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**Subject Matter: Mathematics**

**Grade Level: 2**

**Time Allotment: Two 60-minute class sessions**

**Master Teacher: Sharon Porter**

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### Overview

Young mathematicians often have difficulties with the concepts of borrowing and carrying in dealing with two-digit numbers in subtraction and addition operations. In the introductory activity, they will practice decisions to regroup or just go for it! Using online video clips and interactive Web sites, the concepts of regrouping will be illustrated. Students will practice step-by-step strategies for solving regrouping problems in addition and subtraction. As a culminating activity, students will role play as bankers to solve more problems in regrouping.

### Learning Objectives

Students will be able to:

- Review the place value system and double-digit addition and subtraction.
- Create and manipulate double-digit regrouping.
- Identify ways to use regrouping.

### Oregon Standards Available at:

<http://www.ode.state.or.us/cifs>

#### Mathematics – Calculations and Estimations

Compute fluently and make reasonable estimates.

- Develop and evaluate strategies for adding and subtracting whole numbers.
- Add and subtract pairs of any two-digit numbers.

### Media Components

#### Video

Check the link at <http://www.opb.org/edmedia/trs/> to find access to the video(s) from unitedstreaming™ referenced in these lesson plans.

- “Math Investigations, Part One” (26:00)
  - **Clip:** “Segment 6: Trains (Addition and Subtraction)” (03:53)



- “Mathica’s Mathshop: Merry Band” (15:00)
  - **Clip:** “Addition Using 100s, 10s, and 1s” (03:53)

## Web

- **Addition Online Activity**  
This interactive Web site provides step-by-step practice for carrying from 1s to 10s in addition problems of two-digit numbers.  
<http://www.dositey.com/addsub/as85/add3r.htm>
- **Subtraction Online Activity**  
Carrying from the 1s column to the 10s column is the focus of this interactive online exercise in subtraction of two-digit numbers.  
<http://www.dositey.com/addsub/subra4.htm>
- **Portaportal - Internet Bookmark Organization**  
Organize your bookmarks for this lesson using this free Internet service that allows for guest access.  
<http://www.portaportal.com>
- **Problems for Deciding Whether to Regroup or Not**  
This worksheet has addition problems to use for making the PowerPoint presentation for Session 1.  
<http://www.rhlschool.com/worksheet.php4?option=add1>  
  
This worksheet has subtraction problems to use for making the PowerPoint presentation for Session 1.  
<http://www.rhlschool.com/worksheet.php4?option=sub1>
- **Deposit Slip Example for Use in Culminating Activity**  
This PDF file features a realistic deposit slip for our “customers.”  
[http://www.education-world.com/a\\_lesson/worksheets/TCM/pdfs/010810im.pdf](http://www.education-world.com/a_lesson/worksheets/TCM/pdfs/010810im.pdf)

## Materials

### Per Student:

- Unifix math cubes (or any other base-10 math manipulatives capable of representing 1s, 10s and 100s)
- Computer with Internet access: Java-enabled and Macromedia Shockwave installed
- Individual chalkboard and chalk/eraser or dry-erase board with marker/eraser

**Per Class:**

- Regrouping problems for large-group display (PowerPoint presentation)
- Deposit and withdrawal slips for banking activity -- deposit slip found at [http://www.education-world.com/a\\_lesson/worksheets/TCM/pdfs/010810im.pdf](http://www.education-world.com/a_lesson/worksheets/TCM/pdfs/010810im.pdf).
- Presentation computer with Internet connectivity, Java-enabled with Macromedia Shockwave installed

**Prep for Teachers**

When using media, provide students with a **Focus for Media Interaction**, a specific task to complete and/or information to identify during or after viewing of video, Web sites or other multimedia elements.

**Session 1:**

- Bookmark all Web sites into your Portaportal Web page and download all video clips. Preview them for specific points you will use to teach students to borrow and carry. Especially heed the cue to stop the “Train” segment to more slowly demonstrate the subtraction in the 10s column.
- Make large posters of this adage for the classroom wall: More on top, no need to stop! More on the floor, you gotta go next door and get 10 more! Number’s the same? Zero’s the game.
- Prepare a PowerPoint presentation using the regrouping problems found at the end of this lesson plan. The object is to build the slide show so that only one problem appears at a time.

