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There is not a single math curriculum product that can improve success in mathematics. There is not an intervention program that can fix math concerns. The only way to increase student success in math is through high quality math instruction. And the key behind quality math instruction is providing adequate support and development. When pedagogy is supported so that math can be accessible to ALL students - everybody benefits. When teachers are able to build their own grade level math content knowledge and pair that with inclusive math instructional methods - everybody benefits.

How do we do it? How do we go about improving pedagogy with the goal of having all students access equitable math instruction? These are questions we answer every day at All Learners Network (ALN).

Our High Leverage Concepts Resources are the center of all that we do. They guide and support our work.

What makes up the High Leverage Concepts Resources?

- High Leverage Concepts (HLCs)
- HLC Progressions
- HLC Assessments

High Leverage Concepts (HLCs)

You can't teach students math without knowing students' current math understandings

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and what grade level mathematics they need to learn that will benefit them the most. The High Leverage Concepts (HLC) serve as a road map to assure that all students are meeting the most fundamental concepts to move onto the next grade. The HLCs do not focus on all grade level concepts, just the single, minimum skill needed to advance to the next grade level - with algebra as the overall trajectory. We name algebra as the overall trajectory because we know that to provide equity to students, and to close existing achievement gaps, all students need to know some mathematics, particularly algebra (Snipes, Finkelstein, Regional Educational Laboratory West (ED) & WestEd, 2015).

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Math for every student

High Leverage Concepts Grades 3-5

Multiplicative Reasoning ⟷ **Fractions**

Grade Three	Grade Four	Grade Five
Multiply and divide numbers within 100 *(in context and in equations)*	**Multiply and divide any two numbers within 1,000** *(in context and in equations)*	**All four operations with fractions** *(in context and in equations)* (**NO** standard algorithms – using modeling and/or decomposition approaches.)
Models for Intervention		
Strong connections between grouping and area models. Use of area models for multiplication facts.	Area models to support decomposition for multiplication. Partitive (sharing) models for division.	Area models to build equivalence for add/sub. Parts/whole models for multiplication, with a focus on whole numbers x fractions. Measurement models for division of fractions.
Models for Instruction		
Grouping models (i.e. circles and stars, loops and groups, beans and cups), jumps on a number line, repeated addition, skip counting; area models for products to 100 (may start by using place value blocks) Experience with both partitive (sharing) models and quotitive (partial quotients) models	Area models for products OR quotients to 1,000 The use of area models to develop decomposition strategies for multi-digit computation Experience with both partitive (sharing) models and quotitive (partial quotients) models both in equations and in context.	Area models for part/whole relationships, place value blocks, Cuisenaire rods, fraction bars, fraction pieces, geoboards, pattern blocks
Critical Strategies		
Compose and Decompose using factors (initially 2s, 5s, 10s) Use compensation based on the commutative, identity, associative, and distributive properties Approach division as a missing factor in a multiplication problem. (Understanding how multiplication and division are related operations.)		Model and Identify equivalent fractions Connect and apply previous understanding of whole number operations and properties of addition and multiplication while operating with fractions.

HLC Progressions

The HLC Progressions identify the developing stages along a continuum of concepts, models, and skills that lead toward student understanding and application of a specific HLC. The HLC Progressions are designed to be a tool for classroom teachers, math interventionists, and special educators who are creating learning opportunities for their students to achieve the concepts targeted by the HLCs. The HLC Progressions are a companion for educators using the HLCs and the HLC Assessments. The progressions are specific to the concepts outlined in the HLCs. All of the HLC Progression documents are designed with increasing complexity from top to bottom and left to right. Students

