



**MATH  
WHISPERER**  
*Where math makes sense*

Research Edition  
The Number Sense Series

# The Counting Numbers

Math Whisperer is a program created and designed for math to make sense, so all students can learn math. For more information, please go to [www.mathwhisperer.com](http://www.mathwhisperer.com)

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## DEDICATION

Math Whisperer materials are dedicated to each person who wants to be successful in math, including those who have struggled in the past. Our goal for our students is that they know the math they need to lead the lives they want.

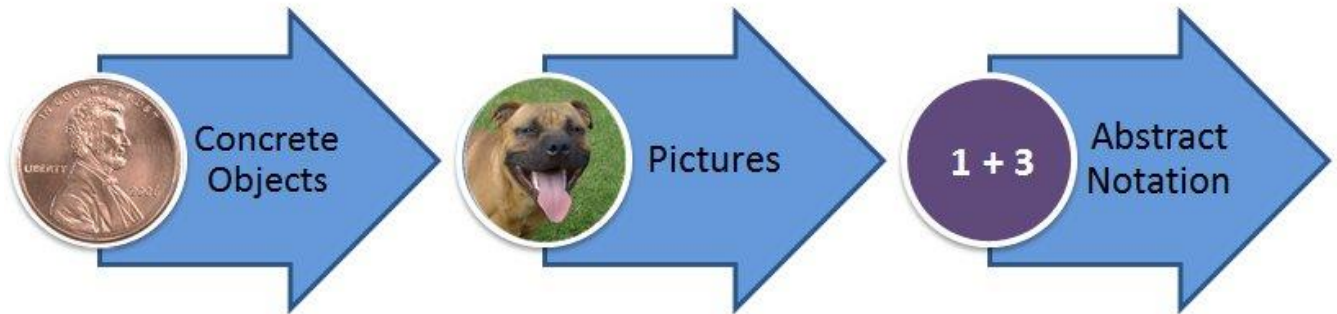
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# 1. Introduction

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Math Whisperer lessons are based on scientific research about how people learn math. Math is actually supposed to make sense. When you start with hands-on objects, math can make sense.



You are probably used to starting with the third step of abstract notation, which means using symbols and maybe a formula. Some people are able to start at this third step, using a formula. Maybe they even understand why the formula works. Maybe they don't, but they get the right answers. These people will benefit from the hands-on objects, also, as they will understand the math at a deeper level. This three-step progression works for everybody.

It may feel silly to you to use hands-on objects. My advice to you is: Try it, please. You will see for yourself how well the three-step progression works. You are much more likely to remember the formulas this way. And if you forget them, you can reinvent them for yourself. Won't it feel great to never have to learn this again? The math will stick with you with the three-step progression.



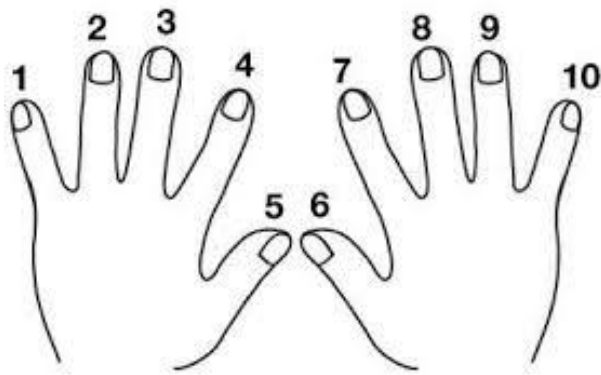
Hello. I'm Bernice, founder of Math Whisperer. I've worked with lots of students just like you, and they were all able to learn the math they wanted and needed to learn. So can you!

# The Counting Numbers

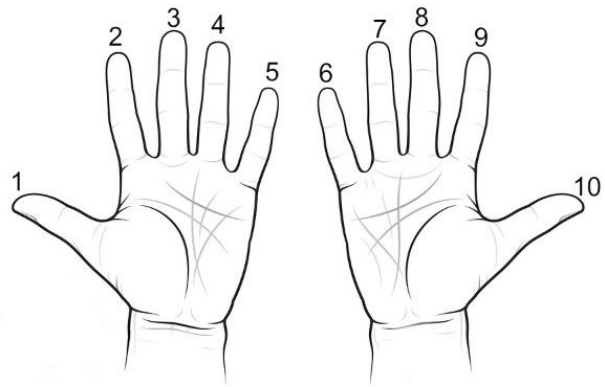
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Counting numbers are 1, 2, 3 and so on. Our number system is based on ten. This is probably because most of us have ten fingers. Being based on ten seems simple, but it is powerful.

One way to hold fingers



Another way



You choose which way works best for you.



Most of us learned to count when we were very young. However, I have seen that many people missed a few big ideas about how our numbers work together. I hope you will take these few lessons to either remind yourself about how our counting numbers work, or even learn about this for the first time.

# Activity 1: How Many? It's hard to count without a system

## You will need:

- Several hundred popsicle sticks (the popsicle sticks that came with your booklet)
- Either a second hand on your watch or phone, or a friend who can count for you

Put all the popsicle sticks out on a table or the floor. How many are there? Measure the time it takes to count them.

