

“UDL acknowledges the diversity in what students know, think, and engage in learning. The framework helps teachers shift from planning for a hypothetical middle to the actual margins of their classrooms.” Lambert, Rachel. “The Magic Is in the Margins: UDL Math.” *Mathematics Teacher: Learning and Teaching PK-12*, vol. 114, no. 9, National Council of Teachers of Mathematics, Sept. 2021, pp. 660–69. <https://doi.org/10.5951/mtlt.2020.0282>.

Universal Design for Learning is achieved by utilizing flexible curricular materials and activities that provide alternatives for students with disparities in abilities and backgrounds. Ascend Math meets the Universal Design for Learning as follows.

Ascend Math architecture supports a diversified classroom and provides teachers the supports to enable students to conceptualize, speak and write about math that is meaningful to their own environment. Through the use of the explicit instruction found in the videos, connected to interactive practice, math modeling tools, study guides and teacher progress monitoring, Ascend Math supports teachers reach the actual margins of their classroom.

The Ascend Math Live Student tracker provides information about student grouping in which students working on the same standards and supporting standards may be pulled for small instructional groupings. For example, a student working on a 7th grade standard can work in a peer group with students working on supporting standards at the 5th and 6th grade functional levels. The Ascend Math teacher guides provide prompts to assist teachers with what, why and how elements with the goal of students communicating their mathematical thinking, engaging in learning and making connections and representations across mathematical ideas. Students truly become problem solvers and teachers as designers.

Overview

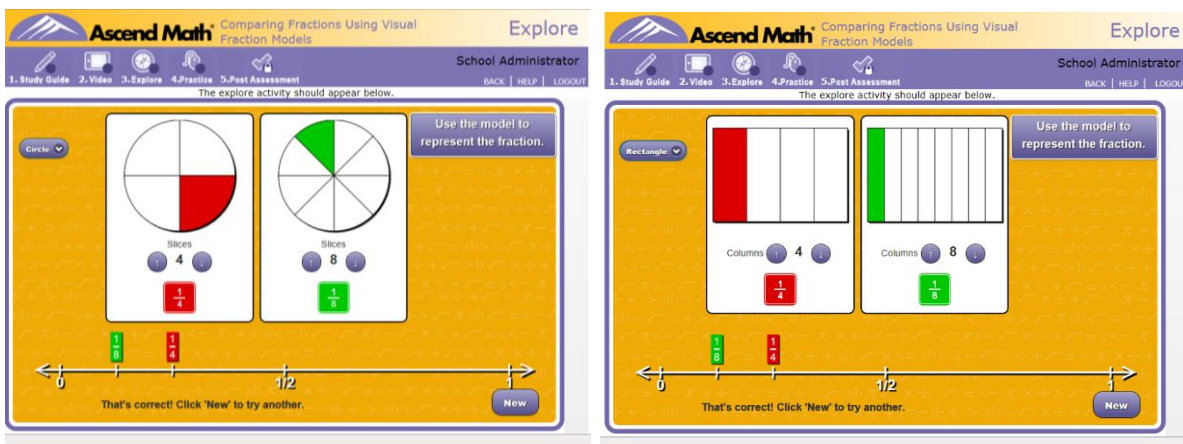
- Big ideas. Curricula emphasize major concepts, principles, categories, rules, techniques, and hierarchical structures related to critical ideas and themes.2
- Conspicuous strategies. Curricula include explicit instruction on steps to complete required tasks.2
- Mediated scaffolding. Curricula include questioning, feedback, and prompts.....3
- Strategic integration. Big ideas are explicitly linked within and across curricula.....5
- Judicious review. Previously taught content is reviewed and linked to applications.6
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Ascend Math has a flexible curriculum designed with all learners' needs in mind. It is organized so that learners experience minimal barriers and maximum learning outcomes.

