## Numbers Away

Summary
This lesson provides a compilation of activities for several subtraction strategies that may be used throughout the year.

## Main Core Tie

Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT.7
Additional Core Ties
Mathematics Grade 2
Strand: OPERATIONS AND ALGEBRAIC THINKING (2.OA) Standard 2.OA.1
Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT. 9
Materials
Number Line

- Number Line

Counters or markers
Fishing for Less
Deck of cards with face cards removed, or 1-10 number cards
Count Back the Dots
Two dice (one marked with the numerals $4,5,6,7,8,9$; the other marked with, two each of, one dot, two dots, three dots, in the formation of regular dot dice.) If blank dice are not available, use 3 " $x$ 5 " cards to make two sets of dot cards and numeral cards. Place the numeral cards in one pile and the dot cards in another.

- Count Back the Dots worksheet

Literature Subtraction
Book, song, or finger play
Paper
Pencil
Concentration Game

- Subtraction Doubles Concentration Cards

Double Toss

- Double Toss Board

Counter or coin

- Double Toss Tracking Sheet Pencil
Tic-Tac-Toe
Paper
Pencil
Chips/counters (2 different colors)
- Spinner 1-9

Three Strikes

- Spinner 1-10
- Three Strikes game board

Markers/chips
Climbing Up the Number Line

- Number Line

Count the Missing Objects
Small objects (cubes, paper clips, beans, etc.)
Additional Resources
Books

- Subtraction Action
, by Loreen Leedy; IBSN 0-8234-1307-1
- Ten Little Garden Snails
, by Beverley Randell; ISBN 0-4350-4932-1
- Ten Sly Piranhas
, by William Wise; ISBN 0-590-48123-1
- Five Little Sharks Swimming in the Sea , by Steve Metzger; ISBN 0-439-59228-3
- Elevator Magic
, by Stuart Murphy; ISBN 0-644-6709-0
- Tic-Tac-Toe Three in a Row
, by Judith Bauer Stamper; ISBN 0-590-39963-2
- Hershey's Kisses Subtraction Book
, by Jerry Pallotta; ISBN 0-439-33779-8
- Shark Swimathon
, by Stuart Murphy; ISBN 0-064-46735-X
- Monster Musical Chairs
, by Stuart Murphy; ISBN 0-064-46730-9
- Little Number Stories Subtraction
, by Rozanne Lanczak Williams; ISBN 1-57471-008-7


## Background for Teachers

Using subtraction strategies helps children understand and learn the basic facts.
Examples of subtraction strategies:
Subtracting 0
Counting back 1, 2, 3
Subtracting doubles
Subtracting from 10
Counting up
These strategies should be taught and re-taught using many different methods and manipulatives. Herein is not a single lesson, but a compilation of activities for several of the strategies that may be used throughout the year.

## Intended Learning Outcomes

1. Demonstrate a positive learning attitude.
2. Understand and use basic concepts and skills.
3. Communicate clearly in oral, artistic, written, and nonverbal form.

Instructional Procedures
Invitation to Learn

Ask the question, "How many more (or less) girls than boys are there in our class?" Other examples may include, "How many students have long sleeves/short sleeves?" "How many students have shoes that lace/don't lace?," etc.
Have the girls in the class stand in a straight line. Have a boy stand beside a girl, becoming her partner. Any student who does not have a partner stands in a separate group. The students can now see which group has more.
Instructional Procedures
Counting Back
Counting back is a strategy used for subtracting. Students start with the largest number and count back the number being subtracted. This is an efficient strategy when subtracting 1,2 , or 3 .
Counting Back 1, 2, 3
Have the class count back from 10 to 0 .
Say a number. Ask students to tell you what number comes before it. Explain that the number before is 1 fewer, or 1 less. Use the terms 1 fewer and 1 less interchangeably, as students need to understand both terms.
Show multiple subtraction problems using subtract 1 (e.g., 10-1=9,5-1=4).
Repeat the activity using subtract 2 and subtract 3 .

## Use Number Line

Have students place a counter on a number on the number line.
Have students move their counter down 1 less.
Have them say the equation (e.g., 8-1=7).
Repeat this activity, subtracting the numbers 1,2 and 3 .
Fishing for Less-Variation on 'Go Fish'
Students play in groups of two to four.
Each student is dealt 5 cards. The remaining cards are placed facedown in a pile.
The first student chooses a card from his/her hand. S/he asks a partner if $\mathrm{s} / \mathrm{he}$ has a card that is one less (e.g., If the student has a $4, \mathrm{~s} / \mathrm{he}$ would ask, "Do you have a card that is 1 less than 4 ?" If player 2 has a $3, s /$ he gives that card to the first player.). The first player places the match in front of him/her and continues to play until s/he can no longer get a card that is one less than a
card in his/her hand. S/he then draws a card from the pile and his/her turn is over.
The game is over when all of the draw pile is gone and students can no longer make a match from cards in their hand.
Count Back the Dots
The addition version of this game, It's A Fact!, was introduced during the 2004 Elementary CORE Academy.

