

Understanding Addition and Subtraction

Key Content from This Unit:

Kindergarteners fluently add and subtract within five. They decompose numbers into pairs in more than one way (with numbers less than or equal to 10) by a drawing or equation. Students represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

Developing Conceptual Understanding
 Concrete → Pictorial → Visualization → Abstract



Students solve problems by acting them out with concrete objects, then by drawing pictures to represent objects, then to more abstract visualizations, then to abstract equations to represent the problem.

Vocabulary to Know:

- Addition:** to combine; put together two or more quantities
Compose: to put together from basic elements, i.e., 10 can be composed from an 8 and a 2 or a 7 and a 3
Counting back: a way to subtract, starting with the bigger number and counting back from there
Counting on: a way to subtract by, starting with the smaller number and counting on to the total
Decompose: to separate into basic elements, i.e., 15 can be decomposed into a ten and five ones
Difference: the difference between two numbers, the answer to a subtraction equation
Missing Addend: A strategy for subtraction when you use addition, like to solve $9 - 5 = ?$, think $5 + ? = 9$
Subtraction: To take one quantity away from another quantity

What came before this:

Earlier in kindergarten, children use objects, fingers, mental images, and drawings to represent and solve addition and subtraction word problems. Students add and subtract within 10, using objects or drawings to represent the problem. They also decompose numbers less than or equal to 10 into pairs in more than one way, using objects or drawings and find the number that makes 10 when added to a given number (1–9).

What comes after this:

In grade 1, students will add and subtract within 20, demonstrating fluency for addition and subtraction within 10. They will understand the meaning of the equal sign. Students will solve addition and subtraction number stories with unknowns in all positions.

Common Core Focus:

- Fluently add and subtract within five.
- Decompose numbers less than or equal to 10 into pairs in more than one way, using objects or drawings. Record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$; $5 = 4 + 1$).
- Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- Find numbers that make 10 using objects and pictures, record findings using an equation

K.OA.1, K.OA.3, K.OA.4, K.OA.5

Spotlight on the Math Practices

Make Sense of Problems and Persevere in Solving Them

Mathematically proficient students can:

- Rely on concrete objects or pictures to help make meaning of and solve a problem;
- Explain the meaning of a problem;
- Select a strategy like drawing a diagram, acting it out, creating a mental image or possibly writing an equation to solve simple addition and subtraction problems.

How Can You Help?

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- Ask your child to name two numbers that are put together to make any number 10 or less.
- Have your child act out simple put together and take apart problems.
- Show and have your child count some objects. Cover some of them with a bowl and have your child decide how many are hidden.

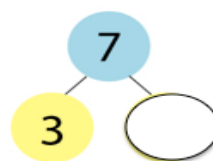
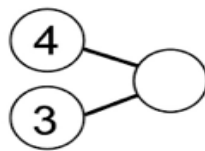
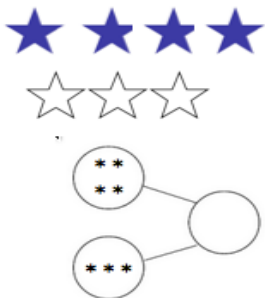
KEY MATHEMATICS of the COMMON CORE

Number Bonds

The number bond is a pictorial representation of part/part/whole relationships showing that smaller numbers (the parts) make up larger numbers (the whole). The number bond is a key model for showing students how to both take apart (decompose) and put together (compose) numbers with ease. This in turn leads directly to their emerging addition and subtraction skills.

In Kindergarten, students first become fluent with number bonds to 5, and then build understanding of the very important number 10. As students become more comfortable using number bonds, the bonds may be presented in different orientations (e.g. the whole not always on top).

Composing and decomposing numbers is a powerful concept and number bonds will help students visualize those relationships in kindergarten and future grades.



Here are various representations of number bonds that could be used in kindergarten. See how the number bonds can use both drawings and numbers.

Some Resources to Help at Home

- <http://www.iboard.co.uk/activity/Alien-Pairs-to-10-733> Pairs to make ten
- http://www.curriculumsupport.education.nsw.gov.au/countmein/children_eggs_in_a_carton.html
- <http://www.k-5mathteachingresources.com/addition-and-subtraction-activities.html>
- <http://www.topmarks.co.uk/Flash.aspx?f=TakeAway> has interactive subtraction stories.
- <http://illuminations.nctm.org/Activity.aspx?id=3566> Add and subtract with Okta