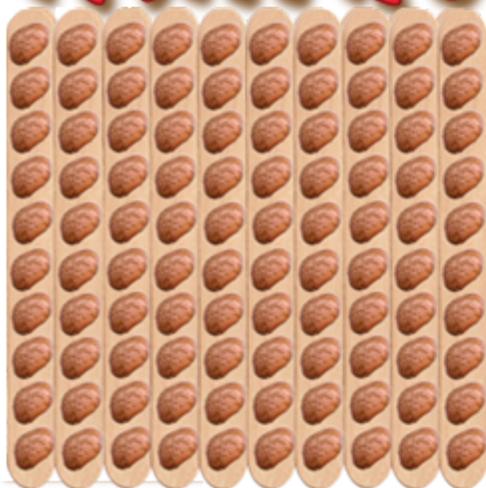




**Tools for Active Teaching and Active Learning**

# Hands-On Math

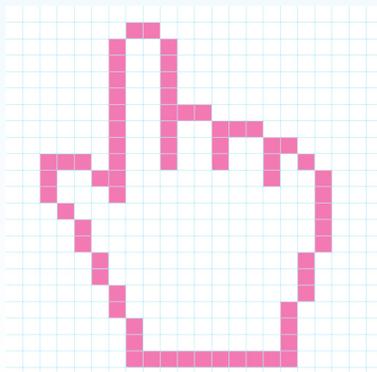


**Bean Sticks**

**Explore and Discover:**

- ✓ Place Value
- ✓ Addition and Subtraction
- ✓ Whole Numbers
- ✓ Number Theory

## Instructor's Guide



Ventura Educational Systems

©2011 All Rights Reserved

## Copyright Notice

This product is intended for use by individuals and schools. The purchaser is entitled to use this product but not to transfer or sell reproductions of this product or manual to other parties. The software application and supporting documentation are copyrighted by Ventura Educational Systems. All rights and privileges guaranteed by the copyright laws of the United States and through international treaties are reserved.

## Credits

**App Design** Ventura Educational Systems

**Instructional Technology and Programming** Fred Ventura, Ph.D.  
Ben Ventura

Jon Ventura

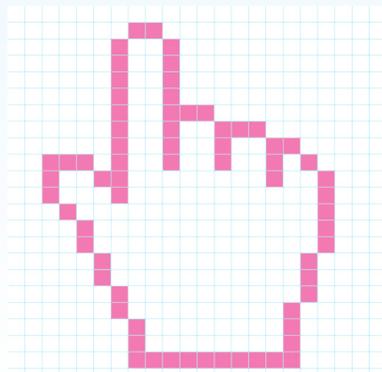
**Project Manager** Marne Ventura

**Dr. Fred Ventura** is an experienced classroom teacher and has taught elementary, secondary and college levels. He holds a doctorate in education from the University of California and presents workshops for educators on the instructional uses of technology.

**Marne Ventura** is an experienced classroom teacher and holds a masters degree in reading and language development of the University of California.

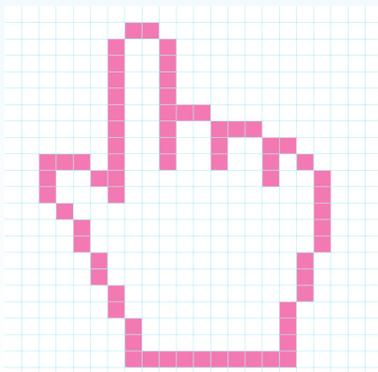
**Ben Ventura** is a systems administrator and programming expert. He attended Sonoma State University and works as a consultant to public agencies and private companies.

**Jon Ventura** holds a Ph.D. in computer science from the University of California, Santa Barbara. His area of study is visualization and augmented reality.



# Table of Contents

Overview .....	4
Introduction to Hands-On Math: Bean Sticks.....	6
Using an iPad in a Manipulative Approach to Math.....	7
Getting Started .....	8
Settings.....	9
In App User’s Guide .....	11
Bean Sticks Playground .....	12
Placing Blocks on the Bean Sticks Playground .....	13
Activities .....	14



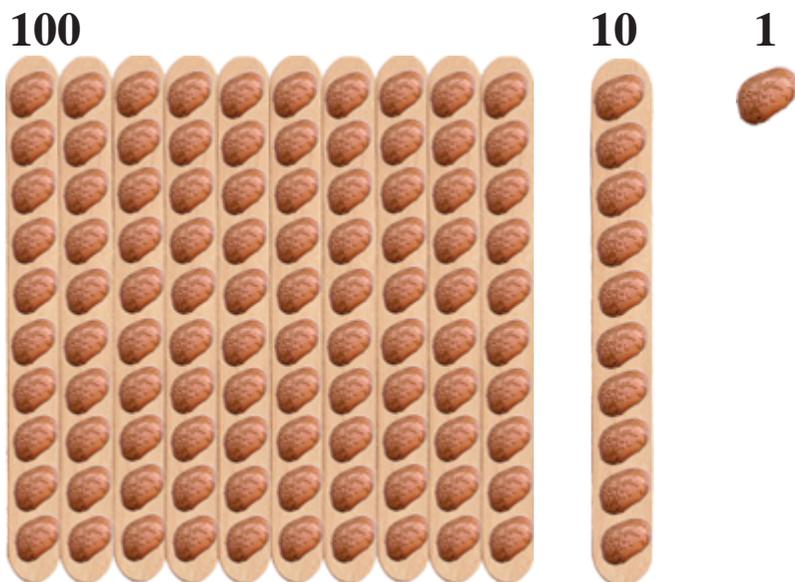
## Overview

The use of Bean Sticks is one of the best ways to give students an insight into the base 10 numbering system commonly used in mathematics. Mathematics took a giant step forward when people learned to use a positional numbering system to represent numbers. Roman numerals and other early ways that were used to represent number were severely limited in their ability to represent large numbers and operations such as addition and subtraction were not easily performed. Hands-On Math Bean Sticks is designed to help children develop an understanding of place value. In order for a child to develop a meaningful understanding of mathematics it is essential that the child know the underlying concepts that are the cornerstone of the representational place value system. After a student has developed a clear understanding of addition and subtraction as operations involving the joining and separating of sets, he or she is ready to begin the systematic study of numbers greater than 9.

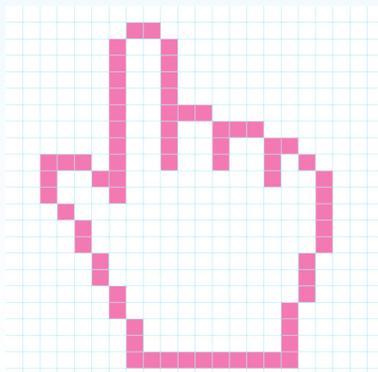
The decimal system employs only ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. Children must learn that the position of a given digit in a number determines its value. For example, in the number 387 the 3 represents 3 sets of one hundred, the 8 represents 8 tens and the 7 represents 7 ones.

The Bean Sticks app turns your iPad into an interactive tabletop surface that we call a Playground. The Playground provides the child with an opportunity to freely explore place value concepts. The Playground provides three types of blocks for each decimal place setting.

*Visualizing mathematical concepts is the key to understanding. Models help significantly in cognitive development.*



Research has shown that children learn best through active involvement in the learning process. Hands-On Math: Bean Sticks is designed to be a tool that teachers can use for active teaching and active learning. Math manipulative devices can be a rich source of teaching strategies for problem solving and can be very helpful in developing an intuitive understanding of mathematical concepts. The Hands-On Math series

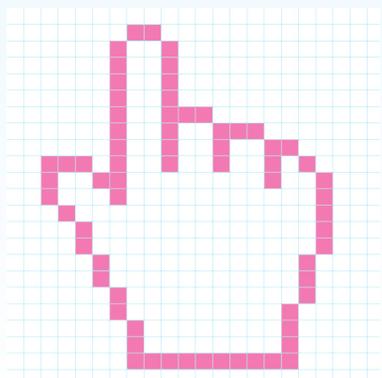


suggests ways in which concrete learning experiences can be extended to a representational level and still remain manipulative and interactive.

This guide consists of two sections. The first part is written for the teacher and explains the functions of the app and options available. It presents ideas for instructional strategies that can be implemented with each simulated manipulative device. The second section of the manual is a set of curriculum-based activities that are designed to help the teacher in using the Hands-On Math app. These activities have been developed for elementary and middle school age children and are arranged by order of grade level where the concepts are typically introduced. Teachers will want to decide what is the best sequence for using the materials with their particular group of students. Each lesson is aimed at specific mathematical objectives including counting, representing numbers using the place value system, addition and subtraction with regrouping. Each activity is meant to be a beginning. Teachers will want to encourage the children to explore extensions of each activity with different examples. Orally discussing each activity will help to foster higher level thinking.

Hands-On Math: Bean Sticks is a starting point. Learning should be fun and as students work with the app, it is my intention that they will begin discussing, sharing and creatively exploring mathematics.

-- Fred Ventura, Ph.D.



## Introduction to Hands-On Math: Bean Sticks

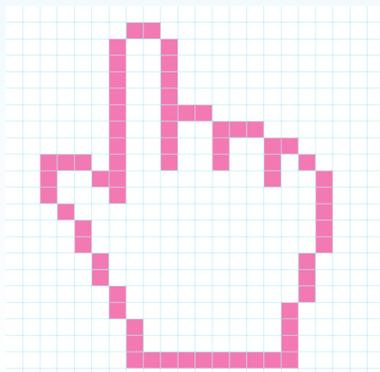
*Piaget's theory of cognitive development is a comprehensive theory about the nature and development of human intelligence.*

Approaches to the teaching of mathematics that rely heavily on one methodology are inherently weak and unlikely to produce optimal results. Educators have found that teaching strategies must adapt to accommodate new discoveries which expand our understanding of the learning process and new technologies which expand our delivery systems.

According to learning theory, children learn best when they are actively involved in the learning process. There are many ways to do this but one example is having children work in small groups in a laboratory/discovery situation. Small group instruction encourages variation in teaching methodology. Variation in the way in which material is presented serves the instructional process since one particular methodology may not be best for all children. Different children respond differently to a particular educational approach. The same methodology that is appropriate for one content area or developmental stage may not be appropriate in a different content area or with children who are at a different developmental stage.

