Subitizing & Number Bonds

Starfall Kindergarten MATHEMATICS

Starfall Education Foundation
P.O. Box 359, Boulder, CO 80306

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Subitizing & Number Bonds

Week **18**

Week **18** Summary

This week the children will learn about number combinations and number bonds of 10. They will learn to distinguish odd and even numbers and will be introduced to arrays to 20, and how to use them as a way to count more easily and quickly. The week also includes a review of number bonds (in general), subitizing (seeing patterns), and arrays.

The children will also:

- Add and subtract to 10
- Practice greater than
- Create arrays using magnets
- Review the Commutative Property of Addition

Preparation

DAY **1**

Prepare 60 black and 60 red construction paper strips. The children will use these to create chains to match math equations.

Prepare a set of 11 index cards by writing one of the following equations on each.

- $10 + 0 = 10$
- $9 + 1 = 10$
- $8 + 2 = 10$
- $7 + 3 = 10$
- $6 + 4 = 10$
- $5 + 5 = 10$
- $4 + 6 = 10$
- $3 + 7 = 10$
- $2 + 8 = 10$
- $1 + 9 = 10$
- $0 + 10 = 10$

You will also use a blank math mat and several connect cubes or other manipulatives.

DAY **2**

You will need a clothes hanger and ten red or yellow plastic clothespins.

DAY ❸

Collect examples of arrays used in everyday life such as an egg carton, muffin tin, and plastic muffin/cupcake container. You will also use a 12-pack of water bottles and 15 small circle magnets.

DAY ❹

You will use the Ten-Frame, Dice, and Domino Number Representation Cards for 1 through 12. You will also need 8 magnets.

DAY ❺

Activity Center 1 — Navigate classroom computers to *Starfall.com*.

Activity Center 2 — Divide a set of Addition Equation Cards 1 through 10 so each pair of children has a set.

Activity Center 3 — Duplicate a copy of the Arrays Cut and Paste worksheet for each child. The children will need scissors and glue sticks.

Activity Center 4 — Prepare materials for this week's Teacher's Choice Activity.

Summative Assessment — The children will need 20 clothespins and a clothes hanger.

Record your observations as you watch the children work in this center on the Summative Assessment Checklist for Unit 7, Week 18.
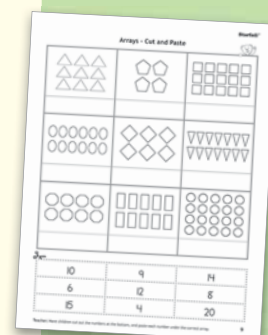
Arrays Cut and Paste
Worksheet

	DAY ①	DAY ②
Daily Routines	• Calendar • Place Value • Weather • Hundreds Chart • Number Line	
Magic Math Moment	Make 10 objects	Greater than
Math Concepts	Number bonds of 10 Create combinations of ten using connect cubes Write equations for combinations of ten	Compare two numbers and determine which is greater than the other Review number bonds Hanger activity for 5 and 10 Determine the equation to match a number sentence (Commutative Property of Addition)
Formative / Summative Assessment	Create 10-Chains to match equations	Write equations to match number sentences
Workbooks & Media	*Starfall.com*: Add & Subtract: "Make 10 Objects"	

DAY 3	DAY 4	DAY 5
• Calendar • Place Value • Weather • Hundreds Chart • Number Line		
Even and odd	Even and odd	**Learning Centers** *Starfall.com:* • Monthly Calendar • Add & Subtract: "Make 10 Objects" • "Make 10 Numbers" • "Math Helpers" ①
Determine if a number is even or odd **Introduce** Arrays to 20: Patterns to count easily and quickly Demonstrate arrays Form arrays using magnets	Even numbers on the Number Line Pair magnets to distinguish even and odd Review subitizing and arrays Practice seeing patterns to count Match different kinds of number cards to play "Concentration"	Solve equations ② Match numbers to arrays (Workbook page 9) ③
Distinguish arrays	Create arrays	Teacher's Choice ④
Math Melodies CD Track 36, "Yonder in the Pair, Pair Patch"		Summative Assessment: Create number combinations of 10 and write matching equations ⑤

Magic ✨ Math Moment

Make 10 Objects

Navigate a computer with projection capabilities
(or gather the children around a classroom computer) to *Starfall.com*:
Add & Subtract: "Make 10 Objects." Allow the children to assist to complete
the activity.

