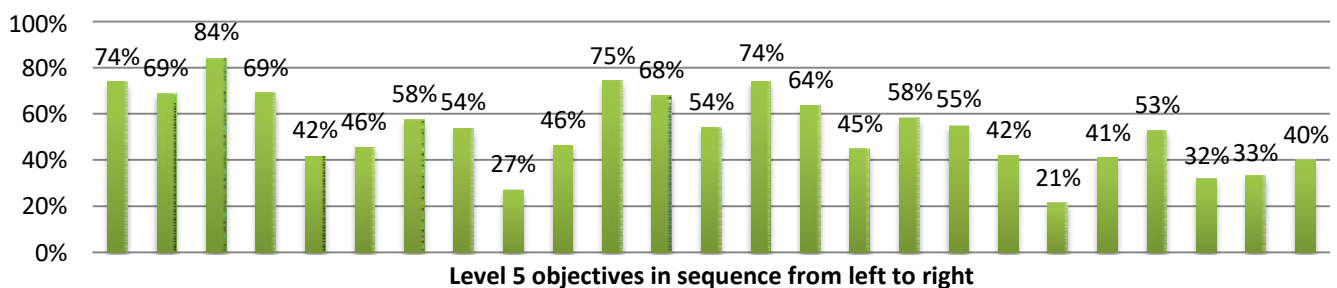
Ranking of skill gaps for students placed at grade level 5

Level 5



Rank	Unit	Objective	%
1	Whole Number Multiplication and Division	Modeling Division of Whole Numbers	84%
2	Fractions Concepts	Interpret a Fraction as Division of the Numerator by the Denominator	75%
3	Whole Number Multiplication and Division	Interpreting Multiplication as Scaling	74%
4	Fractions Operations	Multiplication, Using Area Models with Fractional Sides	74%
5	Whole Number Exponents and Order of Operations	Exponents and Place Value	69%
6	Whole Number Multiplication and Division	Order of Operations: Parentheses, Brackets, and Braces	69%
7	Fractions Operations	Modeling Whole Numbers Divided by Unit Fractions	68%
8	Metric and Customary Systems of Measurement	Converting Metric Measurements	67%
9	Fractions Operations	Multiplying a Fraction by a Whole Number Using Area Models	64%
10	Fractions Operations	Adding and Subtracting Fractions with Unlike Denominators	58%
11	Fractions Concepts	Finding Equivalent Fractions	58%
12	Fractions Applications	Modeling Addition and Subtraction of Fractions I	55%
13	Fractions Operations	Multiplying Fractions by Fractions	54%
14	Fractions Concepts	Comparing Fractions	54%
15	Decimals Operations	Dividing Decimals by Decimals	53%
16	Geometry Concepts	Parallelograms	50%
17	Fractions Concepts	Mixed Numbers and Their Equivalent Fractions	46%
18	Metric and Customary Systems of Measurement	Converting the Standard Measurements of Capacity and Mass	46%
19	Fractions Concepts	Introduction to Fractions	46%
20	Fractions Operations	Adding and Subtracting Fractions with Like Denominators	45%

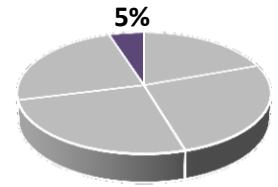
## Objectives in Sequence Showing Student % with Gap



