

Back to Basics with Base Ten Blocks

Mayor's Commission on Literacy

2015 Tutor Institute

October 24, 2015

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Objectives

After completing this workshop, you will be able to increase your student's math literacy by:

- Explaining the concepts of digits, whole numbers, place value, and expanded form
- Using base ten blocks to
 - Represent whole numbers
 - Add whole numbers
 - Subtract whole numbers
- Knowing the web address of various helpful math websites

College and Career Readiness Standards (CCRS)

- *The importance of college and career readiness for adult students cannot be overstated. Increasingly, students entering the workforce are discovering that they need critical knowledge and skills that are used on a regular basis. They recognize that pursuing a career pathway that pays enough to support a family and provides genuine potential for advancement hinges on being able to perform the complex tasks identified by the Common Core State Standards as critical for postsecondary success.*

<http://lincs.ed.gov/publications/pdf/CCRStandardsAdultEd.pdf>

SOURCE: <https://lincs.ed.gov/professional-development/resource-collections/profile-521>

WEB
RESOURCE

College and Career Readiness Standards (CCRS)

Understand Place Value

Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones — called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- 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). (1.NBT.2)

Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$. (1.NBT.3)

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

- 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. (1.NBT.4)
- Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1.NBT.5)
- 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. (1.NBT.6)

Number Sense

Struggling to define number sense, Case (1998) stated the following:

- *Number sense is difficult to define but easy to recognize. Students with good number sense can move seamlessly between the real world of quantities and the mathematical world of numbers and numerical expressions. They can invent their own procedures for conducting numerical operations. They can represent the same number in multiple ways depending on the context and purpose of this representation. They can recognize benchmark numbers and number patterns: especially ones that derive from the deep structure of the number system. They have a good sense of numerical magnitude and can recognize gross numerical errors that is, errors that are off by an order of magnitude. Finally, they can think or talk in a sensible way about the general properties of a numerical problem or expression-- without doing any precise computation. (p. 1)*

Number Sense: Rethinking Arithmetic Instruction for Students with Mathematical Disabilities

<http://www.ldonline.org/article/5838/>

Case, R. (1998, April). A psychological model of number sense and its development. Paper presented at the annual meeting of the American Educational Research Association, San Diego.

Whole Numbers

- Use **digits** (0,1, 2, 3, 4, 5, 6, 7, 8, 9) to write any number
- **Whole numbers** 0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, ...
100,...2,543...
- The position of each digit in a number determines its **place value**

Example: The two 8s in the number 8658 represent different amounts because of their different placements

Place Value

Place Value Chart

Billions			Millions			Thousands			Ones			Decimals		
hundreds	tens	ones	hundreds	tens	ones	hundreds	tens	ones	hundreds	tens	ones	tenths	hundredths	thousandths
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Standard Form: 222,222,222,222.222

Expanded Form: 200,000,000,000 + 20,000,000,000 + 2,000,000,000 +
 200,000,000 + 20,000,000 + 2,000,000 + 200,000 + 20,000
 + 2,000 + 200 + 20 + 2 + 0.2 + 0.02 + 0.002

Word Form: two hundred twenty-two billion, two hundred twenty-two million,
 two hundred twenty-two thousand, two hundred twenty-two
AND two hundred twenty-two thousandths

WEB
RESOURCE

Place Value

<https://www.mathsisfun.com/>



- Search place value
 - Text
 - Practice
 - Video

STANDARD FORM

Write the number in each period followed by a comma

421,872

EXPANDED FORM

The expanded form of a number shows each digit of the number with its place value