Operations & Algebraic Thinking

A.3 - Decompose numbers less than 11.

A.4 - For 1-9, find the number that makes 10.

Number Bonds of 10

Materials
☐ A large quantity of connect cubes or other math manipulatives
☐ 60 strips of black and 60 strips of red construction paper
☐ Math mat (blank)
☐ Prepared index cards

1 "Missing Number Game"

Gather the children in a semicircle on a rug or the floor. Say: **Let's play the "Missing Number Game."**

Distribute several connect cubes or other manipulatives to each child.

Review and practice the "Make 10 Objects" activity the children completed in today's Magic Math Moment. Have one child place 5 connect cubes on a blank math mat. Ask: **How many more cubes should we add to have a total of 10?** Write the equation $5 + ? = 10$ on the board.

Choose a volunteer to add cubes to total 10 while the class counts. Ask: **How many cubes did we add to total 10?** (Volunteers respond.) **Right, we added 5 more cubes. We started with 5 cubes and we added 5 more cubes to total 10.** Complete the equation on the board. Read: $5 + 5 = 10$.

Continue for the other combinations of 10.

Formative Assessment

Create a 10-Chain

Say: **Today you will work with a partner to create a 10-chain. Each set of partners will choose an index card with an equation written on it. You and your partner will use paper strips to create a chain to match your equation.**

Explain: **You will use RED strips for the first number of your equation and BLACK strips for the second number of your equation.**

Demonstrate how to create a paper chain. Partners come forward to select an index card and the corresponding number of red and black strips.

When partners (or groups) finish their chains, assist them in attaching their index cards to them. Hang the chains from the ceiling of the classroom if possible.

You may create groups of 3 to work together to accommodate your class size.

Magic Math Moment

Greater Than

Materials
☐ None

Say: **Let's play "Greater Than." I will write two numbers on the whiteboard. Raise your hand if you know which number is greater.**

Choose a volunteer to circle the larger number. The class gives a thumbs-up to confirm or a thumbs-down if the volunteer chose incorrectly. Repeat as time allows.

Counting & Cardinality

CC.7 - Compare two numerals between 1 and 10.

Operations & Algebraic Thinking

A.3 - Decompose numbers less than 11.

A.4 - For 1-9, find the number that makes 10.

A.5 - Fluently add and subtract within 5.

Review Number Bonds

Materials
☐ Whiteboard, markers
☐ Ten red or yellow plastic clothespins
☐ Hanger

1 **Introduce Hanger Activity to 5**

Say: **We have been talking about number bonds. Number bonds are pairs of numbers that go together to form a new number.**

Indicate the hanger with five red plastic clothespins attached. Say: **Here is another way to show number bonds. This is a 5 hanger because it has 5 clothespins attached to it. We won't add more clothespins or take any clothespins away. Since it is a 5 hanger, it will always have 5 clothespins attached.**

Note: Equations should not be erased once written on the whiteboard. The object is to reinforce that each equation equals 5.

Move the clothespins to the right side of the hanger then slide one to the left. Ask: **How many clothespins are on the left? How many are on the right? We could use this 5 hanger to create an equation. What would the equation be?** $(1 + 4 = 5)$ Write the equation on the whiteboard.

Slide another clothespin to the left. Ask:

- **How many clothespins are on the left now?**
- **How many are on the right?**
- **What would the equation be?**

A volunteer writes the equation $2 + 3 = 5$ on the whiteboard.

Slide another clothespin to the left. Ask:

- **How many clothespins are on the left?**
- **How many are on the right?**
- **What would the equation be?**

A volunteer writes the equation $3 + 2 = 5$ on the whiteboard.