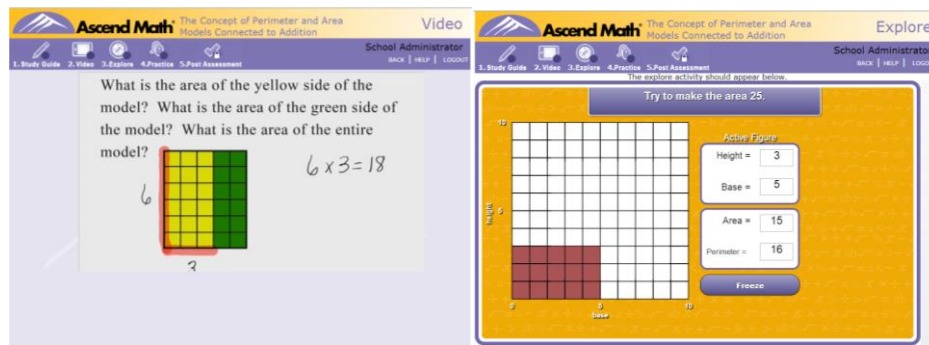
Provides content that has been aligned to rigorous content and practice standards. Content is structured to vertically align within each student's individual plan. Foundational skills spiral back into future lessons so connections can be made through vertically aligned concepts; the student will either quickly pre-assess out of the foundational skills as they reappear or have the opportunity to refresh his knowledge. Content is presented in various ways to give struggling learners multiple opportunities to process, but also to provide learners who already understand the basics another perspective on how to further explore the mathematics (see image below). Interactive exploration and practice provide students with immediate and effective feedback giving learners the opportunity for productive struggle that will result in higher-order thinking and reflection.

In the diagrams below, the numerical representation of a fraction is compared to an area model which in turn is compared to a number line display. Students may explore the concept using either a pie chart or a rectangle.



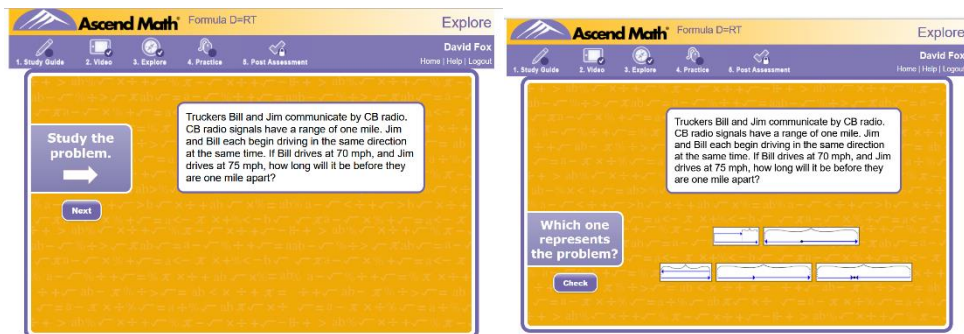
- Conspicuous strategies. Curricula include explicit instruction on steps to complete required tasks.

Each instructional objective includes a video. The videos are complemented with interactive explorations that allow students to model what was demonstrated in the video. Ascend Math provides opportunities to discover formulas and processes explicitly discussed in the instructional video portion by connecting these to modeling tools. For example, solving an area-of-a-square problem is explained in manageable steps in a video. Students are then directed to an interactive exploration which allows them to model the area and how it changes as they change the side lengths. Representations using unit squares are displayed giving multiple methods to conceptualize the learning. The goal of using conspicuous strategies is to help students understand how to approach and solve problems in a systematic and logical way.

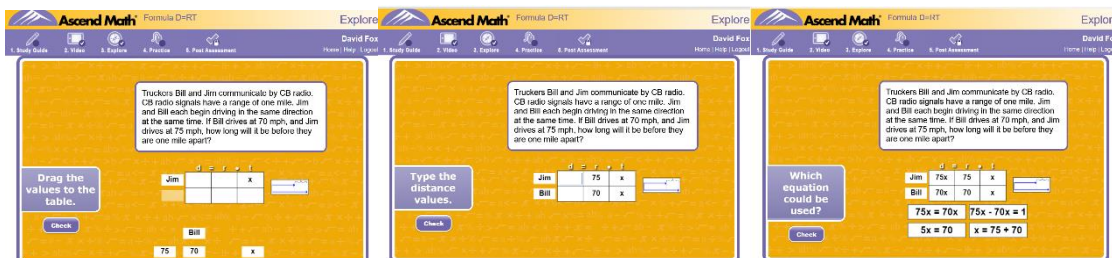


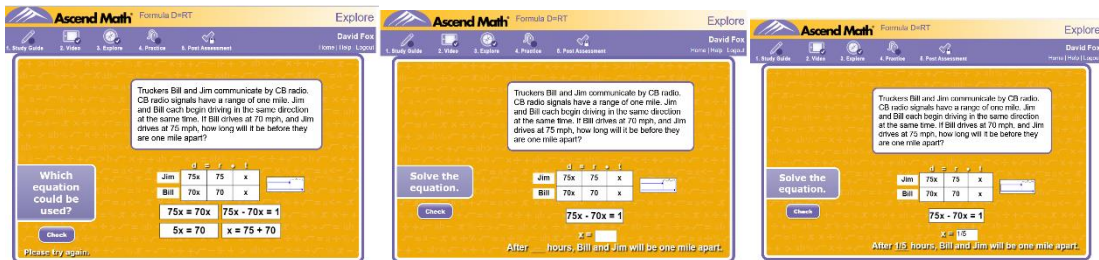
- Mediated scaffolding. Curricula include questioning, feedback, and prompts.