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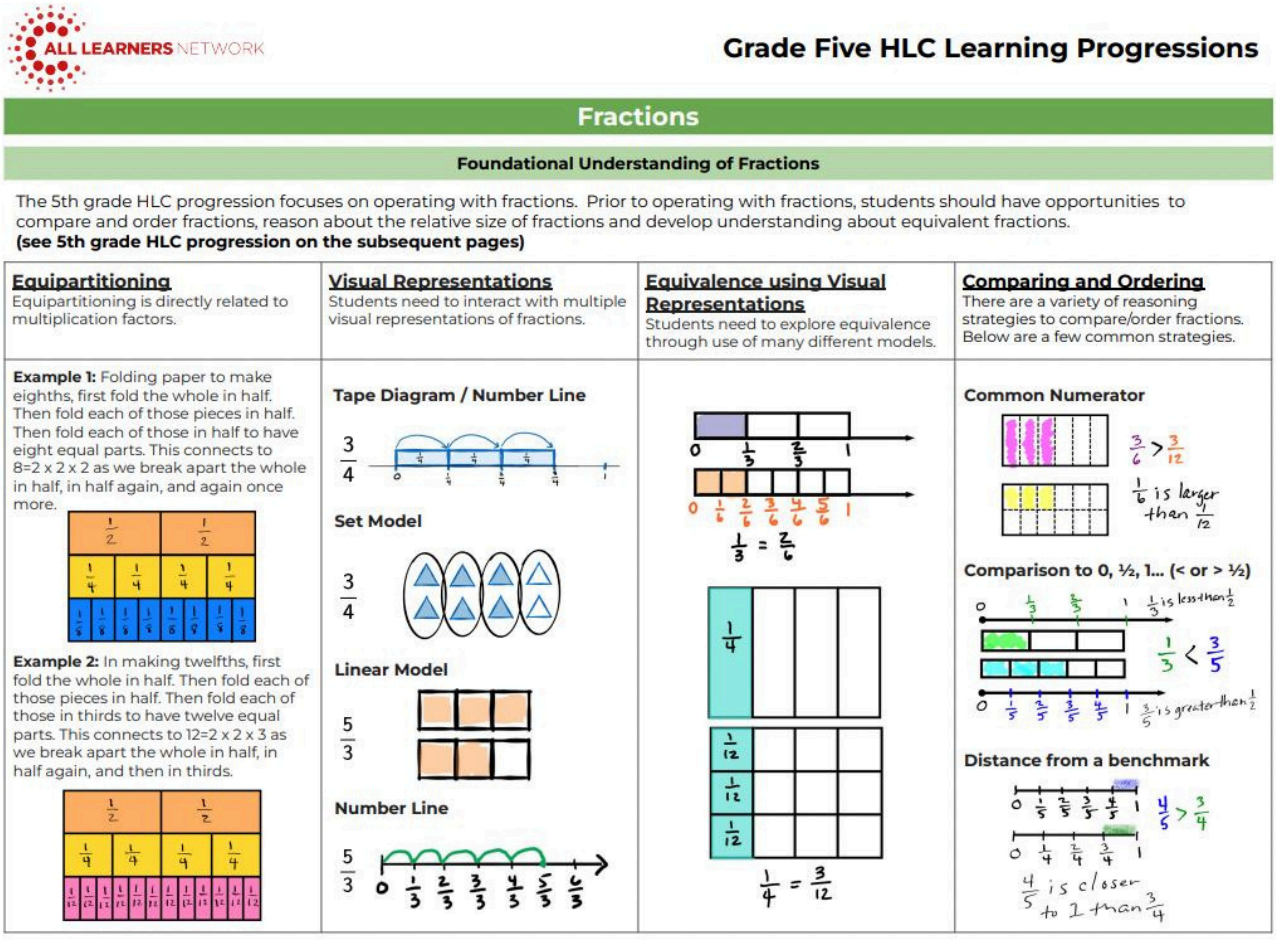
will make progress through the learning HLC Progression at their own pace through the support of targeted learning opportunities provided by the classroom teacher, math interventionist or special educator. The size of the boxes are not proportional to the amount of time students may spend in each phase. Student growth within these concepts is not always linear and may not happen simultaneously across each skill. The HLC Progressions are not a checklist, but instead are reference points to help guide instruction and highlight progress toward the HLC.



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Grade Five HLC Learning Progressions

Fractions

Foundational Understanding of Fractions

The 5th grade HLC progression focuses on operating with fractions. Prior to operating with fractions, students should have opportunities to compare and order fractions, reason about the relative size of fractions and develop understanding about equivalent fractions.
(see 5th grade HLC progression on the subsequent pages)

Equipartitioning Equipartitioning is directly related to multiplication factors.	**Visual Representations** Students need to interact with multiple visual representations of fractions.	**Equivalence using Visual Representations** Students need to explore equivalence through use of many different models.	**Comparing and Ordering** There are a variety of reasoning strategies to compare/order fractions. Below are a few common strategies.
Example 1: Folding paper to make eighths, first fold the whole in half. Then fold each of those pieces in half. Then fold each of those in half to have eight equal parts. This connects to 8=2 x 2 x 2 as we break apart the whole in half, in half again, and again once more. **Example 2:** In making twelfths, first fold the whole in half. Then fold each of those pieces in half. Then fold each of those in thirds to have twelve equal parts. This connects to 12=2 x 2 x 3 as we break apart the whole in half, in half again, and then in thirds.	**Tape Diagram / Number Line** **Set Model** **Linear Model** **Number Line**		**Common Numerator** **Comparison to 0, ½, 1... (< or > ½)** **Distance from a benchmark**

HLC Assessments

The High Leverage Assessments (HLAs) allow educators to assess a student's current understanding of a particular grade level HLC. These assessments were created to help identify what students CAN do, so that educators can reference the HLCs and the HLC Progressions to plan the next instructional steps. The HLC Assessments are not assessing all of the math standards for a grade level, just the High Leverage Concept we have identified.

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High Leverage Assessment

Name:_____ Teacher:_____ Date:_____

1. Maya walked $\frac{1}{4}$ of a mile to Lee's house. Then they walked $\frac{5}{6}$ of a mile to the park.

   Did Maya walk:

   a. more than a mile
   b. less than a mile
   c. a mile

   Explain your choice.

2. A flower garden has a length of $5\frac{2}{3}$ feet and a width of $3\frac{1}{4}$ feet. What is the area of the garden? Draw a model to show your mathematical thinking.

Together all of the tools within the High Leverage Concepts Resources empower educators to provide equitable math instruction for all students. And that- is what we are here to do - support educators with tools and professional development so all students can access high quality math instruction.

References

Huang, C. W., Snipes, J., & Finkelstein, N. (2014). Using Assessment Data to Guide Math Course Placement of California Middle School Students. REL 2014-040. Regional Educational Laboratory West.

What Now? Scan the QR code and scroll to the bottom of the post for links to next steps

1. Check out our High Leverage Concepts (HLCs), watch our HLC Explainer Videos, and then consider these questions:
   a. How do these resources work together to impact access, growth, and instruction?
   b. How could you use these resources to improve access and growth for all students?
2. Register for one of our upcoming events (many of them are free!).
3. Bring All Learners Network (ALN) into your school or district for embedded professional development.

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