There is an easier way!!



It can help to know the words that go along with the math.

Personally, I have never liked having to learn vocabulary words. It just is not something I enjoy. Hopefully, you are different! Regardless, it is really helpful to know these words.

## Vocabulary

**place value** – Each of the words, “place” and “value” matters. Place is where something is, its location. Value is the worth of something. So, place value is determining the worth or “value” of a number based on its “location” or place.



This is a place

This is a value



hundreds	tens	ones
----------	------	------

This is a place value mat, and you will be using it in Activity 2.

## Activity 2: Grouping makes counting easier – modeling numbers with popsicle sticks

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### You will need:

- A few hundred popsicle sticks
- A handful of rubber bands
- A blank sheet of paper



This is best done with a partner or partners.
















**Step 1.** Bundle your popsicle sticks into groups of 10. In other words, count out ten popsicle sticks and put a rubber band around them. Make at least 20 bundles.



















**Step 2.** Make a place value mat: Divide your sheet of paper into three columns and label them as shown.

hundreds	tens	ones





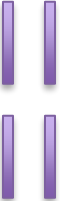



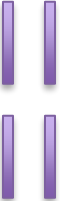



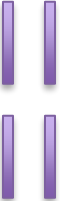

Model the numbers with your popsicle sticks and fill in the blanks.



Place value mat	Numbers	Other Forms								
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$100 + 20 + 3$										
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Place value mat	Numbers	Other Forms						
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hundreds	tens	ones						

# Practice 1: Modeling larger numbers without popsicle sticks

This would take a lot of popsicle sticks, so I recommend just drawing the pictures!

Place Value Mat	Expanded Form (as shown)	Standard Form	Word Form								
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">Thousands</td> <td style="width: 25%;">Hundreds</td> <td style="width: 25%;">Tens</td> <td style="width: 25%;">Ones</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Thousands	Hundreds	Tens	Ones					<p>Expanded form:</p> $1000 + 300 + 40 + 5$	<p>1345</p>	<p>one thousand three hundred forty five</p>
Thousands	Hundreds	Tens	Ones								
											
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">Thousands</td> <td style="width: 25%;">Hundreds</td> <td style="width: 25%;">Tens</td> <td style="width: 25%;">Ones</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Thousands	Hundreds	Tens	Ones					$2000 + 600 + 5$	<p>3029</p>	
Thousands	Hundreds	Tens	Ones								
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Thousands	Hundreds	Tens	Ones								

Place Value Mat				Expanded Form (as shown)	Standard Form	Word Form
Thousands	Hundreds	Tens	Ones			Four thousand, two hundred thirty
Thousands	Hundreds	Tens	Ones			
						
Thousands	Hundreds	Tens	Ones		2080	

## Practice 2: Decomposing numbers

(that means taking numbers apart)

Decomposition of the number	Name of the number
$20 = \underline{2} \text{ tens} + \underline{0} \text{ ones}$	four hundred twenty
$30 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$35 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$13 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$15 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$11 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$18 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$12 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$89 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$73 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$62 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$48 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	
$57 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$	

Decomposition of the number	Name of the number
420 = <u>4</u> hundreds + <u>2</u> tens + <u>0</u> ones	twenty
832 = ___ hundreds + ___ tens + ___ ones	
350 = ___ hundreds + ___ tens + ___ ones	
503 = ___ hundreds + ___ tens + ___ ones	
305 = ___ hundreds + ___ tens + ___ ones	
108 = ___ hundreds + ___ tens + ___ ones	
180 = ___ hundreds + ___ tens + ___ ones	
789 = ___ hundreds + ___ tens + ___ ones	
897 = ___ hundreds + ___ tens + ___ ones	
703 = ___ hundreds + ___ tens + ___ ones	
602 = ___ hundreds + ___ tens + ___ ones	
486 = ___ hundreds + ___ tens + ___ ones	
527 = ___ hundreds + ___ tens + ___ ones	

## Activity 3: Name that number

---

You will need:

- Expanded form deck (on pages 17 – 22)



Here is some more vocabulary. It may help you understand what is going on with this card “game.” You can still play and learn without remembering these two phrases, but it will make more sense to you if you spend a couple of minutes to understand the terms.

There are two phrases: expanded form and standard form

“Form” is used in both phrases. Form means shape.

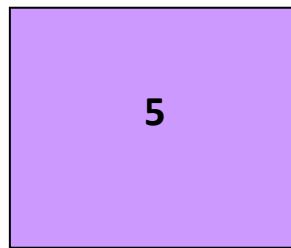
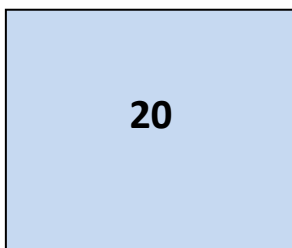
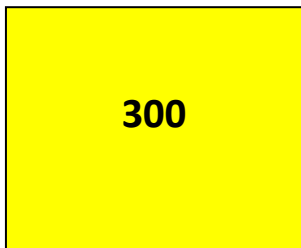
**Standard** form is the usual or “standard” way we describe a number.