421,872

$$400,000 + 20,000 + 1,000 + 800 + 70 + 2$$

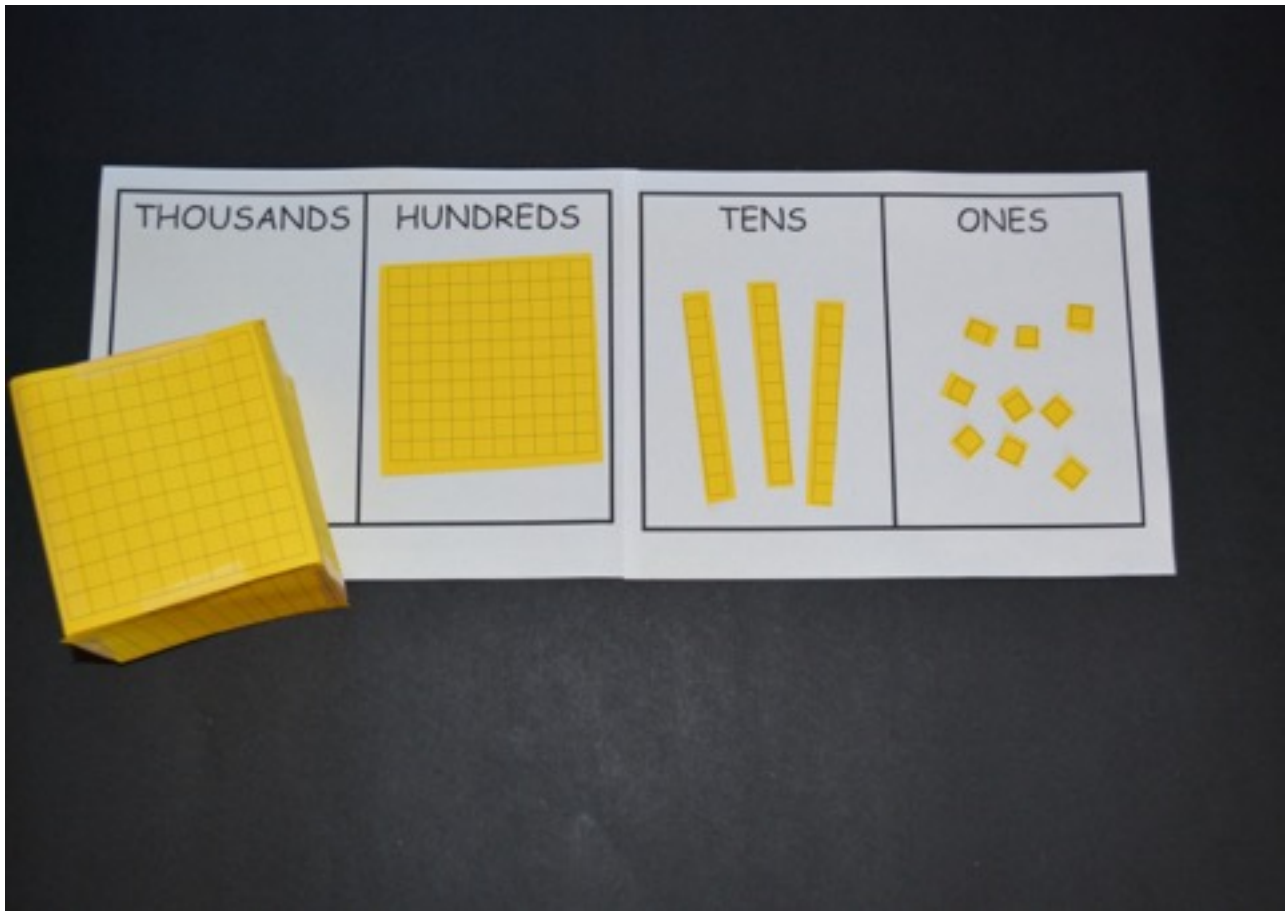
WEB
RESOURCE

https://www.khanacademy.org/math/pre-algebra/order-of-operations/place_value/v/place-value-3

