**Major changes (and a few minor ones): CC to RP Progressions**

July 25, 2019

Changes to February 2019 version are marked with track changes.

In each section, all page numbers refer to previous draft of progression.

**Front matter**

Added to list of writers: Emina Alibegovic, Hugo Rossi

*Preface.* Added mention of GAIMME and SET reports, statements of support. Removed dead links, updated others.

*Introduction* was switched to main matter (so its page numbers are in arabic numerals). Added sidenote on no number line in K–1; mention of Clements et al., 2017, 2019 to early childhood refs; paragraph at end (CCSS prescribes very little terminology). Removed dead links, updated others.

**CC**: separated from OA Progression.

**OA**: Took out some instances of “and decimals” from “fractions and decimals” (as per NF Progression Overview).

Changed “opposite” in mention of “subtraction as opposite of addition.”

Added reference to Modeling Progression in Overview.

K: new paragraph on working within 10 addressing <http://mathematicalmusings.org/forums/topic/subtraction-k-oa/>

End of grade 1: New paragraph on no number line in K–1.

Grade 3: Added notes to Table 3 (meaning of partitive and quotitive); added new figure with array (same figure as NBT Progression grade 4).

Edited discussion of parentheses in grade 3. Deleted “or • ” in “× or • or \* for multiplication” (because not coordinated with Expressions and Equations Progression) and "or /” in "$\div$ or / for division” (because not coordinated with 5.NF.3 unless one distinguishes between / and – for fractions). Added need to read expressions from left to right if no parentheses.

Added examples of patterns to grades 4, 5. Added sidenotes on patterns (from Functions Progression), notation for remainders (from NBT Progression).

Added Appendix 2 (an edited version of Karen Fuson’s comment on why terminology in Tables 1 and 2 is different from CGI: <http://commoncoretools.me/forums/topic/question-about-the-addition-subtraction-problem-types-table-p-88/>).

**NBT**: Grade 3: Added part of parentheses sidenote from OA Progression.

Pages 8–9: respaced and edited (got both addition methods on p. 8).

New subtraction figure p. 9.

Redrew “division as finding side length” (grade 4, p. 16), quick drawings in grade 2.

Grade 4: added fraction to decimal conversion reference to NF; added NF remark on notation to end of margin note. On p. 15: Paragraphs rearranged and new figure with array to address 4.NBT.6 more directly and http://mathematicalmusings.org/forums/topic/the-use-of-andor/

Grade 5: comment to address difference between 4.NBT.6 and 5.NBT.6: <http://mathematicalmusings.org/forums/topic/4-nbt-6-to-5-nbt-6/>

Added figure to address http://mathematicalmusings.org/forums/topic/4-nbt-1-and-5-nbt-1-only-1-place-value-to-the-rightleft/

Comment: 5.NBT.7 is fraction divided by fraction in decimal notation. Fraction divided by fraction in fraction notation doesn't happen until grade 6 (6.NS.1).

Added mention of comparing decimals as grade 5 sidenote.

|  |  |
| --- | --- |
| Figure | Changes |
| p. 4, uniformity | Now like p. 14. |
| p. 16, Division as finding group size | Replaced by array figure |
| p. 16, Cases involving 0 in division | part way 🡪 partway |
| p. 17 | redrawn |
| p. 18, Recording division after an underestimate | redrawn |

**MD**: Changed table format to that of side by side comparison in GM Progression and added reference to OA Progression and a few details about arithmetic, e.g., “within 20” and limits on denominators.

Added paragraph from NF Progression overview on meaning of “fraction” as sidenote.

Many more page breaks. Broke statue and bamboo table in two.

Added references to GM and 6–8 SP Progressions.

Measurement data grade 4: added to sentence on decimals, addressing <http://mathematicalmusings.org/forums/topic/4-md-2/>.

Added margin figure on using info from bar graph (same as in NF Progression).

Restored accidentally deleted note about histograms on last page.

**GM**: Overview: added sidenote on liter defined in terms of cubic meter; added 5.NF and 6.G to side by side comparison of area and volume standards, also note re B and b in volume formula.

Added notes to Table 4 (meaning of partitive and quotitive).

Some small changes to emphasize the connection between measurement via filling and via packing.

