

core advocates ►

2017 Impact Through Instructional Advocacy Convening

Supporting All Learners in
Accessing Grade-Level Math
Content

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STUDENT
ACHIEVEMENT
PARTNERS

CCSS WHERE TO FOCUS GRADE 3 MATHEMATICS



MATHEMATICS



GRADE 3



FOCUS

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority¹ of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.^{2,3}

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 3

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

- 3.OA.A ■ Represent and solve problems involving multiplication and division.
- 3.OA.B ■ Understand properties of multiplication and the relationship between multiplication and division.
- 3.OA.C ■ Multiply and divide within 100.
- 3.OA.D ■ Solve problems involving the four operations, and identify and explain patterns in arithmetic.
- 3.NBT.A ○ Use place value understanding and properties of operations to perform multi-digit arithmetic.
- 3.NF.A ■ Develop understanding of fractions as numbers.
- 3.MD.A ■ Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- 3.MD.B □ Represent and interpret data.
- 3.MD.C ■ Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- 3.MD.D ○ Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- 3.G.A □ Reason with shapes and their attributes.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

REQUIRED FLUENCIES FOR GRADE 3

3.OA.C.7	Single-digit products and quotients (Products from memory by end of Grade 3)
3.NBT.A.2	Add/subtract within 1000

¹ At least 65% and up to approximately 85% of class time, with Grades K–2 nearer the upper end of that range, should be devoted to the major work of the grade. For more information, see Criterion #1 of the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publisherscriteria.

² Refer also to criterion #3 in the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publisherscriteria.

³ Note, the critical areas are a survey of what will be taught at each grade level; the major work is the subset of topics that deserve the large majority of instructional time during a given year to best prepare students for college and careers.

CCSS WHERE TO FOCUS GRADE 5 MATHEMATICS



MATHEMATICS



GRADE 5



FOCUS

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority¹ of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.^{2,3}

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 5

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

- 5.OA.A ○ Write and interpret numerical expressions.
- 5.OA.B ○ Analyze patterns and relationships.
- 5.NBT.A ■ Understand the place value system.
- 5.NBT.B ■ Perform operations with multi-digit whole numbers and with decimals to hundredths.
- 5.NF.A ■ Use equivalent fractions as a strategy to add and subtract fractions.
- 5.NF.B ■ Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
- 5.MD.A □ Convert like measurement units within a given measurement system.
- 5.MD.B □ Represent and interpret data.
- 5.MD.C ■ Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
- 5.G.A ○ Graph points on the coordinate plane to solve real-world and mathematical problems.
- 5.G.B ○ Classify two-dimensional figures into categories based on their properties.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

REQUIRED FLUENCIES FOR GRADE 5

5.NBT.B.5	Multi-digit multiplication
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¹ At least 65% and up to approximately 85% of class time, with Grades K–2 nearer the upper end of that range, should be devoted to the major work of the grade. For more information, see Criterion #1 of the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publisherscriteria.

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Recommendations for Targeted Math Support and Interventions

Use this resource while addressing gaps in student understanding in both universal instruction and math interventions. Gain knowledge of common pitfalls schools fall into, and adjust approaches accordingly based on the recommendations below.

Common Misstep	Recommendation
Blindly adhering to a pacing guide/calendar	Use formative data to gauge student understanding and inform pacing
Halting instruction for a broad review	Provide just in time support within each unit or during intervention
Trying to address every gap a student has	Prioritize most essential prerequisite skills and understanding for upcoming content
Trying to build from the ground up or going back too far in the learning progression	Trace the learning progression, diagnose, and go back just enough to provide access to grade level material
Re-teaching students using previously failed methods and strategies	Provide a new experience for students to re-engage, where appropriate
Disconnecting intervention from content students are learning in math class	Connect learning experiences in intervention and universal instruction
Choosing content for intervention based solely on students' weakest areas	Focus on major work clusters from current or previous grades as it relates to upcoming content
Teaching all standards in intervention in a step-by-step, procedural way	Consider the aspect of rigor called for in the standards when designing and choosing tasks, activities, or learning experiences
Over-reliance on computer programs in intervention	Facilitate rich learning experiences for students to complete unfinished learning from previous or current grade

5th grade example

Jog-A-Thon task (*Illustrative Mathematics*)

Alex is training for his school's Jog-A-Thon and needs to run at least 1 mile per day. If Alex runs to his grandma's house, which is $\frac{5}{8}$ of a mile away, and then to his friend Justin's house, which is $\frac{1}{2}$ of a mile away, will he have trained enough for the day?