CHALLENGE

Expanded Form

Base Ten Blocks



Base Ten Blocks

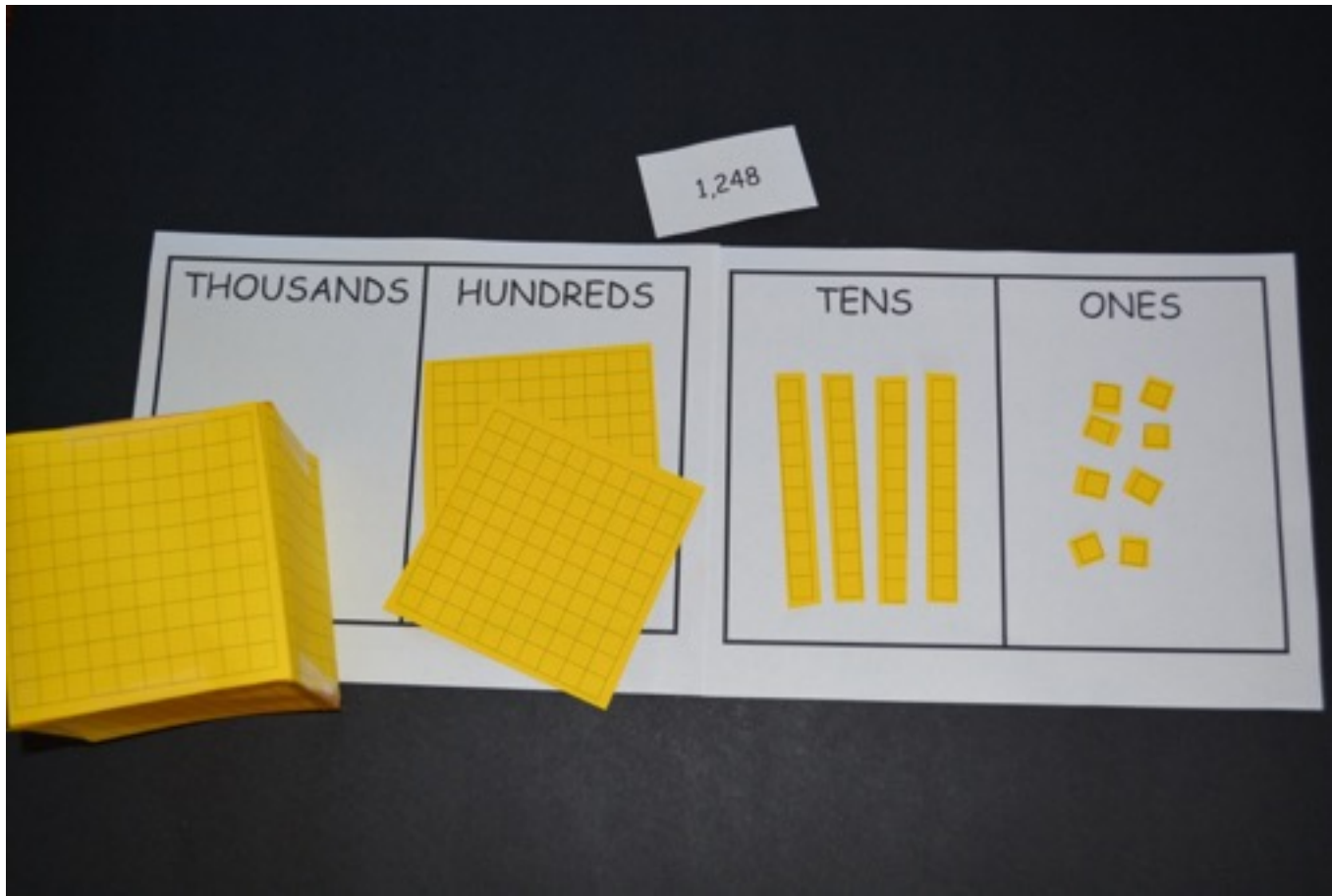
- Made my own but, you can buy them or download a .PDF file to print your own