Ascend Math explorations provide support to the student in the form of questions, feedback, and prompts, in order to help the student complete a task or learn a new skill. The goal of mediated scaffolding is to help the student develop their own understanding and problem-solving skills, rather than simply providing the student with the answers or solution to a problem. For example a problem on Distance Rate and Time provides guidance to set up the problem.



Students are then prompted to set up the equations and then solve for the answer (quantitative).





Truckers Bill and Jim communicate by CB radio. CB radio signals have a range of one mile. Jim and Bill each begin driving in the same direction at the same time. If Bill drives at 70 mph, and Jim drives at 75 mph, how long will it be before they are one mile apart?

	d	r	t	
Jim	75x	75	x	
Bill	70x	70	x	

Which equation could be used?

Check

Please try again.

Solve the equation.

Check

After 15 hours, Bill and Jim will be one mile apart.

Ascend Math “Compasses” Teacher Guides contains mediated scaffolding supports with question prompts to help the student clarify their understanding of the material, guidelines to gauge student progress, and prompts or hints to help them complete tasks. The use of the teacher guides helps students develop their critical thinking skills, build confidence, and become more independent learners.

Ascend Math Compasses also contain math vocabulary, strategies for developing math conceptual knowledge, applications to real world situations and questions to check for understanding that will encourage students to speak about math. Compasses include a specific lesson on how to use concrete manipulatives to reinforce and expand learning. In the Comparing Fractions Compass Guide below, teachers are directed to use the interactive Explore activity (see below) to reinforce conceptual understanding and provide visuals for math vocabulary. This example shows how students can use visuals and concrete representation of fractions on a number line. The provided check for understanding questions in the teacher guides allow teachers to address any learning gaps and understand student thinking before students continue the Ascend Math program and/or core curriculum math concepts.



Ascend Math Teacher Guide

2063

Comparing Fractions

Overview, Purpose and Objective:

Students will be able to compare fractions with like and unlike denominators using $>$, $<$, and $=$ signs.

Prior Knowledge Needed:

The student should:

- Have a basic understanding of fractions.
- Have basic multiplication fact mastery.

Lesson Details:

This exploration allows students to compare fractions visually and using the number line. On the top left, there is a slider that allows the exploration to show Circles or Squares.

- Change the exploration to **Squares**.
- Add rows and columns to the squares using the arrows.
- Color the parts by clicking on them.

Check for Understanding:

Students should discuss:

- What do you observe about these fractions?
- Which color has the greatest amount shaded? Which one has the least amount shaded?
- Do any fractions have the same numerator? Which color shaded is largest?
- How does the denominator compare on the larger color versus the smaller color?
- How does that compare if you were to apply that concept to sharing a pizza or a cookie?
- Have students come up with more real-word fraction examples.
- Now select **Check**.
- How do your observations relate to how the numbers display on the number line?

Additional Activity (Independent/group activity to reinforce lesson):

Pass out fraction bars and allow for short free discovery period. Review that fractions can only be compared when they have a common denominator. Review comparing two written fractions with common denominator and students prove using fractions bars.

- Review method taught in lesson for comparing fractions with unlike denominators and have students prove with fraction bars.

Teaching Aids/Materials Needed for Activity:

- fraction bars
- white boards/markers
- journals

Vocabulary:

