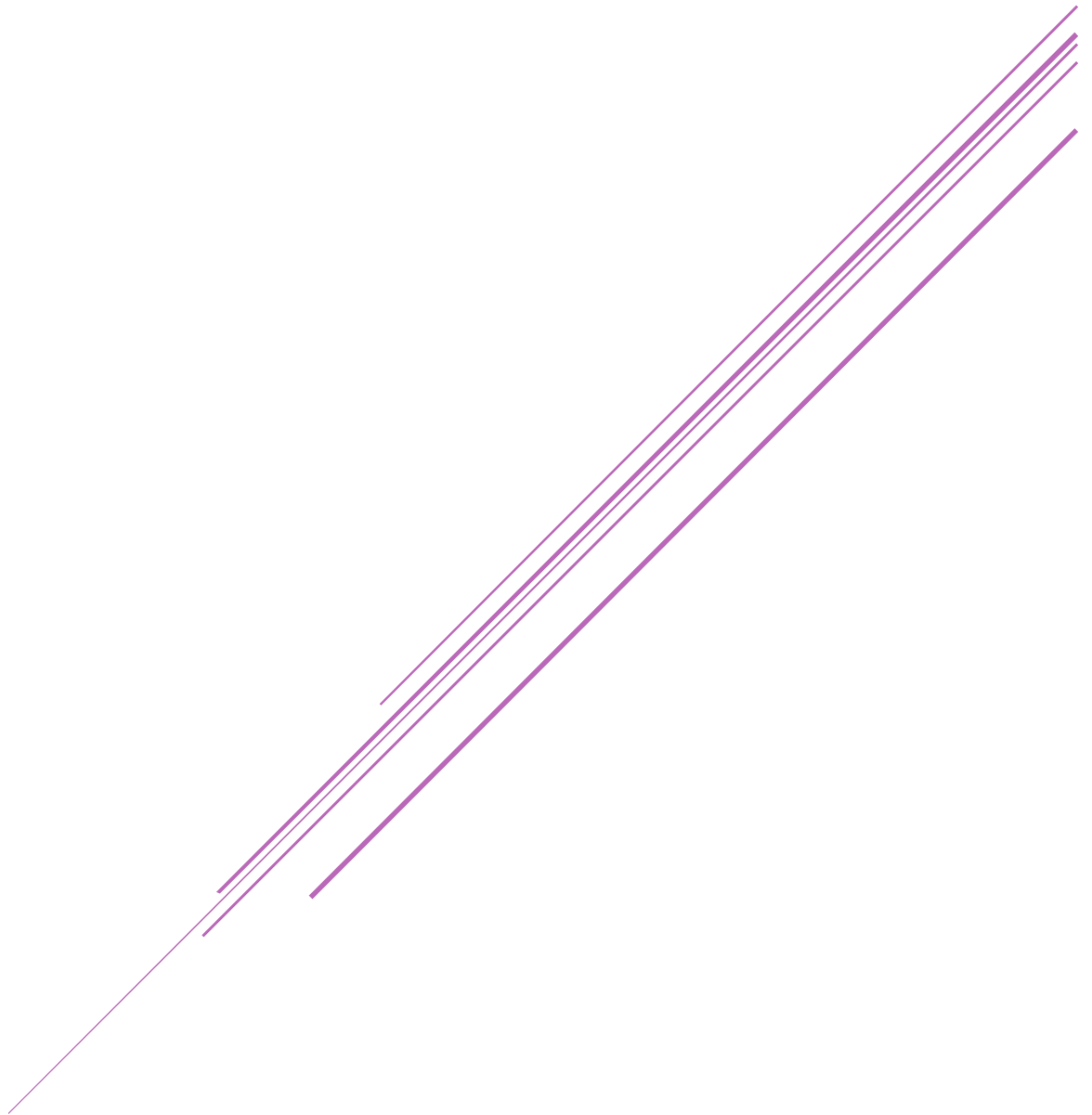


ACCELERATING MATH LEARNING

Guidelines on addressing math learning loss



Accelerating Stagnant Learners

The impact of the varying settings of education in the last year is a challenge stakeholders are not taking lightly. However, when evaluating statewide assessment data from prior to 2020 a disheartening trend is clear. The lowest scoring 25% of students in math are stagnant learners and do not show improvement on test scores.¹ Unfortunately, “about 20 percent of public school students’ teachers in both grades [4th and 8th grade] reported that a lack of adequate instructional resources was a moderate or serious problem in 2019”.² Therefore, it is imperative when evaluating resources using funds allocated for learning loss and/or stagnant learners, such as ESSER, to choose a program with the ability to accelerate math for ALL learners. Programs that accelerate learning have a systematic design, encourage conceptual learning along with reinforcement of fluency, provide meaningful data, address social and emotional learning, incorporate multi-modal teaching with supports for small group instruction, and encourage de-tracking math. This paper explores guidelines on addressing math learning loss.

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Systematic Design

To advance students, programs need to have a systematic design that provides students with materials at their current level, while assuring pre-requisite skills are reviewed and any gaps are addressed before being introduced to new concepts. Instead of only presenting new materials without accessing prior knowledge, Ascend Math intentionally meets the students within their

¹ What Works Clearinghouse, 2021, “Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades”, <https://ies.ed.gov/ncee/wwc/>

² NAEP Mathematics, 2019 <https://www.nationsreportcard.gov/highlights/mathematics/2019/>