[http://lrt.ednet.ns.ca/PD/BLM_Ess11/
table_of_contents.htm](http://lrt.ednet.ns.ca/PD/BLM_Ess11/table_of_contents.htm)

WEB
RESOURCE

Using Base Ten Blocks to Represent Numbers

1,248

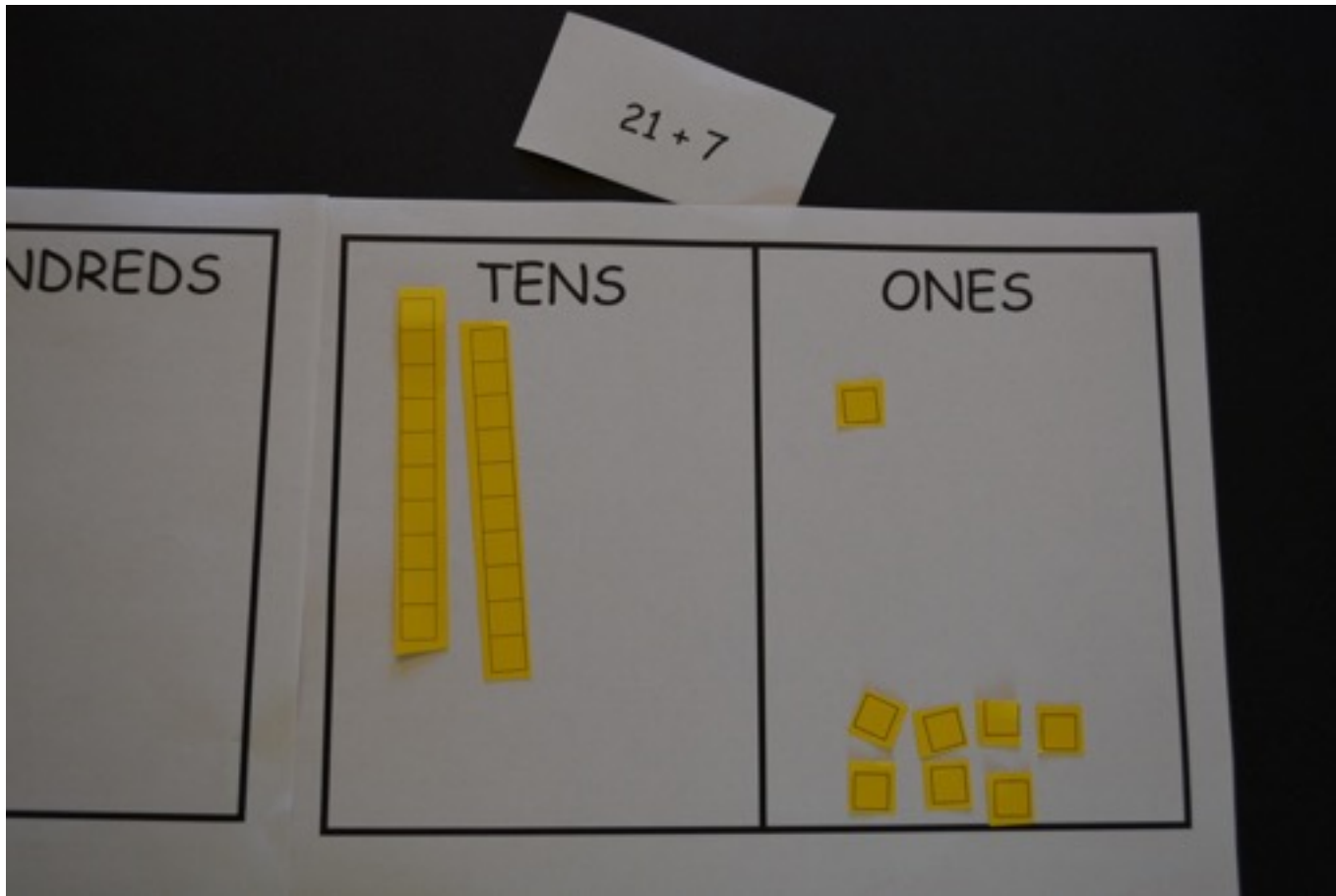


CHALLENGE

Using Base Ten Blocks to
Represent Numbers

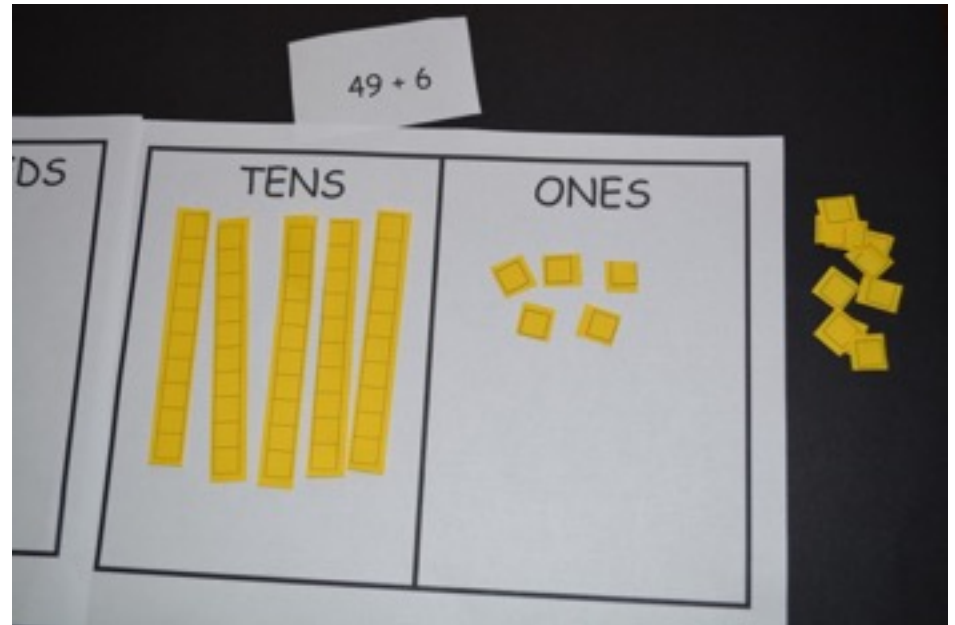
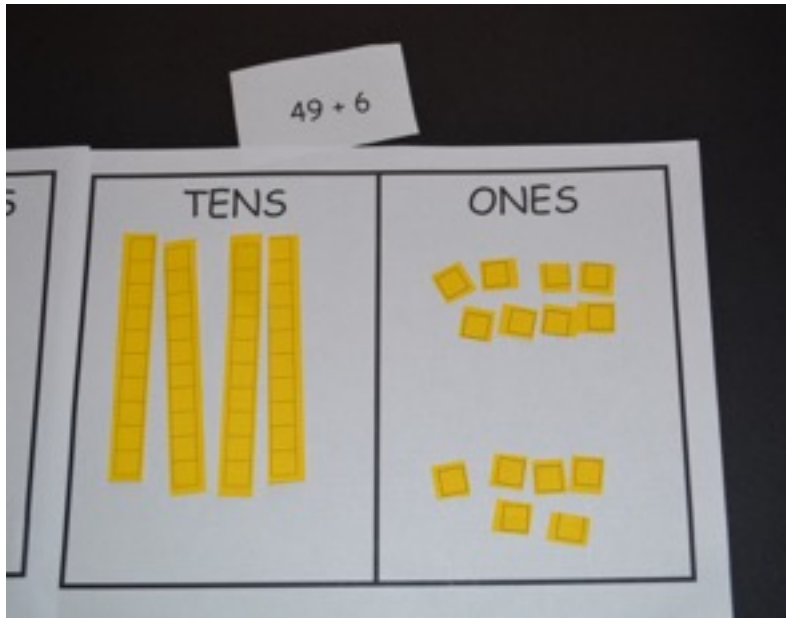
Using Base Ten Blocks to Add Numbers

