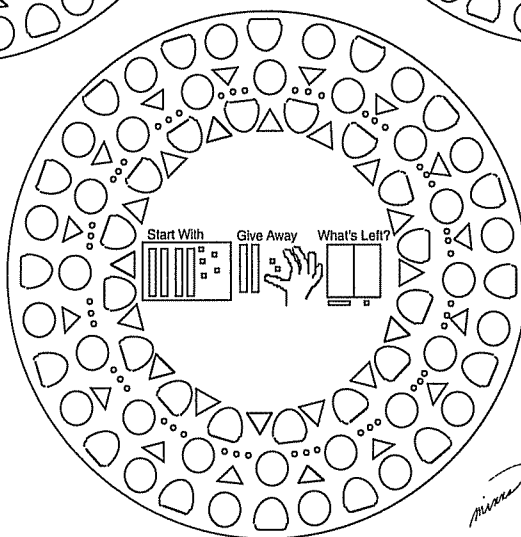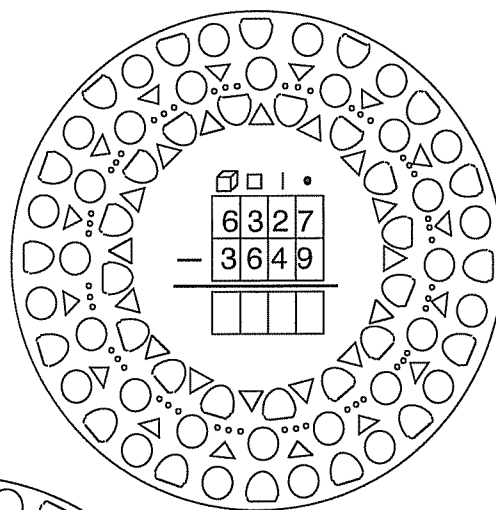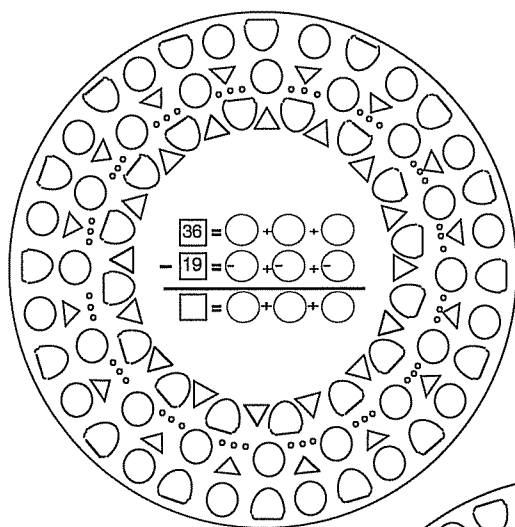# Patterns in Arithmetic
Subtraction Placement PDF
Parent/Teacher Guide

Booklet 3 - General Principles of Regrouping (Borrowing)
Booklet 4 - Large Numbers and Practice
Base Ten Subtraction - Chrysalis Charter School

$$36 = \bigcirc + \bigcirc + \bigcirc$$
$$- 19 = \bigcirc + \bigcirc + \bigcirc$$
$$\square = \bigcirc + \bigcirc + \bigcirc$$

$$\begin{array}{r} 6327 \\ - 3649 \\ \hline \end{array}$$

Start With   Give Away   What's Left?

By Alysia Krafel, Susan Carpenter, and Suki Glenn

Based on methods developed by Prof. Michael Butler at the
UCI Farm Elementary School
University of California, Irvine

Beginning subtraction is found in *Patterns in Arithmetic: Book 1 and Book 2* which covers the curriculum for six to seven-year-old students (first and second grades). These composite books teach basic concepts and number sentences for addition and subtraction. Book 2 teaches the principles of regrouping (carrying) in addition.

Designed for seven to nine-year-old students (third grade) who have never had formal instruction. in regrouping (borrowing) in subtraction.
Prerequisite: knowing regrouping (carrying) in addition
This booklet:
- uses manipulatives for concept development.
- teaches several strategies for doing subtraction with multiple methods of breaking up.
- teaches larger numbers and regrouping them for subtraction.
- teaches the standard procedure in expanded and short notation formats.
- generally results in strong understanding of regrouping.

Designed for eight to ten-year-old students (fourth grade) who have had formal instruction in regrouping in subtraction..
Prerequisite: Booklet 3 - Subtraction or previous instruction in regrouping
This booklet:
- reviews and teaches regrouping of larger numbers.
- reinforces the mechanics of standard Base Ten subtraction.
- provides practice to develop fluency.

Designed for seven to ten-year-old students (third and fourth grade) who have never had formal instruction in regrouping (borrowing) in subtraction or those who need reteaching..
Prerequisite: knowing regrouping (carrying) in addition
This booklet:
- is an alternative to Subtraction: Booklet 3.
- is easier and uses only Base Ten regrouping in the format that many people were taught
- is used for slower learners or special education students, or students who need basic reteaching, or for students for whom Subtraction: Booklet 3 is too difficult.

Subtraction: Booklet 3 Placement Assessment Guide

Purpose The purpose of this guide is to assess the fundamental knowledge necessary for success in *Patterns in Arithmetic:* Subtraction - Booklet 3. Assessment: Part 1 is a review of problems from previous books. Assessment: Part 2 is a preview of the new material presented in this booklet and is used to set the baseline for what the student already knows at the beginning of instruction.

Prerequisites The ability to find answers to basic subtraction problems with numbers up to twenty and *Patterns in Arithmetic: Book 2*, the Circle Subtraction Section is preferred but not absolutely necessary.

Materials Assessment: Part 1, page 6; Assessment: Part 2, pages 7 and 8
Score sheets, pages 4 and 5

Instructions Instruct the student to attempt all the problems. If he does not know how to do a problem, he should put a question mark by it. This will let you know he looked at the item and decided he could not do it. It is acceptable to read the items to a student. We are assessing math, not reading. Do not explain any items to him. If he does not know what the question means, tell him to put a question mark on that item.

Assessment Guide This Assessment Guide explains what concept each item on the test is assessing. The item numbers match the item numbers on the student test page. The title of the lesson and booklet number tell you where the concept is taught. In the Assessment Guide, under each lesson title are several assessment criteria. Each criterion is labeled with capital letters 'A,' 'B,' etc. These criteria tell you what to look for in the student work. On the student test, sometimes multiple problems are used to test a concept. These multiple problems are labeled with small letters 'a,' 'b,' etc. Score sheets that match the Assessment Guide for both Assessment: Part 1 and Part 2 follow.

Assessment Criteria for Assessment: Part 1
Can the student:
1. Circle Math Review
    A student new to this program will get A correct but probably not B or C. The teacher guide gives instructions for how to teach this concept using the material in Subtraction: Booklet 3 - Circle Math Subtraction: Review. Most students learn this concept easily. It is not necessary for you to obtain *Patterns in Arithmetic: Book 2* to teach your student this concept.
    A. get the correct answer in the box?
    B. break up the numbers into the circles correctly?
    C. perform the little subtraction problems in the circles and sum for the result?

2. Circle Math Review
    The student is asked to do a single problem three different ways by breaking up the numbers in different combinations. The answer should always come out the

same. Take note if the student uses a standard regrouping procedure. If the student can do D but not C, there is a good chance he does not understand the place value of regrouping.

  A. get the correct answer?
  B. do the problems three different ways?
  C. use a standard tens and ones breaking up as one of the ways?
  D. use a standard regrouping of tens strategy?

3. Fixing Problems

Can the student locate errors? Sometimes errors happen in breaking up the numbers. Sometimes the top number is less than the bottom number. A common error is the student will take the difference between the two numbers, which will result in an incorrect answer. There are several ways to work with a top number less than the bottom one. The standard way to deal with this problem is to move a ten from the first circle in the top row to the second circle in the top row to increase the size of the second number. You can actually regroup with a five or a two also. There is nothing unique about ten except it makes record keeping easier. Many students will take only what is needed to zero out the column. Another way to deal with it is to use a negative number. 1 - 7 is -6. This negative number can then be subtracted when the answers to the little subtractions are summed (See IOUs). A student may also rearrange the numbers to subtract without regrouping at all. All of these strategies work.

  A. locate the errors in the calculations by circling them?
  B. fix the mistakes to produce a correct final result?
  C. deal effectively with a larger number on the bottom than on the top? Make a note of which strategies he uses.

4. Difference Between

Difference Between is a common form that shows up in word problems. Questions that ask, "How many more?" are working with this concept.

  A. use a picture to determine how many more balloons?
  B. write the number sentence to go with the balloon picture?
  C. get the correct answer on both the problems with no picture?
  D. put in the correct number sentence for both the problems with no picture?

