Complements for Numbers to 10

Grade Level/Course:
Kindergarten/1st grade

Lesson/Unit Plan Name:
Complements for Numbers to 10

Rationale/Lesson Abstract:
Students will find all the complements or "partners" for numbers to 10. This skill is important because when young kids understand that numbers can be decomposed into two smaller numbers it increases their number sense. Finding complements of these numbers will also help students as they learn addition and subtraction.

Timeframe:
The lessons are meant to last for about a half hour each. However, this lesson could be repeated several times for all the numbers to 10.

Common Core Standard(s):
K.OA.1Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

California State Standard(s):
NS 2.1 Use concrete objects to determine the answers to addition and subtraction problems (for two numbers that are each less than 10).

Instructional Resources/Materials:

- Different colored party beads cut into lengths 1-10. If these are not available, then die-cut circles taped together by color in the shape of beads.
- Larger die-cut circles in the same color as the beads.
- Recording sheets for numbers 4-10 (see attached)
- Dixie cups
- Number cards to 10, + and = cards (enough for each child)
- Inch graph paper
- Two colors of square inch tiles cut from construction paper (enough for each child to have 10 of each color)

Part 1: Explore the Beads

Note: this lesson could be done over a series of days or weeks if working with all the numbers to 10

Explore: Pair up the students and give each pair a Dixie cup full of all the colored beads. Have students explore the beads for 5 minutes or so with their partner. Guide them to sort the beads and maybe count how many beads are on each colored strand. Pull the students back together and ask them what they noticed about the beads.

Model:
Have a discussion about how many beads are on each colored strand. As you look at each strand display the large die-cut beads to reinforce the number of beads on each strand. If time allows, have the students find the 1 bead, 2 bead, 3 bead, etc from their cup and hold it up.

Explain to students that they can make bigger numbers by putting 2 strands of beads together. Lay out the large display die-cut 4 bead on the rug and model pulling different colors of die-cut beads underneath to make 4 (ie. You can use two of the 2 strand beads or one of the 3 strand bead and single bead). Explain to the kids that the two strands that we used to make 4 or two numbers are called its partners. For example, 2 and 2 are partners for 4, 3 and 1 are partners for 4, etc. Students may discover that they can make 4 by switching the 1 and 3 bead strands to different positions. Explain the importance of being able to move the same colored beads in different positions but the total number of beads remaining the same.

Guided Practice:
After you have modeled ways to make 4 with different colored beads, give the students time with their partner to make 4 with their own beads as many ways as they can. Pull the students back together and have partners share out how they made four by manipulating the big die-cut beads. Teacher records the students' findings on a chart by drawing the different color beads that make 4 and writing the partners next to each color. Every time a new number is introduced the teacher should make a new chart with all the different bead partners for that number. There would be 9 separate charts for numbers 2-10.

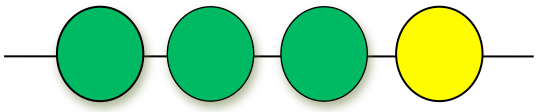
For each way to make 4, guide the students to use their fingers to show how many beads were on each strand separately and then move their hands together to show how many in all.

"2 and 2 are partners for 4"

Students may come up with different ways to make 4 by using 3 different colored beads. Explain that these are in fact ways to make 4 and honor their thinking but explain that when we talk about "partners" there are only two strands of beads representing 2 numbers that can be a model for any particular number. This reinforces the concept of partners or complements of a number.

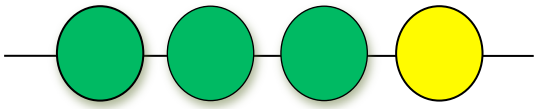
Independent practice:

After the students have made 4 as many ways that they can, have them record on the 4 sheet (attached at the end of the lesson) using different colored crayons to reflect the different colors of the beads. Point out that using the word "and" shows that you are joining the beads together to make 4.



3 and 1

Finally, when you introduce addition concepts and symbols, have the students record their bead combinations with equations.

