

Borrowing from our Neighbors

Brief Overview:

In these lessons, students will be introduced to three different approaches to subtracting with regrouping. First, the concept will be introduced through a story which students will act out. By the second day students will model what they have learned about regrouping using based ten blocks. On the third day students will practice this skill using a number line.

NCTM Content Standard/National Science Education Standard:

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems;
- Understand meanings of operations and how they relate to one another;
- Compute fluently and make reasonable estimates

Grade/Level:

2-3

Duration/Length:

Three 45-60 minute lessons

Student Outcomes:

Students will:

- Add no more than 3 whole number addends with no more than 2 digits in each addend and a sum of no more than 100
- Subtract **whole numbers** with no more than 2 digits in the minuend or the subtrahend

Materials and Resources:

Day 1

- Student Resource 1, Pre-Assessment
- Teacher Resource 1, Pre-Assessment (Answer key)
- Teacher Resource 2, Subtraction story Read-Aloud (Friendly Neighbors)
- Teacher Resource 3, Student Script
- Teacher Resource 4, Place Value Mat (Digit City)
- Student Resource 2, Digit Cards –Students or teacher must cut before game)

***Teacher Preparation Day 1:** Make a laminated poster-board or transparency (optional)

***Make copies for class (at least 4 per student)**

- Painter's tape

***Teacher Preparation Day 1:** Tape an 8 foot square on the floor and then divide the square into four quadrants.

- Base-Ten blocks

Day 2

- Teacher Resource 5, Base-ten Block Place Value Mat

***Teacher Preparation Day 2:** make transparency (about 4 copies per student)

- Overhead base-ten blocks

- Base-ten blocks

***Teacher preparation Day 2:** Prepare set packs of base 10 blocks per set of partners: 9 Longs and 20 cubes

Day 3

- Student Resource 3, Subtraction using a number line

- Teacher Resource 6, Subtraction using a number line (Answer Key)

- 3-4 Blank Transparencies

***Teacher preparation Day 3:** Create number line for teacher facilitation display

- Classroom number line

- Student Resource 4, post-assessment

- Teacher Resource 7, post-assessment Answer Key

Development/Procedures:

Lesson 1

Pre-assessment

Distribute Student Resource 1. Pre-Assessment(This page will be used to assess students' ability to subtract using 2 digit numbers.)

Allow time for students to complete. Answers can be found on Teacher Resource 1.

Launch

Read story, *Friendly Neighbors*, that is found on Teacher Resource 2. This story will help the students understand the concept of subtracting.

Teacher Facilitation

- Display this number sentence $32-18=$ on the board
- Discuss how students can rewrite this problem vertically to make it easier to solve.

- Discuss why writing the problem vertically makes it easier to solve.
- Ask students to role play borrowing from their neighbors using directions found on Teacher Resource 3, Story Script.
- Display a laminated poster-sized (optional) board of Teacher Resource 4, Digit City or make a transparency.
- Model writing 2-digit subtraction problems on Teacher Resource 4.
- Distribute Teacher Resource 3, and Teacher Resource 4 to each student.

Student Application

Provide an opportunity for students to practice this new skill with a partner.

- Students will model how to subtract two digit numbers with regrouping by knocking on Mr. Tens door and asking for one group of tens.

Embedded Assessment

Teacher will informally assess the students' understanding and progression towards mastery through informal observation during student application time and using Teacher Resource 2.

Re-teaching/Extension

- For those who have not completely understood the lesson, review what is needed.
- For those who have understood the lesson, introduce 3 digit regrouping.

Lesson 2

Pre-assessment

Write the following question on the board: $32-18=$. Pose this question: "How can you solve this problem?" Turn and talk. Informally assess students' understanding based on student discussion.

Launch

- Post the following question on the board for a review.
In the land of groups of ten, the citizens of the first floor have cupcakes. They have 1 group of ten and 8 cupcakes. The citizens on the 2nd floor have 3 groups of ten and 2 cupcakes. How many more do the residents of the 2nd floor have than the 1st floor?