5. Difference Between Patterns

These kinds of problems are used to detect patterns in strings of numbers.

  A. fill in the correct numbers?

Assessment Criteria for Assessment: Part 2

1. Discovering Easier Ways

One of the early discoveries children make about breaking up numbers is that some ways are easier than others. Using multiples of ten is one of those ways. Having the top and bottom numbers match, which zeros out a column, is another way. We want students to learn that the standard way is *a* way, not *the* way.

  A. break up the two problems differently?
  B. use factors of ten to make the break up easier? E.g., $56 = 30 + 10 + 16$
  C. avoid creating situations where regrouping is needed?
  D. get correct matching answers?

2. Nonstandard Regrouping

This is related to the discussion in Fixing Problems, Item C in Part 1. There are hundreds of ways to

do a subtraction problem.
  A. show that the answer to each problem is the same?
  B. get all the answers in the squares correct?
  C. solve each problem differently (instead of just copying the answers)?
There are no scores on the items below; just make a note about strategies.
  D. regroup any problem by moving a ten?
  E. use a negative number (an IOU) in any problem?
  F. zero out a column so that the number in the circle below the line is 0?

3. Covering
This is a variation of Difference Between in Part 1 with larger numbers. The student should use Base Ten Blocks. Have him build the given number. Then he should put the covering number on top of the one hundred flat (barge).
  A. understand how to manipulate the blocks to do a covering problem?
  B. get the correct answer to problem a?
  C. get the correct answer to problem b?

4. Standard Regrouping Manipulative
Sometimes you will find a student who can do the problems but not be able to show regrouping with the blocks. This is an indication of lack of understanding of the regrouping process. Some students do not know they are regrouping a ten, thinking it is a one.
  A. use the blocks to show how the answer to problem a is obtained?
  B. use the blocks to show how the answer to problem b is obtained?
  C. show the correct answer in the written problems?

5. Standard Regrouping: Short Way
These are two digit problems. The student is asked to do the problems both the standard expanded way and the short way. The first problem is 50 - 32. It is shown in both formats. In the standard expanded way, the fifty must be crossed off and a forty written above it, not a four. The student must demonstrate that he knows the number being regrouped is a ten. In the short notation, the five is crossed off and replaced by a four. In both cases a one is placed in front of the zero. It is possible for a student to not know that a ten is moving into the ones place. Many think it is a one. We want to be sure he can do the problems using the standard procedure but at the same time understand the place value of the numbers being regrouped.
  A. get the correct answers to both problems?
  B. use the standard expansion correctly showing the real place value of the number being moved from the tens place to the ones place?

6. Three Digits Regrouping: Manipulative
  A. use the blocks to show how the answer to problem a is obtained?
  B. get the correct answer to problem a?
  C. use the blocks to show how the answer to problem b is obtained?
  D. get the correct answer to problem b?

7. Three Digits Regrouping: Recording
  A. get the correct answers to both problems?
  B. use the standard expansion correctly showing the real place value of the number being regrouped?

Assessment Score Sheet: Part 1   Name _____ Date _____

Can the student:

1. Circle Math Review
        Yes   No   A. get the correct answer in the box?
        Yes   No   B. break up the numbers into the circles correctly?
        Yes   No   C. perform the little subtraction problems in the circles and sum for the result?

2. Circle Math Review
        Yes   No   A. get the correct answer?
        Yes   No   B. do the problems three different ways?
Note which strategies are present. Tens and Ones?   Standard Regrouping?

3. Fixing Problems
        Yes   No   A. locate the errors in the calculations by circling them?
        Yes   No   B. fix the mistakes to produce a correct final answer?
        Yes   No   C. deal effectively with a larger number on the bottom than on the top?
                             Make a note of which strategies he uses.

4. Difference Between
        Yes   No   A. use a picture to determine how many more balloons?
        Yes   No   B. write the number sentence to go with the balloon picture?
        Yes   No   C. get the correct answer on both the problems with no picture?
        Yes   No   D. put in the correct number sentence for both the problems with no picture?

5. Difference Between Patterns
        Yes   No   A. fill in the correct numbers?

Items Correct =   _____   = _____%
        Items Possible =   13

Note: A student new to this program will need more instruction with lessons Circle Math Subtraction:
Review and Fixing Problems and additional practice using this method of subtraction.

Can the student:

1. Discovering Easier Ways (of breaking up)

Yes   No   A. break up the two problems differently?

Yes   No   B. use factors of ten to make the break up easier? E.g., 56 = 30 + 10 + 16

Yes   No   C. avoid creating situations where regrouping is needed?

Yes   No   D. get correct matching answers?

2. Nonstandard Regrouping

Yes   No   A. show that the answer to each problem is the same?

Yes   No   B. get all the answers in the squares correct?

Yes   No   C. solve each problem differently (instead of just copying the answers)?

                                                 D. regroup a problem by moving a ten?

                                                 E. use a negative number (an IOU) in any problem?

                                                 F. zero out a column so that the number in the circle below the line is 0?

3. Covering as a Strategy

Yes   No   A. understand how to manipulate the blocks to do a covering problem?

Yes   No   B. get the correct answer to both problems?

4. Standard Regrouping: Manipulative

Yes   No   A. use the blocks to show how the answer to problem a is obtained?

Yes   No   B. use the blocks to show how the answer to problem b is obtained?

Yes   No   C. show the correct answer in the written problems?

5. Standard Regrouping: Short Way

Yes   No   A. get the correct answers to both problems?

Yes   No   B. correctly use the standard expansion showing the real place value of the number being moved from the tens place to the ones place?

6. Three Digits Regrouping: Manipulative

Yes   No   A. use the blocks to show how the answer to problem a is obtained?

Yes   No   B. get the correct answer to problem a?

Yes   No   C. use the blocks to show how the answer to problem b is obtained?

Yes   No   D. get the correct answer to problem b?

7. Three Digits Regrouping: Recording

Yes   No   A. get the correct answers to both problems?

Yes   No   B. correctly use the standard expansion showing the real place value of the number being regrouped?

Items Correct = _____ = _____%

Items Possible =   20

Put a question mark next to any problem you do not know how to do.

1. Solve.   a.   b.

$\boxed{15}$ = ◯+◯+◯ $\boxed{14}$ = ◯+◯+◯

−$\boxed{12}$ = (-◯)+(-◯)+(-◯)   −$\boxed{7}$ = (-◯)+(-◯)+(-◯)

$\boxed{}$ = ◯+◯+◯ $\boxed{}$ = ◯+◯+◯

2. Solve each problem a different way.

a. $\boxed{26}$ = ◯+◯   b. $\boxed{26}$ = ◯+◯   c. $\boxed{26}$ = ◯+◯

−$\boxed{17}$ = (-◯)+(-◯)   −$\boxed{17}$ = (-◯)+(-◯)   −$\boxed{17}$ = (-◯)+(-◯)

$\boxed{}$ = ◯+◯ $\boxed{}$ = ◯+◯ $\boxed{}$ = ◯+◯

3. Find the mistakes. Circle them with a red pencil.

a.   b.

$\boxed{21}$ = ⑯+⑫+③ $\boxed{21}$ = ⑳+①

−$\boxed{9}$ = (-②)+(-⑥)+(-①)   −$\boxed{9}$ = (-②)+(-⑦)

$\boxed{}$ = ◯+◯+◯ $\boxed{24}$ = ⑱+⑥

4. a. Who has more balloons? _____
      How many more? _____
      Number sentence _____

      Jackie   Joseph
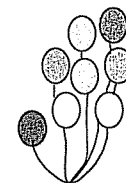
   b. How many more is 18 than 7? _____
      Number sentence _____

   c. How many more is 60 than 40? _____
      Number sentence _____

5. Fill in the missing numbers. The difference between each number is _____.

__0__ , ____ , __8__ , ____ , ____ , ____
     ∨   ∨   ∨   ∨   ∨
     4   4   4   4   4

1. Solve each problem a different way.

a.
$$62 = \bigcirc + \bigcirc + \bigcirc$$
$$-\ 37 = (-\ \ ) + (-\ \ ) + (-\ \ )$$
$$\square = \bigcirc + \bigcirc + \bigcirc$$

b.
$$62 = \bigcirc + \bigcirc + \bigcirc$$
$$-\ 37 = (-\ \ ) + (-\ \ ) + (-\ \ )$$
$$\square = \bigcirc + \bigcirc + \bigcirc$$

2. Solve each problem a different way.

a.
$$35 = (15) + (15) + (5)$$
$$-\ 28 = (-10) + (-10) + (-8)$$
$$\square = \bigcirc + \bigcirc + \bigcirc$$

b.
$$35 = (15) + (15) + (5)$$
$$-\ 28 = (-10) + (-10) + (-8)$$
$$\square = \bigcirc + \bigcirc + \bigcirc$$

c.
$$35 = (10) + (10) + (10) + (5)$$
$$-\ 28 = (-10) + (-10) + (-6) + (-2)$$
$$\square = \bigcirc + \bigcirc + \bigcirc + \bigcirc$$

d.
$$35 = (30) + (5)$$
$$-\ 28 = (-20) + (-8)$$
$$\square = \bigcirc + \bigcirc$$

Take out Base Ten Blocks. You may use them for any problem from here to the end of the test.