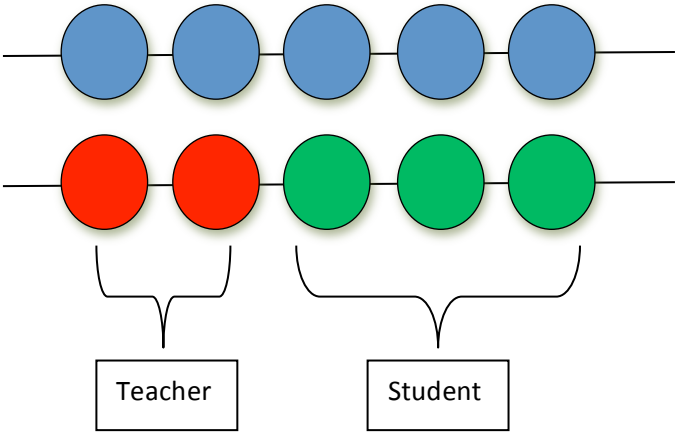


3 + 1 = 4

Part 2: Find the Missing Partner

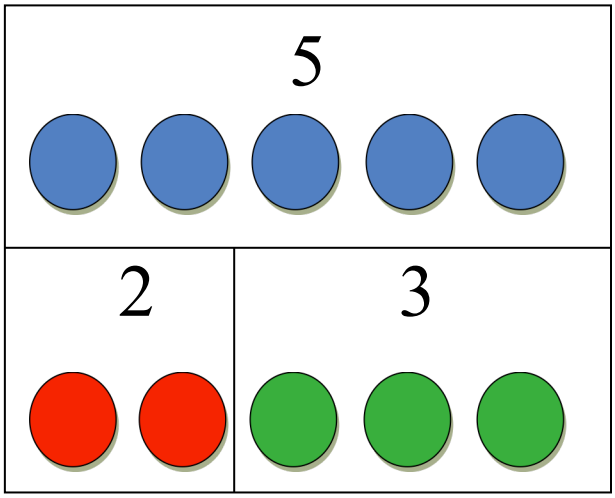
Model:
Using the large die-cut circles, choose a number to make and lay out that strand bead on the rug or pocket chart. For example, tell the students you want to make the number 5 using only 2 different colors. Display the die-cut 5 bead. Beneath it, choose one color to display (in the example below it is the red 2 bead). Ask the students to talk with their partner and see if they can figure out what other color bead they can use to make 5. Have a student come up and add the colored bead to the one you have laid down to make 5. Have students use their fingers on each hand to display the partners for 5.

Example:



Guided Practice:
Have students play a game to review all the partners for numbers that have been taught. For example, make note cards with multiple copies of numbers that you have taught in class. Each team gets a stack of note cards with all of the numbers to practice. Student A chooses a card and shows it to student B. If there is a 6 on the card then student A will put down one bead strand that is a partner for 6. Student B must choose the correct bead strand that completes the partner for 6. Student A checks his choice and decides if it is correct. Once they agree, the teammates switch roles. They keep going until they get through the whole stack of cards. This activity helps the students practice finding a missing addend to make a sum.

Extension:
Once students are ready, you could also show them how this equates with a bar model for an addition fact.



Tile Complements

Part 1: Finding Complements with tiles

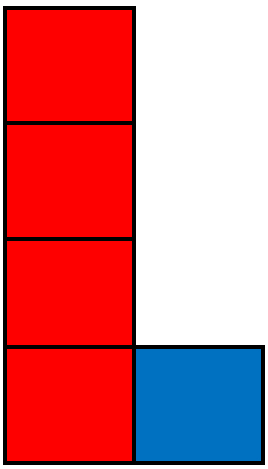
Materials:

- Square inch tiles in two different colors*. Enough for each child to have 10 of each color
- Inch graph paper
- Number cards with additional + and = cards

*in this example I will use red and blue tiles, but you can use any two colors you wish.

Model:

Show students the red and blue colored tiles and explain that you are going to build numbers using the different colors.



- Display 4 red tiles and 1 blue tile in any touching formation on the inch graph paper.
- Have the students count all the tiles and tell you how many there are by showing you on their fingers. Write the number 5 beneath the formation. Explain that you made 5 with 2 different colored tiles.
- Ask the students to show you on their fingers how many red tiles there are on one hand. Have them show you on the other hand how many blue tiles there are. The red tiles and blue tiles together equal 5.
- If the students have done ample work on complements you can reiterate that two partners for 5 are 4 and 1. Have the students chorally repeat the sentence **"The partners for 5 are 4 and 1"** with you while they represent red with the fingers on one hand and blue on the fingers of the other.

Continue representing all the partners for 5 with the red and blue tiles. Have students repeat the sentence for each of the partners for 5 while showing them on each hand.
4 red and 1 blue
3 red and 2 blue
2 red and 3 blue
1 red and 4 blue

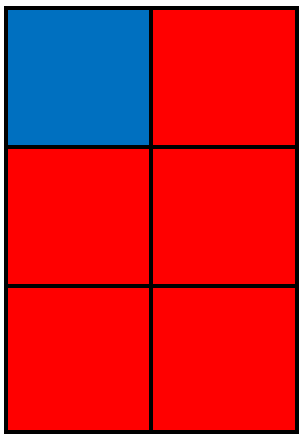
Point out to the students that it doesn't matter if we make 5 with 4 red and 1 blue or 4 blue and 1 red. It is still 5. Show students that they can build an equation with their red and blue tiles. This exposes the students to equations and the symbols. However, they will practice this skill later with the Extension activity.

4 red + 1 blue = 5 tiles

4 + 1 = 5

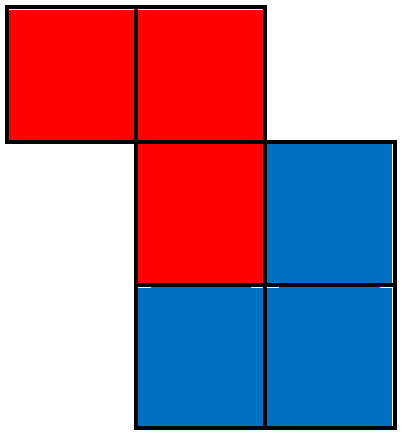
Guided Practice:
The students will work in pairs to build numbers to 6 using the 2 color tiles. Each student should have a piece of inch graph paper and 10 colors of each tile. The partners will take turns rolling one die (1-6) and counting out tiles for the number shown on the die. Each partner can choose any formation of red and blue tiles to represent the number on their graph paper. They must have sides of the tiles touching each other in their formation, no corners. When each student has built their number, they take turns telling each other how they made the number on the die. Instruct the students to always put the number of red tiles first in their sentence.

Example:
The students roll a 6



Student A

Student A tells their partner:
"I made 6 with 5 red and 1 blue. How did you make 6?"