$$21 + 7$$



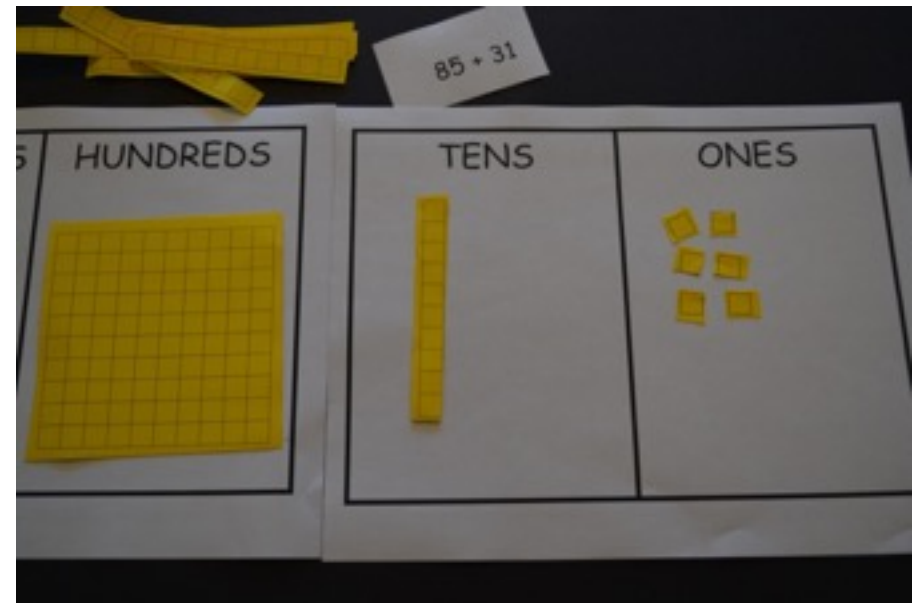
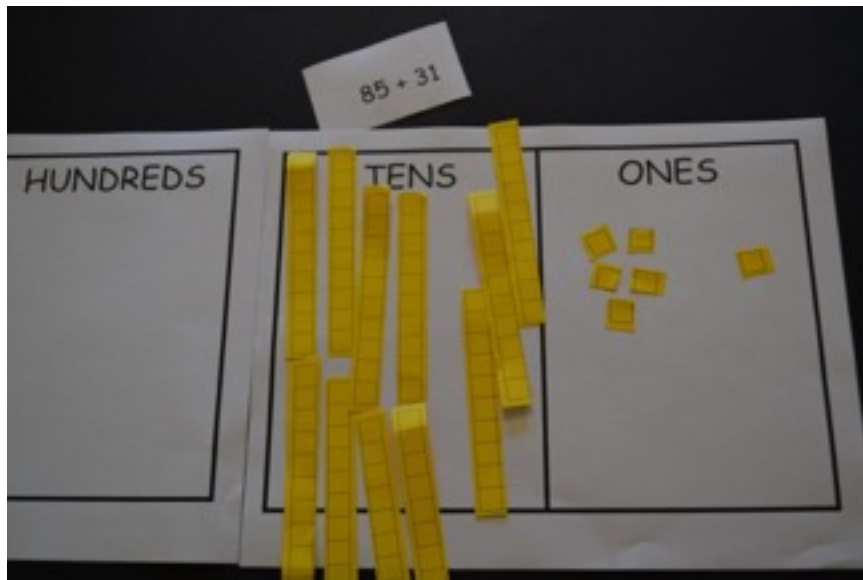
Using Base Ten Blocks to Add Numbers