3. a. Take out a 100 flat. Cover it with 43.
   How much is not covered? _____

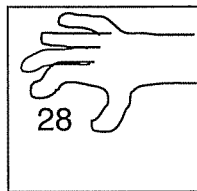   b. Build 132. Cover it with 67.
   How much is not covered? _____

4. Use Base Ten Blocks to solve the problems.   Draw the answer.   Write the problem shown by the picture.
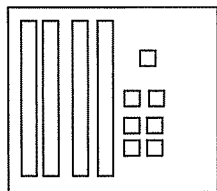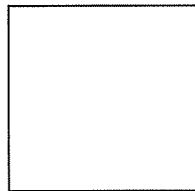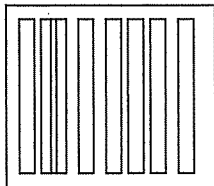
a.   Start With   Take Away   What's Left?
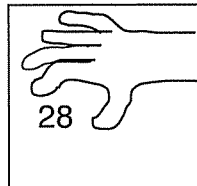
=

Example:

$$\begin{array}{r} 47 \\ -\ 28 \\ \hline \end{array}$$
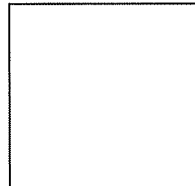
b.   Start With   Take Away   What's Left?

=

Now, you write the problem and solve it.

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

5. Solve each problem two ways. First do it the expanded way.
   Then do it the short way.

   a. Expanded way   Short way   b.   Expanded way   Short way

$\boxed{50}$ = (50) + $(\ 0\ )$ 50 $\boxed{86}$ = (80) + $(\ 6\ )$ 86

− $\boxed{32}$ = (30) + $(-\ 2)$ − 32   − $\boxed{39}$ = (30) + $(-\ 9)$ − 39

____ = ____ + ____   ____   ____ = ____ + ____   ____
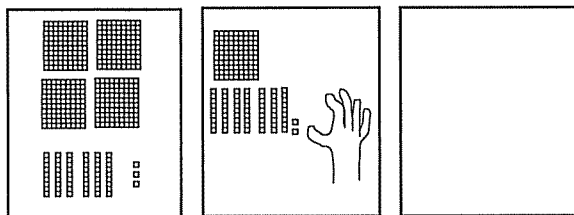   tens   ones   tens   ones

6. Use Base Ten Blocks to solve these problems.
   Draw the answer in the What's Left? box.

	Start With	Take Away	What's Left?		Start With	Take Away	What's Left?
a.				b.			

7. Solve each problem. Record the expanded way and the short way.
   a. Expanded way   Short way

$\boxed{347}$ = $\bigcirc$ + $\bigcirc$ + $\bigcirc$ 347

− $\boxed{156}$ = $(-\ \ )$ + $(-\ \ )$ + $(-\ \ )$ − 156

$\square$ = $\bigcirc$ + $\bigcirc$ + $\bigcirc$
     hundreds   tens   ones

   b.   Expanded way   Short way

$\boxed{435}$ = $\bigcirc$ + $\bigcirc$ + $\bigcirc$ 435

− $\boxed{279}$ = $(-\ \ )$ + $(-\ \ )$ + $(-\ \ )$ − 279

$\square$ = $\bigcirc$ + $\bigcirc$ + $\bigcirc$
     hundreds   tens   ones

Subtraction: Booklet 4 Placement Assessment Guide

Purpose   The purpose of this guide is to assess the fundamental knowledge necessary for success in this booklet. This assessment assumes one year of work in regrouping with two digit problems with understanding. Most students will be just beginning the fourth grade year and will need more work to master regrouping with understanding and be able to operate with two and three digit regrouping and zeros.

Assessment: Part 1 is review material from the last booklet and is used to determine student readiness for this booklet. Assessment: Part 2 is a preview of the new material presented in this booklet and is used to set the baseline for what the student already knows at the beginning of instruction.

Prerequisites   *Patterns in Arithmetic: Book 2* - Subtraction section and Subtraction: Booklet 3

Materials   Assessment: Part 1, page 15, and Assessment: Part 2, page 16
Score sheets, pages 13 and 14
Base Ten Blocks

Instructions   Instruct the student to attempt all the problems. If he does not know how to do a problem, he should put a question mark by it. This will let you know he looked at the item and decided he could not do it.

Do the assessment in two parts. Give Assessment: Part 1 and check it for readiness for this booklet. If he is not ready for this booklet, there is no point in giving Assessment: Part 2. If he passes all the readiness items, then give Assessment: Part 2.

After scoring Assessment: Part 2, use the Booklet Selection Guide to determine the correct booklet for your student based on the results of the assessment.

Assessment Guide   This Assessment Guide explains what concept each item on the test is assessing. The item numbers match the item numbers on the student test page. The title of the lesson and booklet number tell you where the concept is taught. In the Assessment Guide, under each lesson title are several assessment criteria. Each criterion labeled with capital letters 'A,' 'B,' etc., identifies what to look for in the student work and what concept the item is assessing. On the student test, sometimes multiple problems are used to test a concept. These multiple problems are labeled with small letters 'a,' 'b,' etc. Score sheets that match the Assessment Guide for both Assessment: Part 1 and Part 2 follow.

Assessment Criteria for Assessment: Part 1
Can the student:
1. Word Problems   (*Patterns in Arithmetic: Book 2* - Subtraction section, Subtraction: Booklet 3)
      A. solve simple subtraction word problem (a) with no regrouping required?

B. solve a subtraction word problem that requires a single regrouping (b)?

C. write correctly the number sentence for one out of two of the problems?

2. Nonstandard Regrouping and IOUs (Subtraction: Booklet 3)

It is unlikely that any student who has not worked in *Patterns in Arithmetic* and completed Subtraction: Booklet 3 will know what to do with the circles shown in these problems. He may be able to do the short, standard notation in the box. In nonstandard subtraction (which is the general case of how subtraction is performed), the numbers can be broken up into any set of numbers as long as the sum is equal to the number on the left in the box. He can break up the number any way he wishes in Set 3 and use any number he wishes to regroup in Sets 1 and 2. It does not have to be a ten, although most students use those at this point. See the Answer Key for all the variations that are possible.

A. write the correct answers in the boxes in two of the three sets using any method?

B. write the same answer in boxes a as in box b in all the sets?

C. use a number other than ten to regroup in any of the problems?

D. regroup any number from the 50 in Set 2 to avoid creating a regrouping situation with the ten in the center circle? (See the Answer Key for a sample solution.)

E. use a negative number for subtraction to get at least one of the correct solutions?

F. break up the numbers in Set 3 two different ways?

3. Standard Regrouping (Subtraction: Booklet 3)

Again, not all students will know what to do with the numbers in the circles.

A. solve correctly two of the three problems using the short, standard notation? The short notation is the standard way we all do subtraction.

B. use correctly the base ten expanded notation in the circles in two of three problems?

We are looking to see if he can use the expanded form and show the correct place value of the numbers being regrouped. In the first problem, he should cross off the 40 and write 30 above it. He should then write 10 over the 7 or put a 1 in front of the 7 to receive a Yes on this criterion.

Booklet Selection Guide based on results of Assessment: Part 1

- If the student receives a No on criterion 1A or 1C, do the Subtraction section in *Patterns in Arithmetic: Book 2*. Do not give Assessment: Part 2.

- If the student receives a Yes on criteria 1A and 1C but a No on criteria 1B, 2A, and 3A, begin with Subtraction: Booklet 3 or Base Ten Subtraction. Do not give Assessment: Part 2.

Subtraction: Booklet 3 teaches the general principles of expanding numbers and of using multiple methods to find solutions to subtraction problems. This booklet is a good choice for average and above-average students.

Or consider *Chrysalis Charter School: Base Ten Subtraction*, which uses only the base ten, standard way to break up numbers and teaches only a single method to solve subtraction problems. This booklet is intended for students who have learned standard subtraction but do not understand the place value or need review of the procedure. It is also a good choice for students who have difficulty with math in general.

