The concept of equality is an important foundation of algebraic understanding. For many children, however, the equal sign does not signify equality but represents a request for an answer. To help children develop an algebraic understanding of equality, they need to understand that the equal sign tells them the quantities on both sides are equivalent in value. Guide them to think of the equal sign as meaning “is the same as” or “has the same value as.”

In their early work with number sentences, children need to see that $3 + 6 = 9$ and $9 = 3 + 6$ represent the same idea. Help them understand that $9 = 3 + 6$ is not written backwards or incorrectly. It is just a different way to show that 9 is the same as $3 + 6$. Make sure they do not change symbols to make the number sentence true. For example, children may want to write $9 = 3 + 6$ as $9 - 3 = 6$. 

**Language Objective**
Children complete the sentence frame, The best way to decide if a number sentence is true or false is ____________.

**Materials**
MathBoard, crayons

**GO DIGITAL**
- Interactive Student Edition
- Personal Math Trainer
- Math on the Spot Video
- iTools: Counters
- HMH Mega Math

**Professional Development**
- Professional Development Videos
Problem of the Day 5.9

Word of the Day  equal

Make two groups of cubes. Add or take away cubes to make the groups equal.

- How many cubes did you show in each group? Answers will vary.

Invite volunteers to explain how they made the two groups equal.

Vocabulary

Fluency Builder

Number Riddles

Provide children with these clues about a number. Then have children guess the number.

- I am thinking of a number. It is the sum of 3 + 5. It is the difference of 9 − 1. What is my number? 8

- What is another way to make 8? Possible answers: 0 + 8, 1 + 7, 2 + 6, 4 + 4, 17 − 9, 16 − 8, 15 − 7, 14 − 6, 13 − 5, 12 − 4, 11 − 3, 10 − 2, 8 − 0

Have children make up their own riddles to share with the class. Encourage children to write them down and solve them before sharing.

Essential Question

How can you decide if a number sentence is true or false?

Making Connections

Ask children to tell what they know about addition sentences.

- What does the = sign in 3 + 5 = 8 mean? Possible answer: It means that the numbers on each side of the equal sign mean the same thing.

- How can you show that 3 + 5 is the same as 8? Possible answer: I can count out three yellow counters and 5 red counters. Then I can count all the counters to show I have 8.

Learning Activity

What is the problem the children are trying to solve? Connect the story to the problem. Ask the following questions.

- How can you use counters to show the numbers on either side of the equal sign mean the same thing? Possible answer: I can set out counters to match the two numbers on one side of the equal sign. Then I can count all the counters to be sure they match the number on the other side.

- What should you do if the numbers do not mean the same thing? Check my work.

Literacy and Mathematics

- Have one partner say a number to 15. Have the other partner use counters to show that number. Have both children write the number sentence the counters show. Have children repeat by saying a different number.

- Say a number sentence, such as 1 + 3 = 5. Have children raise one arm if the number sentence is true. Have children raise both arms and make an X if the number sentence is false. Repeat with other number sentences.

Fluency with the Interactive Student Edition

Fluency Standard 1.OA.C.6

Have children make up their own riddles to share with the class. Encourage children to write them down and solve them before sharing.

Fluency provide additional fluency support for this lesson.
Listen and Draw

Materials crayons

Read the following aloud.

**Color the cards that make the same number.**

Have children find and record the value of each card.

- What number is made on more than one card? 7
- Which two cards use the same numbers? 3 + 4 and 4 + 3
- How are the cards different? They are, draw one card on each side of an equal sign so that the number sentence looks like the following example:
  \[ 6 + 1 = 7 \]
- What does this sentence mean? Possible answers: 6 plus 1 equals 7, 6 plus 1 is the same as 7, 7 is equal to 7
- What does the equal sign mean? Possible answer: When you do the addition or subtraction you get the same number on both sides.

Ask a volunteer to choose two cards that have the same value. As the child tells which two cards they are, draw one card on each side of an equal sign so that the number sentence looks like the following example:

Ask children to show the same number. They can put an equal sign between two of the cards to make a number sentence true.

### Math Talk

**MP2 Attend to precision.** Use Math Talk to focus on children’s understanding of ways to show the same number and the meaning of the equal sign. Write an equal sign on the board. Ask children what it means. Elicit responses to show that it means “is the same as.”