Teacher Facilitation

- Display the number sentence $32-18=$

- Announce to students that today they will learn how to subtract a different way.
- Display Transparency of Teacher Resource 5, Base 10 Place Value Mat
- Model how to use this place mat.
- Record problem vertically at the bottom of the place mat.
- Arrange 32 on Mat, 3-tens(longs) and 2 ones (cubes)
- Ask students, “Do we have enough ones to take away eight? (*No*)
- Discuss with students how to solve the problem: ones need to go next door and borrow 1 ten from the tens place.
- Model how to borrow 1 ten from the tens place. Take 1 (long) ten and replace ten with ten (cubes) ones.
- Ask students: ”Do I now have enough ones to take 8 away?” (*Yes*)
- Model how to subtract the cubes away from the ones side. Ask: “How many ones are left? (*four*)
- Ask students: “Have we completed the problem?”(*No*)
- Discuss that now students are going to subtract the tens from the tens side. Ask: “How many tens are left?” (*1*)
- What is the answer? (*14*)
- Repeat the above steps for more practice.
- Distribute Teacher Resource 5 to students. Practice and model these steps with other subtraction computations with students.
- Play a quick game with the students. Break students off into groups of 3 or 4. Display a subtraction problem. Allow students time to solve problem with strategies they learned. Students may work with partners to solve given problems. The first partners to finish solving the problem wins.

Student Application

Students will practice this new concept with a partner using various number sentence problems with regrouping, such as, $43-27=$, $74-39$, and so on.

Embedded Assessment

Teacher will informally assess the students’ understanding and progression towards mastery through informal observation during student application time and using Teacher Resource 5.

Re-teaching/Extension

Students who have shown mastery may practice 3 digit subtraction problems using the same strategies.

Lesson 3

Pre-assessment/ Launch

Pose the following question. “Yesterday we used base-ten blocks to solve 2-digit subtraction problems. Can anyone think of another strategy to solve 32-18?”

Teacher Facilitation

- Discuss how subtraction is finding the difference between two numbers.
- Direct students attention to the classroom number line.
- Pick two one digit numbers such as 4 and 7.
- Ask the students, “How many spaces are between 4 and 7?”
- Point to the number 4 on the number line using a yardstick or any similar pointer stick and then point to the number 7.
- Count together the jumps from 4 to 7.
- Repeat with other numbers such as 9 and 22.
- Discuss what strategies could be used to speed this process of counting the numbers in between two given numbers.
- Students may come up with skip counting.
- Affirm and encourage all plausible answers.
- Elicit from students that they could count to the nearest tens and add the sums. From 9 to ten would be one jump. Then from 10 to 20 would be 10 jumps and finally from 20 to 22 would be another 2 jumps. $1 + 10 + 2 = 13$. The difference between 9 and 22 is 13.

Student Application

Distribute Student Resource 3, Subtracting Using Number Line; ‘How Many Between Our Neighbors?’. Answers can be found on Teacher Resource 6. Students will practice this new concept with a partner using various subtraction problems with regrouping.

Embedded Assessment

Teacher will informally assess the students’ understanding and progression towards mastery through informal observation during student application time and using Teacher Resource 2.

Re-teaching/Extension

Students who have shown mastery may practice 3 digit subtraction problems using the same strategies. Students may visit the following sites for more math fun with subtraction with regrouping:

<http://rainforestmaths.com>

<http://gamequarium.com/subtraction.html>

Summative Assessment:

Students will take an assessment (Student Resource 4) consisting of three selected response questions and one brief constructed response (BCR) question which challenges students to explain how they solved the third problem. Students may use any of the strategies they have learned. Answers to the summative assessment will be found on Teacher Resource 7.

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Date:

**Pre-Assessment for 2-digit Subtraction with and
without Regrouping**

$7 - 4 = 3$

$$\begin{array}{r} 10 \\ -8 \\ \hline 2 \end{array}$$

$77 - 19 = 58$

$35 - 27 = 8$

$21 - 11 = 10$

Friendly Neighbors

One day in the town of Digit City, were a group of friends who all lived in the same apartment complex called Standard Algorithm. Their names were Mr. Ten, Mrs. Ones, Tensy, and Onesy. Mr. Tens and Mrs. Ones lived on the top floors of their buildings. They were older and always had more of everything compared to their neighbors downstairs. And Mr. Tens always had more than Mrs. Ones. Mr. Tens liked to group his things in quantities of tens. All over his room you would find everything in groups and bundles of ten, 5 groups of ten flower pots, 2 groups of ten cats, 9 groups of ten toothbrushes. You name it, everything was grouped in tens.

