

Teacher Guide to Clarification

2.NBT.5

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

2.NBT.5 Fluently add and subtract within 100 using strategies based on **place value**, properties of operations, and/or the relationship between addition and subtraction.

Defining Place Value Strategies

There are multiple ways students can use and apply their knowledge of Place Value. This standard calls for students to use strategies. Students can use strategies, manipulatives and pictorial representations. (Below are 4 strategies named in standard **1.OA.6**)

Example

$$28 + 67$$

Student 1

Decomposing Adding tens and ones

$$20 + 60 = 80$$

$$8 + 7 = 15$$

$$80 + 15 = 95$$

Student 2

Counting on by 10

$$28 + 10 + 10 + 10 + 10 + 10 + 10$$

$$88 + 7 = 95$$

Example

28 + 67 continued

Student 3

Making ten

$$28 + 67$$

$$28 + 2 + 65$$

$$28 + 2 = 30$$

$$30 + 65 = 95$$

Decompose the 67 into 2 and 65 so I can have 2 ones to make 28 a 30.

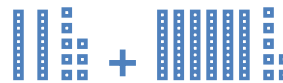
Student 4

Create easier or known sums

$$30 + 60 = 90$$

plus 5 more ones = 95

$$28 + 67$$



MOVE
2

In grade two the use of a visual like base-ten blocks would be beneficial to show how you can move the ones around

When teaching these Place Value strategies the approach the teacher takes is just as important. A recommendation is to let students solve the problem in any way that works for them, then elaborate on how they solved the problem. Given the problem $32 + 25$ students can solve the problem a few different ways. It is up to the teacher to recognize how they solved it and then identify that strategy to the other students. This promotes student-discovery learning. The teacher then truly becomes a facilitator of learning.

In this grade level, the conceptual understanding is being developed. In grade 4, students will learn the standard algorithm with regrouping.

Addition based on Place Value 32 + 25

Decomposing Adding tens and ones

Place Value- I can break the numbers into tens and ones.

I can break the numbers into tens $30 + 20$ which = 50

I can break the numbers into ones $2 + 5$ which = 7

My answer is 57

Count on

Place Value- I can count on

I will start with 32 and count on the tens

$$32 + 20 = 52$$

Then count on the ones

$$52 + 5 = 57$$

Making Ten

Place Value- I can make a ten

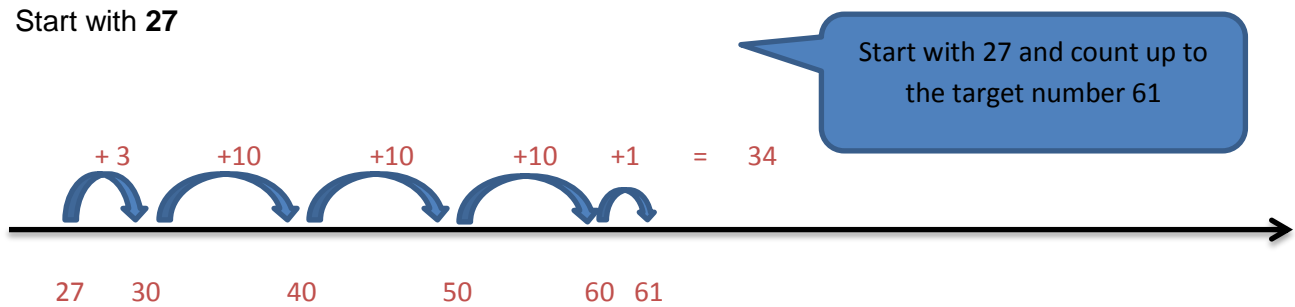
I will start with 32 and add the 5 ones which leaves me with 20. Now I have 37 and I still need 3 to get to the next ten 40, so I borrowed 3 from 20 and I am left with 17. $40 + 17 = 57$

Subtraction Based on Place Value 61 – 27

Open Number Line

Place Value with an open number line (this is interesting to see how the students “hop” up the number line) This will build number sense and eventually, students will not need the number line visually and they can solve this subtraction problem mentally.

Start with 27



Add up by tens and ones (mental version of open number line)

Place Value

$$27 + 30 = 57$$

$$57 + 4 = 61$$

Add $30 + 4 = 34$ is the answer

Subtract by tens and ones (mental version of open number line)

Place Value

$$61 - 27$$

$$61 - 10 = 51, 51 - 10 = 41, 41 - 7 = 34$$

Coherence and Connections: Need to Know

Below Grade Level	At Grade Level	Above Grade Level
1.NBT.4	2.NBT.5	3.NBT.2
1.NBT.5	2.OA.1	
1.NBT.6	2.OA.2	

This is fluency Standard

Fluency Expectations or Examples of Culminating Standards

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.

