## It's a Fact!

Summary
This lesson contains many student activities to help students master addition and subtraction skills.
Main Core Tie
Mathematics Grade 2
Strand: MEASUREMENT AND DATA (2.MD) Standard 2.MD. 10

## Additional Core Ties

Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT. 5
Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT. 9

## Materials

Counting On
For every group of three children:
Two dice (One marked with the numerals $4,5,6,7,8,9$; the other marked with one dot, two dots, three dots in the formation of regular dice dots.) If blank dice are not available, use $3^{\prime \prime} \times 5$ " cards to make two sets of the numeral cards and four sets of the dot cards. Place the numeral cards in one pile and the dot cards in another.

- Count the Dots worksheet (pdf)

Doubles
Mirrors
Dominos
Doubles and Doubles +1: Slap It Fast

- Slap It Fast
paddles
- Slap It Fast Number Cards (pdf)
- Slap It Fast Team Boards (pdf)

Combinations of 10
Egg cartons cut into ten-frames

- Ten-frames (pdf)

Two-sided counters
Unifix cubes
Playing cards or number cards
Combinations of 10: Fishing for Tens
Playing cards ace through 9 or Fishing For Tens Number Cards 0 through 10 (pdf)

- Fishing for Tens worksheet (pdf)

Bridging 10
Egg carton cut into tenframes
Counters
Pipe cleaners
Beads
Fact Families
Dominos--the higher the number, the bigger variety of practice

Dice--the higher the number, the bigger variety of practice Unifix cubes

- Dice Fact Families worksheets (pdf)
- Domino Fact Families worksheets (pdf)
- Unifix Cube Fact Families worksheets (pdf)

Triangular flash cards
Number cards 0-10

- Fact Families worksheet (pdf)

Additional Resources

- Mission: Addition
, by Loreen Leedy; ISBN 0-8234-1307-1
- Subtraction Action
, by Loreen Leedy; ISBN 0-8234-1454-X
- Counting Crocodiles
, by Judy Sierra; ISBN 0-1520-0192-1
- Domino Addition
, by Lynette Long; ISBN 0-590-33027-6
- Ten Sly Piranhas
, by William Wise; ISBN 0-8037-1200-6
- Elevator Magic
, by Stuart Murphy; ISBN 0-0644-6709-0
- Two of Everything
, by Lily Toy Hong; ISBN 0-8075-8157-7
- Double the Ducks
, by Stuart Murphy; ISBN 0-0644-6249-8
- 10 For Dinner
, by Jo Ellen Bogart; ISBN 0590731734
- Ten Dirty Pigs
, by Carol Roth; ISBN 0-7358-1569-0


## Background for Teachers

There is an order of teaching addition strategies that is beneficial to helping children understand and learn the basic facts. It is:
counting on
doubles
combinations of 10
doubles +1
bridging 10
in-betweens
These same strategies work for subtraction, with the addition of the counting back strategy and fact families.
These strategies should be taught and retaught using many different methods and manipulatives. Herein is not a single lesson, but a compilation of activities for several of the strategies that can 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
Literature is always an enticing way to introduce math concepts. We are fortunate to have an abundance of quality math literature to choose from. Here are a few suggestions of how to introduce these fact strategies.
Concept of Addition and Subtraction
Mission: Addition, by Loreen Leedy
Subtraction Action, by Loreen Leedy
Counting On
Counting Crocodiles by Judy Sierra
Domino Addition, by Lynette Long
Counting Back
Ten Sly Piranhas, by William Wise
Elevator Magic, by Stuart Murphy
Doubles
Two of Everything, by Lily Toy Hong
Double the Ducks, by Stuart Murphy
Making Tens
10 For Dinner, by Jo Ellen Bogart
Ten Dirty Pigs, by Carol Roth
Instructional Procedures
Counting On--Count the Dots
Counting on is the first and simplest addition strategy. Children learn to start at one of the addends, which may be a number other than one, and count on from there. Eventually they are able to see the advantage of starting with the largest number and counting on from there. This strategy is most effective when the addends are small: 1, 2,
or 3 . It can be used with larger numbers, but is not as efficient.
Before playing the game, children need to spend some time just rolling the dice (explained in Materials) and counting on, starting with the die marked with the numeral, and counting on with the die with the dots. After some experience, ask the class to determine the smallest and largest number that can be rolled with these dice. Then ask them to 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 the Dots worksheet.
One child rolls the dice, another determines the amount, 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 child has participated in each task.
After 30 rolls, the children count the tallies for each number and record on the bar graph at the bottom of the worksheet.
Record each team's totals on a class graph. Discuss if any team predicted correctly which total would come up most often. Discuss why the graph looks the way it does. Does the class graph look like the individual team graphs? Would it look the same if we played the game again?
Doubles
Doubles are facts in which both addends are the same. Children find the double facts easy to remember. This is an important strategy because the doubles can work as landmark or benchmark facts that can help children to find answers to other related facts, such as doubles +1 and inbetweens. Doubles +1 are facts in which one addend is one more than the other $(3+4,7+8)$. Inbetweens are facts in which one addend is two more than the other; the number in between them is
doubled to find the sum $(6+8=7+7)$
Any game that uses dice can be adapted so that it involves doubles. Simply use one die doubled instead of two.