zone of proximal development and spirals materials to advance long term learning. The zone of proximal development is an education buzzword that means students are challenged at the appropriate level for their existing skills and knowledge—not too easy, not too difficult. A student might not be able to conquer a brand-new topic on their own, but with the right supports, they can learn and retain something new that was previously out of reach. This insight, known across educational and psychological literature as the “zone of proximal development.”³ For example, refer the images below of a 4th grade fraction unit, a 7th grade Ratio and Proportion Unit and an Algebra I Solving Systems of Equations Unit. Each unit includes spiraled and grade level aligned lessons which address the zone of proximal development.

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 is only assigned when the pre assessment identifies need.

Fractions Concepts - Level 4

| | | | |
|-------|------------------------------|------------------------------------------------------------|-------------------------------------------------------|
| E4.04 | 3.NF.A.1, 3.NF.A.2, 3.NF.A.3 | 4.MD.B.4, 4.NF.A.1, 4.NF.A.2, 4.NF.B.3, 4.NF.B.4, 4.NF.C.5 | Understanding Fractions |
| 2112 | | 4.NF.A.1, 4.NF.A.2, 4.NF.B.3, 4.NF.B.4 | Understanding Unit Fractions on a Number Line Diagram |
| 2114 | | 4.NF.A.2, 4.NF.B.3 | Comparing Fractions Using Area Models |
| 2220 | | 4.MD.B.4, 4.NF.A.2 | Line Plots to Display Fractional Data |

Ratio and Proportion - Level 7

| | | | |
|------|------------------------------|----------|---------------------------------------------------|
| 3121 | 6.RP.A.1, 6.RP.A.2, 6.RP.A.3 | 7.RP.A.2 | Ratios Using Fraction Notation |
| 3122 | 6.RP.A.2, 6.RP.A.3 | 7.RP.A.1 | Rates and Units Using Fraction Notation |
| 3123 | | 7.RP.A.2 | Proportional Relationships |
| 3124 | | 7.RP.A.3 | Finding an Unknown in a Proportional Relationship |
| 3131 | | 7.RP.A.3 | Modeling Proportional Relationships I |
| H108 | | 7.RP.A.2 | Sequences: Use proportions to find missing values |