**Geo, K–6**: Added to end of Overview mention of 5.NF and 6.G.

Added sidenote re vocabulary, p. 3 (recycled from end of Introduction).

Added example of prism packed with cubes of fractional edge length in grade 6.

Added sidenote re B and b in volume formula in grade 6 (recycled from GM side by side comparison table note).

|  |  |
| --- | --- |
| Figure | Changes |
| Pattern blocks | redrawn |
| Margin pp. 3, 9, 12 | Made letter labels correct font size |

**NF**: Added Overview, Where this Progression is Heading sections.

Changed “fraction strips” to “tape diagrams” (however, note that CCSS glossary says these are the same), changed look of tape diagrams, color-coded on p. 18. Mention of no number line in K–1. Fixed letter standards. Reduced instances of equations set off on separate lines within sentences. More diagrams, e.g., pp. 3, 4, 5, 10, 13, 14.

Added sidenote re parentheses on p. 12 referring to OA Progression grades 3 and 5.

In grade 3, elaborated tick mark discussion.

In grade 4, added ways of reading decimals aloud recycled from NBT Progression.

Added elaboration in text and diagrams of relationships described in equations or diagrams in grades 4 and 5, e.g., more mentions of “fundamental property” in grade 4.

Added tape diagrams from NS Progression for 4 div 1/3 and ½ div 3.

Included in Where this Progression is Heading: “Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers”; sidenote about fractions different from ratios in CCSS, and, initially, fraction bar is not used for ratios.

**RP**: Added to Overview and Where this Progression is Heading on use of fraction bar in expressions with units, e.g., 3 miles / 2 hours rather than 3/2 miles/hours: http://mathematicalmusings.org/forums/topic/is-dimensional-analysis-part-of-math-6/.

Comment about fractions different from ratios in CCSS on p. 4.

Overview: Change in sidenote on quantity: “a quantity describes the measurement of an attribute in specific units. . . .”

Overview: Slight rearrangement of sentences on equivalent ratios and proportional relationships.

Overview, new sidenote: Some authors use the terms ``rate'' and ``unit rate'' differently, e.g., referring to $3$ feet for every $2$ seconds as a rate and $\frac{3}{2}$ feet for every 1 second as a unit rate. If this meaning of unit rate is used, standards 6.RP.2, 7.RP.2b, and 7.RP.2d need to be interpreted accordingly, i.e., ``unit rate'' needs to be interpreted as ``the numerical part of the unit rate.'

Table note: Expectations for use of ratio and rate language appear in standards 6.RP.1 and 6.RP.2.

Added paragraph to Overview on percent as rate.

Added table on use of terms to Overview.

Added paragraph to Overview on choosing an order, responding to http://mathematicalmusings.org/forums/topic/rp-progressions.

|  |  |
| --- | --- |
| Figure | Changes |
| p. 6  Addressing comment at: http://mathematicalmusings.org/2011/09/12/progression-on-ratios-and-proportional-reasoning/ | Added caption: After tables are used to compare ratios, . . . e.g., (3,9) and (3, 5), or steepness of associated lines. |
| p. 10 | Replaced “x = original” by “x is the original”  Replaced “x = increased” by “x is the increased” |

Where this progression is heading: new second paragraph “In Grade 8 and beyond, . . .”

**Footnotes in standards**: Added the original footnotes to K.OA.1 (meaning of “math drawing”), 1.OA.3 (no need for names of properties), 3.OA.5, 3.OA.8, 3.MD.2, 5.NF.7c, 1.G.2, 2.G.1, 2.NBT.9, etc.

**Text edits**

|  |  |
| --- | --- |
| original | changed to: |
| m/s | \slashfrac{m}{s} |
| MP1 etc. | MP.1 |
| put-together, etc. | Put Together, etc. |
| Where the X Progression is heading | Where this progression is heading |
| end-point (GM) | endpoint |
| -graders (MD) | graders |
| quantity | number (sometimes) |
| decimal | in decimal notation (sometimes) |
| \cdot | \times |
|  | References with page numbers added |

**Table numbering**

OA: 3 numbered (T1 and T2 addition situations, T3 multiplication situations)

GM: 2 unnumbered, 1 numbered (T4 multiplication situations for measurement)

MD: 1 unnumbered

RP: 1 unnumbered