For learning mathematics an active teaching and active learning situation is a very desirable educational environment. To create it the teacher must be aware of the behavioral characteristics of the students with regard to mathematics, must be knowledgeable in the particular skills which are being taught and must be able to draw upon diverse strategies in order to decide which is the most appropriate for fostering the development of the targeted mathematical concepts.

In general, educational psychologists believe that the ability of children to learn passes through developmental stages. Each stage is characterized by particular behaviors. In the early stages learning is tied to perceptual responses. As the child matures, abstract reasoning becomes possible and concrete models are useful for laying the conceptual groundwork for new ideas, but once a concept has been internalized the concrete models are no longer necessary. The work of Swiss psychologist, Jean Piaget, has contributed a great deal to support this theory, and to foster the development of educational strategies which are consistent with the theory.



## Using an iPad in a Manipulative Approach to Math

*We use the term “playground” to convey the open-ended, discovery approach to learning that this tool was designed to support.*

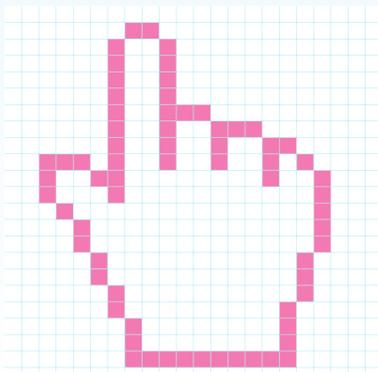
Hands-On Math: Bean Sticks combines and extends the use of concrete materials for teaching mathematics to the touch-based interactive environment of the Apple® iPad™. When used in conjunction with actual manipulative devices the app offers a unique set of strategies for active learning. While using the app students can draw upon concepts developed from concrete experiences that were gained using manipulative devices and will work with the same concepts in a more representational manner using the app. In this way the child’s concrete mathematical knowledge is used to help transition to a representational stage and serves as a foundation for the development of abstract mathematical thinking skills.

Once mathematical concepts have been internalized by the child in a concrete way, the stage is set for a deeper understanding of the more formal, abstract axioms of higher mathematics.

Hands-On Math: Bean Sticks simulates the use of a unit ( $1 \times 1$ ), a ten stick ( $10 \times 1$ ) and a one hundred sticks ( $10 \times 10$ ). Using Hands-On Math: Bean Sticks numbers from 0 to 999 can be represented. Traditionally students would use physical blocks made of wood or plastic. The app simulates these instructional approaches by creating an open-ended area called the Bean Sticks Playground. On the Bean Sticks Playground students manipulate a supply of blocks to represent numbers and to perform additions and subtractions.

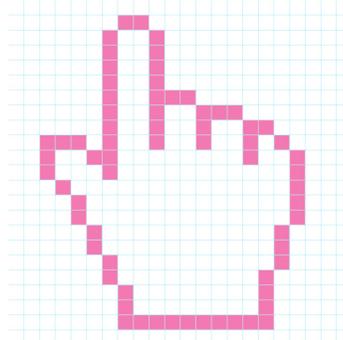
Using the Bean Sticks Playground students can exchange a hundred stick for 10 ten sticks, or a ten stick for 10 beans. The author and designer coined the term, “artificially intelligent math manipulative” to describe how using the Bean Sticks differs from concrete manipulative devices traditionally used in classrooms. The Bean Sticks on the Bean Sticks Playground provide intelligent feedback as the student manipulates the bars.

The Bean Sticks Playground can also be used with lessons that present mathematical concepts in a structured way. Initially teachers may want to provide ample free exploration time and then after the students have become familiar with the product, direct students into more structured investigations. Students will make discoveries and when they do teachers should encourage them to share their discoveries with others in their group.



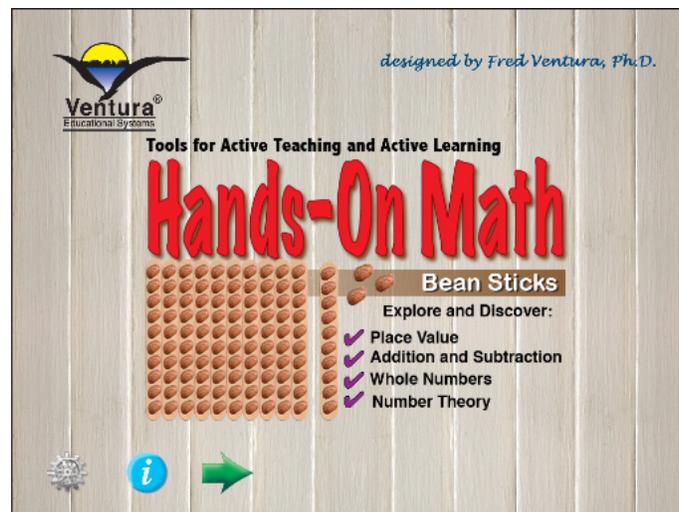
## Getting Started

Hands-On Math: Bean Sticks help students develop an understanding of place value. The program is designed in such a way that the physical operation of the app does not interfere with the learning activity. Icons are used to provide the user with complete control over the interaction with the software features.



## Getting Started

Tap the Bean Sticks icon to launch the app.



The opening view presents the title page with three options:



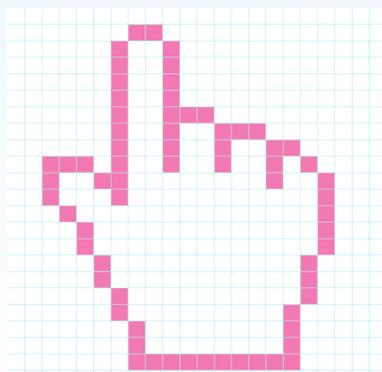
Settings - Tap this icon to control the sound, speech and view options of the app.



Info - Tap this icon to access the User's Guide where an overview of the app is presented.



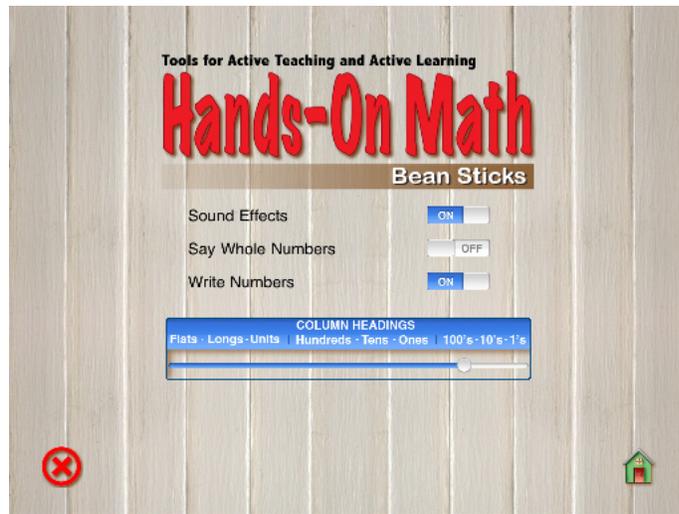
Begin - Tap the green arrow to start using the Hands-On Math: Bean Sticks Playground.



# Settings

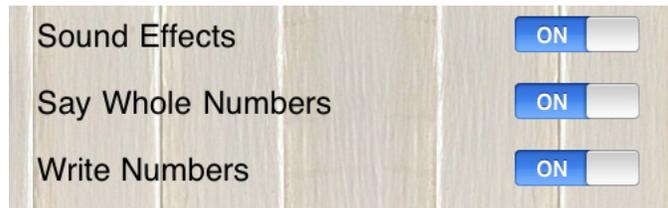


The Settings option provides control of some of the basic features of the app. Options include control for sound effects and speech.

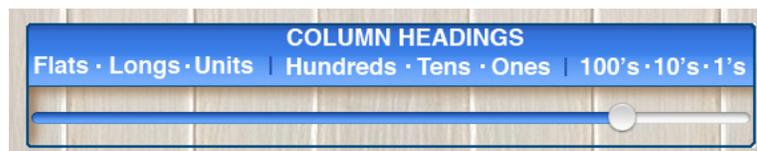


Mild sound effects are used through out the app and add a level of interest for students. When using the app with very young students teachers may wish to have the Speech option on. When Speech is on the name of each number is pronounced when a Bean Sticks is tapped on the Bean Stick Playground.

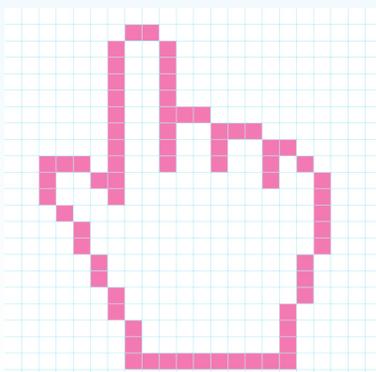
*Use speech effects with very young children to help them learn to read and write numbers.*



Use the on/off switch to activate or deactivate the sound effects, and the speech or the writing of numbers. The default option for writing numbers is to use words, but tapping the words toggles the display to expanded notation.



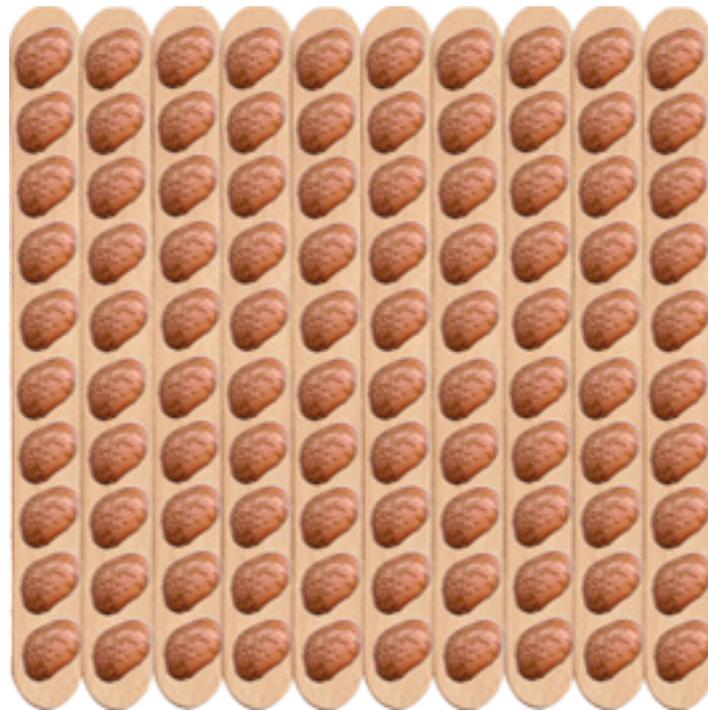
Use the slide control to select the appropriate headings to be used for the place value column shown on the Playground.