Slide all the clothespins to the left. Ask:

- **How many clothespins are on the left?**
- **How many are on the right?**
- **What would the equation be?**

A volunteer writes the equation $5 + 0 = 5$ on the whiteboard.

2 Hanger Activity to 10

Say: **Let's make a change to the 5 hanger.** Add 5 additional red clothespins to the hanger.

Ask: **How many clothespins are there now? Right, 10! This is now a 10 hanger. We won't add any more clothespins or take any away. We will use the clothespins to discover how many different pairs of numbers we can add together to total 10.**

Move 5 clothespins to the left. Say: **There are 5 clothespins here. How many are on the other side?** (Volunteers respond.) **Right, there are 5. What would the equation be?** A volunteer writes $5 + 5 = 10$.

Erase the equation. Move 1 clothespin to the left. Say: **There is 1 clothespin on the left. How many clothespins are on the right? How did you know? What would the equation be?** A volunteer writes $1 + 9 = 10$ on the board. Do not erase the equation.

Move 2 clothespins to the left. Say: **Now there are 2 clothespins on the left. How many clothespins are on the right? How did you know? What would the equation be?** A volunteer writes $2 + 8 = 10$ on the board.

Continue until all the clothespins are on the left, and you have ten equations on the whiteboard.

Ask: **What do you notice about these equations?** Children should understand that each pair of numbers equals 10.

Formative Assessment

Write Equations for Ten

Distribute individual whiteboards and markers. Move 2 clothespins to the left of the hanger and 8 to the right. Ask: **How would this look in a number sentence or equation?** (Volunteers respond.) **Write the equation on your whiteboard. When you are finished writing hold up your whiteboard.**

Note: Most children will write this as an addition equation, but some children may write it as a subtraction equation. Discuss the various answers.

Repeat the above activity with several different number pairs.

Place 1 clothespin on the left and 9 on the right. Say: **Look carefully. There is 1 clothespin on the left and 9 on the right. What happens if I turn this hanger around?**

Turn the hanger to display 9 clothespins on the left and 1 clothespin on the right. Ask:

- **Are there still ten clothespins on the hanger?**
- **How did turning the hanger make it look different?**

Repeat with different configurations of 10 to demonstrate the Commutative Property of Addition.

Magic Math Moment

Even and Odd

Essential Question: *How can we group objects to make counting them easier?*

Say: **When there are two things that are the same, we say they are a pair. If I say you have a pair of arms, what does that mean?** (Volunteers respond.) **Right, that means you have two arms. What else do you have pairs of on your body?**

Continue: **Let's listen for other examples of pairs in this song. It's called "Yonder in the Pair, Pair Patch."** Play *Math Melodies* Track 36. The children may raise their hands when pairs of objects are mentioned in the song.

Explain: **A pair means two of something. Two is an even number. An even number means you can match objects and there won't be any left over.**

Select four children to come to the front of the classroom. Instruct them to pair up. Ask: **Are there any children left without partners?** (Volunteers respond.) **No, we have an even number of children. That means 4 is an even number.**

Select seven children to come to the front of the classroom. Instruct them to pair up. Ask: **Are there any children left without partners?** (Volunteers respond.) **Yes, there is one extra person. There is an odd number of children. That means 7 is an odd number.** Repeat as time allows.

Arrays up to 20

Essential Question: *How can we group objects to make counting them easier?*

1 Introduce Arrays

Say: **We have been talking about how patterns help us count faster. Today we will learn about another way to arrange objects to make them easier to count. They are called *arrays*. Say, *arrays*.** Children repeat, *arrays*.

Indicate *Backpack Bear's Math Big Book*, page 38.

Say: **Backpack Bear would like to show us the arrays he found.** Read page 36 and discuss the different examples of arrays.