- If the student did do *Patterns in Arithmetic: Subtraction - Booklet 3* and receives a Yes on criteria 1A, 1B, 1C, 2A, 3A, and 3B and a No on several of the problem 2 criteria, proceed with Assessment: Part 2 of this assessment and begin Subtraction: Booklet 4, paying particular attention to the review

sections on general subtraction (breaking up in different ways and using negative numbers). Note: Some students get confused with negative numbers and cannot get the place value implications of using this strategy. Do not allow them to use this strategy if this happens. Not everyone is ready for negative numbers at this age.

- If the student did not do *Patterns in Arithmetic*: Subtraction: Booklet 3 and receives a Yes on criteria 1A, 1B, 1C, 2A, 3A, and 3B but No on the remainder criterion of problem 2, proceed with Assessment: Part 2 and begin Subtraction: Booklet 4. If you have time and a bright student, do Subtraction: Booklet 3 to create a firm understanding of the general process of subtraction and the ability to use multiple methods to find solutions. This choice may not be right for you; it is optional.

- If the student did do *Patterns in Arithmetic*: Subtraction - Booklet 3 and receives a Yes on criteria 1A, 1B, 1C, 2A, 3A, and 3B and a Yes on several of the criteria in problem 2, proceed with Assessment: Part 2, begin Subtraction: Booklet 4, and pat yourself and your student on the back for a job well done!

Assessment Criteria for Assessment: Part 2
Can the student:
1. Standard Regrouping - with a drawing or blocks (Subtraction: Booklet 4)
If you are working with a single student and you wish to use Base Ten Blocks instead of a drawing to check understanding of regrouping, you may do this. You are checking to see if the student understands the place value of the numbers he is regrouping rather than simply using a memorized short notation without understanding. Direct his attention to the example problem, but do not explain how to do it. Note: Most students will naturally start in the hundreds place and work backwards. Allow them to do this.

    A. demonstrate understanding with a drawing or with blocks how regrouping from the hundreds place works in both problems? In other words, does he cross off a one hundred square and show the trade of the one hundred for ten tens by drawing ten lines in the tens row?

    B. demonstrate understanding with a drawing or blocks how regrouping from the tens place works in both problems? Crosses off a ten and draws in ten ones in the ones row?

    C. get the correct answer on both problems?

2. Standard Subtraction: Three Digits with Recording (Subtraction: Booklet 4) See the Answer Key for the correct formats for each problem.

    A. write the correct expanded numbers in the circles for all numbers above the line in all three problems?

    B. show the correct place value of the numbers being regrouped in problem a, which involves a single regroup from the tens place?

    C. show the correct place value of the numbers being regrouped in problem b, which involves a double regroup from both the tens and hundreds places?

    D. show the correct place value of the numbers being regrouped in problem c, which involves a double regroup from the tens place and the hundreds place over a zero?

    E. correctly use the short form notation on two of the three problems?

    F. write the correct answer on two of the three problems?

3. Regrouping Practice (Subtraction: Booklet 4)

A. obtain the correct answer on problem a using the short notation?
B. regroup correctly over one zero in problem b?
C. regroup correctly over four zeros in problem c?

4. Word Problems (Subtraction: Booklet 4)
   A. write the correct number sentence in two of the three problems?
   B. obtain the correct answer for two of the three problems?
   C. identify two of these three phrases: 'What's Left?'; 'how much more?' 'shorter than'?

Booklet Selection Guide based on results of Assessment: Part 2
If the student scores 12 Yes marks on Assessment: Part 2, he does not need to work in this booklet except for practice if needed. Remediate any areas where he scored a No and move on.
If he scores between 9 and 11 Yes marks, do only the sections that apply to his No marks.
Any score of 8 or below indicates this booklet is appropriate.

Assessment: Part 1 Score Sheet   Name _____ Date _____

Can the student:

1. Word Problems (*Patterns in Arithmetic: Book 2*, Subtraction: Booklet 3)
   Yes No A. solve a simple subtraction word problem (a) with no regrouping?
   Yes No B. solve a subtraction word problem that requires a single regrouping?
   Yes No C. write correctly one of the two number sentences?

2. Nonstandard Regrouping and IOUs (Subtraction: Booklet 3)
   Yes No A. write the correct answers in two of the three sets?
   Yes No B. write the same answer in box a as in box b in all the sets?
   Yes No C. use a number other than ten to regroup in any of the problems?
   Yes No D. regroup any number from the 50 in Set 2?
   Yes No E. know how to use a negative number for subtraction?
   Yes No F. break up the numbers in Set 3 two different ways?

3. Standard Regrouping (Subtraction: Booklet 3)
   Yes No A. solve correctly two of the three problems using the short notation?
   Yes No B. use correctly the expanded notation in two of three problems?

A % score is not used in this assessment. Place the student according to the criteria of Yes and No discussed in the Booklet Selection Guide

Assessment: Part 2 Score Sheet   Name _____   Date _____

Can the student:

1. Standard Regrouping - with a drawing or blocks (Subtraction: Booklet 4)
  Yes No A. demonstrate understanding of regrouping from the hundreds place in both problems?
  Yes No B. demonstrate understanding of how regrouping from the tens place works? Crosses off a ten and draws in ten ones in the ones row in both problems?
  Yes No C. get the correct answer on both problems?

2. Standard Subtraction: Three Digits with Recording (Subtraction: Booklet 4) See the Answer Key for the correct formats for each problem.
  Yes No A. write the correct expanded numbers into the circles for all numbers above the line in all three problems?
  Yes No B. show the correct place value of the numbers being regrouped in problem a, which involves a single regroup from the tens place?
  Yes No C. show the correct place value of the numbers being regrouped in problem b, which involves a double regroup from both the tens and hundreds place?
  Yes No D. show the correct place value of the numbers being regrouped in problem c, which involves a double regroup from the tens place, and the hundreds place over a zero?
  Yes No E. use the standard short form notation on two of the three problems?
  Yes No F. write the correct answer on two of the three problems?

3. Regrouping Practice (working with large numbers and zeros)
  Yes No A. obtain the correct answer on problem a using the short notation?
  Yes No B. regroup correctly over one zero in problem b?
  Yes No C. regroup correctly over four zeros in problem c?

4. Word Problems (Subtraction: Booklet 4)
  Yes No A. write the correct number sentence in two of the three problems?
  Yes No B. obtain the correct answer for two of the three problems?
  Yes No C. identify two of these three phrases, 'What's left?'; 'How much more?'; 'Shorter than'?

Number of Yes scores _____ = _____%
Number Possible   15

Put a question mark next to any problem you do not know how to do.

1. a. There are 68 rabbits at the petting zoo; 46 have already gotten carrots for break-
        fast. How many rabbits have not gotten their carrots yet? _____
        Write the number sentence. _____

    b. Chuck laid out 653 feet of track for his train. Dave's track is 137 feet shorter than
        Chuck's. How long is Dave's train track? _____
        Write the number sentence. _____

2. Solve each problem a different way.

Set 1   a.
$$53 = (30) + (20) + (3)$$
$$-\ 36 = (-20) + (-10) + (-6)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

b.
$$53 = (30) + (20) + (3)$$
$$-\ 36 = (-20) + (-10) + (-6)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

Set 2   a.
$$68 = (50) + (10) + (8)$$
$$-\ 29 = (-10) + (-10) + (-9)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

b.
$$68 = (50) + (10) + (8)$$
$$-\ 29 = (-10) + (-10) + (-9)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

Set 3   a.
$$74 = \bigcirc + \bigcirc + \bigcirc$$
$$-\ 37 = (-) + (-) + (-)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

b.
$$74 = \bigcirc + \bigcirc + \bigcirc$$
$$-\ 37 = (-) + (-) + (-)$$
$$\boxed{\ } = \bigcirc + \bigcirc + \bigcirc$$

3. Solve all three problems both the expanded way and the short way.

Short way   Expanded way

a.
$$47 = (40) + (7)$$
$$-\ 27 = (-20) + (-7)$$
$$\boxed{\ } = \bigcirc + \bigcirc$$

b.
$$64 = \bigcirc + \bigcirc$$
$$-\ 29 = (-) + (-)$$
$$\boxed{\ } = \bigcirc + \bigcirc$$

c.
$$56 = \bigcirc + \bigcirc$$
$$-\ 38 = (-) + (-)$$
$$\boxed{\ } = \bigcirc + \bigcirc$$

Assessment - Part 2   Name _____ Date _____

1. Draw the Start With number for each problem.
   Cross out the blocks being traded.
   On your drawing, Circle the Take Away number.
   Record the What's Left? number.