Student B

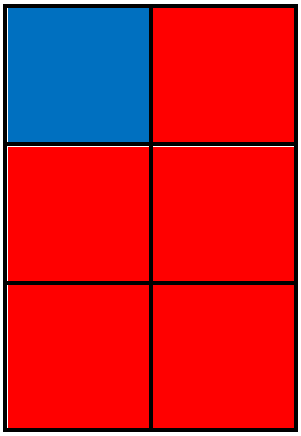
Student B tells their partner:
"I made 6 with 3 red and 3 blue."

Students continue to roll the die and practice building the partners for the number on the die and verbalizing their combinations orally to each other.

Independent Practice:
After the students have had 10 minutes to do this activity with their partner, stop them and tell them to all make the number 5 (you can choose whatever number you want) on their graph paper with their red and blue tiles. Model for them how you will now record the formation by lifting each square and coloring it in the corresponding color. Students should then create their formation, color it with crayons, and write the total number of tiles at the top.

*Differentiation: Some students will be able to record how many red and blue tiles they used under their drawing, while other kids will only be able to record the squares and hopefully write the number. Guide all students to write what they can about their formation on their paper.

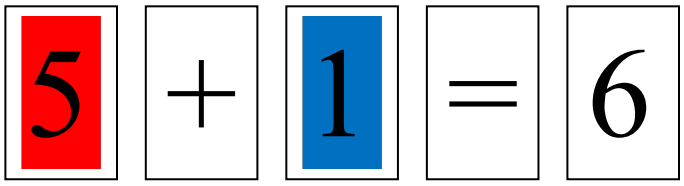
Wrap Up:
Call all the students together and have the students show their work. Discuss the different formations even if students used the same amount of red and blue squares. Compare two students work and have students share what they notice aloud. Help the students move into groups based on how many red and blue squares they used to make 5.
Once students have had ample practice with this activity with numbers 1-6, you can repeat this lesson with numbers 7-10. At this point you will need to use die that have numbers 6-10 or have students pull from a stack of number cards labeled 7-10.



Extension:
This extension repeats the lesson above but also has the student forming addition equations. Students should already be somewhat familiar with the meaning of the addition and equal signs to be successful in this lesson.

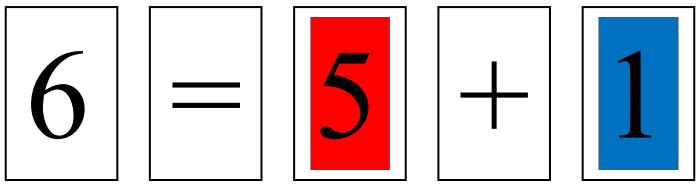
Model:
Create the number 6 with your red and blue squares. Have partners discuss what number you made and how many red and blue squares you use. Have them show the number of red tiles on one hand and the number of blue on the other.

Using number and symbol cards create an equation for this formation. To provide extra scaffolding you can lay the numbers down on colored construction paper to reinforce the number of each colored tile.



Read this aloud for the students: "5 and 1 is 6". Touch each card as you say the words. You can also read it as "5 plus 1 equals 6" depending on what vocabulary your students have been exposed to. Have them chorally read it aloud with you several times. Point out that the number "6" is at the end because when you count the red and blue squares together they equal the number "6". The number that you make with your squares is the total of all the red and blue squares together. Both sides of the equal sign need to be the same. Show how 5 + 1 is just a different way of writing 6.

Show them how you can move the cards around and make the same equation but in a different way. Read it to the students: "6 is equal or the same as 5 and 1" or "6 is equal (the same) as 5 plus 1".



Guided Practice:
Create a different number formation with your tiles and have students discuss with their partners what number was made. Have different students come forward and help lay out the equation in the right order, choosing the right number cards and placing them together to make an equation. Have the students "read" the equation with you chorally. Do this several times so that they understand how the equation relates to the drawing.

Independent Practice:
Use either 1-6 or 6-10 die for each set of partners. Each team should have red and blue squares as well as number and symbol cards. Have students roll the die and agree upon the number to build. Create that number on their graph paper with the tiles. Each student can create their own design for the number. Students should use number cards to manually build the equation underneath their model. When completed, the students should show their models to their partner and read their equation. Their partner checks that the equation matches the model. Roll the die and continue these steps for an allotted period of time.

Stop the kids and give them one number to build on their paper. Once again, model how to remove one square at a time and record their formations by coloring the graph paper under the tiles with the corresponding color. Guide the students to build an equation with their cards to reflect their drawing. Some children may be ready to try and write their equation on their paper, and some may not.

Wrap Up:
Bring the students together with their recorded drawings. Choose different students to share their drawings and read their equations if they have written one. If not, have students display the equation with the number tiles. Have the students chorally read the equation as you point to the correct symbols for the students' drawings.

Note: These lessons can be repeated over a series of weeks as you build concepts on each number to 10.