Indicate the examples of arrays as you identify each. Say: **We can find arrays in many places, like an egg carton, a muffin tin, or a twelve-pack of water bottles. An egg carton has two equal rows of six, and a muffin tin has three equal rows of four. Can you think of other objects like this?**

2   Demonstrate Arrays

Say: **Let's pretend we are putting on a play, and we want to invite people to come see it. We must arrange the chairs in straight rows so the audience can watch the play.**

Clear an area of the classroom and choose six children to move their chairs to the area.

Say: **Here are six chairs. Let's arrange these chairs in rows so that each row has the same number of chairs. I can think of one way.** Demonstrate making three rows of two chairs. Ask:

- **How many rows are there?**
- **How many chairs are in each row?**

Explain: **This is an *array*. Say, *array*.** (Children repeat, *array*.) **Who can think of a different way to arrange the chairs?** Two volunteers work together to find a different way to arrange the chairs (two rows of three).

Ask: **Is there another way to arrange the chairs?** Allow the children to experiment, reminding them that there must be the same number of chairs in each row.

3   Use Magnets to Form Arrays

Place twelve magnets on the whiteboard in an unorganized way. Ask: **Can you tell how many magnets are on the board really quickly? Why not?** (Volunteers respond.) **Right, it is difficult to count them because they aren't organized in a pattern.**

Say: **Let's see how forming an array helps us count faster. I will form an array to help count the magnets.** Arrange the magnets into three rows of four. Ask:

- **How many magnets are in each row?**
- **How do you know each row has four magnets?**

At the end of each row write the number 4. Add 4+4=8 and 8+4=12.

Ask: **Who can think of a different way to arrange the magnets to form an array?** Volunteers arrange the magnets in different arrays. Different arrays for 12 include 4 rows of 3, 3 rows of 4, 2 rows of 6, and 6 rows of 2.

Demonstrate a non-example of an array such as two rows of ten with two left over. Ask: **Is this an array? Why not?** (Volunteers respond.) **Right, an array must have equal rows.** Repeat the activity using 15 magnets.

Formative Assessment

Find the Arrays

Distribute *Backpack Bear's Math Workbook #2* and instruct the children to turn to page 8.

Note: If you have projection capabilities, project the workbook page as a guide.

Say: **The title of this workbook page is Find the Arrays! Look at the first box. Does the picture show an array?** (Volunteers respond.) **Yes, it is an array because both rows have the same number of apples. Since it is an array, use your crayons to color the apples.** The children do this.

Continue: **Look at the next box. Does it show an array of frogs? Why not? Right, the rows of frogs do not have the same number. Since this box does not show an array, make an X on it.** The children do this.

Explain: **Continue to look at one box at a time. If the box shows an array, you will color the pictures. If the box does not show an array, you will make an X on it.**

The children complete the remainder of the workbook page independently. Observe as they work and offer assistance if necessary.

Magic Math Moment
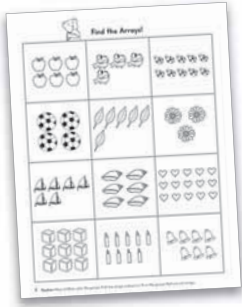
Even and Odd

Essential Question: What does it mean if a number is even? Odd?

Say: **Today let's look for even numbers on the Number Line. Remember, an even number means you can make pairs and not have any left over. Who can find an even number between 1 and 10?** A volunteer does this.

Choose a different volunteer to count out the corresponding number of magnets and place them on a whiteboard.

Continue: **If (**chosen number**) is an even number we should be able to pair up all of the magnets and not have any left over.**

The volunteer checks to see if the number is even. Ask: **Is (**chosen number**) an even number?** Repeat for other volunteers and numbers.

Say: **Let's try looking for odd numbers. An odd number means after you make all of the pairs you can make, there will be one left over. Who can find an example of an odd number between 1 and 10?** A volunteer does this. Choose a different volunteer to count out the corresponding number of magnets and place them on a whiteboard.

Continue: **If (**chosen number**) is an odd number, after we make all of the pairs we can make, there will be one left over.**

Lead the children to understand that one is the most there can ever be left over, because if there were two or more, another pair could be made.