Example:		
Start With	245	
Take Away	− 168	
What's Left?	77	

Draw the blocks.

a. Start With   262
   Take Away   −   95
   What's Left? _____

Draw the blocks.

b. Start With   352
   Take Away   −   186
   What's Left? _____

2. Show both the expanded way and the short way of doing each problem.

a. ◯ + ◯ + ◯ = 234
   − ◯ + ◯ + ◯ = −128
   _____
   ◯ + ◯ + ◯ =

b. ◯ + ◯ + ◯ = 256
   − ◯ + ◯ + ◯ = − 96
   _____
   ◯ + ◯ + ◯ =

c. ◯ + ◯ + ◯ = 206
   − ◯ + ◯ + ◯ = − 99
   _____
   ◯ + ◯ + ◯ =

3. Build and subtract. Draw pictures and trade if necessary.

a.
6	3	2	7
− 3	6	4	9

b.
7	0	2	4
− 1	7	6	7

c.
6	0	0	0	0
− 1	7	6	7	4

4. a. Ramon had 547 CDs in his collection. He sold 429 on Amazon.com. How many
      CDs does he have left? _____
      Write the number sentence. _____

   b. In the fall Neva planted 74 camellia bushes. There are now 108 camellia bushes.
      How many bushes were there before? _____
      Write the number sentence. _____

   c. Samuel laid out 550 feet of track for his slot cars. Ava's track is 75 feet shorter than
      Samuel's. How long is Ava's track? _____
      Write the number sentence. _____

5. What phrases in these word problems tell you they are subtraction problems?

   _____

   _____

Base Ten Subtraction Placement Assessment Guide

Purpose   The purpose of this guide is to assess the fundamental knowledge necessary for success in this booklet. Assessment: Part 1 is review material from the last booklet. Assessment: Part 2 is a preview of the new material presented in this booklet and is used to set the baseline for what the student already knows at the beginning of instruction.

Prerequisites   *Patterns in Arithmetic: Books 1 and 2, Patterns in Arithmetic*: Addition - Booklet 3, or instruction in addition and subtraction number sentences, addition with re-grouping (carrying)

Materials   An *Amelia Bedelia* storybook–any one will do
Base Ten Subtraction - Assessment - Worksheets 1 and 2, pages 2 and 3 in the Student Workbook and pages 1 and 2 in the Parent/Teacher Guide
Score sheets
Base Ten Blocks

Instructions   Before giving the written assessment, read an Amelia Bedelia story to the student. If he does not get the jokes and understand why Amelia is doing the wrong thing, he may not be ready for regrouping conceptually. To understand an Amelia Bedelia joke, he must see that two words that look the same have different meanings and that the joke is that Amelia takes the wrong meaning, that two things that are different can look the same. Regrouping requires understanding that two things can be the same thing but look different, a similar conceptual construct. In order to re-group, he must see that 40 + 12 is the same quantity as 50 + 2 even though it looks different. So Amelia books are a rough way to measure this conceptual milestone. For the written test, instruct the student to attempt all the problems. If he does not know how to do a problem, he should put a question mark by it. This will let you know he looked at the item and decided he could not do it.

It is acceptable to read the items to a student. We are assessing math, not reading. Do not explain any items to him. If he does not know what the question means, tell him to put a question mark on that item.

Do the assessment in two parts. Give Assessment: Part 1 and check it for readiness for this booklet. The answers are in the Answer Key. If the student is not ready for this booklet, there is no point in giving Assessment: Part 2. If he passes all the readiness items, then give Assessment: Part 2.

In Assessment: Part 2, the problems on the first worksheet are meant to be solved with the blocks. When he begins Assessment: Worksheet 2, remove the blocks and ask him to use drawings to solve the problems. On Worksheet 3, he should use no drawings or blocks and solve the problems using only abstract thinking. After scoring Assessment: Part 2, use the Booklet Selection Guide to determine the correct booklet for your student based on the results of the assessment.

This Assessment Guide explains what concept each item on the test is assessing. The item numbers match the item numbers on the student test page. The title of the lesson and booklet number tell you where the concept is taught. In the Assessment Guide, under each lesson title are several assessment criteria. Each criterion is labeled with capital letters 'A,' 'B,' etc. These criteria tell you what to look for in the student work. On the student test, sometimes multiple problems are used to test a concept. These multiple problems are labeled with small letters 'a,' 'b,' etc. Score sheets that match the Assessment Guide for both Assessment: Part 1 and Part 2 follow.

Assessment Criteria for Assessment: Part 1
Can the student:
1. Value of Base Ten Blocks with the actual blocks (*Patterns in Arithmetic*: *Books 1 and 2*)
> A. identify the rod as being ten?
> B. identify the flat as being one hundred?

2. Value of Base Ten Blocks shown as drawings (*Patterns in Arithmetic: Books 1 and 2*)
> A. identify the rod shape as being ten?
> B. identify the flat shape as being one hundred?

3. Write a number from a drawing (*Patterns in Arithmetic: Book 1*)
> A. use numerals in the correct place value to write the number being shown in the picture?

4. Say the name of a number from a drawing (*Patterns in Arithmetic: Book 1*)
> A. write in words the name of the number? Spelling does not count and should not be counted against the student.

5. Add two numbers shown as drawings without regrouping (*Patterns in Arithmetic: Book 1*)
> A. give the correct sum from the picture? May have written the answer as a number.

6. Add two numbers shown as drawings with regrouping (*Patterns in Arithmetic: Book 2*)
> A. give the correct answer from the picture? Give a Yes on this if the student writes the number but does not draw a picture.
> B. demonstrate understanding of regrouping with the picture?
> You are looking for some kind of looping of ten ones blocks to form a ten, which is then moved, or added, to the tens place. It could be a loop and an arrow, or an x and a tens block drawn in.

7. Add two numbers with regrouping (*Patterns in Arithmetic: Book 2*)
> A. write the correct answer in numbers?
> B. show a correct picture of the sum?
> C. draw the ten carried into the tens place from the regrouped ones?

8. Subtract two numbers without regrouping (*Patterns in Arithmetic: Book 2*)
   - A. get the correct written answer?
   - B. show the Give Away in the drawing with a loop or an x of what was removed?
   - C. draw the correct answer below the line to show what is left?

Booklet Selection Guide based on results of Assessment: Part 1

Patterns in Arithmetic: Book 2 is a large book that focuses on numeration, number patterns and the general concept of trading one unit for another and recording it as place value, e.g., ones for tens. The process of trading is called *regrouping* (*carrying* and *borrowing* are the previous terms). The big concept in second grade in most textbooks is place value and regrouping in addition. Subtraction is generally introduced also. But most second-grade students are not ready to go backwards into subtraction with regrouping and find this process confusing and frustrating. Regrouping in subtraction is best left to third grade for most students. It takes less time and is much less difficult for the student.

1. Critical items for readiness to begin Base Ten Subtraction with regrouping are a Yes on Items 1A, 1B, 2A, 2B, 7A, and 8A. If these items are No, begin with Book 2. He must be able to regroup (carry) in addition with numbers before beginning this book.

2. If he has Yes on the items above, but No on Items 6A, 7B, and 8C, he may not have experience with drawing pictures of problems or may not have worked with blocks. If this is the case, he can not do Items 6B and 7C. Do a problem like problem 7 (addition with regrouping) with blocks and see if he can trade ones for tens in a physical way on his own. If so, you can proceed with Base Ten Subtraction and teach him how to draw problems as you go. If not, begin with Book 2.

3. If he has Yes on all the critical items and a Yes on Item 5A, which shows he understands the pictures, but a No on 6B and 7C, he may not actually understand regrouping at all. Many students at this age have memorized how to add with carrying but do not understand they are trading ones for tens and moving the ten into the next column. Many think it is a *one*, or don't think about it at all. Lack of understanding of regrouping and place value will cause many difficulties later on. Take the time to get it right at this tender age. To check, do a few problems like problem 7 (addition with regrouping) with blocks and see if he can trade ones for tens without help. If so, you can proceed with Base Ten Subtraction and teach him how to draw problems as you go. If not, begin with Book 2.

4. Items 3 and 4 test understanding of numeration. If he has difficulty with these items, and many will at this age, remediate it as you go. Not being able to do these items is not critical for beginning Base Ten Subtraction but lets you know this area is weak.

Booklet Selection Guide based on results of Assessment Part 2

If the total score is 60% or less, this is the correct booklet for your student.
If your student was able to get correct answers using a standard procedure (Item 9) but was unable to build with the blocks or draw the trades, this is still the correct booklet because he is likely demonstrating that he has memorized the procedure but lacks understanding. He may understand the process but be unfamiliar with the blocks or with drawings. To check this, show him how to record the trades with blocks and then reassess his understanding. If he can easily do another problem without assistance, assume he does understand the physical process of regrouping.
If the score is 75% or greater, move on to Subtraction: Booklet 4. Use Subtraction: Booklet 4 for practice and work with larger numbers and lots of zeros in the top number.

