

Equal or Not Equal

NCTM Standards 1, 2, 3, 4, 6, 7, 8

Common Core State Standards 1.OA 1, 3, 4, 6, 7, 8, 1.NBT 4

Lesson Planner

STUDENT OBJECTIVES

- To understand the meaning of the equal sign
- To determine whether equations involving addition and subtraction are true or false

1 Daily Activities (CCRG p. CC 15)

Open Ended Problem Solving/Headline Story

Skills Practice and Review—
More or Less


2 Teach and Practice (CCRG p. CC 16–CC 18)

A True or False (CCRG p. CC 16)

B Playing a Game: Heads or Tails?
(CCRG p. CC 17)

C Identifying and Creating True and False Sentences (CCRG p. CC 18)

MATERIALS

- coins, cups, folders
- index cards, two per child
- counters (optional)
-  LAB Masters, CCRG pp. CC 20–CC 21

3 Differentiated Instruction (CCRG p. CC 19)

Leveled Problem Solving (CCRG p. CC 19)

Intervention Activity (CCRG p. CC 19)

Extension Activity (CCRG p. CC 19)

Practice Master, CCRG p. CC 22

Extension Master, CCRG p. CC 23

Lesson Notes

Lesson 11.4-1 has been added. Use Lesson 11.4-1 after children complete Lesson 11.4.

About the Lesson

In this lesson, children compare expressions in a particular way. Instead of using the symbols for less than, greater than, or equal, children will decide whether the expressions before and after the equal sign are equal or not equal. In other words, they will determine whether mathematical sentences are true or false.

About the Mathematics

The problems in this lesson review and preview properties of equality. It isn't necessary for you to point out and name these properties for your class. They are:

- The Reflexive Property:
For any expression x , $x = x$.
- The Symmetric Property:
For any two expressions x and y ,
if $x = y$, then $y = x$.
- The Transitive Property:
For any three expressions x , y , and z ,
if $x = y$ and $y = z$, then $x = z$.

Children will also see that if the same number is added to or subtracted from both sides of a true equation then the new equation will still be true.

1 Daily Activities

Developing Mathematical Language

Vocabulary: equal, not equal, true, false

Tell children that number sentences with an *equal* sign can be either *true* or *false*. If the amounts on both sides of an *equal* sign are the same, then the number sentence is *true*. If the amounts on both sides of an *equal* sign are not the same, then the equation is *false*. The amounts are *not equal*. Show examples of *true* and *false* number sentences and have children identify them.



Help English language learners understand the terms *true* and *false*.

Beginning Help children evaluate sentences in everyday vocabulary with the terms true and false. For example, say to a student wearing a red shirt, "You are wearing a blue shirt. Is that sentence true or false?"

Intermediate Ask children to give examples of true and false statements. Record their statements on the board with the word "true" or "false" beside each one.

Advanced Make a table with two columns marked "true" and "false" on the board. Have children give examples of true and false number sentences and record them in the table.

Open-Ended Problem Solving

Share this headline story with your class. Encourage children to give examples that match the story.



Headline Story

Taylor and Meg did not have the same number of marbles. Taylor gave Meg 2 of his marbles. Then they had the same number.

Possible responses:

If Taylor had 10 and Meg had 8... Wait! That won't work. Say Taylor has 12 and Meg has 8. Then if he gives her 2, she has 10 and he has 10. Taylor has to have 4 more marbles than Meg at the beginning.



Skills Practice and Review

More or Less

Tell the class that you are going to say a two-digit number. Then you will call on children and ask either for a number that is more than the number you said or a number that is less. You may call on two children after saying a single number, and get both a number that is more and a number that is less for the same number. You may want to keep track of the numbers that have been said, and add the rule that none of the numbers that have already been used can be used again.

2 Teach and Practice

whole class



15
MIN

Materials

- For each child:
2 index cards

NCTM Standards 1, 2, 3, 4, 6, 7, 8
CCSS 1.OA 1, 3, 4, 6, 7, 8, 1.NBT 4

Concept Alert

Some children may be confused by seeing sentences such as $2 + 2 = 6$ on the board. The idea of a false sentence can be a tricky one. You may want to cross out these sentences with a single line, as in $2 + 2 = \overline{6}$. Then children can still read the sentence, but it is clearly marked as false.

A True or False

Purpose To evaluate number sentences as true or false

Introduce Write the words “true” and “false” on the board. Ask children to read the words and to tell you what they know about them. Children will likely begin to give examples of statements that are true and false. Take some time to have children make cards with these words on them.