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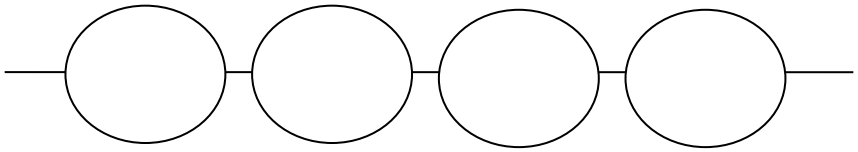

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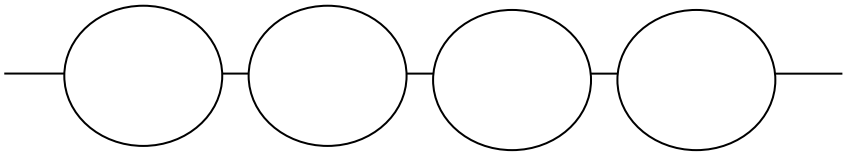

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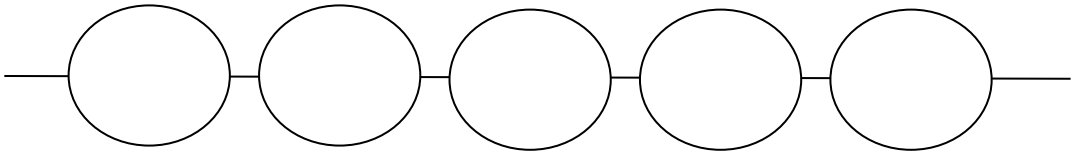

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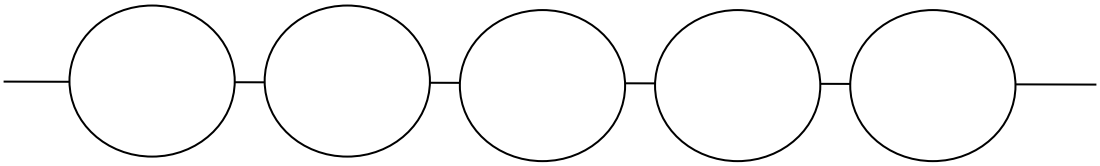

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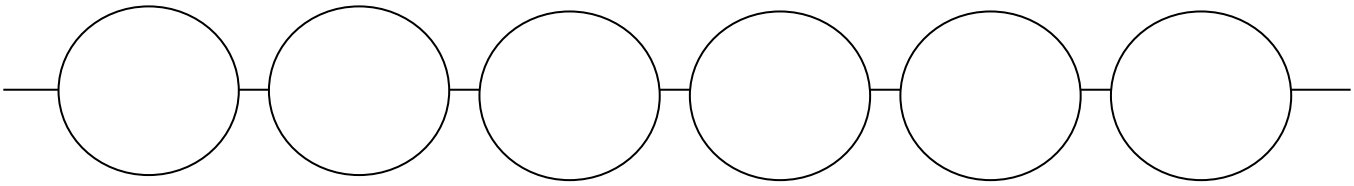

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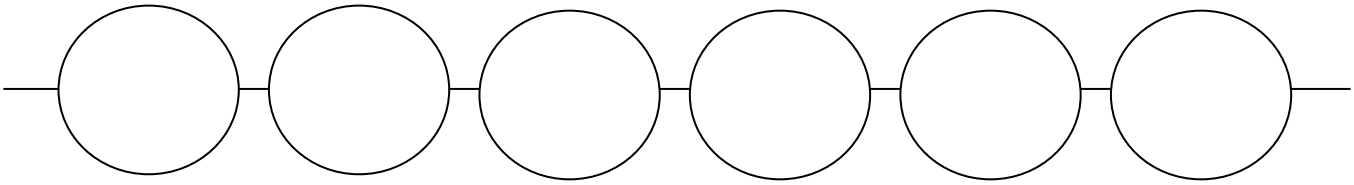

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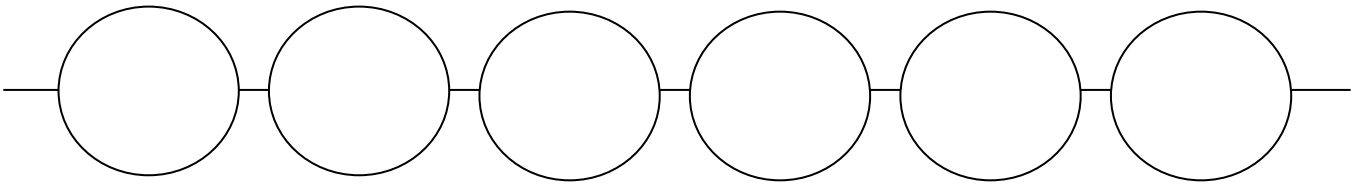

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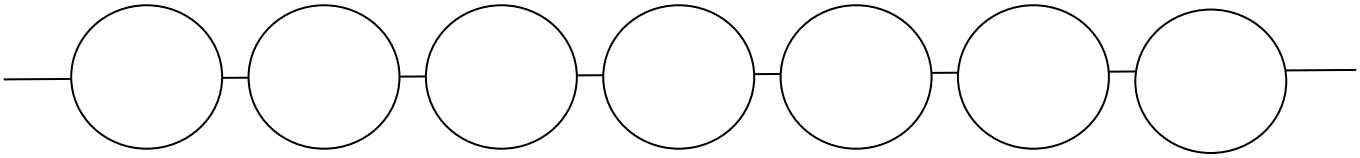

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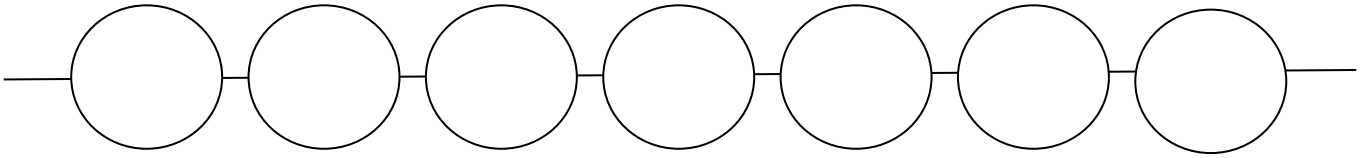