**Expanded** form comes from the word “expand.” “Expand” means to make larger.

325 is standard form

$300 + 20 + 5$  is expanded form.

Here is 325 in expanded form with the appropriate cards in your deck:

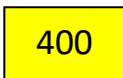

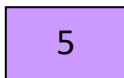





Step 1. Cut on the cards on pages ...

Step 2. Shuffle the hundreds (yellow), tens (blue), and ones (lavender) separately and place them face down.



Step 3. Pick one card from each deck. Write the name of the number in standard form.

Hundreds	Tens	Ones	Standard form
			Four hundred twenty five
			_____

Then: Practice with 20 sets like what you have with the yellow, blue, lavender, adding

- a.
- b.
- c.
- ...

Option 2: This is a game of chance. Keep score on page 23



100

10

1

200

20

2

300

30

3

400

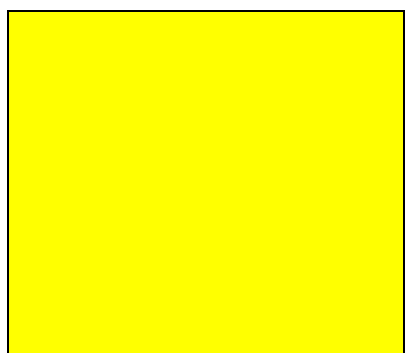
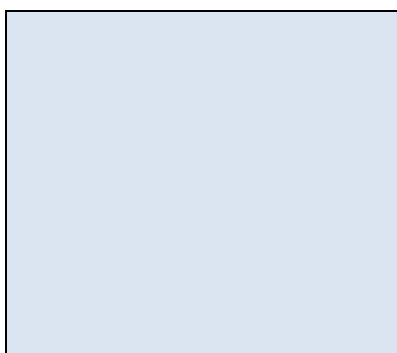
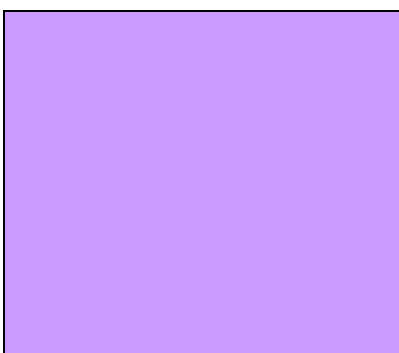
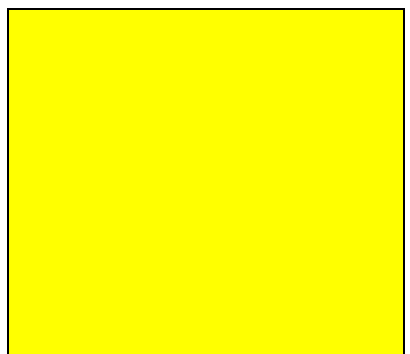
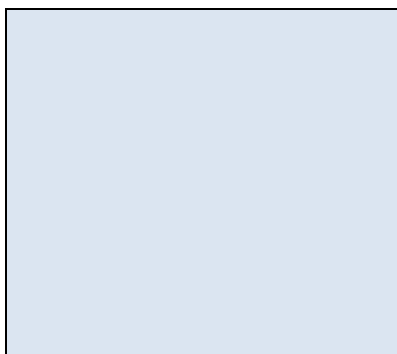
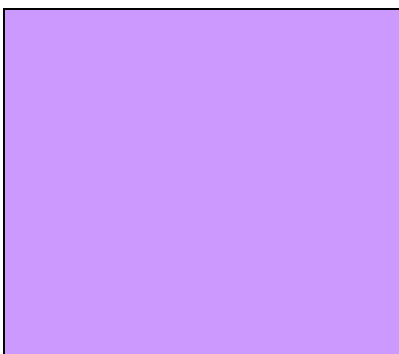
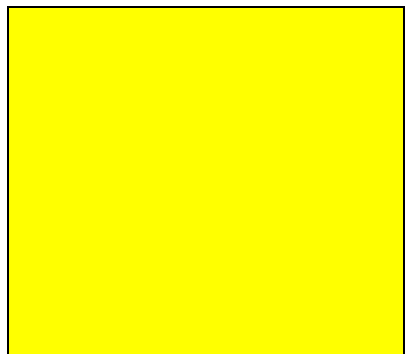
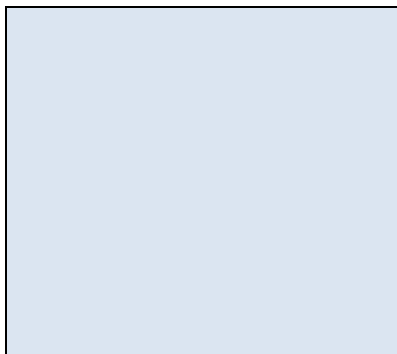
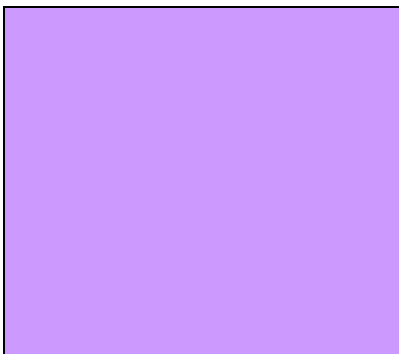
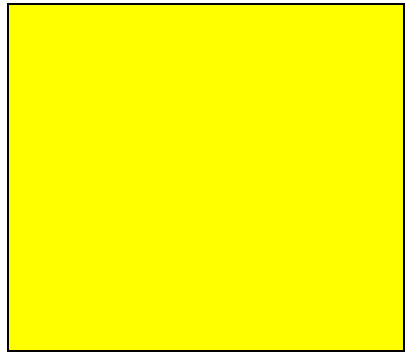
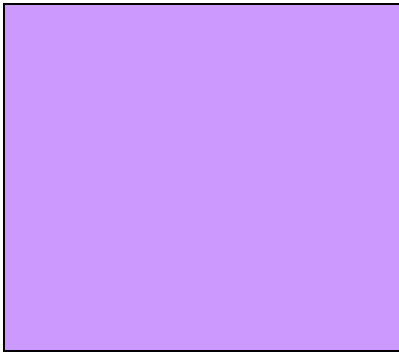
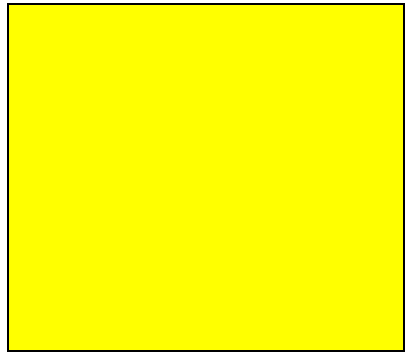
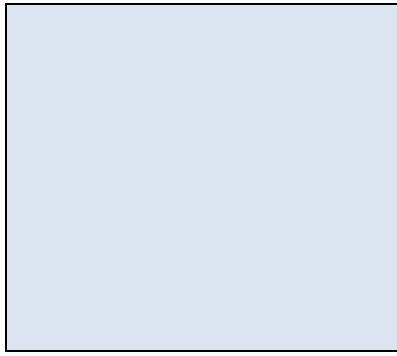
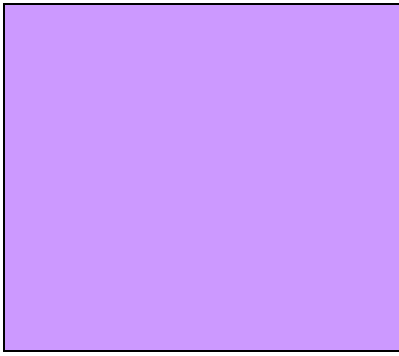
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4

