

Unit 5 Research



Once kindergarten children have basic number sense, they soon begin to understand 10 as the foundation for place value. They are then able to distinguish that teen numbers consist of a set of ten and some ones, and that ten ones create one group of ten.

Children must understand that each cardinal teen number consists of two groups; one group of ten, and a group of ones. Therefore they should realize, for example, that 16 consists of one group of ten and 6 ones. The ability to visualize ten ones as one set of ten is crucial to future understanding of math concepts.

To aid in the development of this sense of awareness, it is helpful to provide experiences in which the children observe 16 objects, for example, separated into a group of ten and a group of six, and relate these quantities using both the number words "sixteen is ten and six" and the written number symbol, 16.

It is also helpful to illustrate the written equation $16 = 10 + 6$. Repeated experiences in considering these relationships will assist the children in overcoming the typical error of reversal, or writing the number they say first, when writing teen numerals. Children will eventually hear sixteen and recognize that when writing teen numerals, they write 1 first, even though they may not yet think of this one as a representation of ten, so they write 61.⁽¹⁾

Having learned that ten is the building block of our base 10 numeration system, young children can usually "read" two-digit numbers long before they understand the effect the placement of each digit has on its numerical value. A kindergartner might be able to correctly read 41 as forty-one and 14 as fourteen, without understanding why the numbers are of different values. Ten-frames were developed by researchers Van de Walle (1988) and Bobis (1988) to help develop numbers sense within the context of ten.⁽²⁾⁽³⁾

The simultaneous use of two ten-frames can provide an important first step to understanding teen numbers. In a Starfall classroom, the teacher articulates a teen number, for example, 14. The children then place the Number Card 1 beneath the first ten-frame and fill the ten-frame with 10 counters. They then place the Number Card 4 beneath the second ten-frame and add 4 counters to total 14. Activities such as this are included in the Starfall Math Curriculum because research shows that children develop mental images of numbers based on their experiences with ten-frames.⁽⁴⁾

(1) Committee on Early Childhood Mathematics, (2009). *Mathematics Learning in Early Childhood: Paths toward Excellence and Equity*. Cross, C.T., Woods, T. A., and Schweingruber, H. (Eds). Washington, D.C.: National Academies Press.

(2) Bobis, J. (1996). "Visualization and the development of number sense with kindergarten children." In Mulligan, J. & Mitchelmore, M. (Eds.) *Children's Number Learning: A Research Monograph of the Mathematics Education Group of Australasia and the Australian Association of Mathematics Teachers*. Adelaide: AAMT.

(3) Van de Walle, J. A. (1988). *Elementary School Mathematics: Teaching Developmentally*. London: Longman.

(4) Back, J. (2014). "Place Value: The Ten-ness of Ten", NRICH: Enriching Mathematics, University of Cambridge, UK.

Unit 5 Frequently Asked Questions

Do children need to have a solid understanding of place value before introducing teens?

It is very common for children to experience some difficulty with the numbers 11-19, since their names do not follow the common rules, and numerals now take on very different meaning depending on their placement.

The key to understanding numbers beyond ten is to understand place value; however, children do not need to have a full understanding of place value prior to introducing the teen numbers.

Children are exposed to numbers beyond ten daily during the calendar, number line, and hundreds chart routines, and most importantly through the place value routine, in which they are bundling sets of tens with ones left over. Activities involving counting on from a given number and the use of ten frames also assist children in their understanding of the “tricky teens,” which provides a foundation for formally introducing the numbers 11 through 19.

What types of intervention do you suggest for children who struggle with teens?

As with learning to read the numerals 0 through 9, there are many everyday situations that provide purposeful opportunities to practice recognizing numerals and numeral writing. For example, recording the score of a game between the teachers and children, counting crayons in a container and then recording the number, lining children up and having them “count off” as you indicate them in line, assigning a “teen” number to each child (they can write their teen number on their whiteboards or paper), and playing games calling up different teen numbers are all excellent opportunities in which the children can receive needed daily practice. Repeated exposure to the numbers and experiences that involve recording numbers will help those who are struggling while also providing reinforcement for the others.