## Bean Sticks

Beans Sticks are used to represent 100, 10 and 1.

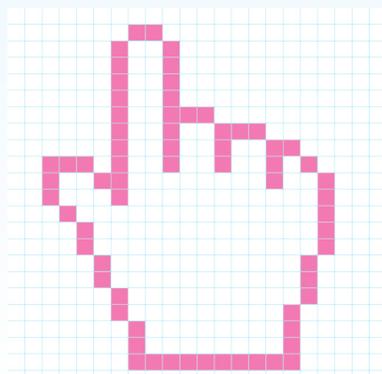
### 100 • One Hundred



### 10 • Ten



### 1 • One



## In App User's Guide



Tapping the Info icon brings up the Hands-On Math User's Guide. The guide provides a quick overview to the features of the app. It serves as a quick reference to the use of the product.



Users can navigate by tapping either the right or left arrows. Swiping right or left can also be used to move to the next page or previous page.

Exit the user's guide by tapping the home icon.

*Swipe right or left to change pages or use the buttons.*



Next Page - Tap this icon to move to the next page.



Previous Page - Tap this icon to move to the next page.



Instructor's Guide - Tap to automatically begin downloading the PDF of the Instructor's Guide from [www.venturaes.com](http://www.venturaes.com). We recommend you install the Instructor's Guide in iBooks for convenient reference.



Tap the World Wide Web icon to launch your iPad browser and view the Ventura Educational Systems Website.

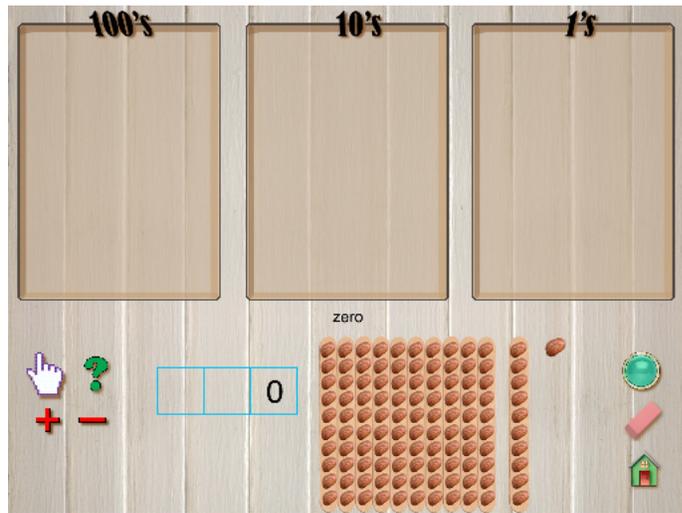


Home - Tap this icon to exit from the User's Guide.

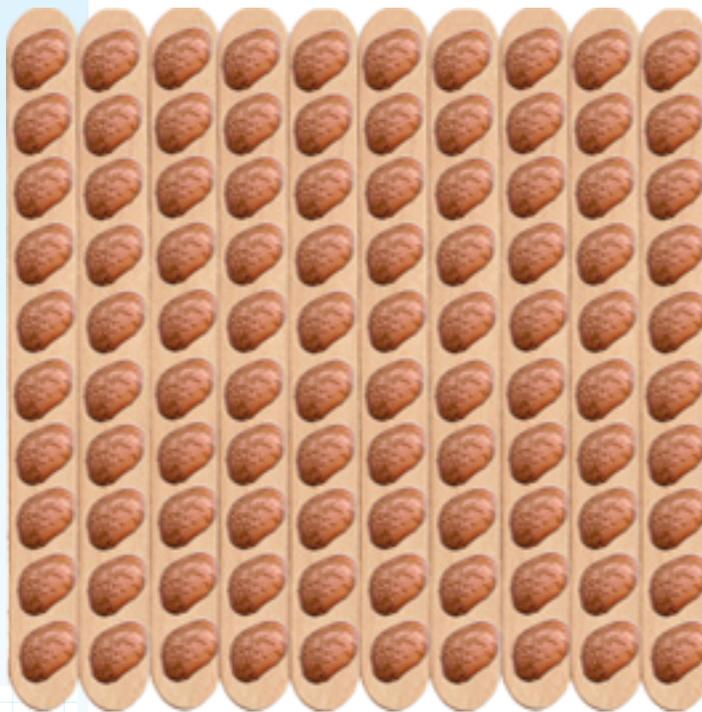
# Bean Sticks Playground



The Bean Sticks Playground is where the fun begins. Tap the green arrow to get started. You will notice that at the top of the screen there are three trays designating the place value columns.



At the bottom of the screen there are several icons and three stacks of Bean Sticks. The Bean Sticks are designated as follows:



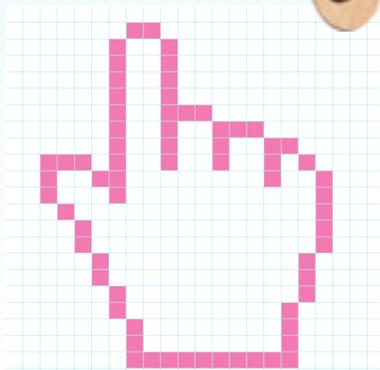
**Flat  
Hundreds  
or 100's**



**Longs  
Tens  
10's**

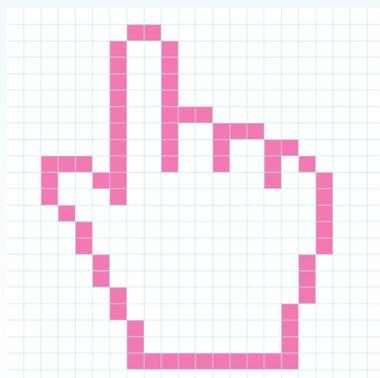
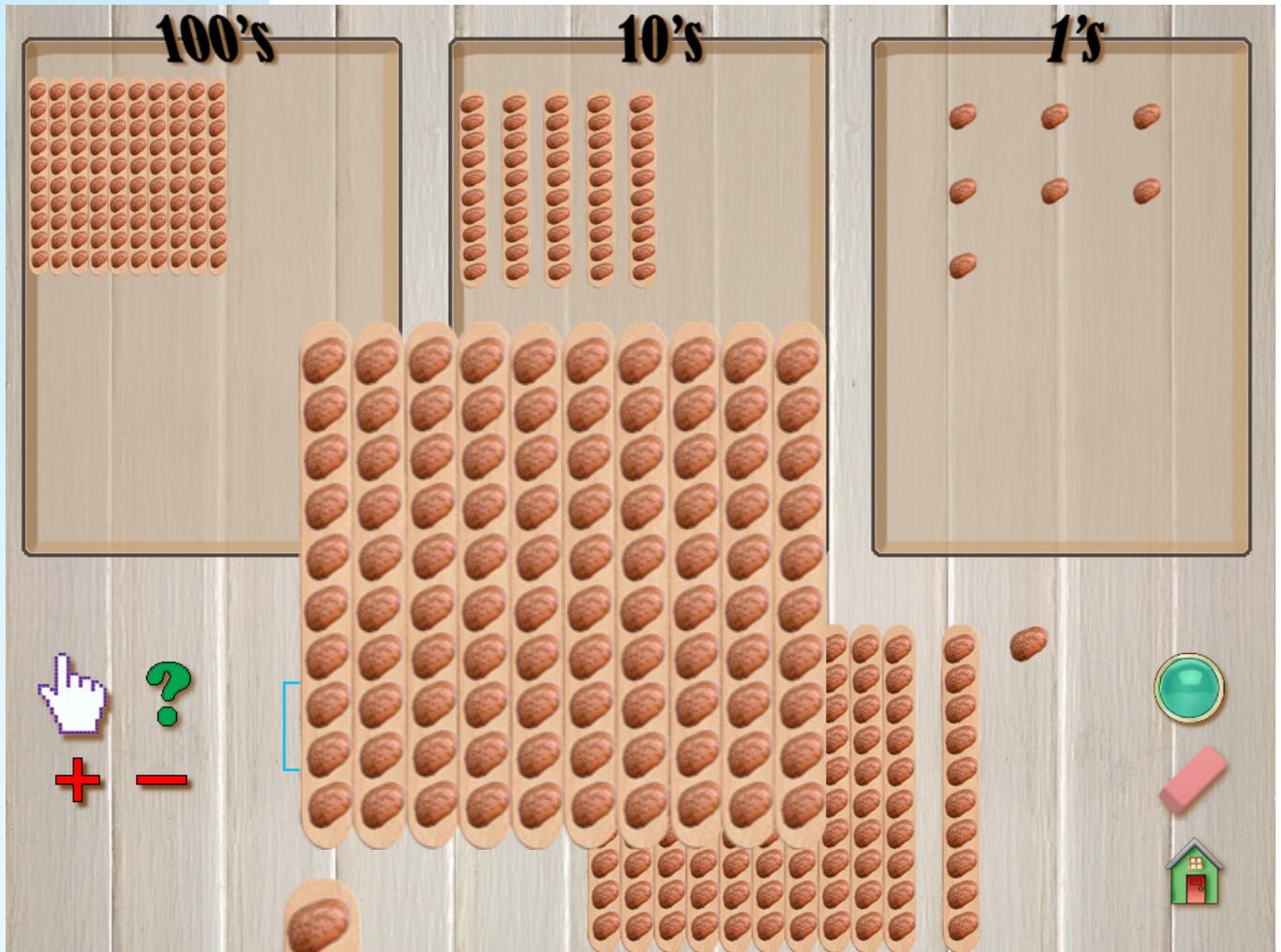


**Units  
Ones  
1's**



# Placing Bean Sticks on the Playground

To move a Bean Stick on the Playground drag it to the appropriate tray. Nine Hundreds Bean Sticks can be placed in first tray or hundreds column. Eighteen Tens Bean Sticks can be placed in the second tray or tens column and eighteen Ones Bean Sticks can be placed in the third column or ones (units) column.