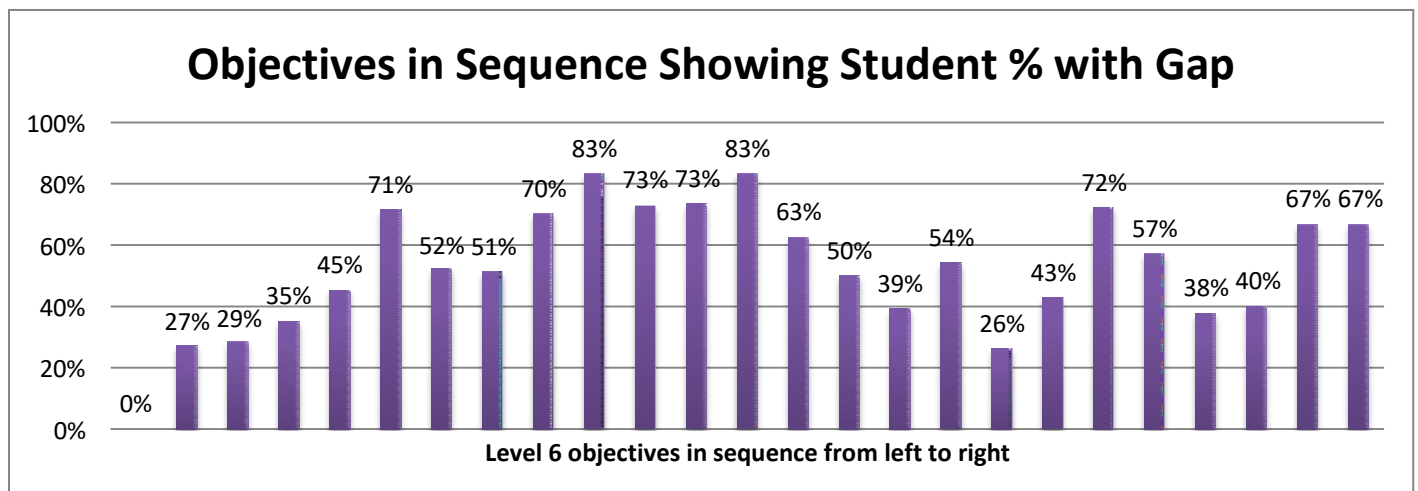
# Grade 7 Students

Placed at Grade Level 6

Level 6



Rank	Unit	Objective	%
1	Fractions Applications	Modeling Multiplication and Division of Fractions	83%
2	Fractions Applications	Modeling Perimeter and Area Using Whole Numbers and Fractions	83%
3	Integers and Real Numbers Concepts	Comparing Numbers in the Real World on a Number Line	75%
4	Fractions Applications	Modeling Division of Fractions in Story Context	73%
5	Fractions Applications	Modeling Multiplication of Fractions in Story Context	73%
6	Ratio and Proportion	Ratios Using Fraction Notation	72%
7	Whole Number Factors and Multiples	Least Common Multiple	71%
8	Fractions Operations	Multiplying and Dividing Mixed Numbers	70%
9	Metric and Customary Systems of Measurement	Converting the Standard Measurements of Length	67%
10	Metric and Customary Systems of Measurement	Converting the Standard Measurements of Capacity and Mass	67%
11	Metric and Customary Systems of Measurement	Converting Units of Mass	67%
12	Fractions Applications	Modeling Addition, Subtraction, Multiplication, and Division of Fraction	63%
13	Ratio and Proportion	Rates and Units Using Fraction Notation	57%
14	Metric and Customary Systems of Measurement	Converting Units of Capacity	57%
15	Decimals Operations	Multiplying Decimals	54%
16	Geometry Concepts	Solids	53%
17	Fractions Operations	Visualizing Quotients of Fractions	52%
18	Fractions Operations	Dividing Fractions by Fractions	51%
19	Decimals Operations	Converting Decimals to Fractions	50%
20	Geometry Concepts	Polygons in the Coordinate Plane	50%



## Individualized Instruction Begins at the Student's Lowest Skill Gap

As this report clearly shows, students identified for intervention have very different sets of skill gaps. Most math intervention programs offer only on-grade level instruction. For a math intervention program to be most effective it should include assessment that provides an [individualized study plan](#) for each student focused on their individual skill gaps plus instruction that allows students to move through their individual skill gaps at their own pace.

Ascend Math is intensive math intervention that meets each student at their lowest skill gap and guides each through an individualized study plan unique to each student. In this way, students with gaps three, four or more grades below level get the help they need.

Students learn best when they are engaged. That's why every instructional video and online exploration in Ascend is made interactive.

Students working just 1.5 to 2 hours a week in Ascend Math make tremendous progress, often gaining one to two grade levels in a semester or less. This happens because they are focused only on their individual needs.

Learn more at [www.ascendmath.com](http://www.ascendmath.com) or call toll-free (877) 843-0277.



Visit [www.ascendmath.com](http://www.ascendmath.com) to take part in interactive demos and weekly webinars.  
Or call us at 1-877-843-0277



## 7 Things to Consider When Choosing An Effective Math Intervention Program

		Ascend	Other
1	Intensive online math intervention that begins at the student's functional grade level. Students can progress through multiple levels on a single subscription.	<input checked="" type="radio"/>	<input type="radio"/>
2	Universal screener identifies skill gaps according to each state's rigorous standards.	<input checked="" type="radio"/>	<input type="radio"/>
3	Automatically assigns a unique study path at each level in which the student has skill gaps.	<input checked="" type="radio"/>	<input type="radio"/>
4	Real time data to make progress monitoring easy and give teachers a perspective on what each student needs and will receive next.	<input checked="" type="radio"/>	<input type="radio"/>
5	Gold standard multi-modal online instruction for more than 700 lessons/objectives.	<input checked="" type="radio"/>	<input type="radio"/>
6	Helps students gain a conceptual understanding of math standards through lessons and activities and provides students a methodology to write and speak about math.	<input checked="" type="radio"/>	<input type="radio"/>
7	Follows precisely the Standards for Mathematical Practice.	<input checked="" type="radio"/>	<input type="radio"/>

Learn more at [www.ascendmath.com](http://www.ascendmath.com)

