Exploding Dots and Common Core Connections
NNMC Math Teachers Circle Workshop July 9-12, 2018
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Standards for Mathematical Practice: 1, 2, 6, 7, and 8

- MP1: "Make sense of problems and persevere in solving them".
- MP2: "to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own".
- MP6: "Attend to precision."
- MP7: "Mathematically proficient students look closely to discern a pattern or structure."
- MP8: "Look for and express regularity in repeated reasoning."

Standards for Mathematical Content
Number & Operations in Base Ten

Kindergarten
Introduction: "Work with numbers 11-19 to gain foundations for place value."
CCSS.MATH.CONTENT.K.NBT.A.1
Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Grade 1
Introduction: "Understand place value."
CCSS.MATH.CONTENT.1.NBT.B.2
Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
CCSS.MATH.CONTENT.1.NBT.B.2.A
10 can be thought of as a bundle of ten ones — called a "ten."
CCSS.MATH.CONTENT.1.NBT.B.2.B
The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
CCSS.MATH.CONTENT.1.NBT.B.2.C
The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
CCSS.MATH.CONTENT.1.NBT.B.3
Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Introduction: "Use place value understanding and properties of operations to add and subtract."

CCSS.MATH.CONTENT.1.NBT.C.4

Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

CCSS.MATH.CONTENT.1.NBT.C.5

Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

CCSS.MATH.CONTENT.1.NBT.C.6

Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Grade 2

Introduction: "Understand place value."

CCSS.MATH.CONTENT.2.NBT.A.1

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

CCSS.MATH.CONTENT.2.NBT.A.1.A

100 can be thought of as a bundle of ten tens — called a "hundred."

CCSS.MATH.CONTENT.2.NBT.A.1.B

The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

Introduction: "Use place value understanding and properties of operations to add and subtract."

CCSS.MATH.CONTENT.2.NBT.B.5

Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

CCSS.MATH.CONTENT.2.NBT.B.6

Add up to four two-digit numbers using strategies based on place value and properties of operations.

CCSS.MATH.CONTENT.2.NBT.B.7

"Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit

numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds."
CCSS.MATH.CONTENT.2.NBT.B.9
Explain why addition and subtraction strategies work, using place value and the properties of operations.

Grade 3
Introduction: "Use place value understanding and properties of operations to perform multi-digit arithmetic."
CCSS.MATH.CONTENT.3.NBT.A.1
Use place value understanding to round whole numbers to the nearest 10 or 100.
CCSS.MATH.CONTENT.3.NBT.A.2
Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
CCSS.MATH.CONTENT.3.NBT.A.3
Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

Grade 4
Introduction: "Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place."
CCSS.MATH.CONTENT.4.NBT.A.1
Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Grade 5
Introduction: "…the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense." And "Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations."
CCSS.MATH.CONTENT.5.NBT.A.1
Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
CCSS.MATH.CONTENT.5.NBT.A.2
Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Grade 6
Revisiting place value and operations in a new form and reinforcement.

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