### Strategy:

**Scaffold Language**

Children can practice using the words equal and not equal with both words and symbols. Draw two squares on the board. In one square, draw 3 red circles and 2 blue circles. In the other square, draw 4 red circles and 1 blue circle.

- Are the numbers of circles the same or different? They are the same. Are the numbers of circles equal or not equal? They are equal.

Repeat with an example of *not equal*, such as 4 red and 7 blue circles in one square, and 5 red and 5 blue circles in the other square.
Model and Draw

The equal sign means that both sides are the same.

Write a number to make each true.

\[9 = \_\] \[4 + 5 = \_\] \[4 + 5 = \_ + \_\]

4 + 5 + 5 is not true. It is false.

4 + 5 = 9 and 5 + 5 = 10. 9 is not equal to 10.

Why is 4 + 5 = 5 + 5 not true? The sums on both sides of the equal sign are not the same.

How did you find the number to make the number sentence true? I saw a 4 and a 5 on one side, so I put a 5 with the 4 on the other side.

Share and Show

Which is true? Circle your answer. Which is false? Cross out your answer.

1. \[7 = 8 - 1\] \[6 - 6 = 7 - 7\]

2. \[4 + 1 = 5 + 2\] \[6 - 6 = 7 - 7\]

3. \[7 + 2 = 6 + 3\] \[8 - 2 = 6 - 4\]

4. \[5 - 4 = 4 - 3\] \[10 - 1 = 0\]

THINK Are both sides equal?

Remind children to add or subtract before they decide if the number sentence is true or false.

For Exercise 2, what is 4 + 1? 5 + 2? 5; 7

How can you use 5 and 7 to tell if the number sentence is true or false? I can compare 5 and 7. They are not the same, so the number sentence is false.

How do you know which number sentences are true? Possible answer: The value on each side of the equal sign is the same.

Use the checked exercises for Quick Check.

Quick Check

If a child misses the checked exercises

Then Differentiate Instruction with

- Reteach 5.9
- Personal Math Trainer 1.OA.D.7
- RtI Tier 1 Activity (online)

Advanced Learners

Materials Numeral Cards 1–12 (see eTeacher Resources), index cards, crayons

- Give individuals or partners Numeral Cards and five index cards. Have children write an equal sign on one index card, plus signs on two index cards, and minus signs on the remaining two index cards.

- Have children shuffle the Numeral Cards and choose five cards without looking. Ask them to try to make a true number sentence using at least three of the Numeral Cards and the appropriate index cards.

- Once children have created a true number sentence or have decided that it is not possible, have them return the cards, reshuffle them, and repeat the activity.

COMMON ERRORS

Error Children may not use the correct operation.

Example In Exercise 2, children subtract to rewrite the first number sentence as 3 = 3.

Springboard to Learning Have children circle the plus and minus signs. Remind them to use those signs to see if the number sentence is true but not change the signs to make it true.
On Your Own

MP6 Attend to precision. If children answered Exercises 3 and 4 correctly, assign Exercises 5–12.

Exercise 12 requires children to go beyond investigating number sentences and write original number sentences that are true.

Math on the Spot Video Tutor
Use this video to help children model and solve this type of Think Smarter problem.


MP7 Look for and make use of structure.
To extend children’s thinking, have them decide how to change a number sentence that is false to make it true.

• In Exercise 5, which number sentence is false? What would you change to make it true? $1 + 9 = 9 - 1$ is false. I would change the $-$ to a $+$.

• In Exercise 6, how could you change the second number sentence so that it is true? Possible answers: $16 - 0 = 9 + 7; 16 - 9 = 0 + 7$

MP8 Look for and express regularity in repeated reasoning.

• How can you tell if a number sentence is true or false? Possible answer: When I figure out what each side equals, then I can see if the numbers are the same.

Exercise 7 is more challenging because it requires children to determine why the number sentence Lyle wrote is false and correct his error to make the number sentence true.

SMARTER Lyle writes the false number sentence $2 + 10 = 8$. Complete the number sentence to make the sentence true.

$2 + \_ = 8$
13. Which are true? Use ✓ to color.

<table>
<thead>
<tr>
<th>20 = 20</th>
<th>9 + 1 + 1 = 11</th>
<th>8 - 0 = 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 = 1 + 2</td>
<td>10 + 1 = 1 + 10</td>
<td>7 = 14 + 7</td>
</tr>
<tr>
<td>6 = 2 + 2 + 2</td>
<td>11 - 5 = 1 + 5</td>
<td>1 + 2 + 3 = 4 + 5</td>
</tr>
</tbody>
</table>

14. Think Smarter

Use the same numbers.