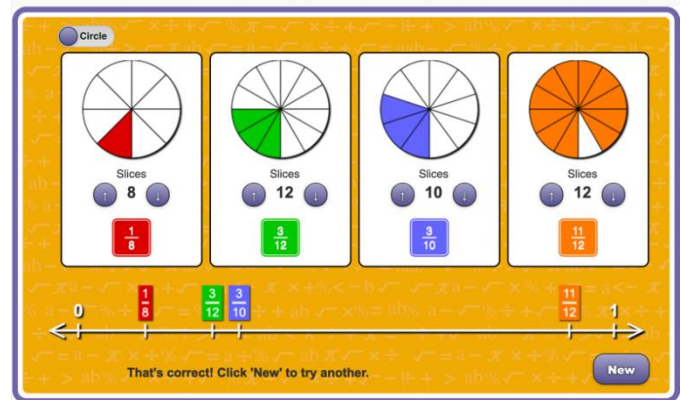
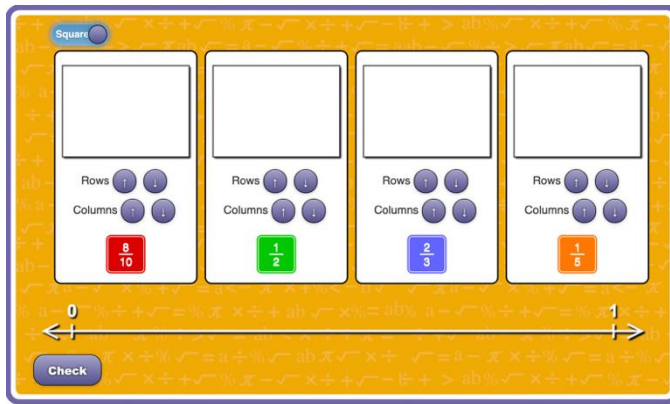
- fraction
- numerator
- denominator
- equivalent fraction
- common denominator

Notes:

- Strategic integration. Big ideas are explicitly linked within and across curricula.

By utilizing the Live Student Tracker teachers can group students in non-traditional ways. This supports UDL in that students working at different grade level equivalencies on supporting standards may be grouped for peer-to-peer learning. This approach will allow students to make connections at varying depths of knowledge and teachers can help students develop a deeper understanding of the material and see how the concepts students are learning fit into the broader context of their education. The Ascend Math compasses suggests activities that allow students to

see the relevance of what they are learning in the real world. For example, in questions to check for understanding above, students are asked to apply fractions to sharing a pizza or a cookie.



Utilizing all the tools of Ascend Math, students become more motivated and engaged in their studies, and will develop important critical thinking skills.

- Judicious review. Previously taught content is reviewed and linked to applications.

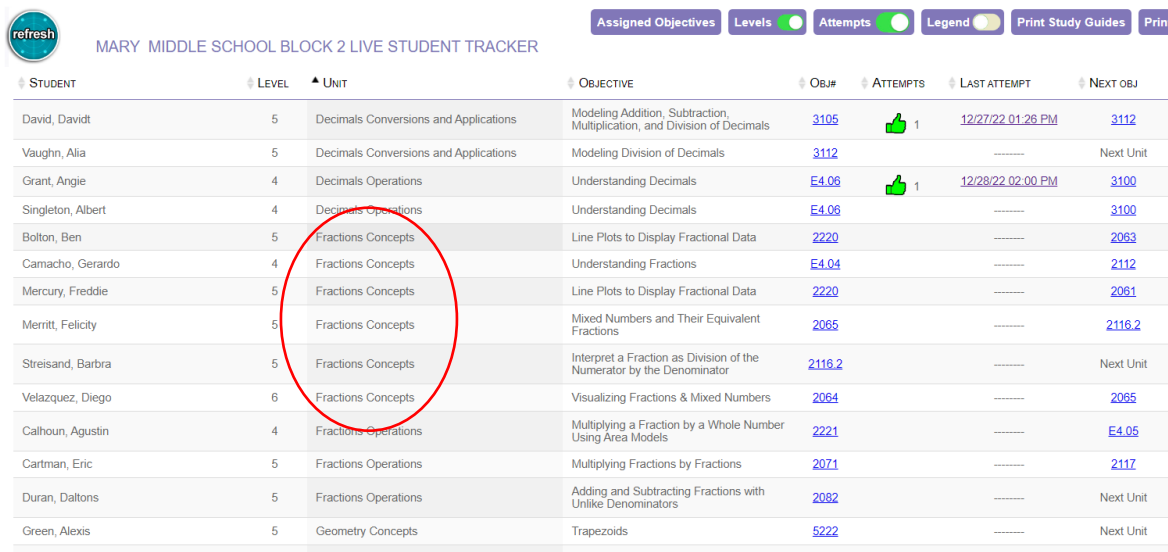
Scaffolding is built into Ascend Math. As a student progresses through levels, foundational skills are offered again. The student will either quickly and easily pre assess out of the foundational skills as they appear in a study plan or the student will have the opportunity to refresh their knowledge when directed to learning resources. In the example below. The darker purple represents an alignment match for a unit. The light purple are scaffolded lessons.