Students can also show their fluency using an efficient, general algorithm.¹⁸

¹⁸ For the difference between a computation *strategy* and a computation *algorithm*, see the glossary of the standards (page 85, under the letter “c” for “computation”).

PARCC Draft Model Content Frameworks: Mathematics Grades K-2 (2013, December).

Retrieved May 10, 2014, from

http://parconline.org/sites/parcc/files/PARCCMCFMathematicsNovember2012V3_FINAL_0.pdf

So, let's go to the Standards Document glossary pg. 85

Computation algorithm. A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. *See also:* computation strategy.

Computation strategy. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. *See also:* computation algorithm.

FYI:
2.NBT.5 is from
the 2.NBT.B
cluster

Examples of Major Within-Grade Dependencies

- Understanding place value (cluster 2.NBT.A) is the foundation for using place value understanding and the properties of operations to add and subtract (cluster 2.NBT.B). (Mastery of the two clusters can grow over time in tandem with one another.) Adding and subtracting within 1,000 (2.NBT.B.7) involves adding or subtracting hundreds with hundreds, tens with tens and ones with ones, sometimes

composing or decomposing tens or hundreds. These ideas and methods rest on an understanding of the place value units (2.NBT.A.1, building on 1.NBT.A.2).

PARCC Draft Model Content Frameworks: Mathematics Grades K-2 (2013, December).

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Use place value understanding and properties of operations to add and subtract

Students become fluent in two-digit addition and subtraction. 2.NBT.5, 2.NBT.6 Representations such as manipulative materials and drawings may be used to support reasoning and explanations about addition and subtraction with three-digit numbers. 2.NBT.7

When students add ones to ones, tens to tens, and hundreds to hundreds they are implicitly using a general method based on place value and the associative and commutative properties of addition.

Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics(draft). K-5 Number and Operations in Base 10.* Tucson, AZ: Institute for Mathematics and Educations, University of Arizona.

For this standard students are only required to add and subtract within 100.

Classroom Resource

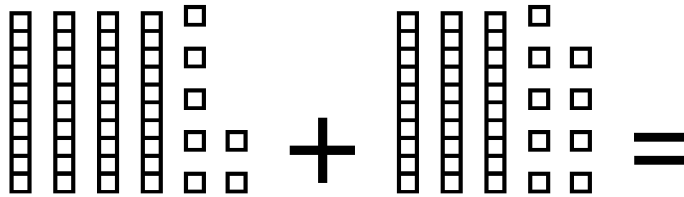
PPT of Place Value addition and subtraction problems within 100

HOT Questions

1. How many tens are in the sum of the addition problem $16 + 39$
2. How many ones are in the difference of the subtraction problem $23 - 18$
3. Solve the addition problem two different ways $67 + 24$
4. Why would I split up the numbers this way in order to add?

$$\begin{array}{ccccccc} & & 27 & + & 14 & & \\ & \swarrow & & & \searrow & & \\ 20 & + & 7 & + & 10 & + & 3 & + & 1 & = \end{array}$$

5. Explain how you can move the base-ten blocks in order to solve the addition problem.



Additional Resources

Illustrative Mathematics – relate addition and subtraction to money

<https://www.illustrativemathematics.org/illustrations/1309>

Illustrative Mathematics – Saving Money

<https://www.illustrativemathematics.org/illustrations/1292>

Assessment Task with Rubric - using place value or properties of operations to solve

<http://standardstoolkit.k12.hi.us/crayons-2-oa-1-2-nbt-5/>

Assessment Task with Rubric – using place value or properties of operations to solve Students critique a student suggested place value strategy to add numbers together.

<http://standardstoolkit.k12.hi.us/toothpicks-2-nbt-5-2-nbt-9/>

Assessment Task with Rubric – using place value or properties of operations to solve

<http://standardstoolkit.k12.hi.us/stamps-2-nbt-5-2-nbt-9/>

Assessment Task with Rubric – using place value or properties of operations to solve

Students analyze two equations written in different ways. Students solve both problems (equations) and explain their thinking.

<http://standardstoolkit.k12.hi.us/class-problem-2-nbt-5-2-nbt-9/>

Assessment Task with Rubric – using place value or properties of operations to solve Students solve a word problem in two different ways using numbers and an equation.

<http://standardstoolkit.k12.hi.us/joes-cards-2-oa-1-2-nbt-5/>