Write a different number sentence that is true.

7 + 8 = 15

8 = 15

Possible answer shown.

15. Think Smarter +

Is the math sentence true?

Choose Yes or No.

- 5 - 4 = 9 - 8  ● Yes  ○ No
- 13 = 5 + 7  ● Yes  ○ No
- 6 + 2 = 2 + 6  ● Yes  ○ No

Essential Question

Reflect Using the Language Objective. Have children complete the sentence frame, The best way to decide if a number sentence is true or false is _____________, to answer to Essential Question.

How can you decide if a number sentence is true or false? Possible answer: I can add or subtract to solve each side of the equal sign. Then I can compare the numbers to see if they have the same value.

Math Journal

Write 5 + □ = 6 + 8. Write a number to make the sentence true. Draw a quick picture to explain.
Practice and Homework

Use the Practice and Homework pages to provide children with more practice of the concepts and skills presented in this lesson. Children master their understanding as they complete practice items and then challenge their critical thinking skills with Problem Solving. Use the Write Math section to determine children’s understanding of content for this lesson. Encourage children to use their Math Journals to record their answers.

Algebra • Equal and Not Equal

Which are true? Circle your answers. Which are false? Cross out your answers.

1. \(6 + 4 = 5 + 5\)
2. \(10 = 6 - 4\)
3. \(8 + 8 = 16 - 8\)
4. \(14 = 1 + 4\)
5. \(8 - 0 = 12 - 4\)
6. \(17 = 9 + 8\)

7. Which are true? Use a \(\Box\) to color.

<table>
<thead>
<tr>
<th>15 = 15</th>
<th>12 = 2</th>
<th>3 = 8 - 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 = 1 + 5</td>
<td>9 + 2 = 2 + 9</td>
<td>9 + 2 = 14</td>
</tr>
<tr>
<td>1 + 2 + 3 = 3 + 3</td>
<td>5 - 3 = 5 + 3</td>
<td>13 = 8 + 5</td>
</tr>
</tbody>
</table>

8. Write \(\square\) Math. Write \(5 + \square = 6 + 8\). Write a number to make the sentence true. Draw a quick picture to explain.

Check children’s work.

Problem Solving

Math Talk

Use the following questions to guide the activity.

- How do you know whether a number sentence is true or false? I can see whether the value of each side of the equal sign is the same.
- When a number sentence is false, how can you change it to make it true? Possible answer: I can change the numbers or the plus and minus sign on one side of the equal sign.

Summarize

Children analyze number sentences to decide whether they are true or false and then justify their reasoning.

Extend the Math Activity

True or False?

Materials index cards, Sign Cards (See eTeacher Resources)

Investigate Write the numbers 5, 10, and 13 on the board. Have children choose one of the numbers and write a way to make that number on an index card. For example, children may choose the number 5, and write \(8 - 3\) on an index card.

Invite two children to come to the board to copy what they have written on their index cards. They should write their facts side by side on the board and draw an equal sign between them. Explain that this number sentence may be true or false. Next, have the class work together to decide if the number sentence is true or false. If the number sentence is true, ask a child to write true next to it. If it is false, ask a child to draw a line through it.
Lesson Check (1.OA.D.7)

1. Circle the number sentences that are true. Cross out the ones that are false.
   \[4 + 3 = 9 - 2\]  \[4 + 3 = 9 + 2\]
   \[4 + 3 = 4 - 3\]  \[4 + 3 = 6 + 1\]

Spiral Review (1.OA.A.2, 1.OA.C.6)

2. Use 5, 6 and 11 to write related addition and subtraction sentences.
   \[5 + 6 = 11\]
   \[6 + 5 = 11\]
   \[11 - 5 = 6\]
   \[11 - 6 = 5\]

3. Solve. Draw or write to show your work. Drawings may vary.
   Leah has 4 green toys, 5 pink toys, and 2 blue toys. How many toys does Leah have?
   Possible answer: \[4 + 5 + 2 = 11\]  \[11\] toys

Continue concepts and skills practice with Lesson Check. Use Spiral Review to engage children in previously taught concepts and to promote content retention. Common Core standards are correlated to each section.