Using Ten to Solve Harder Problems

Playing a Game

In this lesson "make-a-ten" strategy is introduced through a game. There are two different games in this lesson. Both games address the same standards and have the same rules. *Play Ball* takes longer to completely cover the gameboard.

NC Mathematics Standard:

NC.2.OA.2 Demonstrate fluency with addition and subtraction, within 20, using mental strategies.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100 by:

- **Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.**
- **Comparing addition and subtraction strategies, and explaining why they work.**
- **Selecting an appropriate strategy in order to efficiently compute sums and differences.**

Standards for Mathematical Practice:

2. Reason abstractly and quantitatively.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Student Outcomes:

I can add two numbers and use tens to find the sum.

Math Language:

What words or phrases do I expect students to talk about during this lesson?

tens, sum, strategy, teen numbers, make a ten

Materials:

- Game board for each pair of students.
- Deck of number cards for each pair of students, numbers 0-10, four of each number
- Transparent counters, two colors

Advance Preparation:

1. Copy the game boards.
2. Make the game cards.

Launch: 5-10 minutes

1. Introduce the game **Snowballs** or **Play Ball**. Ask students what they notice about the board. Most will notice that all the circles have a ten and a number is added to it. Ask students to share ways they would solve these problems. Highlight that there is a pattern to adding a number to ten. Write the problems on the board and have students examine the patterns.
2. 10 + 0 = 10 10 + 1 = 11 10 + 2 = 12 10 + 3 = 13 10 + 4 = 14 10 + 5 = 15
   10 6 = 16 10 + 7 = 17 10 + 8 = 18 10 + 9 = 19 10 + 10 = 20
3. Explain that today we are going to play a game that helps us use our ten plus a number facts to solve other problems.
4. Explain the rules of the game.
5. Play a few rounds with the class. As students solve the problems emphasize that we are using our ten facts to solve "teen" problems. For example, if 5 + 7 is drawn, we can think of 5 + 5 + 2 to solve the problem.
6. It may be helpful to record strategies so students have a visual model. For example, 8 + 3 could be shown as

   8 + 3 =

   1 7

   7 + 3 = 10

   10 + 1 = 11

   Record several examples as cards are drawn.
7. The class may need to play an entire game together to understand the strategy used to solve these problems. If you feel that the students need to play the entire game together, this "launch" will be your entire lesson. Tomorrow's lesson will be a review of the game and using tens strategy, and then they will play the game with a partner.

Explore:

1. Pair students and have them play the game with a partner.
   As the students are working, listen to their conversations. Look for strategies that will generate discussions to help others move toward a deeper understanding of the mathematical goal.
   a. Are they discussing how to use tens to solve the problem?
   b. Are they sharing their strategies with their partner?
   c. Do some students automatically know some of these facts?
   d. Are students using other related facts to solve problems? For example, 8 + 9 could be thought of as 8 + 8 + 1. During the share time, have students share other ways they are solving the problems.
   e. What vocabulary are they using as they discuss their strategies?
2. Observe how students organize and represent their thinking.

Discuss: 10 minutes

1. Bring the group back together and have selected students share their strategies for solving the teen facts. As they share strategies relate the strategies to using ten facts to solve harder facts.

2. Model on chart paper or the board how students are breaking apart the numbers. (See example above.)

Additional Activities

1. Have students play these games multiple times to strengthen their understanding of using tens (or other strategies) to solve harder addition problems. Playing a game once is not enough to build this understanding. They need multiple experiences.

Evaluation of Student Understanding

Informal Evaluation: Observe the students as they play the game. Write notes about their strategies.

Formal Evaluation/Exit Ticket: The activity sheet can be used as an exit ticket.

Meeting the Needs of the Range of Learners

Intervention: Check to see if students know their ten facts. If not, play making ten games such as *Tens Go Fish.* (Directions follow on next page.)

Possible Misconceptions/Suggestions:

Possible Misconceptions	**Suggestions**
• Some students may not know the ten facts and cannot use them to solve the teen facts. • Students break numbers in to smaller parts but the parts are not helpful. For example $8 + 3 =$ $6 \quad 2$ This break apart does not use the make a ten strategy.	• In a small group have students play games for making tens or practice the ten facts with flashcards. • Practice breaking numbers apart to make tens. After making sure the students know their ten facts, give students an equation such as 7 + 8. Ask how to break the 7 apart (or 8) to make a ten with the 8. Ask what goes with 8 to make a 10. Do this many times. Using Unifix cubes to model the process may help.