Students play in groups of three.
Before playing the game, students need to spend time rolling the dice (explained in Materials) and counting back. Start with the die marked with the numerals and count back the dots on the other die. After some practice, ask the class to determine the smallest and largest number that can be rolled with these dice. Have them predict which total they think will come up most often if they roll the dice 30 times. Have them explain their thinking.
Give each group one set of dice and one Count Back the Dots worksheet.
One student rolls the dice, another determines the total, and the third marks the tally by the appropriate number and records the roll. After ten rolls, the children rotate duties so that by the end of 30 rolls each student has participated in each task.
After 30 rolls, students count the tallies for each number and record it on the bar graph at the bottom of the worksheet.
Record each team's totals on a class graph. Did any team correctly predict which total would
come up most often? Discuss why the graph looks the way it does. Do any of the individual team graphs look like the class graph? Would the graph look the same if the game was played again?

## Literature Subtraction

Find a book, finger play, or song that counts back one at a time. Some examples include "Ten in a Bed," "Ten Little Monkeys," or Ten Sly Piranhas.
Sing or read for enjoyment first.
Give each student a piece of paper and sing or read it again.
Have the students write an equation each time a 1 is taken away.
Students write the equations in a column so they can easily see the patterns (e.g., 10-9 = 1, 9 -
$1=8$, etc.).
Subtracting Doubles
Concentration Game
Students play in groups of two to four.
Place all of the cards face down on a flat surface in a 4 by 6 array.
The first player turns over an answer card. S/he must tell his/her partner what "subtracting doubles" problem they are looking for.
Example: If a 3 is drawn, they say, "If I double 3 , I get 6 , or $3+3=6$, so the subtracting doubles problem that l'm looking for is 6-3." A partner states whether s/he agrees or disagrees. If s/he agrees, the player turns over a subtraction problem card. If it is a match, $\mathrm{s} / \mathrm{he}$ keeps the cards and it is the next player's turn. If it is not a match, the cards are turned back over and play moves to the next person.
Play continues until all cards have been matched.
Double Toss
Students play in groups of two to four.
The first player tosses a counter onto the Double Toss Board . S/he uses that number to create a subtraction sentence using doubles. For example, if $s /$ he lands on the number 12 , the student says, "12-6 = 6." (If the student lands on a line, use the number that the counter touches the 'most.') If the number sentence is correct, the student places an " $X$ " on the number 12 on his/her Double Toss Tracking Sheet or a scratch paper with even numbers 2-18 written down.
The second student then takes his/her turn and play continues
until one player has marked off all the numbers.
Subtracting from 10
Tic-Tac-Toe
Students play in groups of two.
Draw a Tic-Tac-Toe board and place one number in each space. Use every number 1-9.
Each player chooses a different color of chips.
The first player spins the spinner and subtracts that number from 10. After the student has solved the subtraction problem, s /he places a chip on the correct number on the game board. The next player spins the spinner, solves the problem, and places his/her color of chip on the game board. If the number is already covered, the student looses a turn. The game continues until a player has Tic-Tac-Toe-three in a row. If there is no three in a row, the student with the most chips on the board is the winner.

## Three Strikes

Students play in groups of two to four.
The first player spins the spinner and subtracts that number from 10. That player places a chip on that number on their Three Strikes game board. The next player then takes his/her turn. If a student is unable to cover a number because it is already covered, s/he places a chip on a strike. The game continues until all of a student's numbers are covered, or a student has three
strikes. The student with the most chips on his/her board wins.
If the game ends because a student covers three strikes, the player with the most chips wins (not counting the student with the three strikes).
Counting Up

## Climbing Up the Number Line

Give each student a number line.
Say two numbers and have the students point to them on their number line. Have them determine the smaller of the two numbers.
Have students count up numbers as they move their left finger to join their right finger. Remind them that this is the difference between the two numbers.
Repeat with many different pairs of numbers.
Count the Missing Objects
Play with a partner.
Have students place a group of small objects in front of them (for this example use 15). One partner counts the objects, then closes his/her eyes.
The other player removes some of the objects (e.g., 6). The first player counts up to find the number of missing objects (e.g., 9 are left, start at 9 count up 10,11,12,13,14,15. We counted 6 numbers, 6 is the number of missing objects).
The second player takes his/her turn.
Have them practice many times.

## Extensions

Write the directions to one of the games you have learned.
Write about and describe a favorite strategy for subtraction and why it works for you.
Give instructions for games, individually or in smaller groups, providing one step at a time.
When appropriate, use smaller numbers and gradually increase.
Monitor students at the various games to review directions and rules.
Family Connections
Teach and play these games with your family.
Teach a family member these subtraction strategies.

## Assessment Plan

Have students write and illustrate a story problem.
Create a short quiz using the counting back strategy.
Observe students while they are participating in the activities.
Bibliography
Research Basis
Isaacs, A., Carroll, W. (1999). Strategies for Basic Fact Instruction. Teaching Children Mathematics, 508-514.
This article includes research about how facts should be taught, common strategies used by children to learn facts, the place of practice in learning basic facts, a sequence for teaching facts, and how fact knowledge should be assessed. (Research was conducted at the University of Chicago School Mathematics Project.)

## Authors

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