Mirrors and counters can be used to write equations for doubles. Partners put counters in front of a mirror so that both the objects and their reflections are visible. Then they write an equation for what they see.
Double dominos can also be used for writing doubles equations.
The activity from the 2nd Grade 2003 Elementary CORE Academy Handbook entitled "Our Class and the Magic Pot" is an excellent way to discover doubles. This activity uses the book Two of Everything.
Doubles and Doubles +1: Slap It Fast

## Whole Class

Spread Slap It Fast Number Cards (p. 8-11) in random order, in a pocket chart, or attached to white board.
Divide class into two teams. One person from each team comes to the front with a paddle. Caller says a number. Players mentally double the number, find it on the Slap It Fast Team Board (p. 8-18) and slap it with the paddle. The first player to slap the number gets a point for his/her team.
This activity can be extended to doubles +1 . Players mentally double the number and add 1. For groups of three
For this game, it is a good idea to match children by ability.
Two children have mini-paddles, one calls the number.
Use the Slap it Fast Team Boards.
Combinations of 10
Combinations of ten are any facts that have a sum of 10. These are also landmark facts that can help children find related facts. (If $7+3=10$, then $7+4=11$ )

Egg cartons cut into a ten-frames are helpful in finding combinations of ten when used with twosided counters (see Tenframes). A counter can be placed in each compartment with the same color showing. Record the equation $10+0=10$. Turn counter in bottom right-hand corner over. Record equation $9+1=10$. Continue turning one counter at a time and recording until all counters have been turned. Ask children if they have found all combinations of ten.
The activity above can also be done with 20 Unifix cubes in two colors of ten each. Start with a train of ten in one color and record equation. Trade one cube for a different color and record again. Continue until train is completely the other color.
Play concentration with playing cards, using the ace through nine, or number cards zero through ten. Place in a $4 \times 4$ array. Children take turns turning over two cards at a time. If the sum of the cards is ten, it is a match and the child keeps the cards. The empty spaces are filled with two cards from the draw pile. Play continues until all cards have been matched.
Use ten-frame flashcards. Flash a card for three seconds. Use the card in any of these ways:
Have students tell you how they "saw" the number.
Have students tell you the missing number.
Flash two cards. Have students tell you how they recombined the numbers to get the total. Combinations of 10: Fishing for Tens

## Four players

Players are each dealt five Fishing For Tens Number Cards. The rest of the cards are spread out into a "pond." Any pairs that total ten are immediately matched and replaced with cards from the "pond." The matched pairs are placed in front of the player to be counted at the end of the game.
Players take turns asking each other for a card that will help them make a ten. If the player
asked has the card, the player whose turn it is gets another turn. If not, $\mathrm{s} /$ he must take a card from the pond.
If a card drawn from the pond is the card originally asked for the player gets another turn. If the card makes a ten with another card in the hand, it can be placed in the pile with the other matches but play moves on to the next player.
Play continues until all cards have been matched. The player with the most matches is the winner.
Each player must then record all their matches in the form of equations on the Fishing For Tens worksheet.
Bridging 10
The facts assisted by this strategy are those in which one addend is close to ten (7, 8, 9). In this strategy, the child mentally moves partial value from one addend to the other to make a ten, thus making the fact easier to solve ( $5+9=4+10$ ).

The egg carton as a ten-frame can also be used effectively for this strategy. Children can build the fact with counters by putting the larger number in the ten-frame and the smaller number outside of it. Then they rebuild the fact by taking counters from the outside number and filling the ten-frame to make a ten.
Build a bridging ten tool by stringing ten beads of one color and then ten beads of another color onto a pipe cleaner. Turn up and twist the ends so the beads don't come off. Start with the largest addend and show it with beads. Leave a space and count out the smaller addend. Move the beads of the first color together to show a new fact using ten.

## Fact Families

This strategy helps children to see the commutative property of addition as well as the inverse operation of subtraction. Children begin to see the relationship between addition and subtraction. The more exposure children have to the two or three numbers involved in each fact family, the more comfortable they become with facts, particularly
subtraction facts.
Dominos, 12 -sided dice, and Unifix cubes are all good manipulatives for exploring fact families. Dice Fact Families, Domino Fact Families, and Unifix Cube Families worksheets are good practice for each of these tools.
Triangular flash cards are also helpful in reinforcing fact families. Each number in the family is written in one of the vertices of the triangle, with the two smaller numbers written in black and the larger number written in red. These may be used in several ways. At first, the children may use them to write 4 equations for the family represented by the card. Later, they can be used to find the missing number by covering any of the vertices.
Using two sets of cards numbered from zero to ten, children can work in pairs to draw two cards and fill in the Fact Families worksheet. This activity can also be done with dominos, using each side of the domino as an addend.
Use children's names, spelling words, vocabulary words, or special unit words to make fact families--\# of vowels, \# of consonants, total \# of letters.

## Strategies for Diverse Learners

For Learners with Special Needs
Give instructions for games, individually, one step at a time.
When appropriate, use smaller numbers and gradually increase.
In Fishing for Tens activity, give a "cheat' sheet with combinations of ten.

## Extensions

Writing Connections
Math Journals Entries
Write the rules to one of the games you have learned.
Write about and describe a favorite strategy for adding and why it works for you.
For the Counting Crocodiles book: How many crocodiles did the monkey trick? Use words, pictures, and numbers to explain.
Class Books
Two of Everything-I put $\qquad$ in the magic pot and I took out $\qquad$ .
Elevator Magic-l'm on Floor $\qquad$ and I want to go down to Floor $\qquad$ . On that Floor I found $\qquad$ .
Family Connections
Teach games to family.
Teach strategies to family.
Make a fact family using family members (\# of girls, \# of boys, total \# in family).
Assessment Plan
Observation of children while participating in any of the activities. Journal entries from Possible Extensions/Adaptations/Integration.

Authors
Utah LessonPlans