You see, Mrs. Ones and Onesy lived in the ones building which is to the right of the Tens building. Mr. Ten and Tensy lived in the tens building which is to the left of the Ones building. They were as close as friends could possibly be. They would do many things together like go shopping, ride bikes, eat dinner, and go to the park. One thing they loved to do was borrow things from one another, but they wouldn't just borrow any old kind of way, they had a particular way of borrowing things. Let me explain the way they borrowed. You might think it's odd but once you understand, it won't be strange to you at all. Here's an example; One day Tensy and Onesy who lived on the bottom floors, needed 18 apples for some apple pies they wanted to bake. Mr. Tens and Mrs. Ones had 32 apples together. So Onesy did what she always does which is to go upstairs to see her friend, Mrs. Ones. Mrs. Ones only had 2 apples but she knew where to go to get more. She knew that Mr. Tens always keeps his things in groups of ten. She also knew she could only borrow from Mr. Tens one group of ten at a time.

She knocked on Mr. Ten's door and asked, "Mr. Tens, I need 1 group of ten apples." Mr. Tens gave Mrs. Ones 1 group of ten apples which is the same as ten apples.

Now Mrs. Ones had ten apples plus the two she already had making a total of 12 apples. She could now give Onesy eight apples and she was left with 4.

Tensy needed one group of ten apples. He went to Mr. Ten upstairs to ask for his apples. Mr. Ten having already given one group of tens to Mrs. Ones now had two groups of ten left. He gladly gave Tensy 1 group of ten apples. Now he was left with 1-ten.

How many apples were left you ask? Well, if Mr. Tens had 1-ten and Mrs. Ones had 4 ones then they had 14 apples left!

And this is how they lived happily ever after in the town of Digit City.

Mr. Tens	Mrs. Ones
Student A 3	Student B 2
Student C 1	Student D 8

(Student A, B, C and D will be sitting in their blocks holding the number of corresponding base 10 blocks.)

In the town of Digit City, the residents on the top floor of Standard Algorithm have 32 apples. The residents on the bottom floor want 18 apples. How many apples will the residents of Standard Algorithm have left?

- Student D will ask Student B for 8 blocks.
- Student B will say, “I only have 2 ones but I can ask my neighbors Mr. Tens for ten ones.”
- Student A will give Student B 1 ten.
- Teacher will ask Student B, “How many ones do you have now?”
- Student B will say, “I have 12 ones now. I have enough to give my neighbor downstairs 8 ones.”
- Student B will give Student D 8 ones.
- Teacher will ask Student B, “How many ones do you have left?”
- Student B will say he has 4 ones left.
- Teacher will ask, “How many does Mr. Tens have now?”
- Student A will say he has 2 tens now.
- Student C will ask Student A for 1 ten.
- Student A will give Student C 1 ten.
- Teacher will ask Student A, “How many tens does Mr. Tens have now?”
- Student will say one ten.
- Teacher will ask, “What is the difference between 32 and 18?”
- Students will say, “14”.

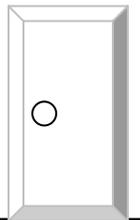
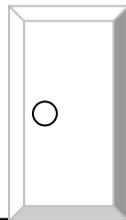
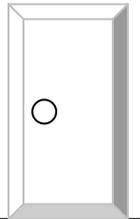
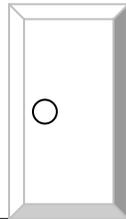