Tens



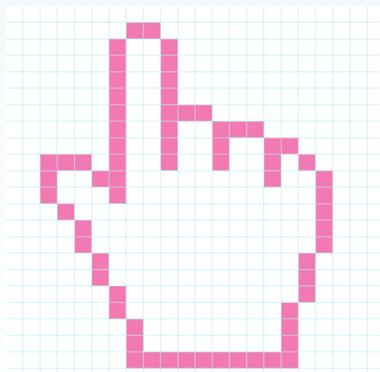
Tap the eraser icon to remove all the Bean Sticks from the Playground. Tens and Ones (Units) Bean Sticks can also be placed in the trays. Bean Sticks will only go into the appropriate column. Auditory and visual feedback is given when a Bean Stick is placed in an inappropriate column.



Ones (Units)

## Activities

Place Value.....	15
Place Value: Naming Numbers.....	16
Place Value: Showing Numbers with Bean Sticks.....	19
Place Value: Reading Numbers.....	21
Place Value: Writing Numbers.....	22
Two-Place Addition (no regrouping).....	24
Three-Place Addition (no regrouping).....	25
Two-Place Addition (with regrouping).....	26
Three-Place Addition (with regrouping).....	27
Regrouping (Yes or No).....	28
Writing Numbers in Expanded Notation.....	29
Two-Place Subtraction (no regrouping).....	30
Three-Place Subtraction (no regrouping).....	31
Two-Place Subtraction (with regrouping).....	32
Three-Place Subtraction (with regrouping).....	33



## Place Value



Settings



Sound Effects



Say Whole Numbers

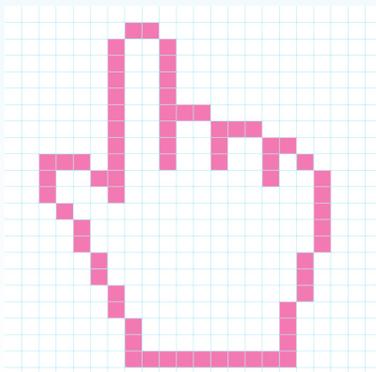


Write Numbers

Hundreds | Tens | Ones

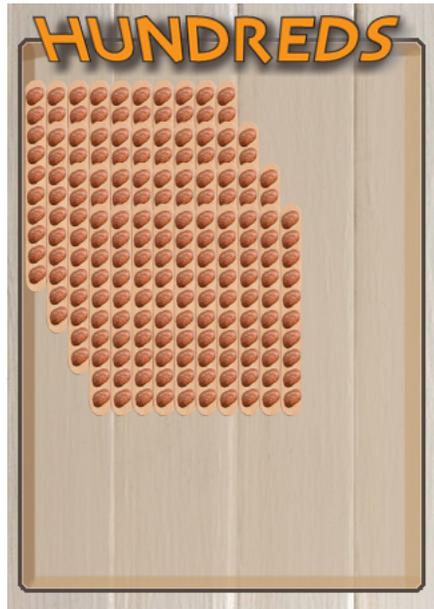


Eraser



Let's begin exploring the Hands-On Math: Bean Sticks Playground by representing a number using the Bean Sticks. From the Home screen tap the Settings icon. Let's represent 413. Tap the Erase to clear the Playground. Begin by dragging a Hundreds Block to the first column on the left. To represent 400, drag a total of four Hundreds Blocks to this tray.

# 413



Steps:

1. Drag 4 Hundreds Sticks to the Hundreds tray (column).
2. Drag 1 Tens Sticks to the Tens tray (column).
3. Drag 3 One Bean to the Ones tray (column).



## Place Value: Naming Numbers

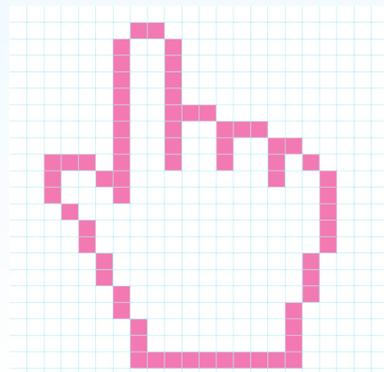
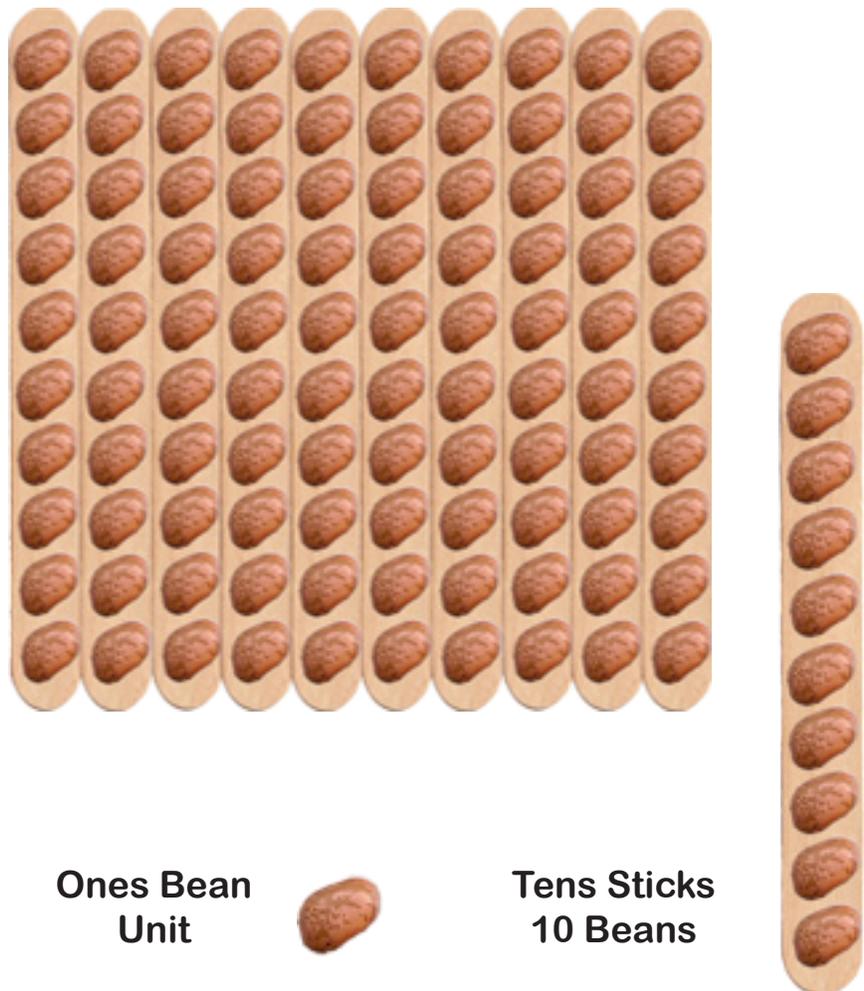
The place value system is based on the concept of groups. Using Bean Sticks, children will develop an understanding of grouping in powers of ten. Activities that involve representing numbers using Bean Sticks or telling which number is represented by a set of Bean Sticks reinforce a child's comprehension of the decimal system.

Because the computer graphic representations used in this app allow Bean Sticks to be separated and joined to show regrouping children can easily discover fundamental concepts such as the idea that a Ten Stick can be exchanged for 10 Beans (Units). By manipulating the physical materials, and then by simulating the manipulation of physical materials using the computer, children are given the opportunity to internalize the basic ideas of the decimal place value system.

Some suggestions of worthwhile activities are the following:

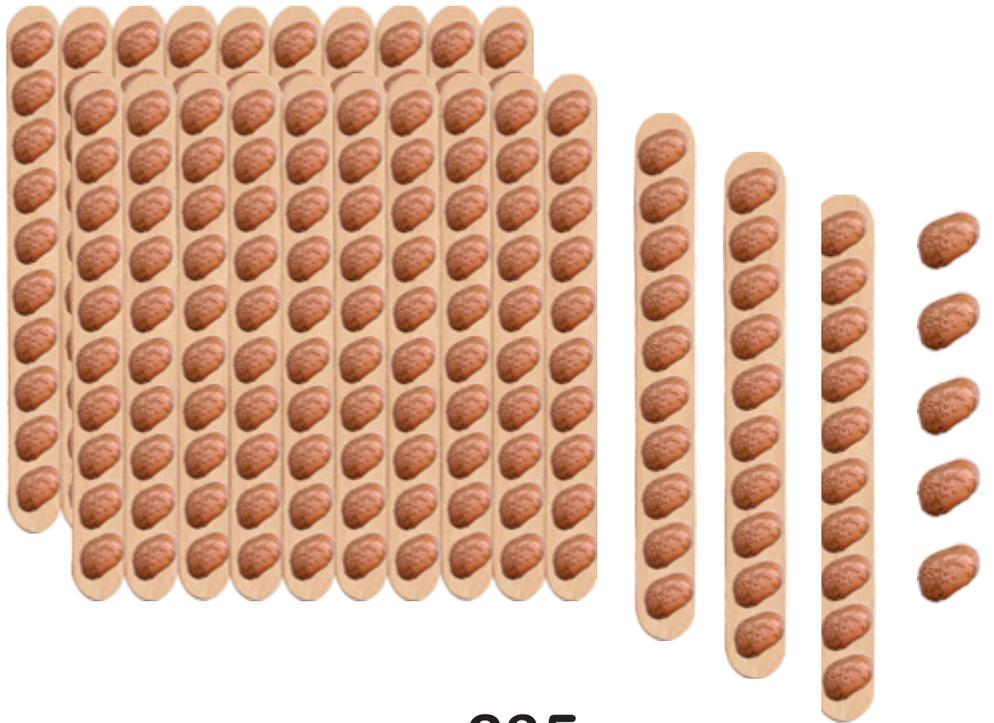
1. Tell the name and give the dimensions of each Bean Stick.