Task Making “true” and “false” cards. Give each child two cards. Have them copy the words “true” and “false” from the board, one on each card. You may want them to write the words in two different colors, for example writing “true” in green and “false” in red.

Practice Allow children to take turns at the front of the class. The child makes a statement and then the class shows either the “true” or “false” in response. At first, the statements can be about everyday things, such as the color of someone’s shirt, but help children transition to mathematical statements. Work toward number sentences with an addition or subtraction expression on both sides of the equal sign, such as the false sentence $2 + 7 = 8 - 3$.

Talk Math

- ❓ How do you know whether the number sentence $4 + 7 = 7 + 4$ is true or false? Possible answer: It’s the same amount on both sides. You can do the addition either way and you get the same answer, 11.
- ❓ Why is the sentence $8 - 3 = 7 - 2$ true? Possible answer: With $7 - 2$, you start with one less than 8, but you take away one less than 3, so it’s the same.

B Playing a Game: *Heads or Tails?*

small groups



20
MIN

Purpose To reinforce the meaning of the equal sign and practice identifying number sentences as true or false

Goal The object of this game, *Heads or Tails?*, is to identify addition and subtraction number sentences as either true or false. Have two or three children bring their “true” and “false” cards up to the front to help you demonstrate the game.

Materials Each group of four children needs one coin, one cup, one folder, and each child needs index cards marked “true” and “false,” as well as paper and a pencil.

How to Play

- 1 Choose one of the four players to be the first Sentence Writer. (You might suggest that the person whose name is last in alphabetical order go first, or use some other simple rule.) This player flips a coin using a cup, and hides the result from the other players with the cup.
- 2 The Sentence Writer will write either a true or false number sentence. The other players should not be able to see what is being written, so have the Writer use a folder to keep the other players from peeking. If the result of the flip was heads, the player writes a false number sentence using addition and/or subtraction, such as $4 - 1 = 3 + 2$. If the result is tails, the player writes a *true* number sentence, such as $2 + 2 = 5 - 1$.
- 3 The Sentence Writer shows the sentence to the other players. The other players quickly decide if the sentence is true or false. They show either their “true” or their “false” card to respond. The first player with the correct answer gets 1 point and becomes the next Sentence Writer.
- 4 Play continues until time is called. The player with the most points wins the game.

Materials

- For each group of 4 children: 1 coin, 1 cup, 1 folder
- For each child: 2 index cards, paper, pencil

NCTM Standards 1, 2, 3, 4, 6, 7, 8
CCSS 1.OA 1, 3, 4, 6, 7, 8; 1.NBT 4

Ongoing Assessment

As groups are playing, you may want to challenge some groups to try using larger numbers. Other children may need to use counters to help them visualize the number sentences.

C Identifying and Creating True and False Sentences

LAB Masters, CCRG pp. CC 20–CC 21

individuals



20 MIN

Purpose To identify number sentences as true or false, and to create examples of true and false number sentences

NCTM Standards 1, 2, 3, 4, 6, 7, 8
CCSS 1.OA 1, 3, 4, 6, 7, 8, 1.NBT 4

Lesson Activity Book Master, CCRG p. CC 20

Chapter 11
Lesson 4-1 **Equal or Not Equal**

NCTM Standards 1, 2, 3, 4, 6, 7, 8
Common Core State Standards 1.OA 1, 3, 4, 6, 7, 8; 1.NBT 4

1. Circle the **true** statements.
Cross out the **false** statements.

$5 + 2 = 5 + 2$	$6 - 3 = 7 - 3$	$9 + 4 = 9 - 4$
$10 + 6 = 11 + 7$	$12 - 9 = 10 - 7$	$3 + 8 = 8 + 3$
$10 + 6 = 9 + 7$	$15 - 8 = 5 - 3$	$23 - 9 = 24 - 10$
$17 + 36 = 17 + 36$	$21 - 7 = 20 - 6$	$20 + 1 = 10 + 2$
$16 - 7 = 16 + 7$	$30 + 4 = 20 + 14$	$8 + 17 = 10 + 15$
$48 + 9 = 9 + 48$	$40 - 18 = 40 - 18$	$10 + 13 = 23 - 1$
$60 + 8 = 50 + 18$	$30 + 6 = 40 + 16$	$84 + 12 = 12 + 84$

NOTE: Your child is learning to identify number sentences as "true" or "false." You may wish to use these words around your home, such as, "You made your bed this morning—is that true or false?"