Assessment Criteria for Part 2

All items in this section come from Base Ten Subtraction. Titles indicate the lesson name where the concept is taught.

Assessment: Part 2 - Worksheet 1: Use manipulatives
Can the student:
1. Tens and Ones: Manipulative (no regrouping)

    A. use the blocks to solve a simple give away problem? Answer may be drawn or recorded with numbers. Tell the student that even though this problem is easy to solve without the blocks, he should use the blocks as a warm-up for the next problems, which are harder.

2. Expanded Tens and Ones: Recording (no regrouping)

    A. demonstrate the use of circles to break up a problem and find the answer. Can he use this format to do a simple subtraction problem?

3. Tens and Ones: Manipulative (with regrouping)

    A. recognize that problem a does not require regrouping and that problem b does require it?

    B. correctly manipulate the blocks to get a correct answer to problem b?

4. Tens and Ones: Manipulative (with regrouping)

    A. trade one of the ten rod blocks for ten unit blocks without prompting in all three problems?

    B. record the correct answer in two of the three problems with a drawing or a number?

    C. correctly write the number sentence for two of the three problems?

Assessment: Part 2 - Worksheet 2
Beginning with Problem 5, use drawings only–remove the blocks and give him colored pencils.
5. Tens and Ones Regrouping

    A. correctly solve two of the three problems without blocks? Allow him to draw if he needs to.

6. Hundreds, Tens, and Ones Regrouping

    A. use a drawing to correctly solve one of the two problems? Can he cross off a one hundred and change it into ten tens by drawing tens rods?

Note: Tell him he can use straight lines to show the tens; he does not have to draw the 3-D representation.

7. Hundreds, Tens, and Ones Regrouping (single regroup in tens place only)

    A. use a drawing or calculation to correctly solve one of the two problems?

Assessment: Part 2 - Worksheet 3
8. Hundreds, Tens, and Ones Regrouping (double regroup in both tens and ones place)

    A. use a drawing or calculation to correctly solve one of the two problems?

9. Hundreds, Tens, and Ones Regrouping

    A. use calculation to correctly solve two of the three problems?

10. Simple Word Problem–How many left?
    A. find the correct answer?
    B. write the correct number sentence?

11. Simple Word Problem–How Many More?
    A. find the correct answer?
    B. write the correct number sentence?

12. Word Problems
    A. identify the correct operation to use on three of four problems?

Booklet Selection Guide based on results of Assessment: Part 2
If the total score is 60% or less, this is the correct booklet.
If your student was able to get correct answers using a standard procedure but was unable to build with the blocks or draw the trades, this is still the correct booklet because he is demonstrating that he has memorized the procedure but lacks understanding.
If the score is 75% or greater, move on to Subtraction: Booklet 4. Use Subtraction: Booklet 4 for practice and work with larger numbers. Make problems with lots of zeros in the top number.

Assessment: Part 1 Score Sheet   Name _____ Date _____

Can the student:

1. Value of Base Ten Blocks with the actual blocks (*Patterns in Arithmetic:* Book 1)
    Yes No A. identify the rod as being ten?
    Yes No B. identify the flat as being one hundred?

2. Value of Base Ten Blocks shown as drawings (*Patterns in Arithmetic:* Books 1 and 2)
    Yes No A. identify the rod shape as being ten?
    Yes No B. identify the flat shape as being one hundred?

3. Write a number from a drawing (*Patterns in Arithmetic:* Book 1)
    Yes No A. use numerals in the correct place value to write a number?

4. Numeration (*Patterns in Arithmetic:* Books 1 and 2)
    Yes No A. write in words the name of the number?

5. Add two numbers shown as drawings without regrouping (*Patterns in Arithmetic:* Book 2)
    Yes No A. give the correct sum from the picture?

6. Add two numbers shown as drawings with regrouping (*Patterns in Arithmetic:* Book 2)
    Yes No A. give the correct answer from the picture?
    Yes No B. demonstrate understanding of regrouping with the picture?

7. Add two numbers with regrouping (*Patterns in Arithmetic:* Book 2)
    Yes No A. write the correct answer in numbers?
    Yes No B. show a correct picture of the sum?
    Yes No C. draw the ten carried into the tens place from the regrouped units?

8. Subtract two numbers without regrouping (*Patterns in Arithmetic:* Book 2)
    Yes No A. get the correct written answer?
    Yes No B. show the Give Away in the drawing with a loop or an x?
    Yes No C. draw the correct answer below the line to show what is left?

Items Correct = _____ = _____%
Items Possible =   15

Assessment: Part 2 Score Sheet   Name _____ Date _____

Can the student:

Pre-Assessment: Part 2 - Worksheet 1 Blocks only
1. Tens and Ones: Manipulative (no regrouping)
 Yes   No   A.   use the blocks to solve a simple give-away problem?

2. Expanded Tens and Ones: Recording (no regrouping)
 Yes   No   A.   demonstrate that he can expand a problem and find the answer?
 Yes   No   B.   record the correct answer in two of the three problems?

3. Tens and Ones: Manipulative (with regrouping)
 Yes   No   A.   recognize that problem a does not require regrouping and that problem b does require it?
 Yes   No   B.   manipulate the blocks to get a correct answer to problem b?

4. Tens and Ones: Manipulative (with regrouping)
 Yes   No   A.   trade one of the ten rod blocks for ten one blocks without prompting in all three problems?
 Yes   No   B.   record the correct answer in two of the three problems with a drawing or a number?
 Yes   No   C.   correctly write the number sentence for two of the three problems?

Pre-Assessment: Part 2 - Worksheet 2   Drawings only
5. Tens and Ones Regrouping
 Yes   No   A.   correctly solve two of the three problems without blocks?

6. Hundreds, Tens, and Ones Regrouping
 Yes   No   A.   use a drawing to correctly solve one of the two problems?

7. Hundreds, Tens, and Ones Regrouping (single regrouping in tens place only)
 Yes   No   A.   use a drawing or calculation to correctly solve one of the two problems?

8. Hundreds, Tens, and Ones Regrouping (double regrouping in both tens and ones place)
 Yes   No   A.   use a drawing or calculation to correctly solve one of the two problems?

9. Hundreds, Tens, and Ones Regrouping
 Yes   No   A.   use calculation to correctly solve two of the three problems?

10. Simple Word Problem–How many left?
 Yes   No   A.   find the correct answer?
 Yes   No   B.   write the correct number sentence?

11. Simple Word Problem–How Many More?
 Yes   No   A. find the correct answer?
 Yes   No   B. write the correct number sentence?

12. Word Problems
 Yes   No   A. identify the correct operation to use on three of four problems?

Items Correct = _____ = _____%
Items Possible =   18

Date_____

Put a question mark next to any problem you don't know how to do.

1. ☐ If this cube is worth 1, then how much is this rod worth? _____
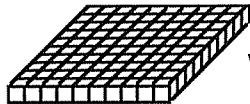
☐ If this cube is worth 1, then how much is this flat worth? _____
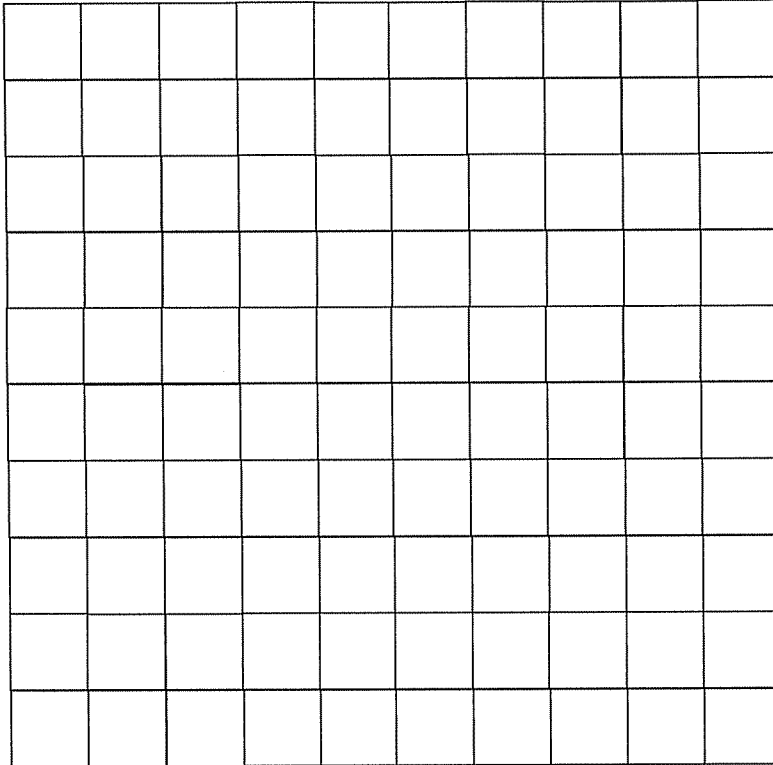
2. Here are little pictures of the Base Ten Blocks.