### Hundreds Stick 10 Ten Sticks



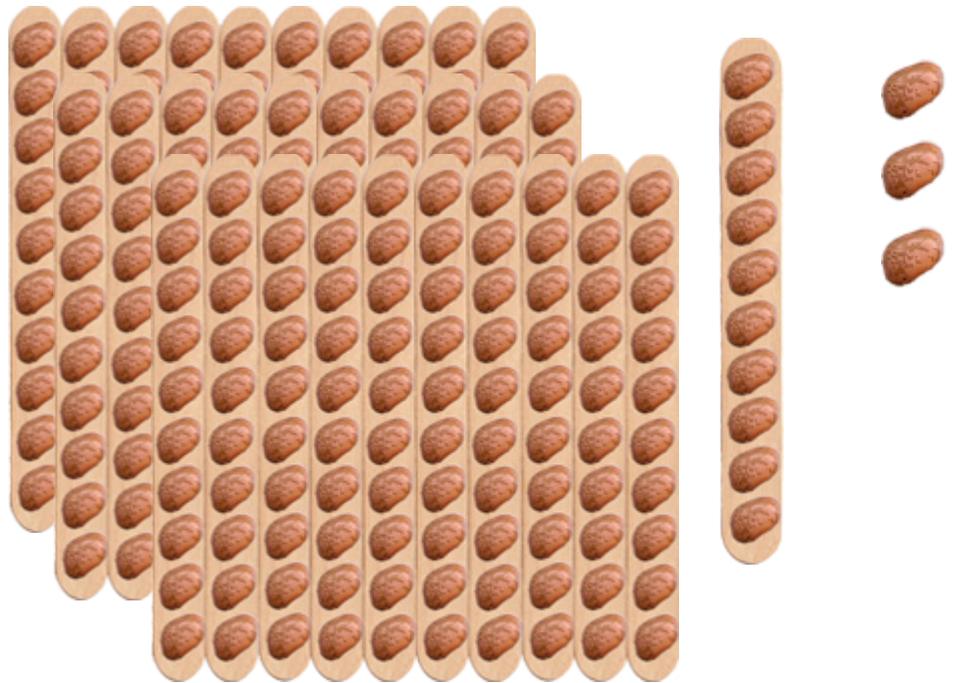
**Place Value:  
Naming  
Numbers**

**A.**

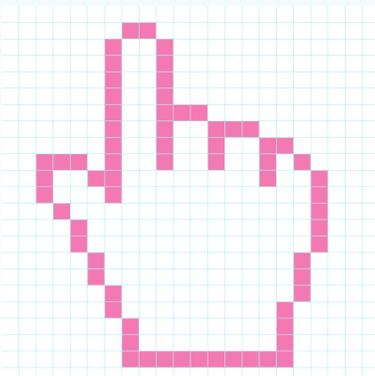


**235**

**B.**

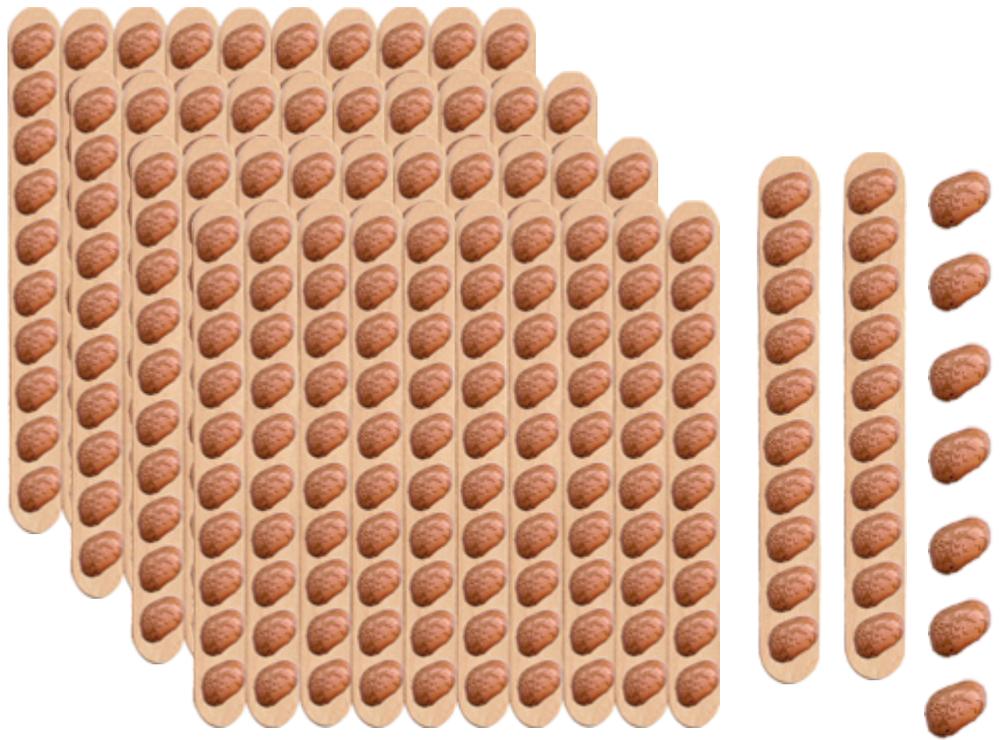


**313**



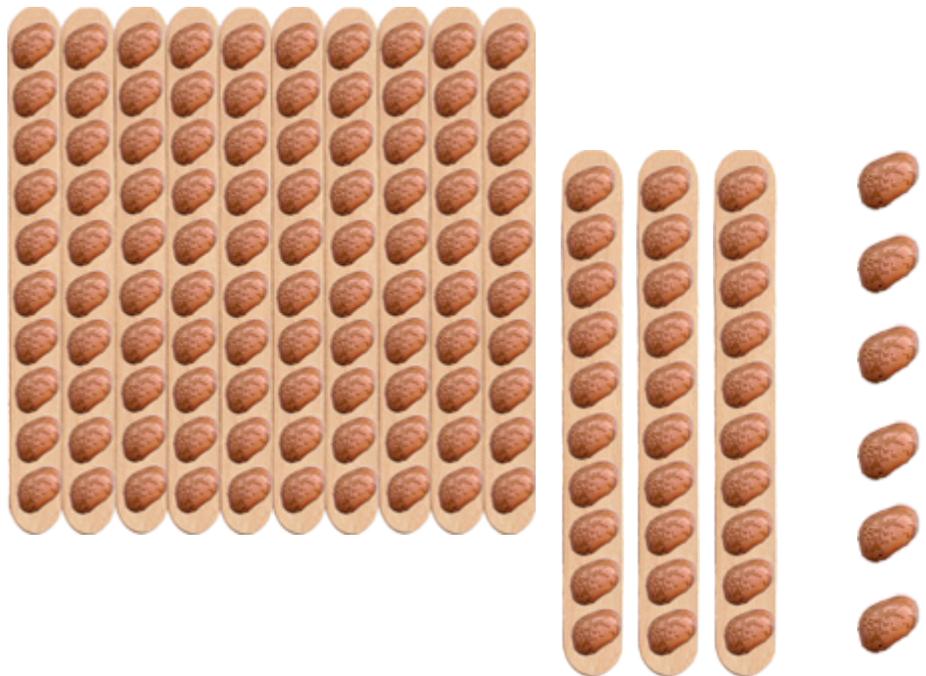
**Place Value:  
Naming  
Numbers**

**C.**

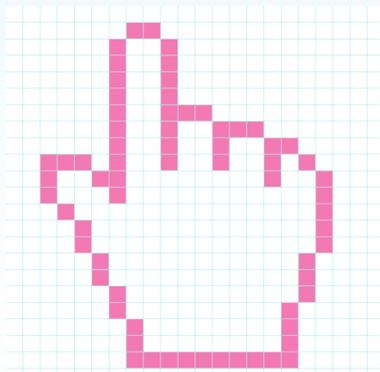


**427**

**D.**



**136**

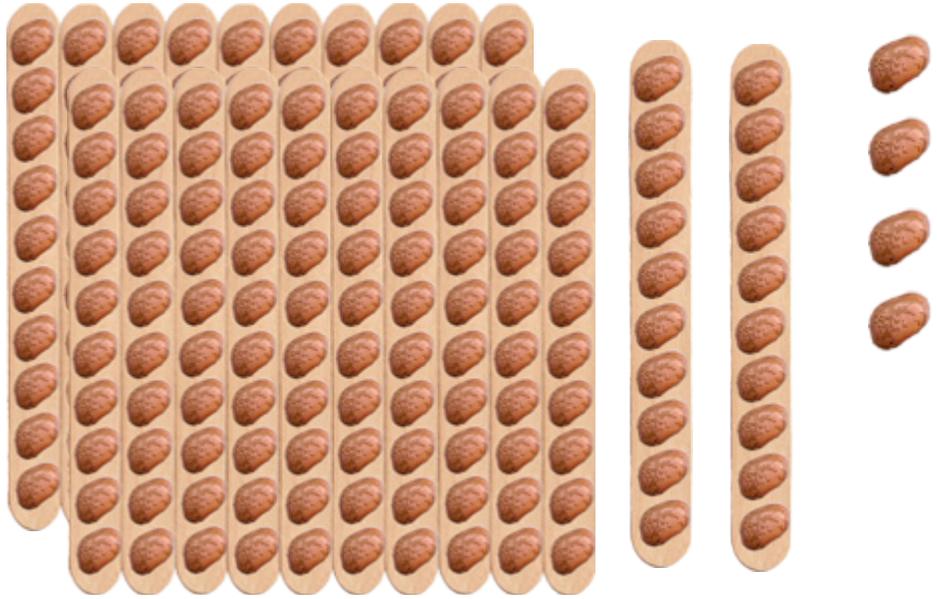


**Place Value:  
Showing  
Numbers  
with Bean  
Sticks**

**A.**

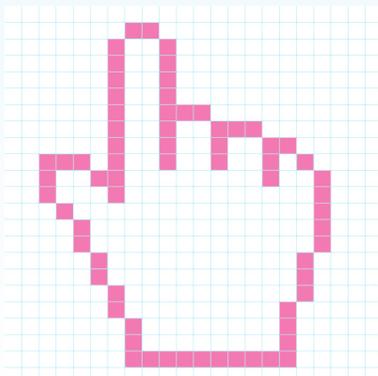
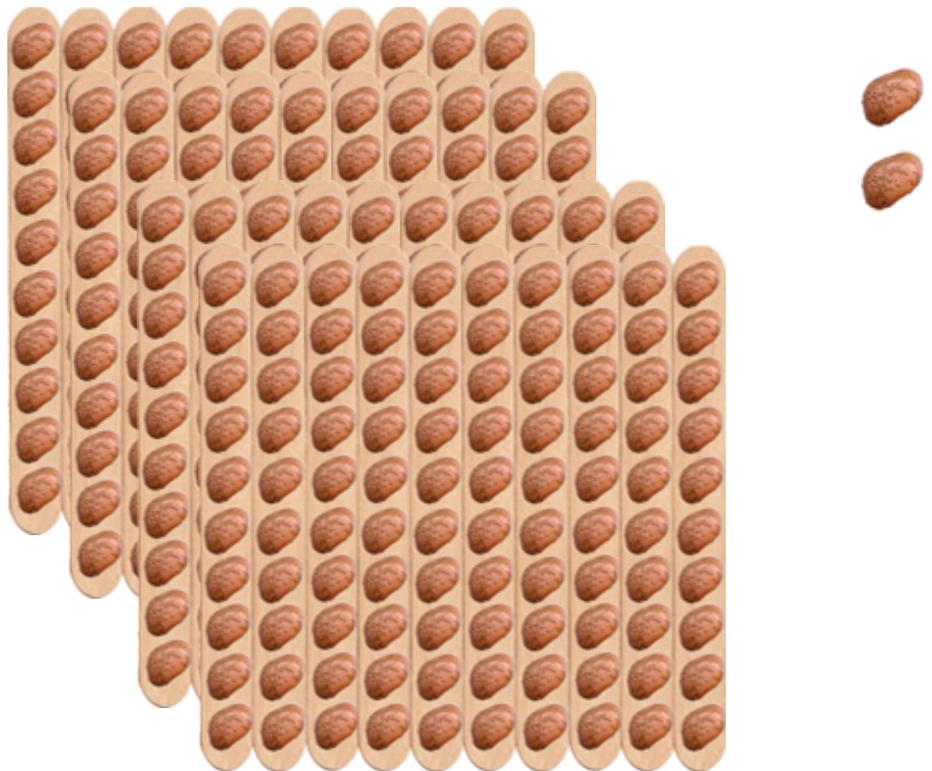
3. Show a given number with Bean Sticks.

**224**



**B.**

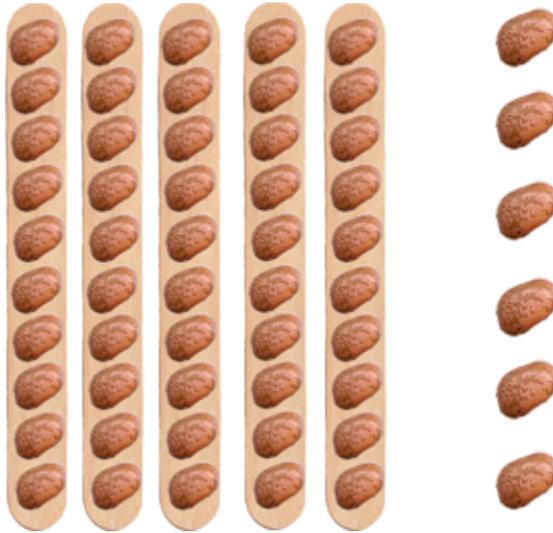
**402**



**Place Value:  
Showing  
Numbers  
with Bean  
Sticks**

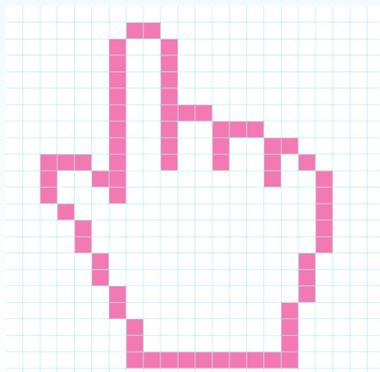