500

50

5



600

60

6

700

70

7

800

80

8

900

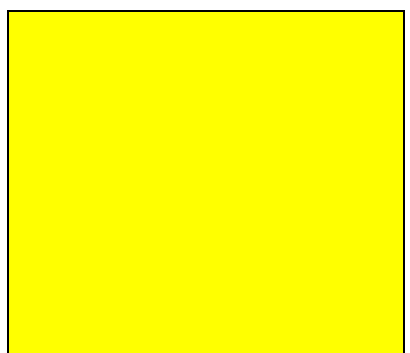
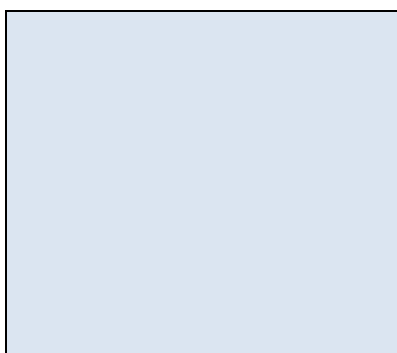
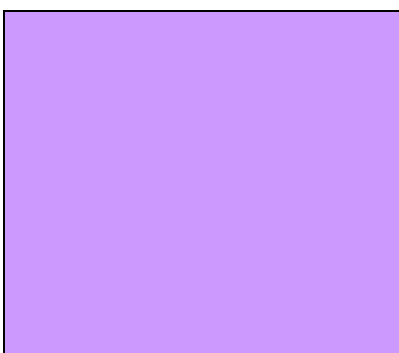
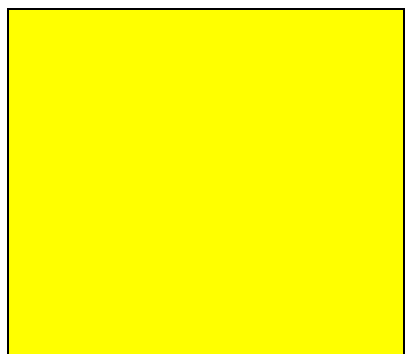
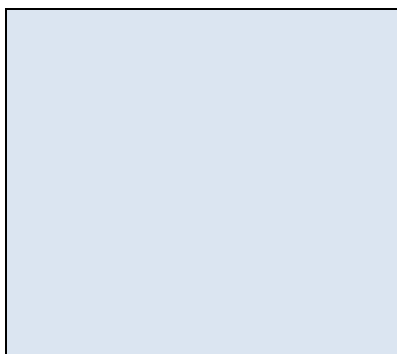
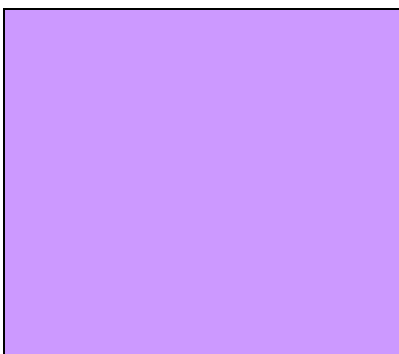
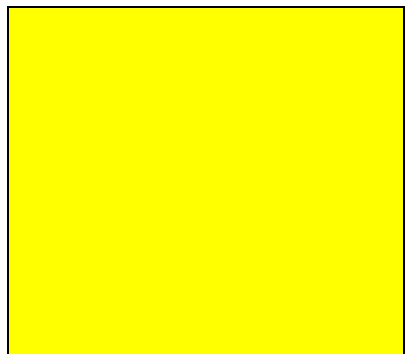
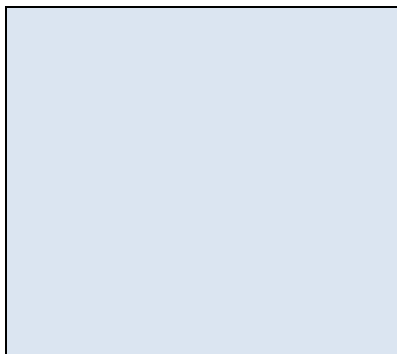
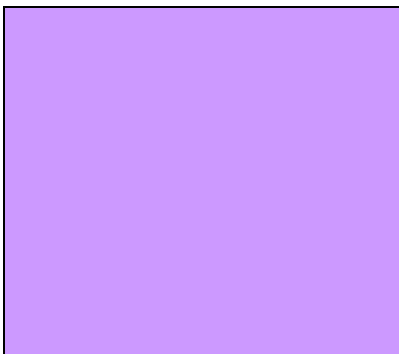
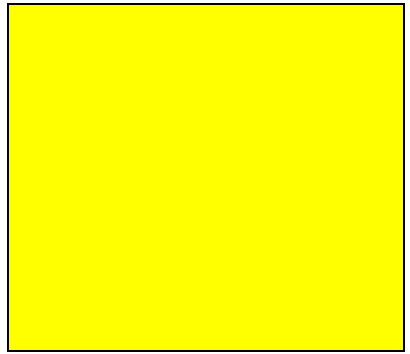
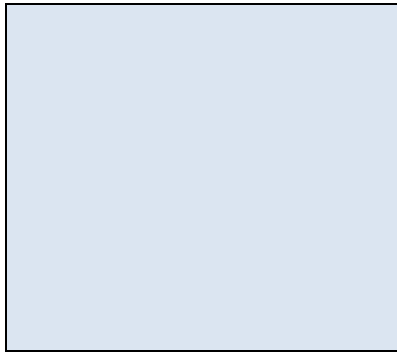
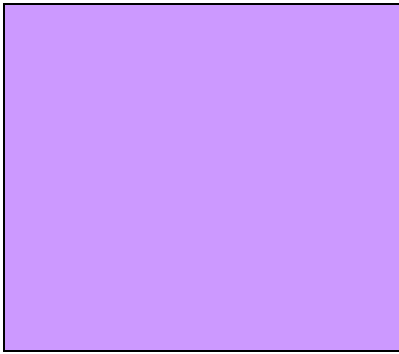
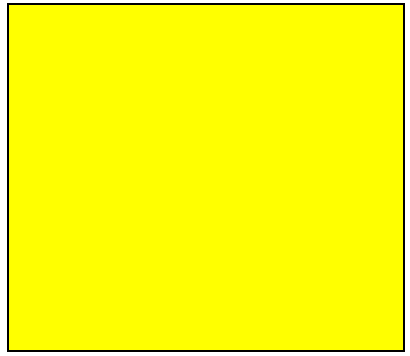
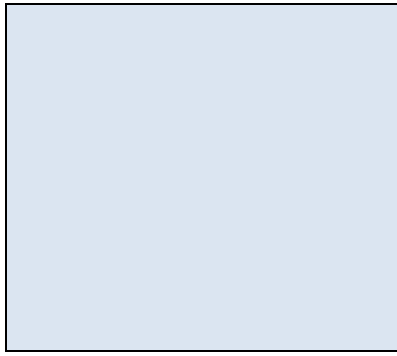
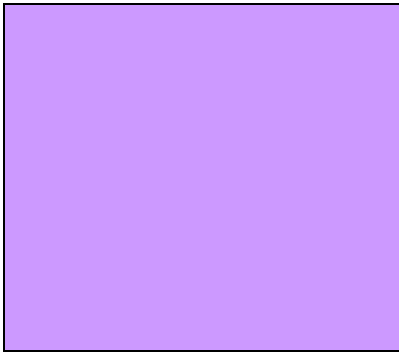
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300

