

## Transcript – Step-Down Approach

The ESTAR/MSTAR Learning Progression is supported from these essential elements in the following way. The first element, target learning goal, is defined as the learning progression. The second element, progress variables, is defined as a learning progression level. The third is intermediate levels of achievement, which we define as a level within the learning progression level. The next is learning performances at each level, which we call sublevels. The last is assessments that measure student development along the progression. For the purpose of TXAR, these 4 elements are used to assess two algebra-readiness concepts. The following lesson will dive into more detail about the content of the ESTAR/MSTAR Learning Progressions.

## Transcript – Examples

Now, let's look at a similar example of learning progressions in mathematics. This is an example of a learning progression for single-digit addition taken from the National Research Councils' textbook, *Adding it Up*.

In the first level, children count out all objects for the first addend, count out all objects for the second addend, and then count the objects. This is referred to as counting all. Within this level, they will abbreviate, internalize, and abstract the procedure as they become more experienced. In the next level, children notice they do not have to count objects for the first addend but can start with the number in the first or the larger addend and count on the objects in the other addend. This is referred to as counting on. As they learn to count on with objects, they begin to use the counting words as countable objects and keep track of how many words they count using fingers or auditory patterns.

Last, children will recompose numbers into other numbers and use thinking strategies, such as making tens or doubling, in which they turn an addition combination they do not know into one they do know.

As the progression shows, children move from using a strategy to being able to rapidly recall specific sums. It is important to remember that different students may spend different amounts of time in the different levels of the learning progression. A student may spend a while in the "Count All" level and then go quickly through the "Count On" and on to the various strategies, or a student may spend no time in the "Count All" level and begin at the "Count On" level.

Let's look at another mathematics example of a learning progression. Look for a copy of this learning progression in the resource section.

Mojica and Confrey (2009) specified a learning progression in mathematics that describes the likely development of student understanding about fractions and object partitioning. In each example, student understanding is projected to develop from little to no understanding represented in the bottom row, upward along the progression toward mastery of the target goal represented in the top row. Each row provides a general description of what the student understands at each level of the progression.