Intervention: Check to see if students know their ten facts. If not, play making ten games such as *Tens Go Fish.*

Tens Go Fish

Materials: Deck of Number Cards 0-10 (four of each) with the wild cards removed
Players: 3 to 4

How to Play: The object of the game is to get two cards that total 10.
1. Each player is dealt five cards. The rest of the cards are placed face down in the center of the table.
2. If you have any pairs of cards that total 10, put them down in front of you and replace those cards with cards from the deck.
3. Take turns. On a turn, ask one player for a card that will go with a card in your hand to 10.
   * If you get a card that makes 10, put the pair of cards down. Take one card from the deck. Your turn is over.
   * If you do not get a card that makes 10, take the top card from the deck. Your turn is over.
   * If the card you take from the deck makes 10 with a card in your hand, put the pair down and take another card.
4. If there are no cards left in your hand but still cards in the deck, you take two cards.
5. The game is over when there are no more cards.
6. At the end of the game, make a list of the number pairs you made.

Play Ball!

Purpose:
Make a ten strategy
Make equations of equivalent expressions

Materials:
Number cards (four copies of numbers 0-10)
Game board
Counters—transparent

Directions:

1. Place a deck of cards facedown between two players.
2. Each player turns over a card.
3. Together they determine the sum of the two cards.
4. After determining the sum they decide which baseball on the game board to place the counter. For example if 7 and 8 are drawn cover the baseball that is labeled 10 + 5.
5. If the sum of the two cards is less than ten, place the cards back in the deck and reshuffle.
6. The game is over when all the cards have been played or the remaining cards cannot be played.

Snowballs

Purpose:
Make a ten strategy
Make equations of equivalent expressions

Materials:
Number cards (four copies of numbers 0-10)
Game board
Counters—transparent

Directions:

1. Place a deck of cards facedown between two players.
2. Each player turns over a card.
3. Together they determine the sum of the two cards.
4. After determining the sum they decide which snowball is equivalent. For example if 7 and 8 are drawn place the counter on the snowball labeled 10 + 5.
5. If the sum of the two cards is less than ten, place the cards back in the deck and reshuffle.
6. The game is over when all the cards have been played or the remaining cards cannot be played.

Activity Sheet

Tom is playing "Play Ball!" He picked up the 6 card and the 7 card. How can he use tens to solve 6 + 7 = ?

Show your strategy?

Kerry is playing the same game as Tom. She draws two cards. The cards are 9 and 4. How can she use tens to solve 9 + 4 = ? Show your strategy.

Serena is playing "Play Ball!" She picked up the 4 card and the 8 card. How can she use tens to solve 4 + 8 = ? Show your strategy.

Play Ball!

10+0

10+1 10+1

10+2 10+2 10+2

10+3 10+3 10+3

10+4 10+4 10+4 10+4

10+6 10+6 10+7 10+7

10+0

10+1 10+1

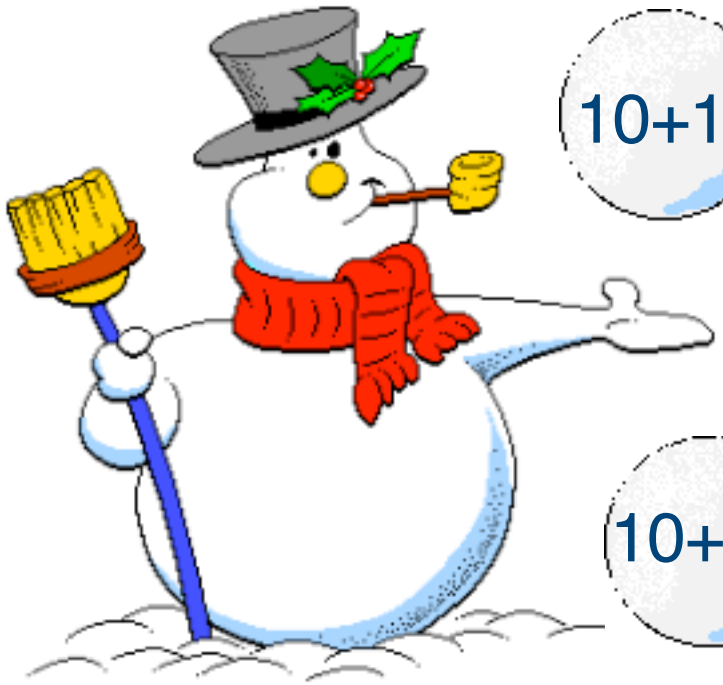
10+2 10+2 10+2

10+3 10+3 10+3

10+5 10+5 10+5 10+5

10+8 10+8 10+9 10+10

Snowballs



10+0

10+1 10+1

10+2 10+2 10+2

10+3 10+3 10+3

10+4 10+4 10+4 10+4

10+5 10+5 10+6 10+7 10+8

10+9

10+10