20

1

400

40

3

700

60

4

800

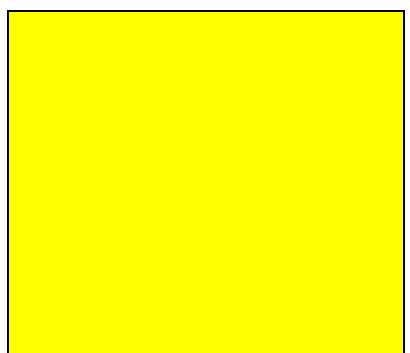
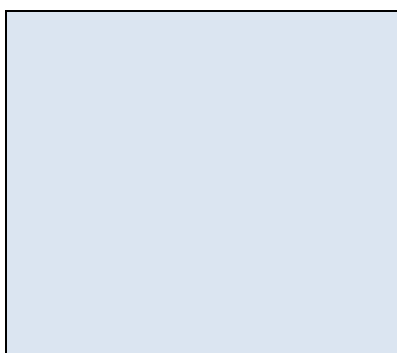
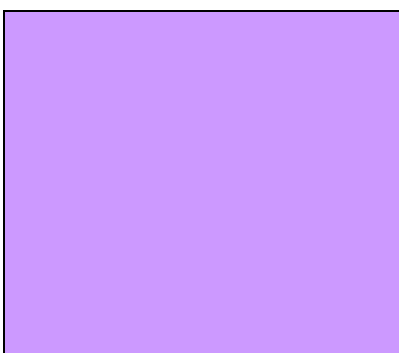
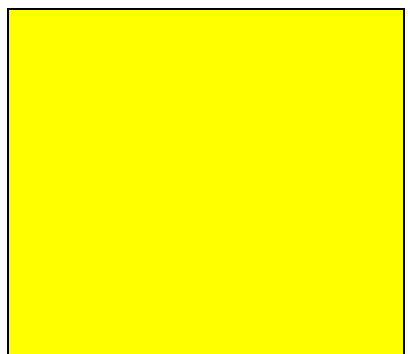
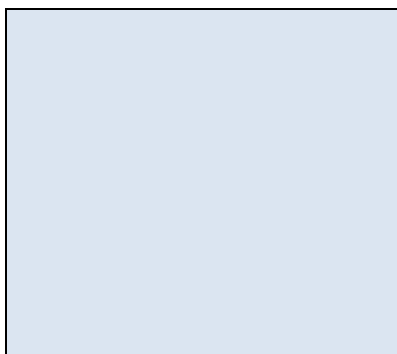
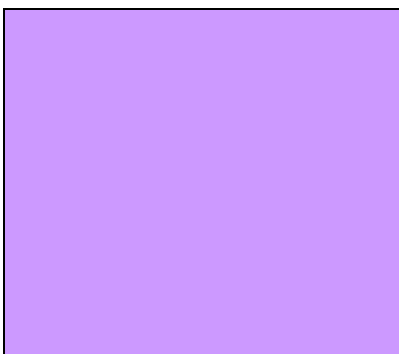
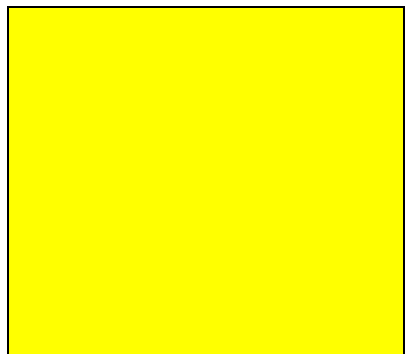
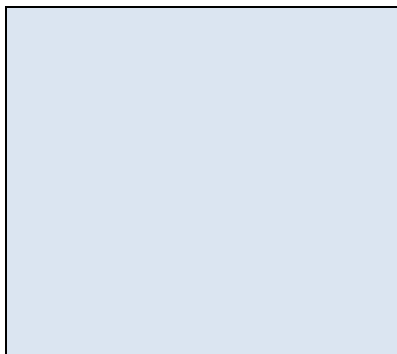
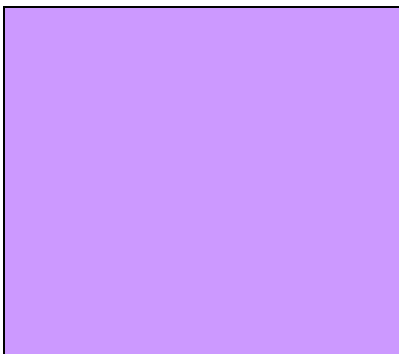
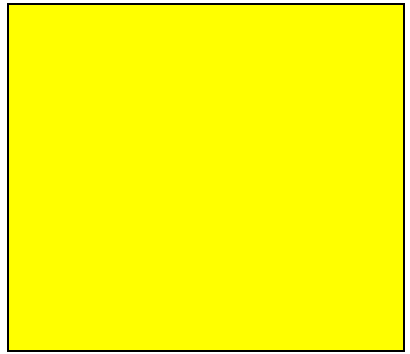
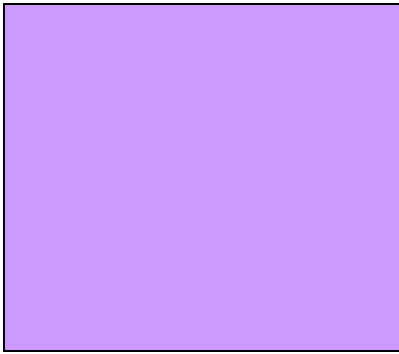
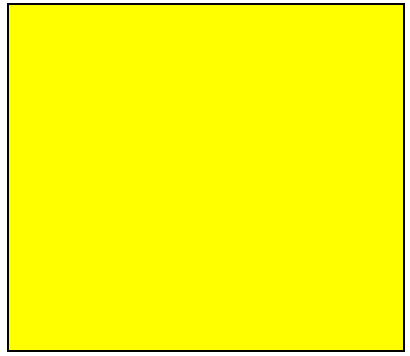
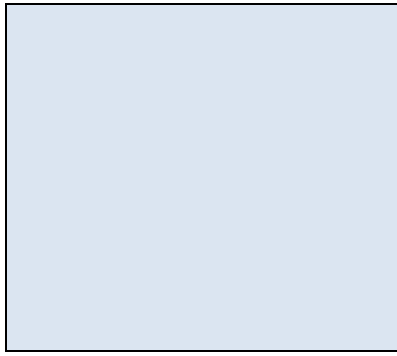
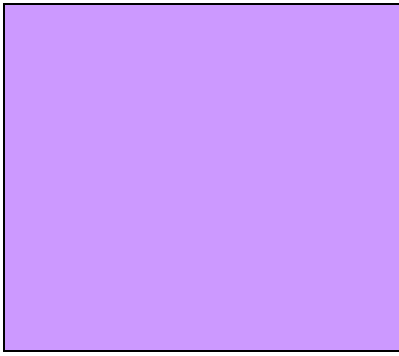
80