Solving Systems of Linear Equations - Level A1

| | | | |
|-----------|----------|----------------------------------------------|-----------------------------------------------------------|
| A13_01_01 | 8.EE.C.8 | A.REI.C.5, A.REI.C.6, A.REI.D.10, A.REI.D.11 | Solve A System Of Linear Equations By Graphing |
| A13_02_01 | 8.EE.C.8 | A.REI.C.5, A.REI.C.6 | Substitution To Solve A System Of Linear Equations |
| A13_03_01 | | A.REI.C.5, A.REI.C.6 | The Addition Method To Solve A System Of Linear Equations |
| A13_04_01 | | A.REI.C.5, A.REI.C.6 | Multiplication With The Addition Method |

Meaningful, Real-Time Data

Beyond standardized scores, educators need meaningful, real-time data to guide instruction for all learners. If the goal is to accelerate learning, valuable teaching time needs to be used effectively and it cannot be assumed what standards in which the learner knows or has deficits. Ascend Math offers pre and post assessment reporting and a plethora of reports that include both formative and summative results that identify State Standards. Like Ascend Math, programs should include individual reports along with class and school-wide data that is updated on a continual basis.

³ New Classrooms.org [The Iceberg Problem](https://newclassrooms.org/icebergproblem/) “How Assessment and Accountability Policies Cause Learning Gaps in Math to Persist Below the Surface...and What to Do About It” <https://newclassrooms.org/icebergproblem/>

Promote Conceptual Learning

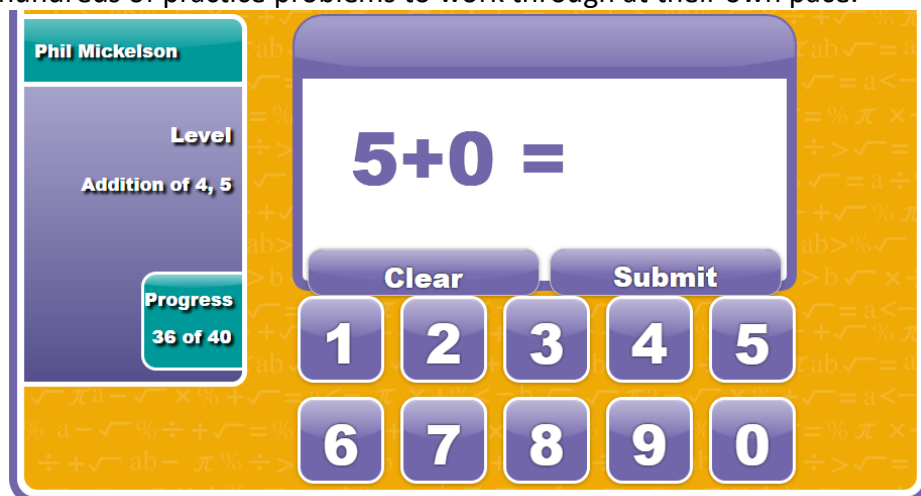


To accelerate below grade level stagnant learners to achieve grade level or above, high stakeholders need to ensure curriculum builds conceptual learning alongside calculations. The What Works Clearinghouse emphasizes the importance of two types of conceptual learning, concrete (3D manipulatives) and semi-concrete (2D manipulatives)⁴. Within Ascend Math, building conceptual learning through concrete and semi-concrete representations into learning is easy for educators with Ascend Math resources. Teacher Guides “Ascend Math Compasses” provide lesson specific guidance for small group instruction and project-based learning (hands-on, technology simulations, guided practice). Ascend Math Compasses also contain math vocabulary, strategies for developing math conceptual knowledge and questions to check for understanding that will encourage students to speak about

math. Compasses include a specific lesson on how to use semi-concrete manipulatives (e.g., virtual Explorations) and additional concrete manipulatives to reinforce and expand learning. Transferring conceptual math knowledge to real-world scenarios is encouraged through peer-to-peer learning as Ascend Math promotes opportunities for discussion and exploration.