Digit City

Teacher Resource 4
Neighborhood Place Value Mat

Mr. Tens

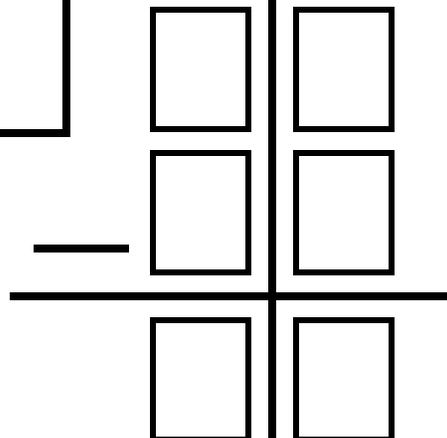
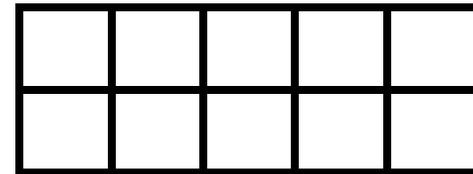
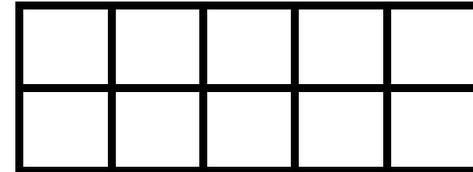
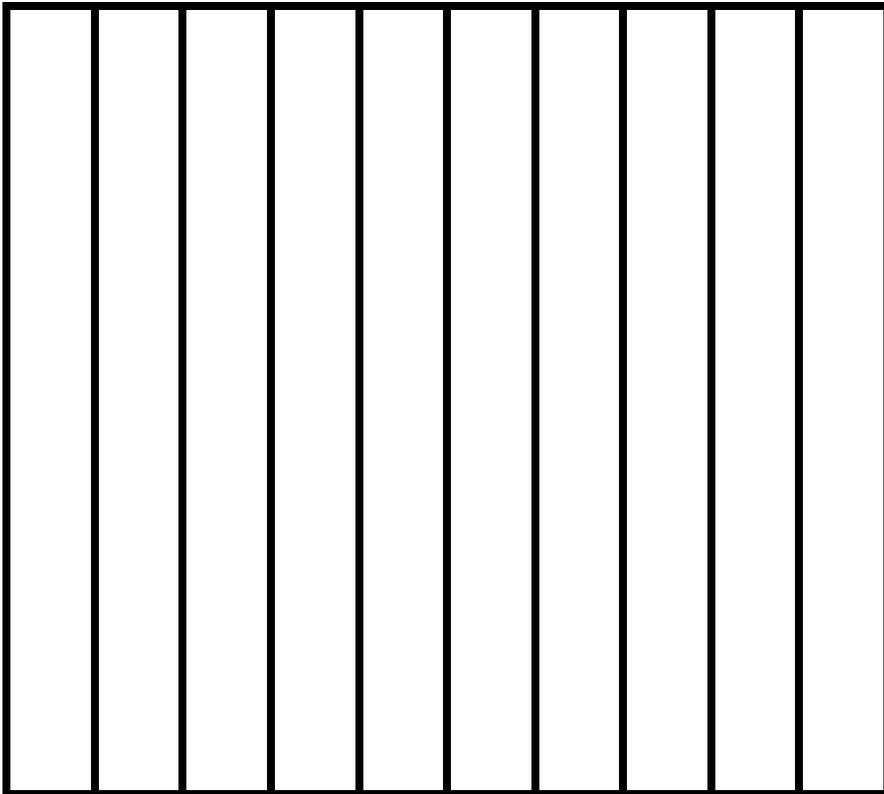
Mr. Ones



Borrowing From Our Neighbors

Groups of Tens

Ones

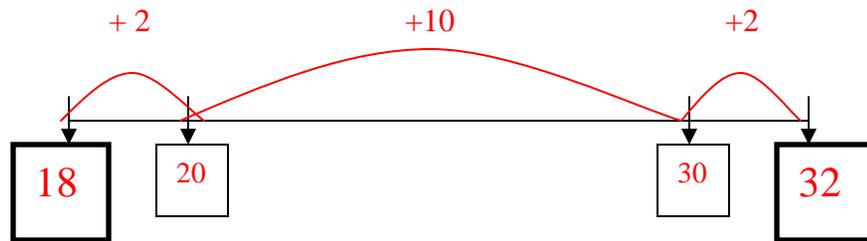




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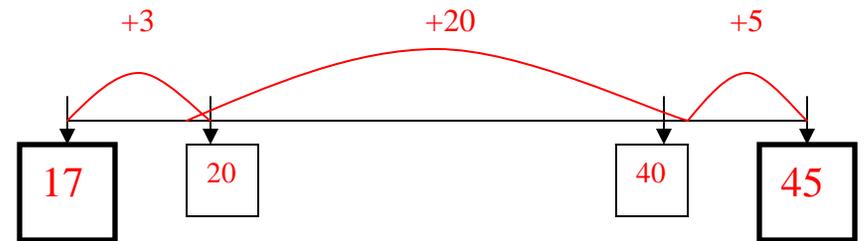
The How Many Between Our Neighbors