Standards Alignment:

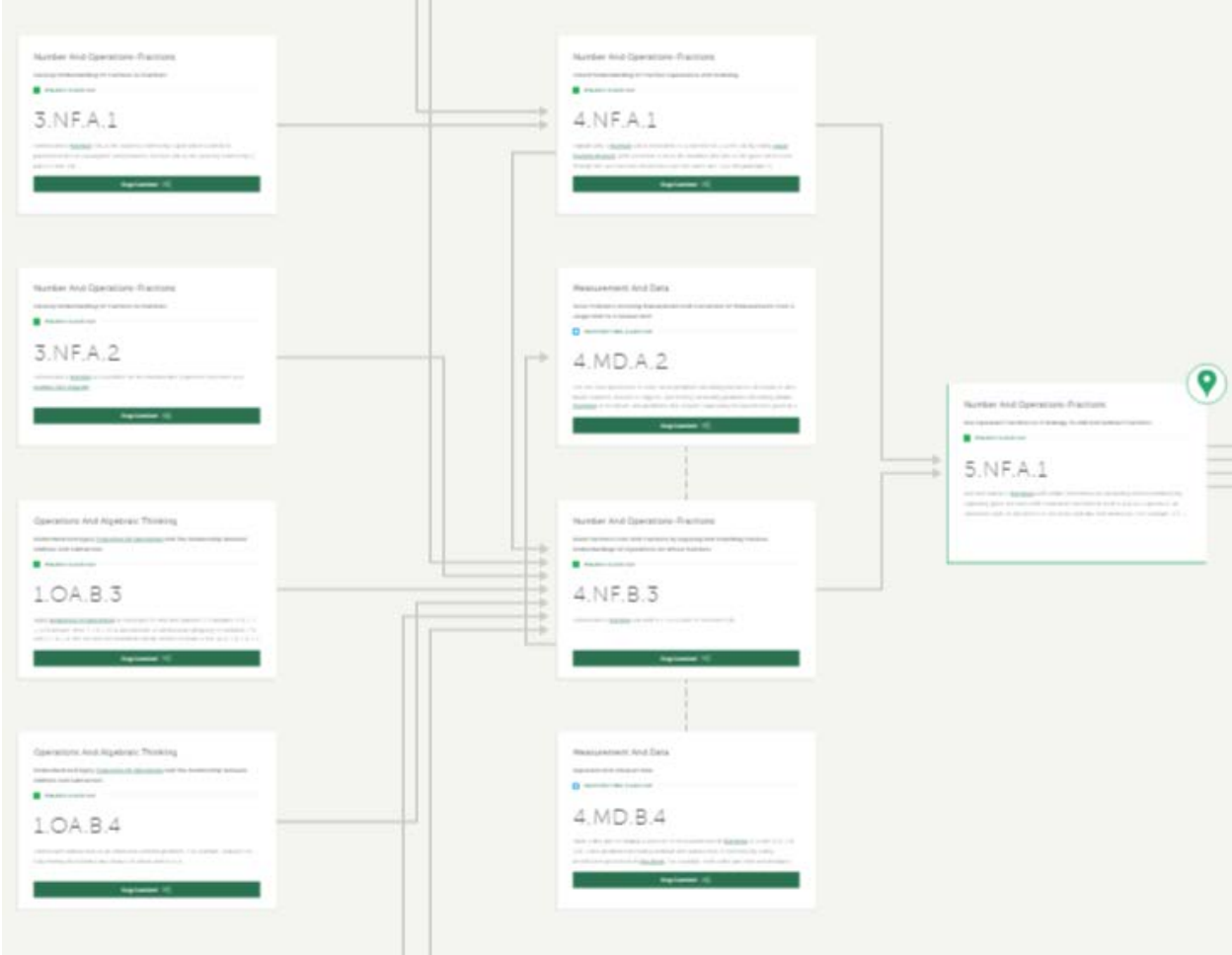
DOMAIN: Number & Operations - Fractions

CLUSTER 5.NF.A: Use equivalent fractions as a strategy to add and subtract fractions.

STANDARD 5.NF.A.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)

ASPECT OF RIGOR: Procedural

Learning Progression:



Diagnose Gap and Prioritize:

Cluster 3.NF.A: Develop understanding of fractions as numbers.

- **Standard 3.NF.A.1:** Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.

Cluster 4.NF.A: Extend understanding of fraction equivalence and ordering.