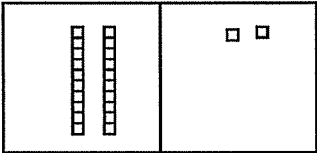If this cube is worth 1, then what is this ▱▱▱▱▱ worth? _____
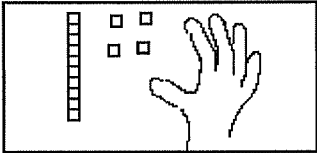
What is this ▦▦▦ worth? _____
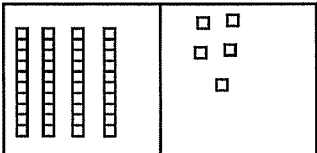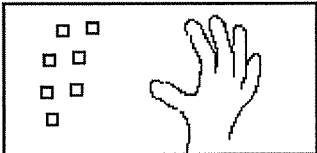
3. What number is showing in this picture? _____
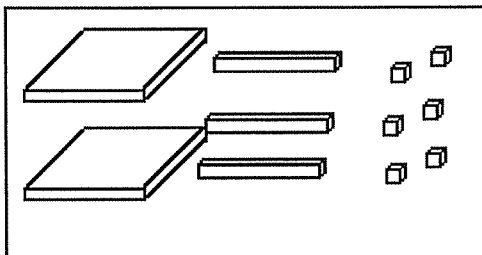
4. Write the name of the number in words shown in problem 3. Don't be
    concerned about spelling.

    _____
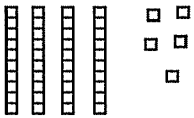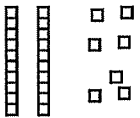
5. Draw the blocks.

Start With	Add	How much all together?

6. Draw the blocks.

Start With	Add	How much all together?

7. Solve.

4	5
2	7

    +

    Draw the blocks   Write the number.

8. Solve.

4	6
3	2

    Take away

1. Solve.

Start With	Give Away	What's Left?

2. Solve. Break up into Tens and Ones.

$$57 = \boxed{50} + \boxed{7}$$
$$- 36 = \boxed{-30} + \boxed{-6}$$
$$= \bigcirc + \bigcirc$$

$$26 = \bigcirc + \bigcirc$$
$$- 13 = \bigcirc - + \bigcirc -$$
$$= \bigcirc + \bigcirc$$

$$54 = \bigcirc + \bigcirc$$
$$- 51 = \bigcirc - + \bigcirc -$$
$$= \bigcirc + \bigcirc$$

3. Solve.

a.

Start With	Give Away	What's Left?

b.

Start With	Give Away	What's Left?

4. Solve.

a.

Start With	Give Away	What's Left?	Write a number sentence.
	15		_____

b.

Start With	Give Away	What's Left?	Write a number sentence.
	27		_____

Date_____

c.   Start With   Give Away   What's Left?   Write a number sentence.

12

_____

5. Solve.   a.   b.   c.

Give Away | 6 | 7 | Give Away | 5 | 2 | Give Away | 5 | 0 |
           | 2 | 8 | | 2 | 6 | | 2 | 4 |

6. Solve.   a.   b.

Give Away 153   Give Away 167

What's Left?   What's Left?

7. Solve.   a.   b.

Give Away | 3 | 2 | 4 | Give Away | 3 | 4 | 5 |
           | 1 | 6 | 3 | | 1 | 8 | 2 |

8. Solve.   a.   b.

□ ══ ▫		
4	3	5

Give Away

1	7	8

□ ══ ▫		
3	4	2

Give Away

1	6	5

9. Solve without using blocks or pictures.

a.	b.	c.
46	305	423
- 19	- 127	- 187

10. There are 68 rabbits at the petting zoo; 46 got carrots for breakfast. How
    many rabbits are left to get carrots? _____
    Write the number sentence. _____

11. Daphne sold 324 boxes of Girl Scout cookies. She delivered 238 boxes.
    How many more boxes does she have left to deliver? _____
    Write the number sentence._____

12. Decide whether to add or subtract to find the answer to these problems
    Write the operation on the line under each word problem.

    a. Gina has ____ jawbreakers and Mike has _____. How many more
    jawbreakers does Mike have? _____

    b. Cadence has ____ outfits for her Barbie doll. She got _____ more for her
    birthday. How many does she have altogether? _____

    c. At the fair there were _____ caramel apples in the morning. At the end of
    the day there were _____ left. How many were sold? _____

    d. One tomato bush had _____ ripe tomatoes and _____ green tomatoes. How
    many tomatoes in all? _____

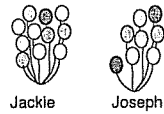**Subtraction: Booklet 3**

BUWV = Break up will vary

Assessment - Part 1 - Worksheet 1

1. Solve. a. Example:

$15 = 6 + 5 + 4$
$-12 = -4 + -4 + -4$
$3 = 2 + 1 + 0$

b.
$14 = \bigcirc + \bigcirc + \bigcirc$
$-7 = - + - + -$
$7 = \bigcirc + \bigcirc + \bigcirc$

2. Solve each problem a different way. Examples: BUWV

a.
$26 = 14 + 12$
$-17 = -14 + -3$
$9 = \bigcirc + 9$

b.
$26 = 9 + 17$
$-17 = -8 + -9$
$9 = 1 + 8$

c. $10 + 10$
$26 = 20 + 6$
$-17 = -10 + -7$
$9 = 0 + 9$

3. Find the mistakes. Circle them with a red pencil.

a.
$21 = 16 + 12\ ^2 + 3$
$-9 = -2 + -6 + -1$
$12 = \bigcirc + \bigcirc + \bigcirc$

b.
$21 = 20 + 1$
$-9 = -2 + -7$
$24 = 18 + 6\ -6$

4. a. Who has more balloons? __Jackie__
   How many more? __3__
   Number sentence __11-8=3__

   Jackie   Joseph

   b. How many more is 18 than 7? __11__
   Number sentence __18-7=11__

   c. How many more is 60 than 40? __20__
   Number sentence __60-40=20__

5. Fill in the missing numbers. The difference between each number is __4__.

$\underset{4}{0} , \underset{4}{4} , \underset{4}{8} , \underset{4}{12} , \underset{4}{16} , 20$

Assessment - Part 2 - Worksheet 2

5. Solve each problem two ways. First do it the expanded way
   Then do it the short way.

a. Expanded way   Short way
   $40 + 10$ $\overset{4}{5}0$
   $50 = 50 + 0$
   $-32 = -30 + -2$ -32
   $18 = 10 + 8$ 18
   tens ones

b. Expanded way   Short way
   $70 + 10$ $\overset{7}{8}6$
   $86 = 80 + 6$
   $-39 = -30 + -9$ -39
   $47 = 40 + 7$ 47
   tens ones

6. Use Base Ten Blocks to solve these problems.
   Draw the answer in the What's Left? box.

$463 - 172 = 291$
$287 - 168 = 119$

a. Start With Take Away What's Left?
b. Start With Take Away What's Left?

7. Solve each problem. Record the expanded way and the short way.

a. Expanded way   Short way
   $200 + 100$ $\overset{2}{3}47$
   $347 = 300 + 40 + 7$
   $-156 = -100 + -50 + -6$ -156
   $191 = 100 + 90 + 1$ 191
   hundreds tens ones

b. Expanded way   Short way
   $300 + 100\ 20 + 10$ $3\overset{2}{4}\overset{1}{3}5$
   $435 = 400 + 30 + 5$
   $-279 = -200 + -70 + -9$ -279
   $156 = 100 + 50 + 6$ 156
   hundreds tens ones

Answer Key - Subtraction Placement

Assessment - Part 2 - Worksheet 1

1. Solve each problem a different way.

a.
$62 = 25 + 25 + 12$
$-37 = -25 + -0 + -12$
$25 = 0 + 25 + 0$

b.
$62 = 30 + 20 + 12$
$-37 = -20 + -10 + -7$
$25 = 10 + 10 + 5$

2. Solve each problem a different way. $12 + 3 = 8$

a.
$35 = 15 + 15 + 5$
$-28 = -10 + -10 + -8$
$7 = 5 + 2 + 0$

b.
$35 = 15 + 15 + 5$
$-28 = -10 + -10 + -8$
$7 = 5 + 5 + -3$

c.
$35 = 10 + 10 + 10 + 5$
$-28 = -10 + -10 + -6 + -2$
$7 = 0 + 0 + 4 + 3$

d. $20 + 10 = 15$
$35 = 30 + 5$
$-28 = -20 + -8$
$17 = 10 + 7$

Take out Base Ten Blocks. You may use them for any problem from here to the end of the test.

