Lesson Purpose: To help students find a variety of ways to build (compose/decompose) numbers.

*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).*

Materials Needed:

- Pocket Chart
- Blank Chart Paper/Markers
- Large Toy Box (on following page)
- Toy Pictures (teddy bears and baby dolls on following page)

Lesson Preparation:
Print out or replicate a larger version of the toy box for students. Cut apart ALL of the toys from the following page. Place the toy box for the entire class to see. ***Some teachers have found success placing their students in a circle on the carpet and the toy box in the middle of the circle.*** Place the pocket chart and chart paper close by for all students to see. Put the toy cut outs nearby for the students to put on to the toy box.

Lesson:
Pose the problem to all of the students:
"I have seven toys in my toy box. My toys are either teddy bears or baby dolls. What are the different ways there could be seven toys in my toy box?"

Have students come and try different combinations of toys. Allow the students to physically place the toys on the toy box. When they are finished placing the toys ask students, "How many toys did you put in the toy box?" (seven hopefully) and then have them place the combination in the pocket chart. Tell the student to put the teddy bears first and then the baby dolls. Have the class help you describe the combination. "What does _____'s combination look like?" (ie. Students will say "Miranda put 4 teddy bears and 3 baby dolls." You will then reaffirm the combination and say, "So seven toys is the same as 4 teddy bears and 3 baby dolls?"

Continue that process until the students have generated all of the possibilities. It is ok if you don't get all combinations in the first lesson—that is typical. This lesson will need to be done multiple times before all combinations are generated. As students begin to generate different combinations, follow up with question, "Is _____'s combination different from all of the other combinations we have? Why?"

Note: A common problem is that students will get stuck making patterns. One child may come up and put an teddy bear, baby doll, teddy bear, baby doll, teddy bear, baby doll, and then teddy bear. When that child places their combination ask them to put the teddy bears first and then the baby dolls. Then the next student may come next and put up teddy bear, teddy bear, baby doll, baby doll, teddy bear, teddy bear, baby doll. That child and others will think this combination is different because it is in a different order. This is a productive struggle and will generate a deep discussion. Ask the class if the combination is different from the other student's? After the class has an opportunity to reason about the question then have the second student put their combination on the pocket chart. Remind them to put the teddy bears first and then the baby dolls. After both combinations are on the pocket chart, follow up with the question again if the combinations are the same and different and why? Over time you want the students want to generalize that order doesn't matter.

Notation Opportunity:
In the beginning you may not have the need to formally notate any of the combinations; placing combinations in the pocket chart would be sufficient. However, as you continue to pose these lessons to your students you will want to begin to formally notate what the students are saying on large chart paper.

Here are some examples of notation that would emerge within these discussions. Do not feel the need to use symbolic notation with the equal sign and plus symbol in the beginning. You will do this for every different combination provided.

I will use Miranda's combination for the example:

- Notation to begin with (using words)
  7 is the same as 4 teddy bears and 3 baby dolls.
- More sophisticated notation (using symbolic notation)
  7 = 4 + 3

(Optional) Follow Up Activities:

After your students have had multiple experiences in a whole group setting generating combinations, you can follow up with an independent story problem. Others have also started with this story problem and used it to lead a CGI discussion. Use your professional judgment on what would work best for your students. This can also be used for formative assessment.

Each student will be given the story problem to independently work. Students can use numbers or draw pictures to complete the page. (Use your discretion)

Note: On the story problem, I purposefully didn't put the exact number toy boxes to match the exact number of combinations.

You can also pose other contexts, similar to this one, to help students compose and decompose four objects. The contexts are limitless. CGI part-part-whole, both parts unknown is the problem type that addresses this standard.