Objective Matches Grade Level Standard - Alignment Match

Objective is a prerequisite, scaffolded or supporting objective for this grade level standard - prerequisite objective from a previous grade standard assigned only when the pre assessment identifies need.

Code	Support Standards	FL Best	Objective Title
Decimals Operations - 6 - (Ascend Default Unit)			
3103	MA.5.M.2.1, MA.5.NSO.2.4, MA.5.NSO.2.5	MA.6.AR.2.4, MA.6.NSO.2.1	Multiplying Decimals
3104	MA.5.NSO.1.5, MA.5.NSO.2.4	MA.6.NSO.2.1	Rounding Decimals
3111	MA.5.NSO.2.4, MA.5.NSO.2.5	MA.6.NSO.2.1	Dividing Decimals by Decimals
Decimals Conversions and Applications - 6 - (Ascend Default Unit)			
3113	MA.4.FR.1.2	MA.6.NSO.3.5	Converting Fractions to Decimals and Decimals to Fractions
3114		MA.6.NSO.3.5	Comparing Decimals and Fractions
3105		MA.6.NSO.2.1	Modeling Addition, Subtraction, Multiplication, and Division of Decimals

Ascend Math's Live Student Tracker provides real time information for what is happening in a class at any point in time. For example, in the example below, teachers may sort the Live Student Tracker by the student's current Unit, the teacher notices that 6 of her students are working on objectives in the unit Fraction Concepts across different grade levels. The teacher may now choose to follow up with small group instruction. By referring to teacher guides, teachers can use a variety of strategies to review previously taught content, such as summarizing key points, providing practice opportunities, or asking questions to assess students' understanding. By linking previously taught content to real-world applications, teachers can help students see the relevance and importance of what they are learning and can also help them develop their problem-solving skills. These strategies help students retain important information and become more confident and independent learners.



STUDENT	LEVEL	UNIT	OBJECTIVE	Obj.#	ATTEMPTS	LAST ATTEMPT	NEXT OBJ
David, David	5	Decimals Conversions and Applications	Modeling Addition, Subtraction, Multiplication, and Division of Decimals	3105	1	12/27/22 01:26 PM	3112
Vaughn, Alia	5	Decimals Conversions and Applications	Modeling Division of Decimals	3112			Next Unit
Grant, Angie	4	Decimals Operations	Understanding Decimals	E4.06	1	12/28/22 02:00 PM	3100
Singleton, Albert	4	Decimals Operations	Understanding Decimals	E4.06			3100
Bolton, Ben	5	Fractions Concepts	Line Plots to Display Fractional Data	2220			2063
Camacho, Gerardo	4	Fractions Concepts	Understanding Fractions	E4.04			2112
Mercury, Freddie	5	Fractions Concepts	Line Plots to Display Fractional Data	2220			2061
Merritt, Felicity	5	Fractions Concepts	Mixed Numbers and Their Equivalent Fractions	2065			2116.2
Streisand, Barbara	5	Fractions Concepts	Interpret a Fraction as Division of the Numerator by the Denominator	2116.2			Next Unit
Velazquez, Diego	6	Fractions Concepts	Visualizing Fractions & Mixed Numbers	2064			2065
Calhoun, Agustin	4	Fractions Operations	Multiplying a Fraction by a Whole Number Using Area Models	2221			E4.05
Cartman, Eric	5	Fractions Operations	Multiplying Fractions by Fractions	2071			2117
Duran, Daltons	5	Fractions Operations	Adding and Subtracting Fractions with Unlike Denominators	2082			Next Unit
Green, Alexis	5	Geometry Concepts	Trapezoids	5222			Next Unit

- Primed background knowledge. New content is linked to and builds on students' background knowledge.

Ascend Math preassessments and screeners support teachers in determining background knowledge that students already possess and identifying any gaps in understanding that need to be addressed. The scope and sequence of Ascend guides student through a learning path in a logical math sequence. Students must successfully pass one lesson in order to move to the next lesson, thereby ensuring that each lesson is linked to and builds to the previous lesson.

The virtual manipulatives in Ascend provide math modeling tools that make it easy to link new content to students' background knowledge which in turn allows students to make connections between what they already know and what they are learning. This process facilitates deeper understanding and retention of material.

For more information, please contact info@ascendmath.com