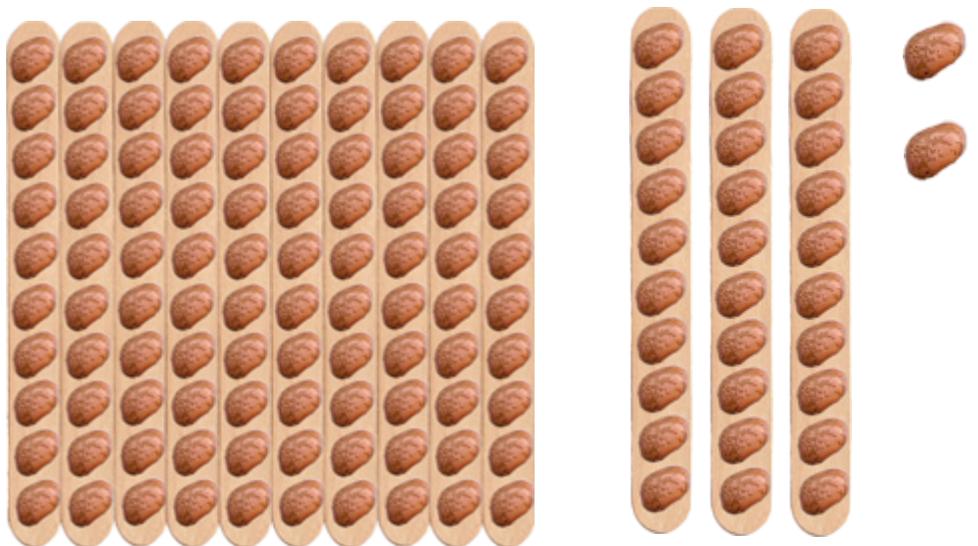
C.

56



D.

132



## Place Value: Reading Numbers

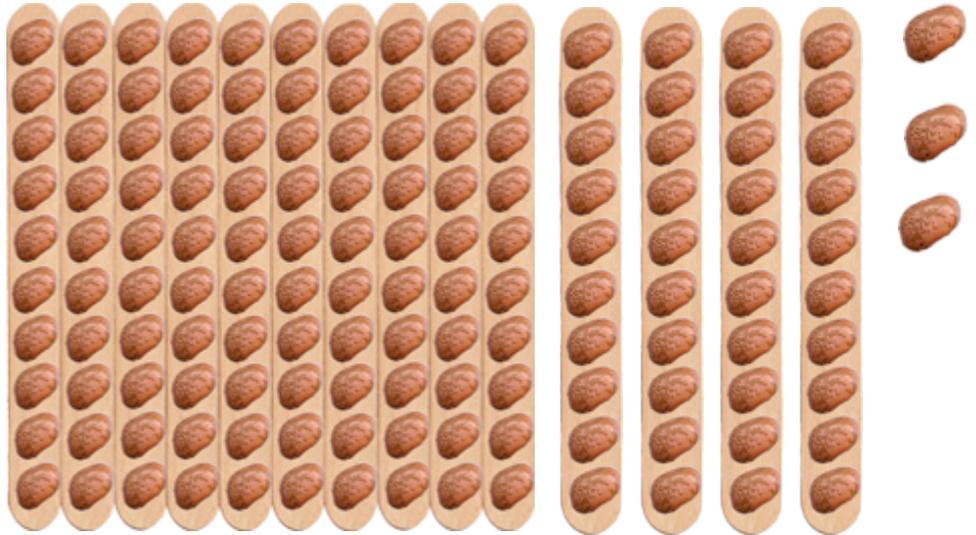
Set the 'Write Numbers'  
option to ON.



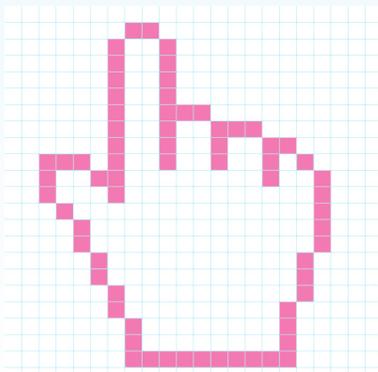
Write Numbers

Show these numbers using the Bean Sticks Playground.

Example: One hundred forty-three.

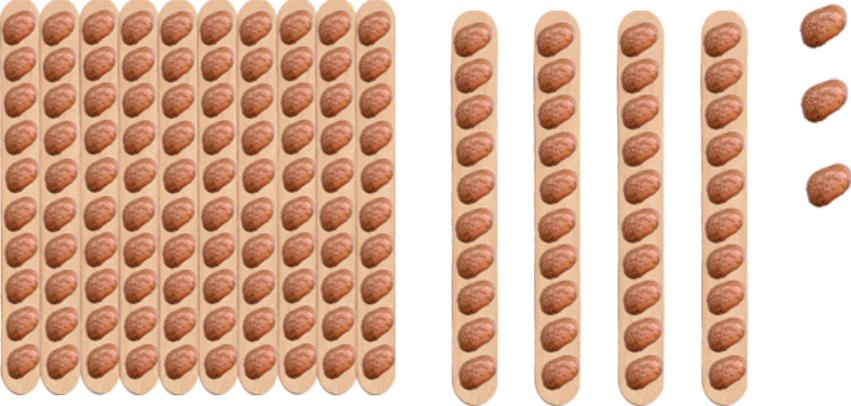


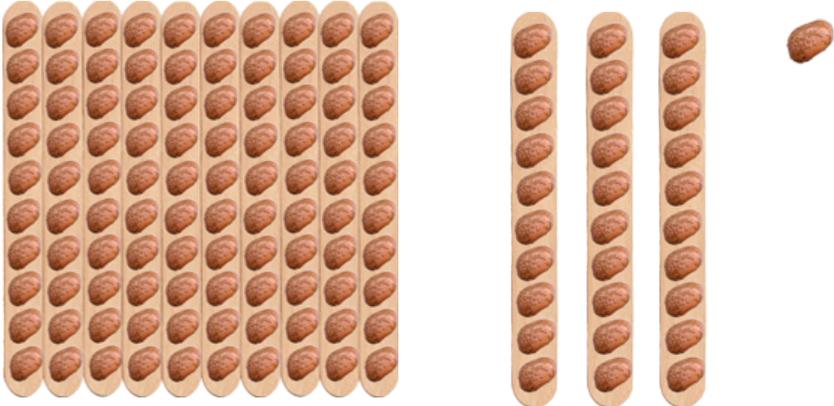
1. Two hundred thirty-six.
2. Four hundred eight.
3. Five hundred fifty-three.
4. Six hundred eleven.
5. Six hundred fifty-seven.
6. Eighteen.
7. Forty-five.
8. Three hundred twenty-one.
9. Sixty-nine.
10. Two hundred ninety-six.

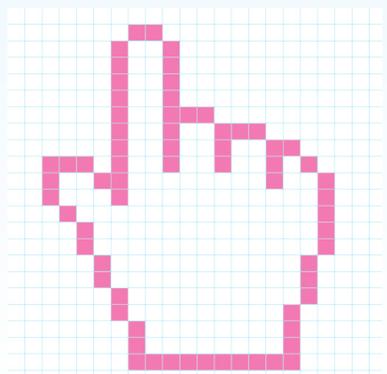


# Place Value: Writing Numbers

Write in numerals and words the numbers shown with these sets of Bean Sticks.