$$49 + 6$$



Using Base Ten Blocks to Add Numbers

$$85 + 31$$

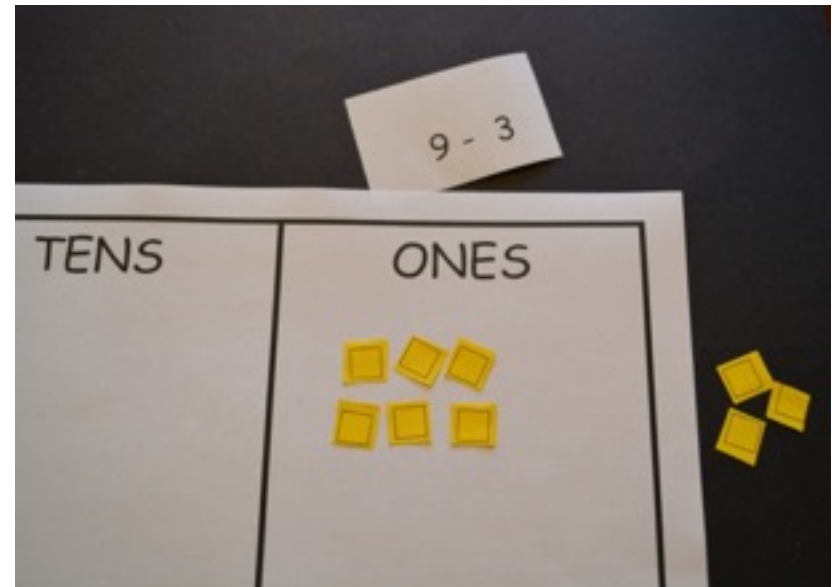
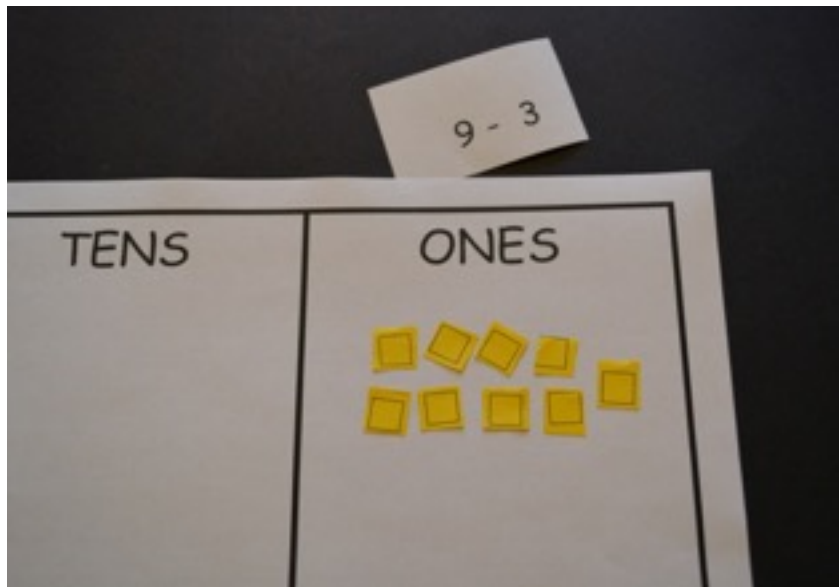