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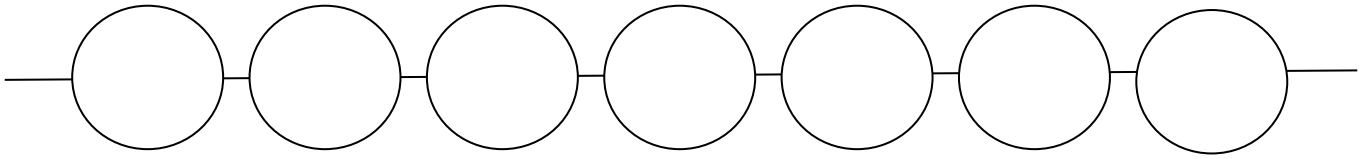

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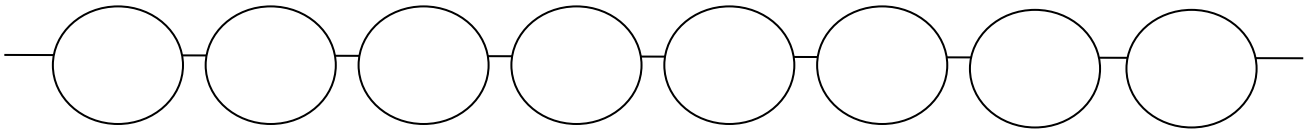

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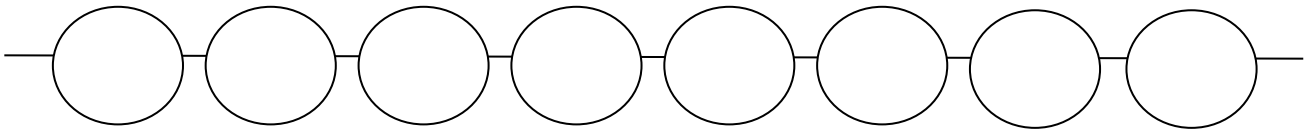

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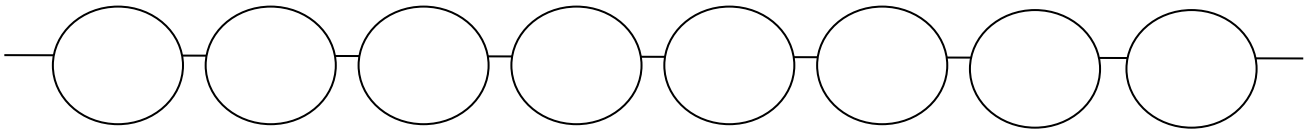

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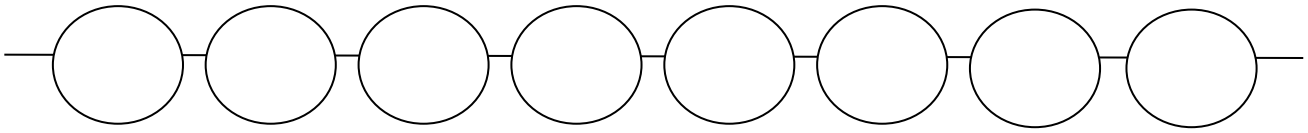

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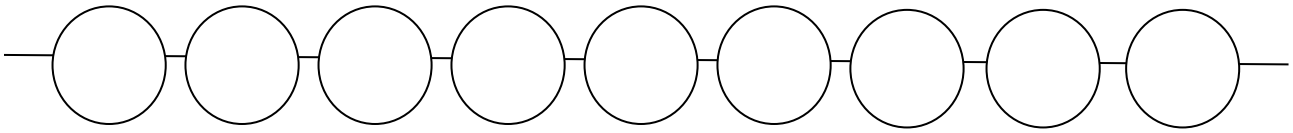

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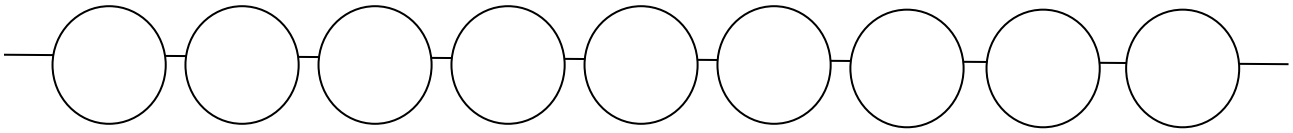

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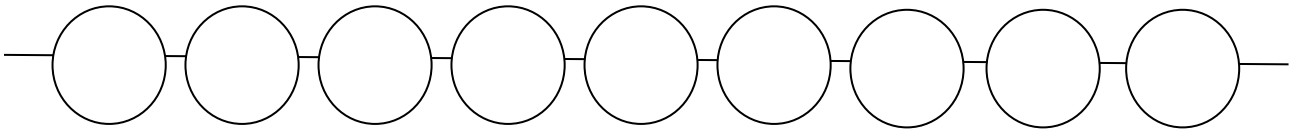

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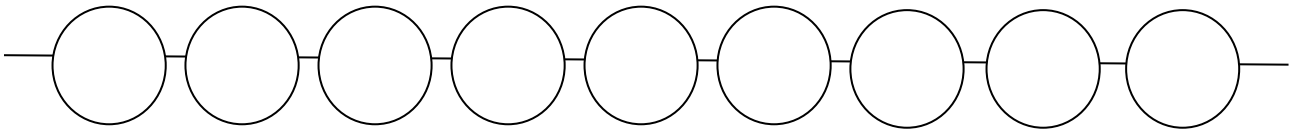