Reinforcement of Fluency

Along with conceptual learning, effective programs include fluency practice as combining both aspects of learning round out math instruction and give stagnant learners the ability to access high math concepts. Ascend Math’s Flash Card Math reinforces basic addition, subtraction, multiplication, and division facts for students with skill gaps. The application gives students access to hundreds of practice problems to work through at their own pace.



⁴ What Works Clearinghouse, 2021, “Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades”, <https://ies.ed.gov/ncee/wwc/>

Address Social and Emotional Learning

Programs that embed social and emotional learning are more important than ever, especially for the discouraged, under-motivated students who may not feel they are progressing in math. If a student believes they will always score in the lower 25% of their peers, how do stakeholders expect them to self-motivate? Beyond teaching math concepts, curriculum should have built-in social and emotional supports for learners.

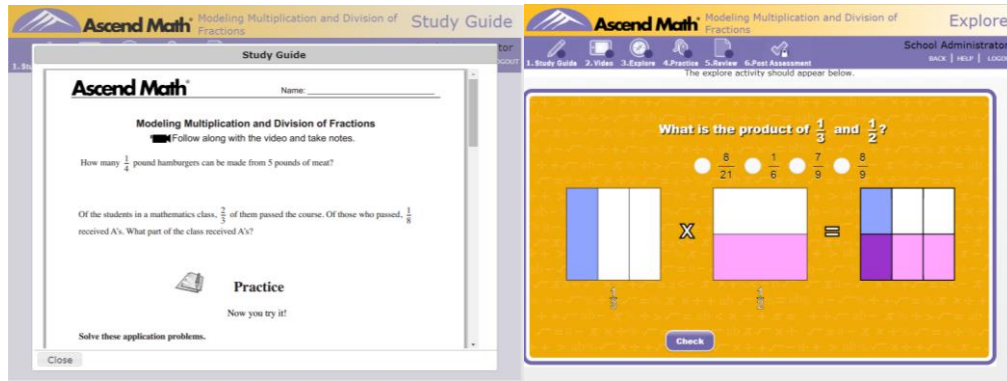
In any setting (i.e., brick and mortar, virtual, hybrid), educators can focus on setting goals and intrinsic motivation along with extrinsic motivation of tangible rewards. Ascend Math presents remediation totally free of any grade level designation. This eliminates student comparisons and stigma along with respect for students' emotional well-being is built in. Furthermore, Ascend Math goes beyond individualized math curriculum and includes certificates, badges, punch card templates, virtual bulletin boards and Base Camp where students spend earned coins on games. Stagnant learners may feel math is a weakness and Ascend emphasizes their successes to keep them motivated to excel.

Parents/guardians play a key role in student motivation and social and emotional learning. Effective programs acknowledge the role of the guardian and provide resources for communication between schools and home regarding curriculum and student success. Ascend Math values the parent/guardian-teacher-student relationship and includes resources such as a Parent Handbook with program explanation and progress monitoring ideas and Parent Letters that can easily be shared with parents/guardians upon beginning the program.

Incorporate Multi-Modal Teaching

Presenting materials for all learning types (e.g., visual, auditory and kinesthetic) ensures no matter how a student best learns they are able to access learning with confidence. If educators become stagnant then students will stay stagnant as well. Through programs such as Ascend Math, students explore math in a multi modal environment for each objective. Programs need to be more than an online workbook. For example, Ascend Math Learning Objectives contain video instruction, interactive practice, interactive explore features and printable study guides for every learning objective.

Ascend Math connects visual and symbolic learning throughout the entire study plan at all levels. See an example below. Fraction multiplication is taught not only by symbolic calculation, but also using visual representation.



Supporting Small Group Teaching

Providing targeted, small group instruction to all students, but especially those who need extra support to accelerate their learning is an efficient use of teacher-led instruction and should be supported by all math curriculums. Ascend Math helps develop momentum in blended learning by giving interactive immediate feedback and empowering teachers to find the ideal moments and opportunities to re-teach, pre-teach or extend. Ascend Math provides tools, such as the Live Student Tracker, for teachers to effectively group students to differentiate instruction for whole and small group instruction utilizing a combination of digital, print based and project-based learning resources.