Lesson Activity Book Master, CCRG p. CC 21

Complete each sentence to make it **true**.

2. $36 + 7 = 33 + \boxed{10}$

3. $24 - 8 = \boxed{26} - 10$

4. $85 + 16 = 16 + \boxed{85}$

Complete each sentence to make it **false**.

5. $18 - 9 = 10 - \boxed{6}$ Answer will vary and can be any number but 1.

6. $52 + 13 = \boxed{96} + 52$ Answer will vary and can be any number but 13.

7. $26 + 32 = 66 + \boxed{44}$ Answer will vary and can be any number but 8.

Problem Solving

8. Write a true number sentence to match this story.

Answers may vary.

Alice had 10 pencils.
She gave 6 of them to Ben.
Now she has 3 blue pencils
and 1 red pencil.

$10 - 6 = 3 + 1$

Teaching Notes for LAB Master, CCRG page CC 20

Encourage children to work quickly on this page. Rather than computing the value of the expressions on each side of the equal sign, children should use estimation skills and common sense to decide about most of the problems.

Ongoing Assessment As children are working, diagnose the problems they are missing or having difficulty with. Is the problem attention to detail? Are children having difficulty with regrouping ideas?

Teaching Notes for LAB Master, CCRG page 21

Be sure that children understand the directions for this page. In Problems 2 through 4, they are to complete each sentence with a number that makes the sentence *true*. In Problems 5 through 7, they are to complete each sentence with a number that makes the sentence *false*.

Problem Solving Children write a true number sentence similar to the ones they have been working with to match a story problem.

Reflect and Summarize the Lesson



How can you tell whether the sentence $13 - 8 = 3 + 10 - 8$ is true or false? Explain.

Possible answer: I can do the math on both sides of the equal sign. On the left you get 5. On the right you get 5. $5 = 5$ is true, so the original sentence is also true.

3 Differentiated Instruction

Leveled Problem Solving

$$38 - 9 = \square$$

1 Basic Level

Jan wrote $46 - 7$ in the box. Is Jan's sentence true or false? **False**

2 On Level

What number could you put in the box to make a true sentence? **29**

3 Above Level

Mike wrote an addition expression in the box to make a true sentence. What could Mike have written? **Answers will vary.**
Possible response: $20 + 9$

Practice Master, CCRG p. CC 22

True or False?

1. Circle the **true** statements.
Cross out the **false** statements.

$5 + 2 = 5 + 2$	$6 - 3 = 7 - 3$	$6 + 8 = 4 + 10$
$15 - 8 = 5 + 2$	$12 + 17 = 20 + 9$	$17 + 6 = 18 + 7$
$4 + 12 = 5 + 11$	$16 - 8 = 15 - 9$	$13 + 12 = 20 + 5$
$47 + 29 = 29 + 47$	$21 - 7 = 21 + 7$	$13 - 6 = 14 - 5$

Complete each sentence to make it **true**.

- $37 + 28 = \underline{28} + 37$
- $58 - 29 = 59 - \underline{30}$
- $\underline{57} + 25 = 70 + 12$
- $64 - \underline{38} = 66 - 40$
- $52 + 38 = \underline{80} + 10$

Extension Master, CCRG p. CC 23

Make It True

Fill in the blank to make the sentence **true**.

- $\underline{41} - 28 = 30 - 20 + 11 - 8$
- $74 - \underline{37} = 60 - 30 + 14 - 7$
- $26 - 19 = \underline{10} - 10 + 16 - 9$
- $43 - 24 = 30 - \underline{20} + 13 - 4$
- $55 - 38 = 40 - 30 + \underline{15} - 8$
- $81 - 63 = 70 - 60 + 11 - \underline{3}$
- $52 - 17 = 40 - 10 + \underline{12} - 7$
- $67 - 39 = 50 - \underline{30} + 17 - 9$
- $32 - 27 = \underline{20} - 20 + 12 - 7$
- $77 - \underline{58} = 60 - 50 + 17 - 8$
- $\underline{92} - 43 = 80 - 40 + 12 - 3$

Make a sentence that follows the pattern.

12. $85 - 36 = \underline{70} - \underline{30} + \underline{15} - \underline{6}$ **Answers may vary.**

Intervention Activity

Equal Expressions

Choose a two-digit number and write it at the top of a sheet of paper. Ask children to write as many addition and subtraction expressions as they can that are equal to the number.

Extension Activity

True or False

Challenge children to create number sentences with at least two operations on each side. Have them trade papers with a partner and mark the number sentences "true" or "false."