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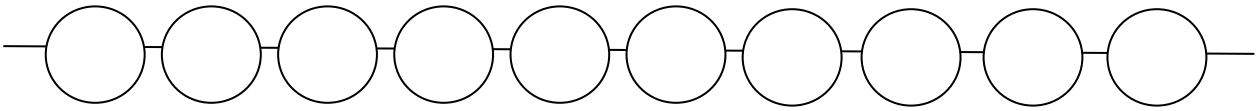

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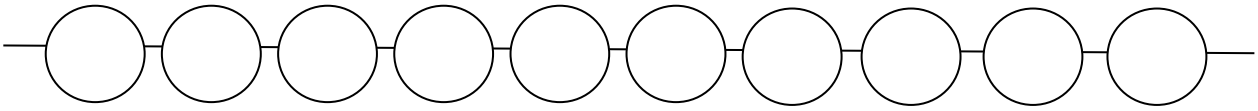

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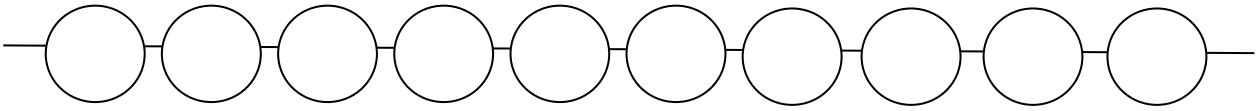

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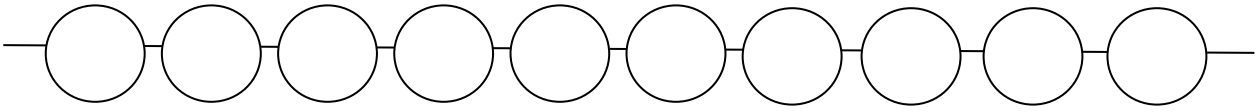

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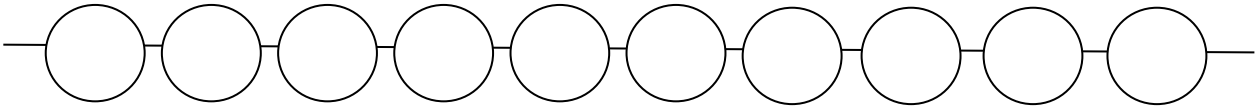

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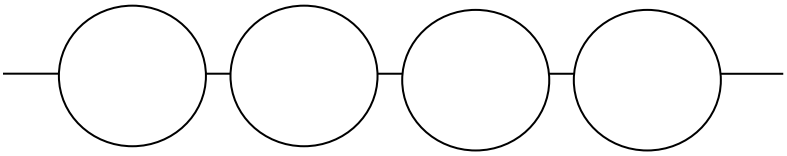

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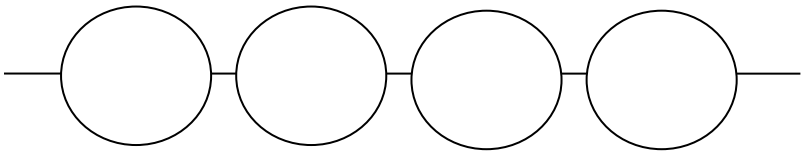

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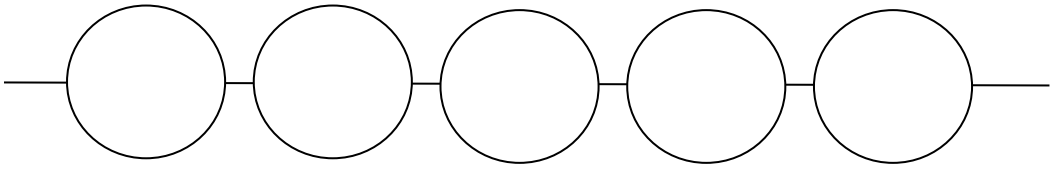

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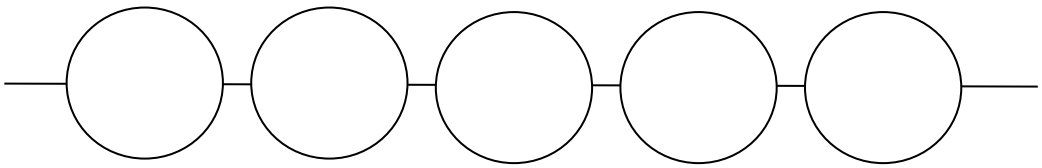

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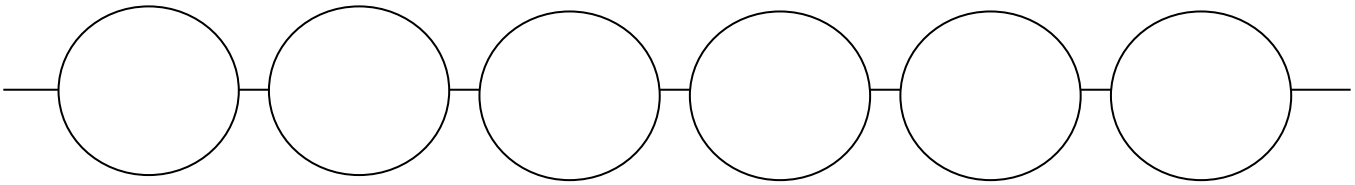