CHALLENGE

Using Base Ten Blocks to Add
Numbers

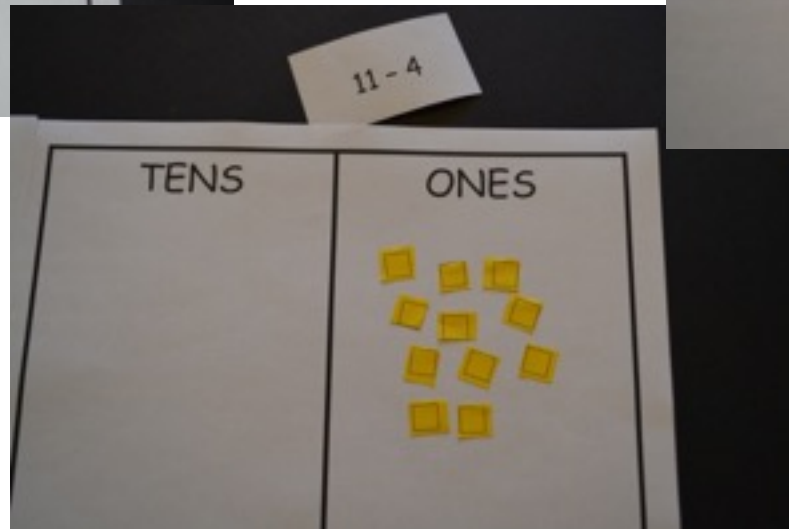
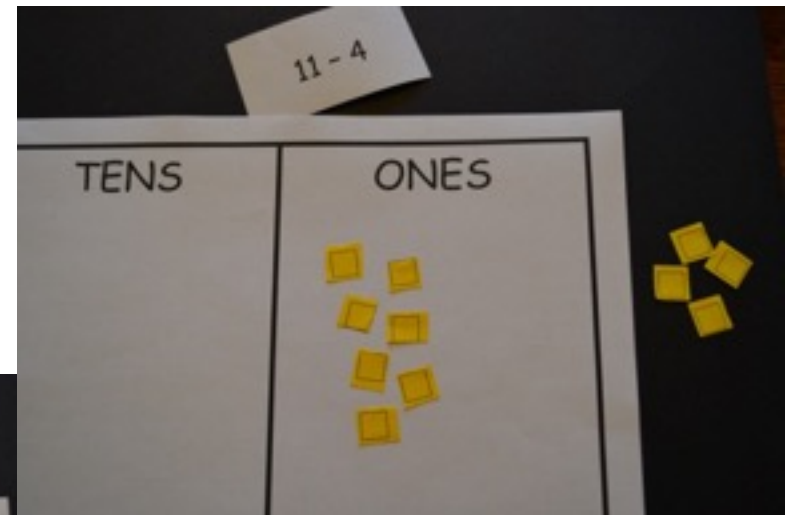
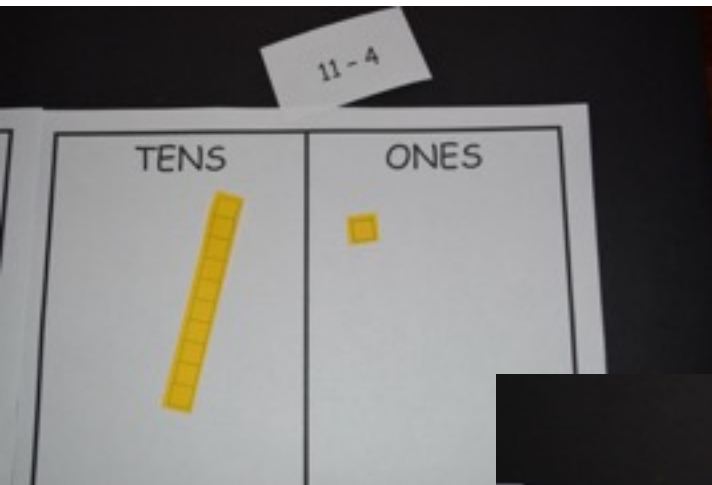
Using Base Ten Blocks to Subtract Numbers

$$9 - 3$$



Using Base Ten Blocks to Subtract Numbers

$$11 - 4$$



CHALLENGE

Using Base Ten Blocks to Subtract
Numbers

Virtual Base Ten Blocks

- Use just to represent numbers

http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html



WEB
RESOURCE

Virtual Base Ten Blocks

- Use to do addition and subtraction problems

[http://harcourtschool.com/activity/elab2004/
gr3/index_2004.html](http://harcourtschool.com/activity/elab2004/gr3/index_2004.html)







THANK YOU !

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