Numerals	Words
143	one hundred forty-three
	

Numerals	Words
	

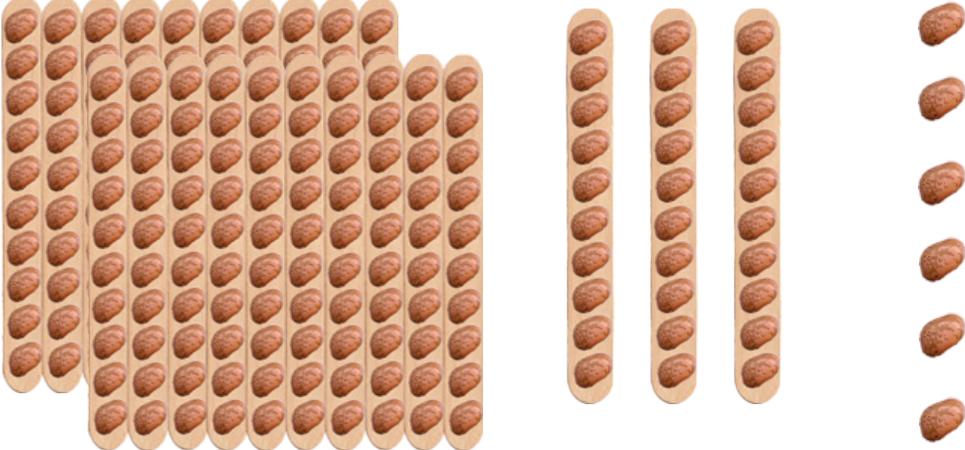


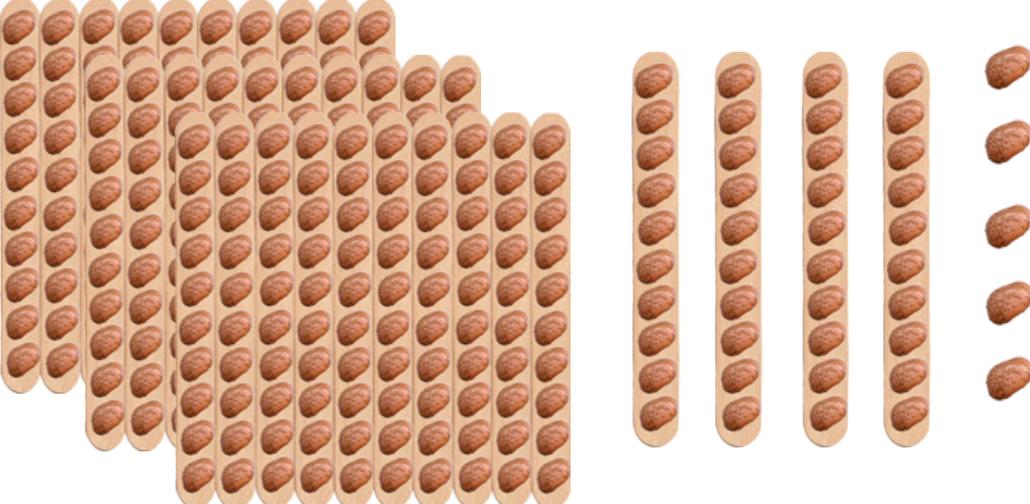
Show these numbers with Bean Sticks:

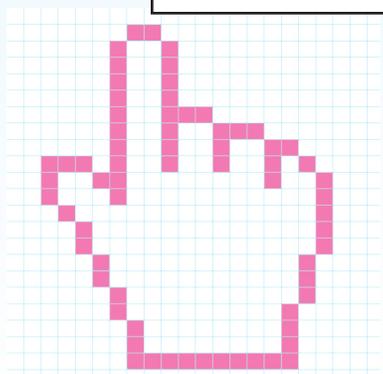
1. Two hundred more than two hundred six-five.
2. One hundred less than four hundred fifty-five.
3. Twenty less than ninety-eight.
4. Thirty-five more than twenty-seven.

# Place Value: Writing Numbers

Write in numerals and words the numbers shown with these sets of Bean Sticks.

<i>Numerals</i>	<i>Words</i>
	

<i>Numerals</i>	<i>Words</i>
	



Show these numbers with Bean Sticks:

1. Four hundred more than two hundred twenty-eight.
2. One hundred less than five hundred eighty-five.
3. Fifty less than seventy-five.
4. Three hundred twenty-five more than four hundred.

# Two-Place Addition

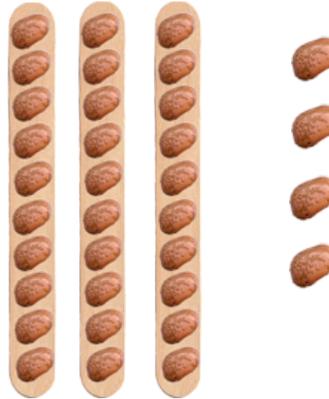
(no regrouping)

Use the Bean Sticks Playground to find the sum.

Steps:

1. Place three tens and four ones on the playground.

$$\begin{array}{r} 34 \\ +21 \\ \hline \end{array}$$



2. Add 2 tens and a one.



3. Write the problem and answer in your notebook.

Find the sum.

1. 
$$\begin{array}{r} 45 \\ +22 \\ \hline \end{array}$$

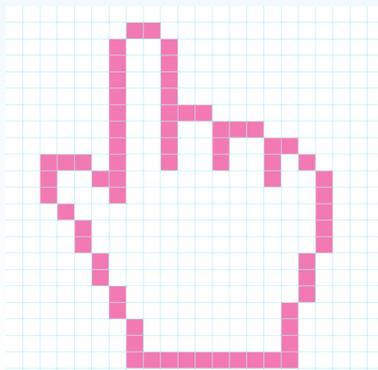
2. 
$$\begin{array}{r} 23 \\ +24 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 31 \\ +17 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 13 \\ +12 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 55 \\ +21 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 15 \\ +14 \\ \hline \end{array}$$



## Three-Place Addition

(no regrouping)

Use the Bean Sticks Playground to find the sum.

Find the sum.

1. 
$$\begin{array}{r} 125 \\ +32 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 233 \\ +22 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 101 \\ +48 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 132 \\ +24 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 121 \\ +17 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 134 \\ +15 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 312 \\ +25 \\ \hline \end{array}$$

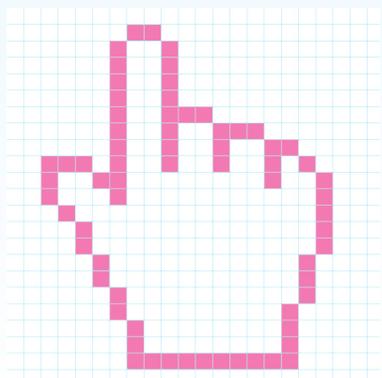
8. 
$$\begin{array}{r} 133 \\ +22 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 175 \\ +22 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 236 \\ +21 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 134 \\ +15 \\ \hline \end{array}$$

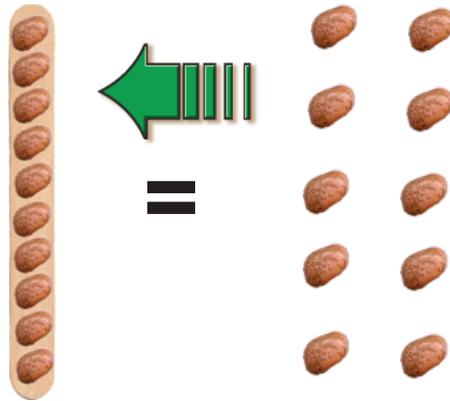
12. 
$$\begin{array}{r} 300 \\ +27 \\ \hline \end{array}$$



# Two-Place Addition

(with regrouping)

Use the Bean Sticks Playground to learn about regrouping. Whenever the Bean Stick in a column can be regrouped a green arrow is shown on the screen.



Find the sum.

1. 
$$\begin{array}{r} 75 \\ +28 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 45 \\ +46 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 25 \\ +18 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 26 \\ +25 \\ \hline \end{array}$$

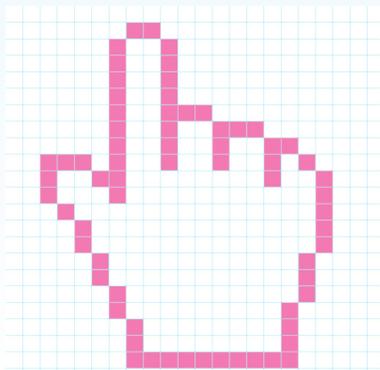
5. 
$$\begin{array}{r} 18 \\ +12 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 26 \\ +18 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 14 \\ +39 \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 12 \\ +19 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 45 \\ +17 \\ \hline \end{array}$$



# Three-Place Addition

(with regrouping)

Use the Bean Sticks Playground to find the sum.

Find the sum.

1. 
$$\begin{array}{r} 285 \\ +32 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 266 \\ +52 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 108 \\ +58 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 477 \\ +29 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 182 \\ +19 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 339 \\ +12 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 384 \\ +65 \\ \hline \end{array}$$

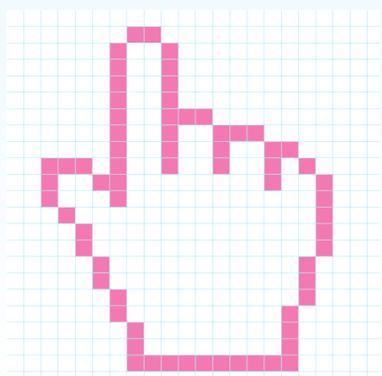
8. 
$$\begin{array}{r} 330 \\ +85 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 284 \\ +19 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 276 \\ +21 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 139 \\ +12 \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 310 \\ +97 \\ \hline \end{array}$$



## Regrouping (Yes or No)

Study each problem. Circle Yes or No to tell if regrouping is needed to find the sum.