**Session 2:**

- Bookmark the Web pages found at <http://www.dositey.com/addsub/as85/add3r.htm> and <http://www.dositey.com/addsub/subra4.htm>.
- Schedule the computer lab or mobile lab and allow one computer per student if possible. Check to see if the proper Windows Media Player and/or QuickTime plug-ins are installed on the demonstration computer you will use for instruction. Make sure that this computer can be connected to a projector or a large-screen monitor for large-group instruction.
- Have enough tables/desks so that there are two “bankers” for every two “customers.” Set them up so that the bankers sit behind the desk and the two customers have room to line up in front of the desk.
- Prepare deposit and withdrawal slips with two-digit numbers for students to use in banking for the culminating activity.
- Make “visors” (like old-fashioned bankers wore) that say “1s” and “10s.” You will need a pair for each “bank.” Each bank will need to have a set of place value blocks or math cubes (manipulatives) to use for money.

## Introductory Activity

**Step 1: Play** the video clip, “Segment 6: Trains (Addition and Subtraction)” (03:53), from the video, “Math Investigations, Part One” (26:00). As a **Focus for Media Interaction**, ask students to copy the problem on their boards and follow along with the steps as it is solved. They will continue to use their individual boards to work with the problem throughout the solution in the video clip.

**Step 2: Pause** the clip as the subtraction problem appears written on the screen (70 cars minus 27 cars). Say, “Uh, oh! We have a problem here. Who knows what it is?” (Answers will vary but look for “You can’t take 7 away from 0.”) You reply, “We have to borrow or regroup to solve this problem. Here’s an easy way to remember what to do.”

**Step 3:** Direct the students to learn the adage that you have placed on a large poster on the wall that says: “More on top, no need to stop! More on the floor, you gotta go next door and get 10 more! Number’s the same? Zero’s the game.” You could even introduce it as a rap lyric for interest.

**Step 4:** Ask the children, “How does our rap help us decide what to do here?” “Do we need to stop or do we need to go next door?” (Answer: Go next door and borrow 10 more.)

**Step 5: Play** more of the video clip that reveals that we have to regroup one 10 and then add that 10 to the 1s column. Make sure students are following these transactions on their own boards. Stop at each maneuver if necessary. Do not play the video clip to the conclusion of the problem’s solution. Stop after the part of the video clip that subtracts the 7 from the 10. (I do not like to introduce the concept of subtracting 20 from 60 at this point.) Have the students finish the problem on their own and then hold up their boards for you to check for success.

**Step 6:** Show the first problem from your regrouping PowerPoint presentation. Direct the students to use the adage that you taught in the first step. Ask the children, “How does our rap help us decide what to do here?” “Do we need to stop or do we need to go next door?” etc. After a few of these problems, you will be able to tell whether students have grasped the concept of applying the adage to the problem at hand.

## Learning Activities

### Session 1

**Step 1:** Tell students we will be watching a video clip about how to add two-digit numerals. As a **Focus for Media Interaction**, ask them to pay attention to the steps in the process and be prepared to discuss the similarities and/or differences between subtraction and addition.

**Step 2: Play** the video clip, “Addition Using 100s, 10s, and 1s” (03:53), from the video, “Mathica’s Mathshop: Merry Band” (15:00).

**Step 3:** At the point where Mathica says, “This calls for my trusty group of 10s,” **pause** the clip. Prompt students to be ready with their materials. As a **Focus for Media Interaction**, instruct the students to follow after Mathica with their own cubes using 58 and 64 as the addition problem we are working on. **Play** the clip.

**Step 4: Pause** the clip when Mathica says, “There’s a group of 10 in there. I must make a trade.” Watch that students see the 10 cubes they have out of the 12 “1s” they have gathered.

**Step 5: Play** the clip to the part where she exchanges for a 10 rod and places it above the 10s column. Watch to see if your students are following her action with the 10 rod (it is placed above the 10s column).

**Step 6:** Let the video clip play out with the regrouping to the 100s column. Talk to the students about the 100s column being the same concept as carrying to the 10s column.

**Step 7:** Start the PowerPoint presentation that you created with the addition and subtraction problems found at <http://www.rhlschool.com/worksheet.php4?option=add1> and <http://www.rhlschool.com/worksheet.php4?option=sub1>. Have the students write on their individual boards whether or not they have to regroup. Check their boards for accuracy as they hold them in the air facing you.