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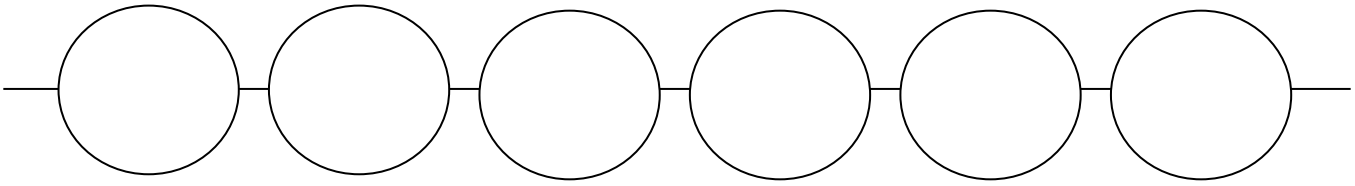

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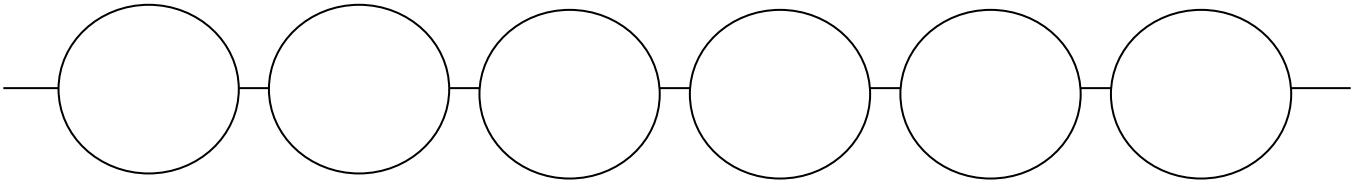

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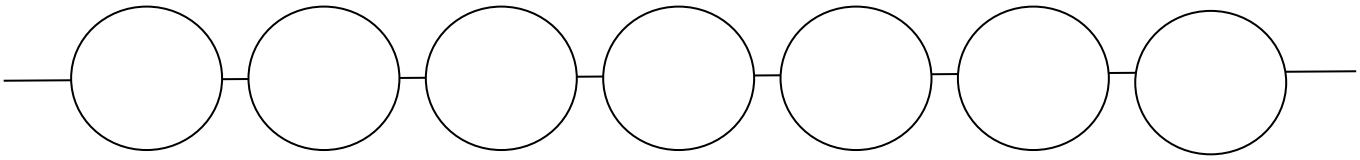

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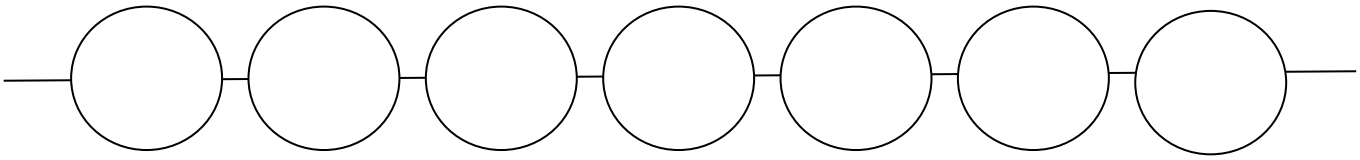

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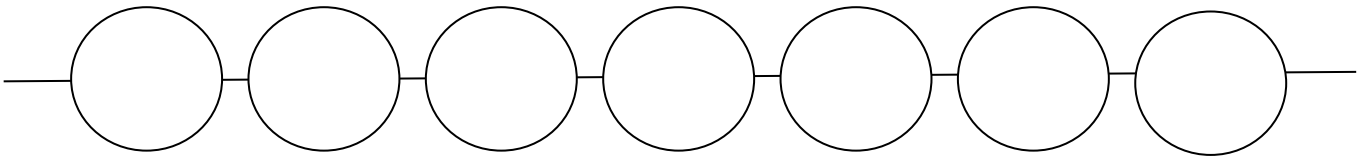

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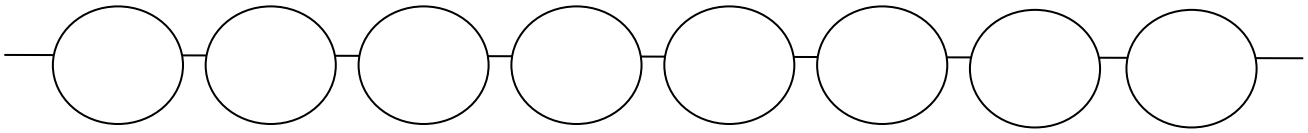

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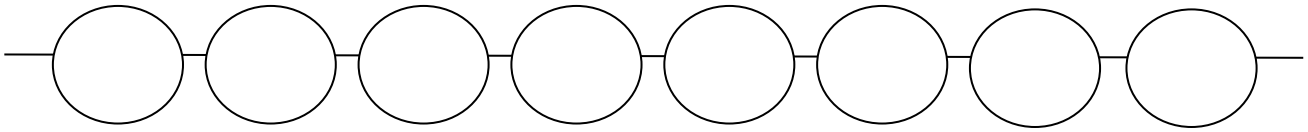

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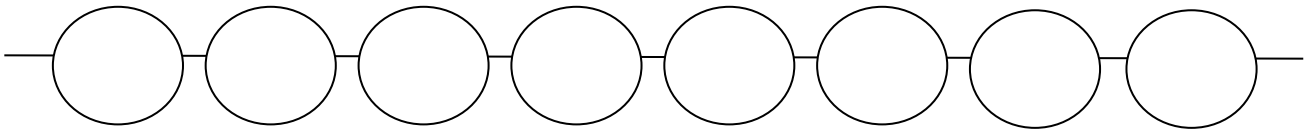