3. a. Take out a 100 flat. Cover it with 43.
   How much is not covered? __57__

   b. Build 132. Cover it with 67.
   How much is not covered? __65__

4. Use Base Ten Blocks to solve the problems. Draw the answer. Write the problem shown by the picture.

a. Start With   Take Away   What's Left?   Example:
28 47
                              -28
                              19

Now, you write the problem and solve it.

b. Start With   Take Away   What's Left?
28 80
                              -28
                              52

Subtraction: Booklet 4

Assessment - Part 1

1. a. There are 68 rabbits at the petting zoo. 46 have already gotten carrots for breakfast. How many rabbits have not gotten their carrots yet? __22 rabbits__
   Write the number sentence. __68 - 46 = 22 rabbits__

   b. Chuck laid out 653 feet of track for his train. Dave's track is 137 feet shorter than Chuck's. How long is Dave's train track? __516 feet__
   Write the number sentence. __653 - 137 = 516 feet__

2. Solve each problem a different way.   Example:

Set 1 a.
$53 = 30 + 20 + 3$
$-36 = -20 + -10 + -6$
$17 = 10 + 0 + 7$

b.
$53 = 30 + 20 + 3$
$-36 = -20 + -10 + -6$
$17 = - + \bigcirc + \bigcirc$

Solution will be unique.

Set 2 a.
$68 = 50 + 10 + 8$
$-29 = -10 + -10 + -9$
$39 = \bigcirc + \bigcirc + \bigcirc$

b.
$68 = 50 + 10 + 8$
$-29 = -10 + -10 + -9$
$39 = \bigcirc + \bigcirc + \bigcirc$

Set 3 a.
BUWV
$74 = \bigcirc + \bigcirc + \bigcirc$
$-37 = - + - + -$
$37 = \bigcirc + \bigcirc + \bigcirc$

b.
$74 = \bigcirc + \bigcirc + \bigcirc$
$-37 = - + - + -$
$37 = \bigcirc + \bigcirc + \bigcirc$

3. Solve all three problems both the expanded way and the short way.

Short way Expanded way
a.
$47 = 40 + 7$
$-27 = -20 + -7$
$20 = 20 + 0$

b. $50 + 10$
$64 = 60 + 4$
$-29 = -20 + -9$
$35 = 30 + 5$

c. $40 + 10$
$56 = 50 + 6$
$-38 = -30 + -8$
$18 = 10 + 8$

Assessment - Part 2

1. Draw the Start With number for each problem.
   Cross out the blocks being traded.
   On your drawing, Circle the Take Away number.
   Record the What's Left? number.

   Example:
   Start With 245
   Take Away − 168
   What's Left? 77

   a. Start With 262
      Take Away − 95
      What's Left? **167**
      Draw the blocks.

   b. Start With 352
      Take Away − 186
      What's Left? **166**
      Draw the blocks.

2. Show both the expanded way and the short way of doing each problem.

   a. (200) + (30) + (4) = 234
      −(100) + (20) + (8) = −128
      (100) + (0) + (6) = 106

   b. (200) + (50) + (6) = 256
      −( ) + (90) + (6) = − 96
      (100) + (60) + (0) = 160

   c. (200) + (0) + (6) = 206
      −( ) + (90) + (9) = − 99
      (100) + (0) + (7) = 107

3. Build and subtract. Draw pictures and trade if necessary.

   a. 6 3 2 7
      − 3 6 4 9
      2,678

   b. 7 0 2 4
      − 1 7 6 7
      5,257

   c. 6 0 0 0 0
      − 1 7 6 7 4
      42,322

4. a. Ramon had 547 CDs in his collection. He sold 429 on Amazon.com. How many
      CDs does he have left? **118 CDs**
      Write the number sentence. **547 − 429 = 118 CDs**

   b. In the fall Neva planted 74 camellia bushes. There are now 108 camellia bushes.
      How many bushes were there before? **34 bushes**
      Write the number sentence. **108 − 74 = 34 bushes**

   c. Samuel laid out 550 feet of track for his slot cars. Ava's track is 75 feet shorter than
      Samuel's. How long is Ava's track? **475 feet**
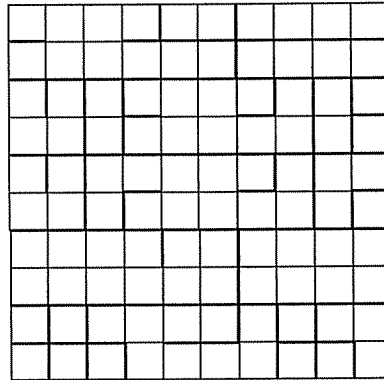   Write the number sentence. **550 − 75 = 475 feet**

5. What phrases in these word problems tell you they are subtraction problems?
   Shorter than, how many before? how many left?

Base Ten Subtraction

Assessment - Part 1 - Worksheet 1

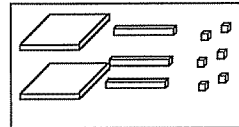1. ☐ If this cube is worth 1, then how much is this rod worth? _____

   ☐ If this cube is worth 1, then how much is this flat worth? _____

2. Here are little pictures of the Base Ten Blocks.
   ▱ If this cube is worth 1, then what is this ▰▰▰ worth? **10**
   What is this ▦ worth? **100**

3. What number is showing in this picture? **236**

Assessment - Part 2 - Worksheet 2

4. Write the name of the number in words shown in problem 3. Don't be
   concerned about spelling.
   Two hundred thirty-six

5. Draw the blocks.

Start With	Add	How many altogether?
		3 6

6. Draw the blocks.

Start With	Add	How many altogether?
		5 2

7. Solve.

   4 5
   + 2 7
   7 2
   Draw the blocks.   Write the number.

8. 4 6
    Give Away 3 2
    1 4

Assessment - Part 2 - Worksheet 1

1. Solve.

Start With	Give Away	What's Left?

2. Solve. Break up into tens and ones

   57 = (50) + (7)   26 = (20) + (6)   54 = (50) + (4)
   − 36 = (30) + (6)   − 13 = (10) + (3)   − 51 = (50) + (1)
   21 = (20) + (1)   13 = (10) + (3)   3 = (0) + (3)

3. Solve.

   a. | Start With | Give Away | What's Left? |

   b. | Start With | Give Away | What's Left? |
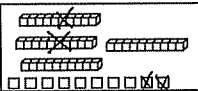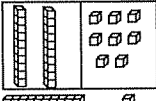
4. Solve.

   a. | Start With | Give Away | What's Left? | Write a number sentence. |
      | | 15 | | 22 − 15 = 7 |

   b. | Start With | Give Away | What's Left? | Write a number sentence. |
      | | 27 | | 45 − 27 = 18 |

Assessment - Part 2 - Worksheet 2

c.

Start With	Give Away	What's Left?	Write a number sentence.

12

$40-12=28$

5. Solve

a.

6	7

Give Away

2	8

3	9

b.

5	2

Give Away

2	6

2	6

5	0

Give Away

2	4

2	6

6. Solve

a.

Give Away 153

What's Left?

1	7	2

Give Away 167

What's Left?

	7	1

7. Solve

a.

3	2	4

Give Away

1	6	3

1	6	1

3	4	5

Give Away

1	8	2

1	6	3

Assessment - Part 2 - Worksheet 3

8. Solve

a.

4	3	5

Give Away

1	7	8

2	5	7

b.

3	4	2

Give Away

1	6	5

1	7	7

9. Solve without using blocks or pictures.

a.
```
  46
- 19
----
  27
```

b.
```
  305
- 127
-----
  178
```

c.
```
  423
- 187
-----
  256
```

10. There are 68 rabbits at the petting zoo. 46 got carrots for breakfast. How many rabbits are left to get carrots? **22 rabbits**
Write the number sentence. **68 - 46 = 22 rabbits**

11. Daphne sold 324 boxes of Girl Scout cookies. She delivered 238 boxes. How many more boxes does she have left to deliver? **86 boxes**
Write the number sentence. **324 - 238 = 86 boxes**

12. Decide whether to add or subtract to find the answer to these problems
. Write the operation on the line under each word problem.

a. Gina has **X** jawbreakers and Mike has **Y** . How many more jawbreakers does Mike have? **subtraction**

b. Cadence has **m** outfits for her Barbie doll. She got **n** more for her birthday. How many does she have altogether? **addition**

c. At the fair there were **S** caramel apples in the morning. At the end of the day there were **T** left. How many were sold? **subtraction**

d. One tomato bush had **V** ripe tomatoes and **W** green tomatoes. many tomatoes in all? **addition**