1. 
$$\begin{array}{r} 125 \\ +22 \\ \hline \end{array}$$

Regroup

Yes No

2. 
$$\begin{array}{r} 239 \\ +32 \\ \hline \end{array}$$

Regroup

Yes No

3. 
$$\begin{array}{r} 103 \\ +52 \\ \hline \end{array}$$

Regroup

Yes No

4. 
$$\begin{array}{r} 436 \\ +87 \\ \hline \end{array}$$

Regroup

Yes No

5. 
$$\begin{array}{r} 137 \\ +19 \\ \hline \end{array}$$

Regroup

Yes No

6. 
$$\begin{array}{r} 329 \\ +93 \\ \hline \end{array}$$

Regroup

Yes No

7. 
$$\begin{array}{r} 343 \\ +75 \\ \hline \end{array}$$

Regroup

Yes No

8. 
$$\begin{array}{r} 310 \\ +29 \\ \hline \end{array}$$

Regroup

Yes No

9. 
$$\begin{array}{r} 136 \\ +18 \\ \hline \end{array}$$

Regroup

Yes No

10. 
$$\begin{array}{r} 246 \\ +26 \\ \hline \end{array}$$

Regroup

Yes No

11. 
$$\begin{array}{r} 141 \\ +17 \\ \hline \end{array}$$

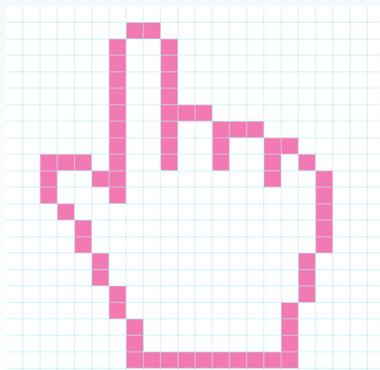
Regroup

Yes No

12. 
$$\begin{array}{r} 330 \\ +27 \\ \hline \end{array}$$

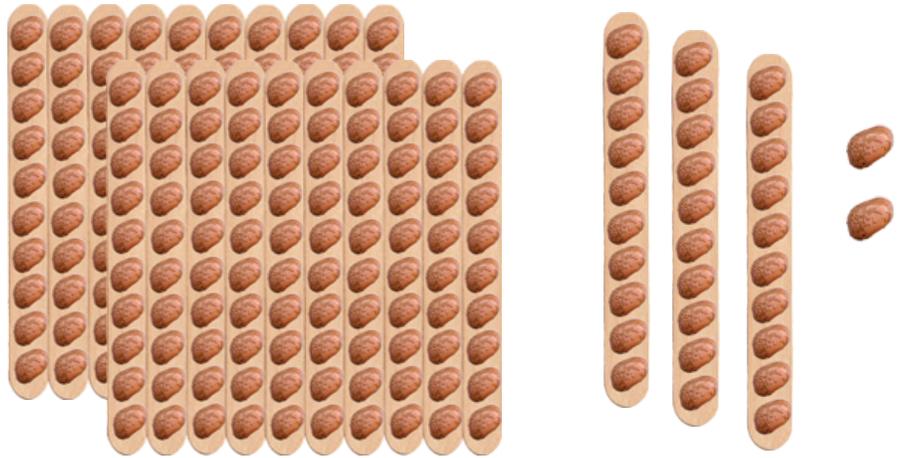
Regroup

Yes No



## Writing Numbers in Expanded Notation

On the Hands-On Math: Bean Sticks Playground numbers can be written in either words or expanded notation. In Settings turn the Write Numbers switch to ON. In the Playground tap to switch from written numbers to expanded notation.



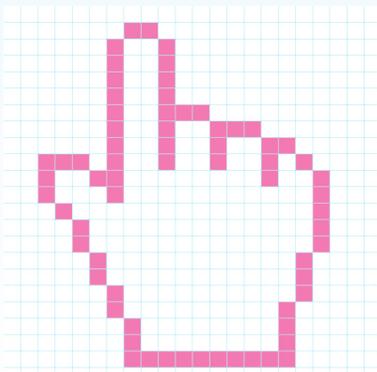
*Standard Form*

*Expanded Notation*

$$232 = 2 \times 100 + 3 \times 10 + 2 \times 1$$

Write these numbers in expanded notation:

Standard	Expanded Notation
465	
225	
431	
556	
73	
187	
129	
170	
825	
38	



## Two-Place Subtraction

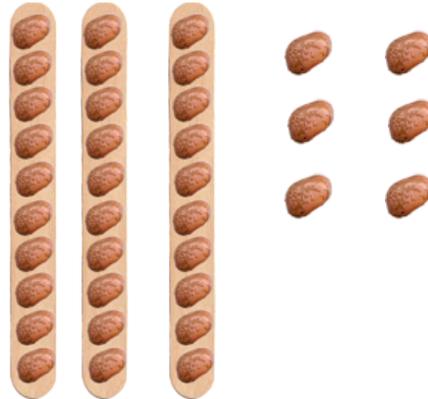
(no regrouping)

Use the Base Ten Blocks Playground to find the difference.

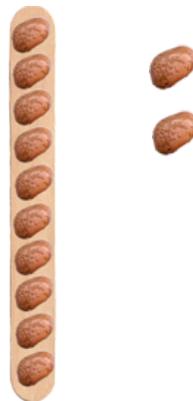
Steps:

1. Place three tens and six ones on the playground.

$$\begin{array}{r} 36 \\ -12 \\ \hline \end{array}$$



2. Remove one ten and two ones.



3. Write the problem and answer in your notebook.

Find the difference.

1. 
$$\begin{array}{r} 25 \\ -12 \\ \hline \end{array}$$

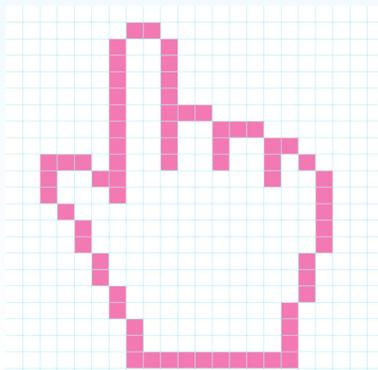
2. 
$$\begin{array}{r} 33 \\ -22 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 76 \\ -12 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 26 \\ -22 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 56 \\ -12 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 35 \\ -12 \\ \hline \end{array}$$



# Three-Place Subtraction

(no regrouping)

Use the Bean Sticks Playground to find the difference.

Find the difference.

1. 
$$\begin{array}{r} 247 \\ -35 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 339 \\ -28 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 246 \\ -21 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 347 \\ -28 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 225 \\ -12 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 325 \\ -15 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 429 \\ -25 \\ \hline \end{array}$$

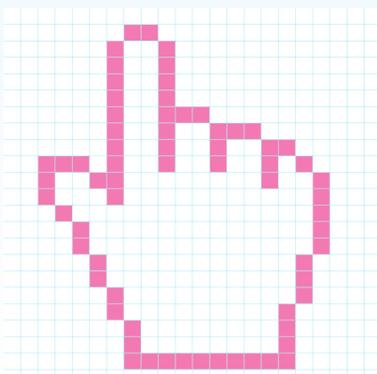
8. 
$$\begin{array}{r} 227 \\ -22 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 286 \\ -15 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 246 \\ -22 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 138 \\ -26 \\ \hline \end{array}$$

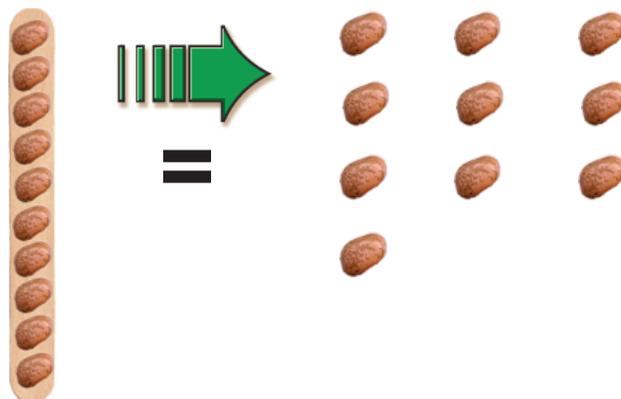
12. 
$$\begin{array}{r} 448 \\ -30 \\ \hline \end{array}$$



## Two-Place Subtraction

(with regrouping)

Use the Base Ten Blocks Playground to learn about regrouping. To exchange a tens block to ones block drag a tens block to the ones column.



Find the sum.

1.

$$\begin{array}{r} 75 \\ -38 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 55 \\ -38 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 23 \\ -19 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 33 \\ -18 \\ \hline \end{array}$$

5.

$$\begin{array}{r} 39 \\ -14 \\ \hline \end{array}$$

6.

$$\begin{array}{r} 75 \\ -28 \\ \hline \end{array}$$

7.

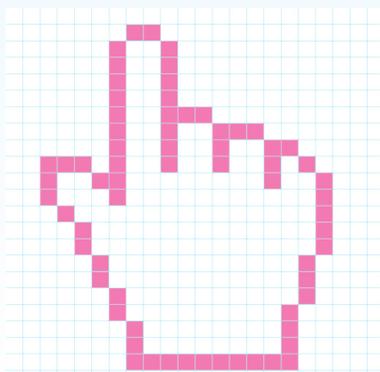
$$\begin{array}{r} 90 \\ -45 \\ \hline \end{array}$$

8.

$$\begin{array}{r} 57 \\ -29 \\ \hline \end{array}$$

9.

$$\begin{array}{r} 25 \\ -18 \\ \hline \end{array}$$



# Three-Place Subtraction

(with regrouping)

Use the Bean Sticks Playground to find the difference.

Find the difference.

1. 
$$\begin{array}{r} 183 \\ -49 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 229 \\ -59 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 206 \\ -48 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 475 \\ -37 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 168 \\ -59 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 223 \\ -42 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 334 \\ -69 \\ \hline \end{array}$$

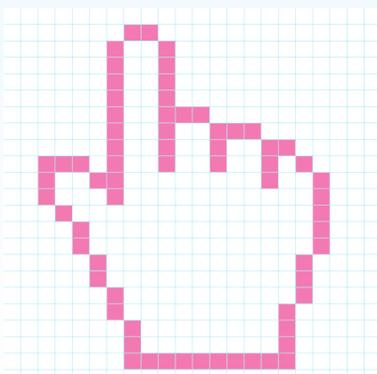
8. 
$$\begin{array}{r} 320 \\ -25 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 185 \\ -99 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 345 \\ -29 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 127 \\ -46 \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 210 \\ -29 \\ \hline \end{array}$$



# Hands-On Math: Bean Sticks

Ventura Educational Systems