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## Expanded Form to Standard Form Card Game

Player 1:					Player 2:					
Expanded form	Place values			Standard form	<, >, =	Standard form	Place values			Expanded form
					○					
					○					
					○					
					○					
					○					
					○					
					○					

Who won this game? \_\_\_\_\_

Player 1:					Player 2:					
Expanded form	Place values			Standard form	<, >, =	Standard form	Place values			Expanded form
					○					
					○					
					○					
					○					
					○					
					○					
					○					

Who won this game? \_\_\_\_\_

# Solutions / Answers
























**MATH  
WHISPERER**  
*Where math makes sense*



# Practice 1: Modeling larger numbers without popsicle sticks

This would take a lot of popsicle sticks, so I recommend just drawing the pictures!

Place Value Mat	Expanded Form	Standard Form	Word Form								
<table border="1"> <tr> <td>Thousands</td> <td>Hundreds</td> <td>Tens</td> <td>Ones</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Thousands	Hundreds	Tens	Ones					$1000 + 300 + 40 + 5$	1345	one thousand three hundred forty five
Thousands	Hundreds	Tens	Ones								
<table border="1"> <tr> <td>Thousands</td> <td>Hundreds</td> <td>Tens</td> <td>Ones</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Thousands	Hundreds	Tens	Ones					$3000 + 20 + 9$	3029	three thousand twenty nine
Thousands	Hundreds	Tens	Ones								
<table border="1"> <tr> <td>Thousands</td> <td>Hundreds</td> <td>Tens</td> <td>Ones</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Thousands	Hundreds	Tens	Ones					$2000 + 600 + 5$	2605	two thousand six hundred five
Thousands	Hundreds	Tens	Ones								

Place Value Mat	Expanded Form	Standard Form	Word Form								
<table border="1"> <thead> <tr> <th data-bbox="172 201 302 226">Thousands</th> <th data-bbox="318 201 423 226">Hundreds</th> <th data-bbox="440 201 496 226">Tens</th> <th data-bbox="513 201 610 226">Ones</th> </tr> </thead> <tbody> <tr> <td data-bbox="180 233 293 709">  </td> <td data-bbox="310 233 415 380">  </td> <td data-bbox="431 233 488 432">  </td> <td data-bbox="505 233 610 709"></td> </tr> </tbody> </table>	Thousands	Hundreds	Tens	Ones					$4000 + 200 + 30$	4230	Four thousand two hundred thirty
Thousands	Hundreds	Tens	Ones								
											
<table border="1"> <thead> <tr> <th data-bbox="172 783 302 808">Thousands</th> <th data-bbox="318 783 423 808">Hundreds</th> <th data-bbox="440 783 496 808">Tens</th> <th data-bbox="513 783 610 808">Ones</th> </tr> </thead> <tbody> <tr> <td data-bbox="180 814 293 930">  </td> <td data-bbox="310 814 415 1245"></td> <td data-bbox="431 814 488 1245"></td> <td data-bbox="505 814 610 1129">  </td> </tr> </tbody> </table>	Thousands	Hundreds	Tens	Ones					$1000 + 70$	1070	one thousand seven hundred
Thousands	Hundreds	Tens	Ones								
											