**Step 8:** As you notice that the rate of success is sufficient to move on from the regrouping concept, continue using the PowerPoint presentation to help students practice regrouping with the cubes. Make sure you are alternating from borrowing to carrying as a regrouping strategy. Actively walk among the students to advise them as they proceed and check for understanding.

### Session 2

**Step 1:** (This session of the lesson could be organized as a station in the classroom if that is a strategy you employ for students’ activities.) Take the students to the computer lab or direct them to computers you may have set up in your room. As a **Focus for Media Interaction**, have the students use their individual marker boards to follow your steps as you demonstrate so that students can see that each step in the operations must be entered into the boxes and carrying

positions for the train to leave the station. Before you go on to the next step on the Internet site, check their boards for the correct number that they will later put in boxes online.

**Step 2:** On the presentation computer for the large group, demonstrate an addition and subtraction problem from these Internet sites: <http://www.dositey.com/addsub/as85/add3r.htm> and <http://www.dositey.com/addsub/subra4.htm>.

**Step 3:** On their own computers, direct the students to pull down to the Internet bookmarks you made ahead of time to <http://www.dositey.com/addsub/as85/add3r.htm> and <http://www.dositey.com/addsub/subra4.htm>. At these sites, students are to enter numbers into the blocks as the problem progresses, step by step. Each student needs to practice completing five subtraction problems and five addition problems.

## Culminating Activity

**Step 1:** Students will practice their skills at regrouping in this activity by acting as “bankers” and “customers.” One banker sits behind a table in the 1s place and one banker sits behind the same table in the 10s place. The rules for a banker are simple — they may not hold more than 9 or less than 0 at a time. Bankers can accept deposits (addition) or withdrawals (subtraction) of the place the banker is holding. The banker must make trades with the other bankers that work to solve the transaction. The 1s banker may group 10 “1s” and “carry” them to the 10s banker or borrow from the 10s banker to make a withdrawal.

**Step 2:** The bankers are given 99 place value blocks (manipulatives). As each customer approaches the bankers, they make transactions using the deposit or withdrawal slip they have been given by the teacher. Using the two-digit number on the slip, the customers must decide whether they are to add or subtract and then if they have to regroup from the banker’s balance.

**Step 3:** Once the bank is broken (can no longer make a transaction or you can declare a time limit), reverse roles and have the bankers become customers and vice versa.

## Cross-Curricular Extensions

### English and Language Arts

- Read “Ten Sly Piranhas” by Victoria Chess. Have students use the format of the story to create their own story using equally sly creatures to portray two-digit subtraction problems. “The Doorbell Rang” by Pat Hutchins is a picture book title to use to teach addition.

### Social Studies – Geography

- Using maps from your county and/or state, ask students to locate key places they would like to visit, plot a round trip route, add up the distances between all the points and report on how many miles their state or county vacation would cover.

## Community Connections

- Bank representatives may visit your class with authentic withdrawal and deposit slips and pose problems for the children to solve.
- Manufacturing workers or shelf stockers in retail may demonstrate the packing of materials into sets of 1s and 10s.

### Regrouping Examples for the PowerPoint Presentation (Introductory Activity)

1.                      2.                      3.                      4.                      5.

$$\begin{array}{r} 89 \\ -14 \\ \hline \end{array}$$
$$\begin{array}{r} 17 \\ -7 \\ \hline \end{array}$$
$$\begin{array}{r} 60 \\ -2 \\ \hline \end{array}$$
$$\begin{array}{r} 11 \\ -9 \\ \hline \end{array}$$
$$\begin{array}{r} 98 \\ -67 \\ \hline \end{array}$$

6.                      7.                      8.                      9.                      10.

$$\begin{array}{r} 55 \\ -15 \\ \hline \end{array}$$
$$\begin{array}{r} 33 \\ -21 \\ \hline \end{array}$$
$$\begin{array}{r} 94 \\ -64 \\ \hline \end{array}$$
$$\begin{array}{r} 13 \\ -12 \\ \hline \end{array}$$
$$\begin{array}{r} 99 \\ -15 \\ \hline \end{array}$$