The volunteer checks to see if the number is odd. Ask: **Is (**chosen number**) an odd number?** Repeat for other volunteers and numbers.

Counting & Cardinality

B.4a - Say number names in order, pairing each object with one number.

CC.6 - Identify odd and even numbers.

Operations & Algebraic Thinking

OA.2 - Divide objects equally into groups.

Subitizing and Array Review

Essential Question: How can we group objects to make counting them easier?

1 **Subitizing, Seeing Patterns**

Gather the children together with their whiteboards and markers.

Mix the Ten-Frame, Dice Cards, and Domino Cards together.

Say: **We have been talking about using patterns to help us count more quickly and easily. Let's see how fast we can count. Watch as I show you a card. I will hide it quickly, so watch carefully. Raise your hand if you know how many dots are on the card. Ready?**

Quickly flash a card and then put it behind your back. Choose a volunteer to tell how many dots there are on the card. Ask: **How did you know it was (**number of dots**)?** Repeat this several times.

2 Write That Number

Say: **Let's play "I can write that number." This time I will flash a card and then hide it quickly. You write the number on your whiteboard that tells how many dots you saw on the card and then show me. Ready?**

Repeat as time allows.

Instruct the children to put away their whiteboards and markers then gather around a pocket chart.

3 Concentration

Place the Ten-Frame, Dice, and Domino Cards face down in the pocket chart.

Say: **Let's play "Concentration." Turn over one card, then try to find another card with the same number represented on it.**

Choose a volunteer to begin. If the child makes a match, he or she removes the cards, gives them to you, and chooses the next volunteer. Play continues as time permits.

Formative Assessment

Create Arrays

Distribute math bags. Say: **Today you will get to create your own arrays. Arrays are a way to arrange objects so they are easier to count.**

Say: **I will write a number on the board. Use your connect cubes to create an array. Let's try one together.**

Write the numeral 8 on the board.

Say: **Here are eight magnets. What is one way to create an array using these eight magnets?** A volunteer creates an array. Ask:

- **What is another way to organize the magnets into an array?**
- **Are there any other ways to make an array?**
- **Why not?**

Note: Use this opportunity to show children how they can count by twos when checking the four rows of two.

The children remove connect cubes or counters from their math bags. They may work individually or with partners.

Write the numbers 4, 9, 10, 12, and 15 on a whiteboard one at a time. The children work to create arrays to match, using their counters or connect cubes.

Next, write 7 on the whiteboard. Instruct the children to create an array. Choose a volunteer to explain that he or she can't do this. Discuss why the children are not able to create an array for 7.

Learning Centers

1 Computer

The children explore:

- Monthly calendar
- Add & Subtract: "Make 10 Objects"
- Add & Subtract: "Make 10 Numbers"
- Add & Subtract: "Math Helpers"

Materials

☐ Computers navigated to *Starfall.com*

2 Equation Flash Cards

The children partner. Partner 1 flashes an Equation Card and partner 2 solves the equation. Then partner 2 flashes a card and partner 1 solves the equation.

When the partners finish, they switch Equation Cards with another pair of children and repeat.

Materials

☐ Addition Equation Cards 1-10 divided so each pair of children has a set

3 Arrays

The children cut apart the boxes at the bottom of the workbook page, match the numerals to the corresponding arrays, and glue them in the dotted lines.

Materials

☐ Arrays Cut and Paste worksheet for each child

☐ Scissors, glue sticks

4 Teacher's Choice

Review or expand a skill from this unit according to the needs of your students.

5 Summative Assessment: Hanger Activity

One of the children arranges 10 clothespins in two groups on a hanger. The children write the corresponding equation on their whiteboards. (Example 3 + 7 = 10)

They repeat the activity with each child taking a turn to arrange the clothespins.

Record your observations on the Summative Assessment Checklist for Unit 7, Week 18.

Materials

☐ Whiteboards, makers

☐ 10 Clothespins

☐ Hanger

☐ Unit 7 Week 18 Summative Assessment Checklist