<table border="1"> <thead> <tr> <th data-bbox="172 1371 302 1396">Thousands</th> <th data-bbox="318 1371 423 1396">Hundreds</th> <th data-bbox="440 1371 496 1396">Tens</th> <th data-bbox="513 1371 610 1396">Ones</th> </tr> </thead> <tbody> <tr> <td data-bbox="180 1381 293 1644">  </td> <td data-bbox="310 1381 415 1833"></td> <td data-bbox="431 1381 488 1801">  </td> <td data-bbox="505 1381 610 1833"></td> </tr> </tbody> </table>	Thousands	Hundreds	Tens	Ones					$2000 + 80$	2080	two thousand eighty
Thousands	Hundreds	Tens	Ones								
											

# Practice 2: Decomposing numbers

(that means taking numbers apart)

Decomposition of the number	Name of the number
$20 = \underline{2} \text{ tens} + \underline{0} \text{ ones}$	twenty
$30 = \underline{3} \text{ tens} + \underline{0} \text{ ones}$	thirty
$35 = \underline{3} \text{ tens} + \underline{5} \text{ ones}$	thirty five
$13 = \underline{1} \text{ tens} + \underline{3} \text{ ones}$	thirteen
$15 = \underline{1} \text{ tens} + \underline{5} \text{ ones}$	fifteen
$11 = \underline{1} \text{ tens} + \underline{1} \text{ ones}$	eleven
$18 = \underline{1} \text{ tens} + \underline{8} \text{ ones}$	eighteen
$12 = \underline{1} \text{ tens} + \underline{2} \text{ ones}$	twelve
$89 = \underline{8} \text{ tens} + \underline{9} \text{ ones}$	eighty nine
$73 = \underline{7} \text{ tens} + \underline{3} \text{ ones}$	seventy three
$62 = \underline{6} \text{ tens} + \underline{2} \text{ ones}$	sixty two
$48 = \underline{4} \text{ tens} + \underline{8} \text{ ones}$	forty eight
$57 = \underline{5} \text{ tens} + \underline{7} \text{ ones}$	fifty seven

Decomposition of the number	Name of the number
$420 = \underline{4}$ hundreds + $\underline{2}$ tens + $\underline{0}$ ones	four hundred twenty
$832 = \underline{8}$ hundreds + $\underline{3}$ tens + $\underline{2}$ ones	eight hundred thirty two
$350 = \underline{3}$ hundreds + $\underline{5}$ tens + $\underline{0}$ ones	three hundred fifty
$503 = \underline{5}$ hundreds + $\underline{0}$ tens + $\underline{3}$ ones	five hundred three
$305 = \underline{3}$ hundreds + $\underline{0}$ tens + $\underline{5}$ ones	three hundred five
$108 = \underline{1}$ hundreds + $\underline{0}$ tens + $\underline{8}$ ones	one hundred eight
$180 = \underline{1}$ hundreds + $\underline{8}$ tens + $\underline{0}$ ones	one hundred eighty
$789 = \underline{7}$ hundreds + $\underline{8}$ tens + $\underline{9}$ ones	seven hundred eighty nine
$897 = \underline{8}$ hundreds + $\underline{9}$ tens + $\underline{7}$ ones	eight hundred ninety seven
$703 = \underline{7}$ hundreds + $\underline{0}$ tens + $\underline{3}$ ones	seven hundred three
$602 = \underline{6}$ hundreds + $\underline{0}$ tens + $\underline{2}$ ones	six hundred two
$486 = \underline{4}$ hundreds + $\underline{8}$ tens + $\underline{6}$ ones	four hundred eighty six
$527 = \underline{5}$ hundreds + $\underline{2}$ tens + $\underline{7}$ ones	five hundred twenty seven

# Help for Helpers

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I know how much teachers and parents want to help their students be successful at math. It can be upsetting to us as adults to see a student for whom we care being upset. However, the very very best way to help your student is to offer encouragement, such as “I know you can do this. I believe in you.” And then leave the student alone to do the work.

As a metaphor, if you yourself want to become physically fit and choose to run a mile, having someone drive you in a car isn’t going to really help you long term. Yes, you will cover the distance. But there is no substitute for the physical exertion, the sweating and huffing and puffing. Learning to be successful in math requires mental exertion, self-soothing during the frustrating times, and mental stamina.

The time of being a student is largely to prepare for adulthood. As an adult needing math in real life or on the job, there is no great answer book that falls from the sky. We don’t generally want to ask our boss or friend: “Am I right? Am I right?” As an adult, we have to know the answer is right ourselves. The time of being a student is the appropriate time to learn these skills. So, difficult as it may be for you, and it can be very difficult, I respectfully urge you to do nothing except offer encouraging words. These materials are carefully scaffolded and I guarantee you that your student is capable of doing the work himself or herself. The right answer is only half the goal—your student needs to know the answer is right independently.

My heartfelt wishes to you, the parent, teacher, or important grownup in your student’s life. You will gain confidence in your students as you watch them be successful on their own.