$$32 - 18 = 14$$



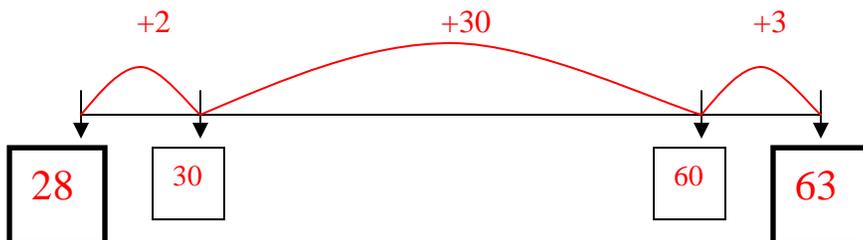
$$2 + 10 + 2 = 14$$

$$45 - 17 = 28$$



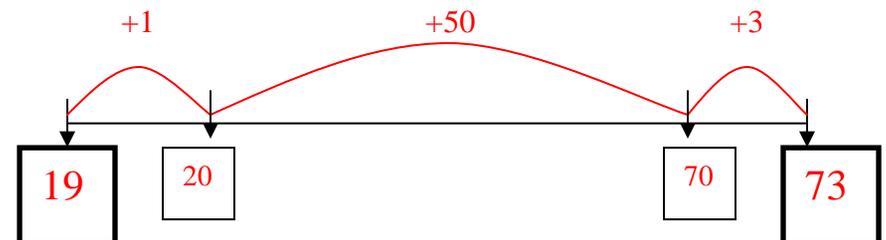
$$3 + 20 + 5 = 28$$

$$63 - 28 = 35$$



$$2 + 30 + 3 = 35$$

$$73 - 19 = 54$$



$$1 + 50 + 3 = 54$$

Borrowing From Our Neighbors

Post-Assessment 2-digit Subtraction with Regrouping

Solve the problems. Make sure to show your work!

$$1. 34 - 26 = 8$$

$$2. 82 - 63 = 19$$

$$3. 75 - 19 = 56$$

Use what you know about subtraction to explain how you solved #3.

Answers will vary but may include:

- I used a number line to solve this problem. I put 19 on one end and 75 on the other end of the number line. From 19 to 20 is 1 jump. From 20 to 70 is 50 jumps. From 70 to 75 is 5 jumps. $1 + 50 + 5 = 56$.

- I used standard algorithm to solve the problem.

$$\begin{array}{r} 6 \ 15 \\ 75 \\ - 19 \\ \hline 56 \end{array}$$

Name:

Date:

Pre-Assessment for 2-digit Subtraction with and without Regrouping

$7 - 4 =$

10

$\underline{-8}$

$77 - 19 =$

$35 - 27 =$

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Name:

Date:

Pre-Assessment for 2-digit Subtraction with and without Regrouping

$7 - 4 =$

10

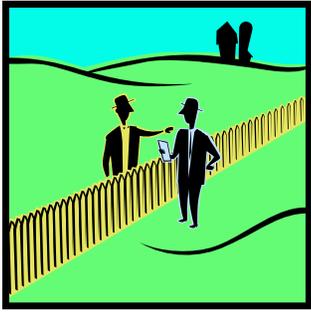
$\underline{-8}$

$77 - 19 =$

$35 - 27 =$

$21 - 11 =$

0	1	2
3	4	5
6	7	8
9	+	-
	=	

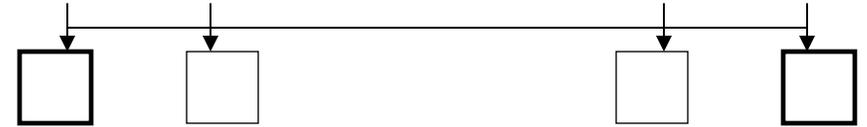
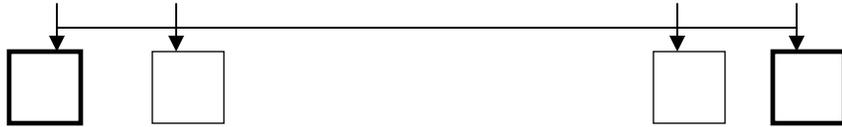


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How Many Between Our Neighbors?

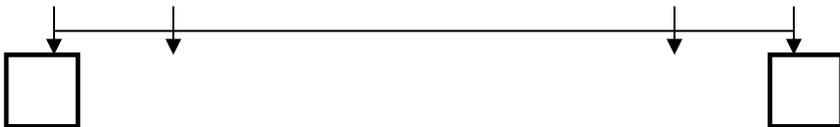
$$32 - 18 =$$

$$45 - 17 =$$



$$63 - 28 =$$

$$73 - 19 =$$



Borrowing From Our Neighbors

Post-Assessment 2-digit Subtraction with Regrouping

Name:

Date:

Solve the problems. Make sure to show your work!

1. $34 - 26 =$

2. $82 - 63 =$

3. $75 - 19 =$

Use what you know about subtraction to explain how you solved #3.