Select Class: Stewart Block 2 ✕ Exit LST

refresh Levels Legend Print Study Guides Print

STEWART BLOCK 2 LIVE STUDENT TRACKER

| STUDENT | LEVEL | UNIT | OBJECTIVE | Obj# | ATTEMPTS | LAST ATTEMPT | NEXT OBJ |
|----------------|-------|----------------------|----------------------------------------------------------------------|--------|----------|------------------|-----------|
| Hartman, Geoff | 5 | Decimals Operations | Rounding Decimals | 3104 | 0 | ----- | 3111 |
| Hatcher, Teri | 4 | Elementary Division | Foundations of Division Using Area Models | 1036 | 2 | 3/16/21 06:39 AM | Next Unit |
| Hall, Larry | 3 | Fractions Concepts | Understanding Unit Fractions - Using Area Models | EM5.01 | 2 | 3/16/21 10:24 AM | EM5.03 |
| Harrison, Anna | 5 | Fractions Concepts | Comparing Fractions | 2063 | 2 | 3/14/21 11:28 AM | 2064 |
| Hill, Bobby | 6 | Fractions Concepts | Finding Equivalent Fractions | 2062 | 3 | 3/15/21 12:56 PM | 2063 |
| Murphy, Rachel | 5 | Fractions Concepts | Interpret a Fraction as Division of the Numerator by the Denominator | 2116.2 | 3 | 3/12/21 08:45 AM | Next Unit |
| Newman, Paully | 4 | Fractions Concepts | Comparing Fractions Using Area Models | 2114 | 0 | ----- | 2220 |
| Brown, Charlie | 6 | Fractions Operations | Multiplying Fractions by Fractions | 2071 | 0 | ----- | 2118 |
| Griffin, Craig | 5 | Fractions Operations | Multiplying Fractions by Fractions | 2071 | 0 | ----- | 2117 |

Detracked Math Classes

In 2019, the National Council of Supervisors of Mathematics (NCSM) called “for detracked, heterogeneous mathematics instruction through early high school [...]” as “tracking does not improve achievement, but it does increase educational inequality.”⁵ Tracking is the norm in most schools, yet the lowest standardized test scores are stagnant. This proposal for a change

⁵ NCSM, 2019, <https://www.mathedleadership.org/docs/resources/positionpapers/NCSMPositionPaper19.pdf>

in math structure is crucial; however, most districts struggle with curriculum that supports such an environment. Programs such as Ascend Math, support heterogeneous classrooms by providing individualized pathways and offers reports such as the Live Student Tracker to indicate students working in standards and supporting standards across different grade levels to form small instructional groupings. In the example above, Larry working in 3rd grade Fraction Concepts could be grouped with Anna (5), Bobby (6), Rachel (5) and Pully (4) to work on Fraction Concepts in a peer to peer learning group. Ascend Math Teacher Guides (Compass Guides) support group learning and reinforcement of conceptual concepts. Pacing is defined by the students' needs and constantly allows for acceleration and review for all learners.

Conclusion

In utilizing a program such as Ascend Math, students have out paced growth targets on high stakes test and other third-party assessments that measure growth across grade levels. Providing a systematic approach to math learning, focusing on meaningful data, promoting conceptual learning and fluency in and supporting detracked and small group teaching and multimodality learning proves beneficial in accelerating learning. Social and Emotional Learning and Parental Supports complete the well-rounded approach to get students back to grade level and beyond. For more information on Ascend Math visit <https://ascendmath.com/>

Ascend Resources:

[Think-View-Share](#)

[Task Completion Student Success Chart](#)

[Time on Task Student Success Chart](#)

[Flash Card Math](#)

[Teacher Compass Guides](#)

[Sign up for a Trial](#)

[Jamboard](#)