- **Standard 4.NF.A.1:** Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two

fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

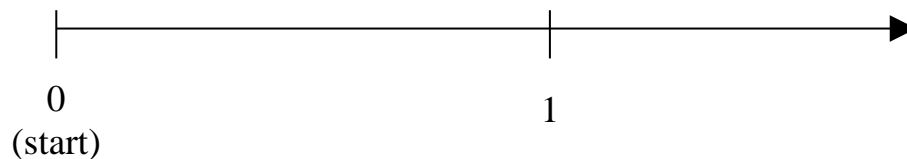
Cluster 4.NF.B: Build fractions from unit fractions.

- 4.NF.B.3: Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

Jog-A-Thon task (MODIFIED)

Alex is training for his school's Jog-A-Thon and needs to run at least 1 mile per day. If Alex runs to his grandma's house, which is $\frac{5}{8}$ of a mile away, and then to his friend Justin's house, which is $\frac{1}{2}$ of a mile further in the same direction, will he have trained enough for the day?

Alex decides to use a number line to represent his route.



- Place Alex's grandma's house on the number line above.
- Will Justin's house be more or less than 1 mile away from the start? How do you know?
- How far did Alex run *exactly*? Explain how you determined the exact distance using words or pictures.

Rationale for adaptations:

1. Added a number line
 - a. reinforces understanding a fraction a/b as the quantity formed by a parts of size $1/b$ and fractions as numbers
 - b. can be used to help students find an equivalent fraction for $1/2$ using a denominator of 8
 - c. can be used to address the common misconception that you can simply add numerators and denominators
2. Scaffolded questions - scaffolds learning to build understanding without rushing to computation

3rd grade example**Analyzing Word Problems Involving Multiplication task (*Illustrative Mathematics*)**

Many problems can be solved in different ways. Decide if the following word problems can be solved using multiplication. Explain your thinking. Then solve each problem.

- a. Liam is cooking potatoes. The recipe says you need 5 minutes for every pound of potatoes you are cooking. How many minutes will it take for Liam to cook 12 pounds of potatoes?
- b. Mel is designing cards. She has 4 different colors of paper and 7 different pictures she can glue on the paper. How many different card designs can she make using one color of paper and one picture?
- c. Nina can practice a song 6 times in an hour. If she wants to practice the song 30 times before the recital, how many hours does she need to practice?
- d. Owen is building a rectangular tile patio that is 4 tiles wide and 6 tiles long. How many tiles does he need?

Standards Alignment:

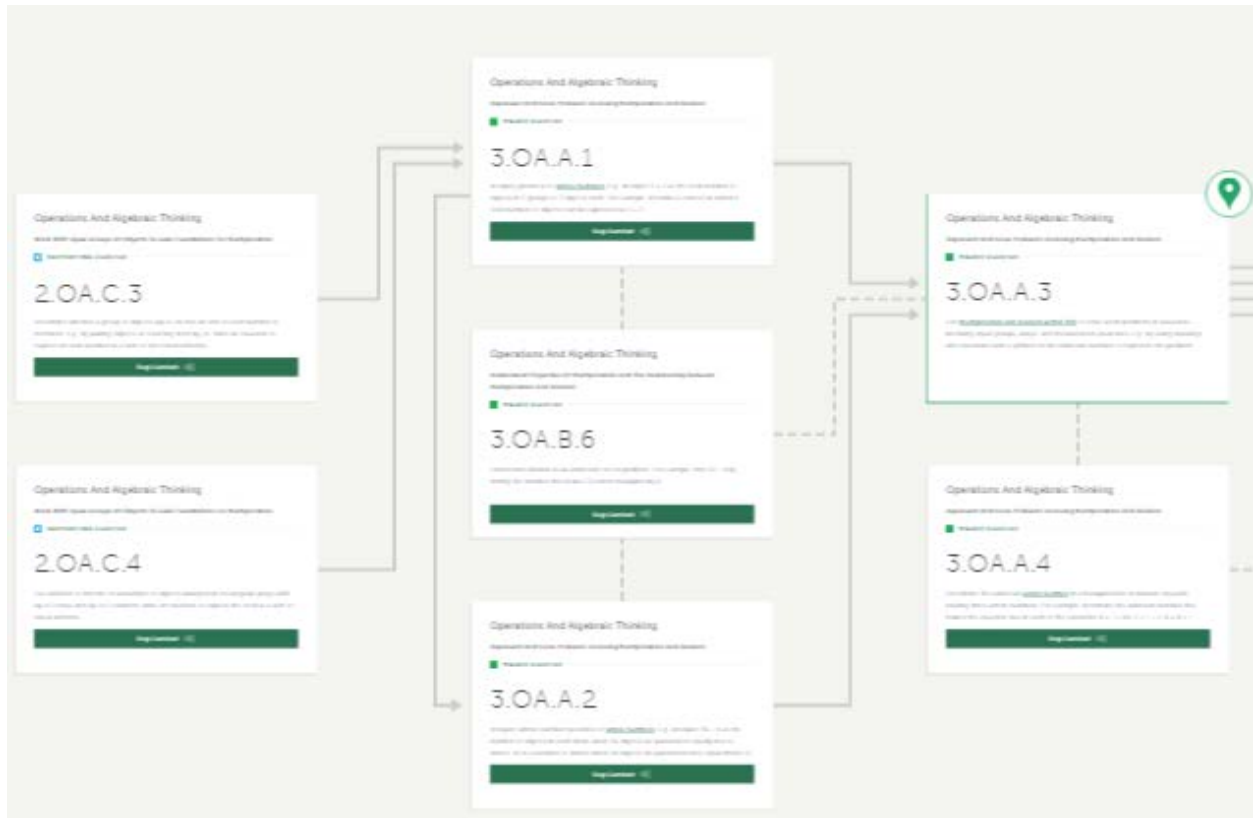
DOMAIN: Operations & Algebraic Thinking

CLUSTER 3.OA.A: Represent and solve problems involving multiplication and division.

STANDARD 3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

ASPECT OF RIGOR: Application

Learning Progression:



Diagnose Gap and Prioritize:

Cluster 2.OA.C: Work with equal groups of objects to gain foundations for multiplication.

- **Standard 2.OA.C.4:** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Cluster 3.OA.A: Represent and solve problems involving multiplication and division.

- **Standard 3.OA.A.1:** Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

- **Standard 3.OA.A.2:** Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.*

Analyzing Word Problems Involving Multiplication task (MODIFIED)

Part 1: Represent the situation using concrete manipulatives or by drawing a picture. Write a number sentence to represent the situation and then solve the problem.

- a. Owen is building a rectangular tile patio that is 4 tiles wide and 6 tiles long. How many tiles does he need?

Part 2: Many problems can be solved in different ways. Decide if the following word problems can be solved using multiplication. Explain your thinking using words and pictures. Then solve each problem.

- b. Natasha wants to buy 20 pencils at the store. If pencils are sold in boxes of 5, how many boxes will Natasha need to buy?
- c. Liam is cooking potatoes. The recipe says you need 5 minutes for every pound of potatoes you are cooking. How many minutes will it take for Liam to cook 12 pounds of potatoes?
- d. Nina can fit 6 times in an hour. If she wants to practice the song 30 times before the recital, how many hours does she need to practice?

Rationale for adaptations:

1. Added part 1 - students will model the situation using manipulatives or a drawing and a number sentence; class discussion can be used to reinforce prerequisite understandings by:
 - a. Representing the scenario in a variety of ways and helping students make connections between concrete, pictorial, and abstract strategies
 - b. Asking questions to help students compare/contrast multiplication and division (How could we rewrite the problem using division?)
2. Reordered problems - put more familiar scenarios first
3. Replaced problem b - the new scenario is likely more accessible for students

3rd grade example

Analyzing Word Problems Involving Multiplication task (*Illustrative Mathematics*)

Many problems can be solved in different ways. Decide if the following word problems can be solved using multiplication. Explain your thinking. Then solve each problem.

- a. Liam is cooking potatoes. The recipe says you need 5 minutes for every pound of potatoes you are cooking. How many minutes will it take for Liam to cook 12 pounds of potatoes?
- b. Mel is designing cards. She has 4 different colors of paper and 7 different pictures she can glue on the paper. How many different card designs can she make using one color of paper and one picture?
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- d. Owen is building a rectangular tile patio that is 4 tiles wide and 6 tiles long. How many tiles does he need?

Standards Alignment:

DOMAIN: Operations & Algebraic Thinking

CLUSTER 3.OA.A: Represent and solve problems involving multiplication and division.

STANDARD 3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

ASPECT OF RIGOR: Application

7th grade example

Molly's Run task (*Illustrative Mathematics*)

Molly runs $\frac{1}{3}$ of a mile in 4 minutes.

- a. If Molly continues at the same speed, how long will it take her to run one mile?
- b. Draw and label a picture showing why your answer to part (a) makes sense.

Standards Alignment:

DOMAIN: Ratios & Proportional Relationships

CLUSTER 7.RP.A: Analyze proportional relationships and use them to solve real-world and mathematical problems.

STANDARD 7.RP.A.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.*

ASPECT OF RIGOR: Procedural Skill/Fluency, Application

Providing Access to Grade-level Content for All Students