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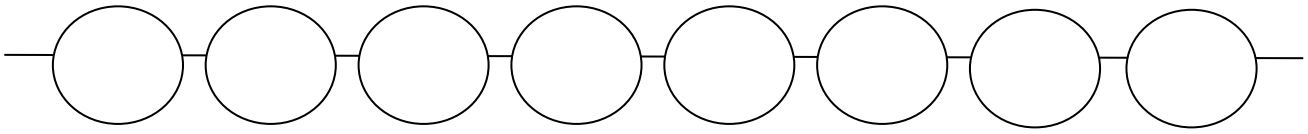

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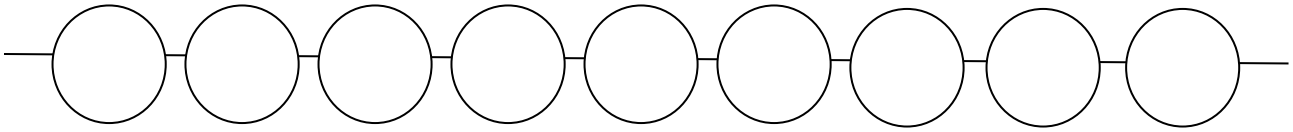

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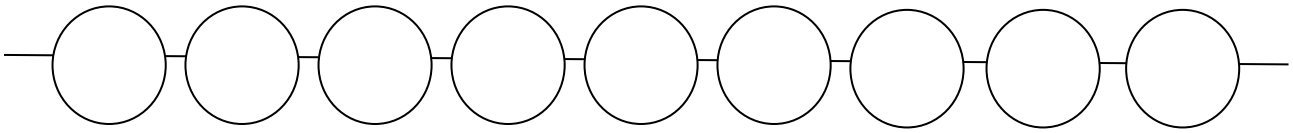

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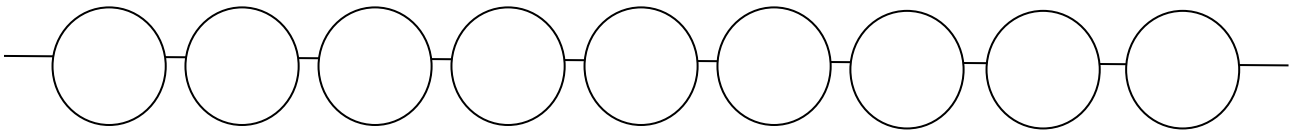

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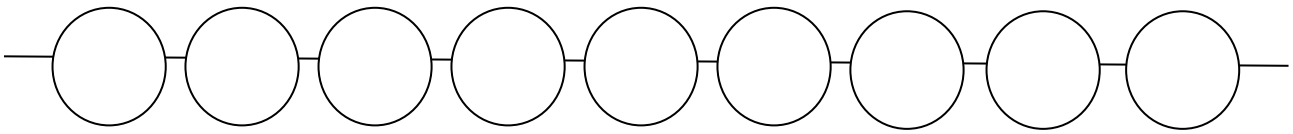

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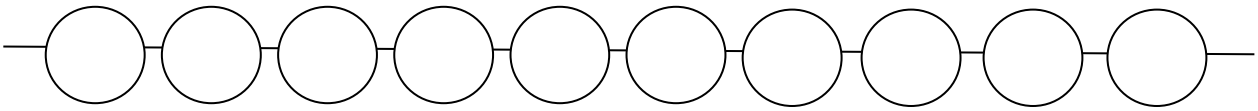

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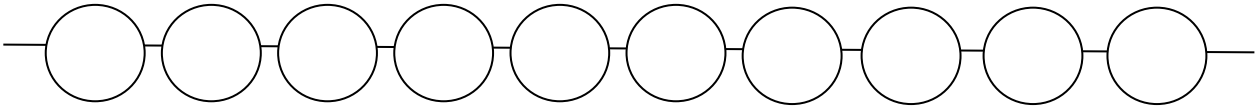

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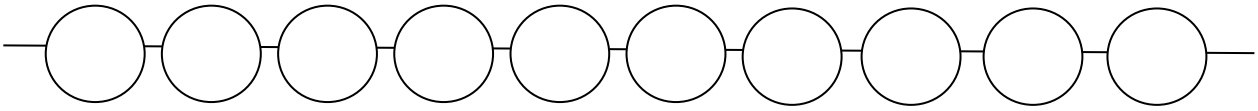

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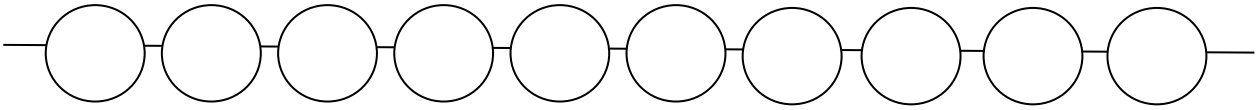

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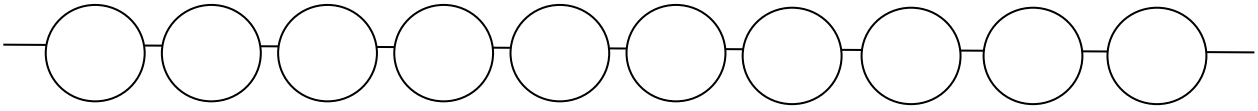

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