

Strategic Teaching and Evaluation of Progress (STEP) Activity Brief

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The STEP Literacy Assessment provides a set of tools, tightly aligned with scientifically established milestones in reading development, to follow students' progress from kindergarten through third grade. These tools are organized into a developmentally sequenced set of tasks that can help a teacher understand the developmental status of individual students and a class of students at any given point. They also help a teacher analyze students' progress over time. The computer-based STEPTool supports use of the STEP assessment data.

STEP Literacy Assessment:

- Builds on a theoretically-based description of **developmental stages of student reading**
- Empirically establishes a **set of diagnostic criteria** for understanding students' progress
- Explicitly links critical elements in reading development into an integrated **literacy assessment system**

Problems of Practice

Teachers who take on a comprehensive literacy approach to instruction engage in complex teaching practices rooted in the developmental reading process. Rather than providing instruction that is scripted and routinely delivered, teachers must actively develop their classroom practice based on evidence of how their students are progressing as readers. Reliable and valid assessment of students is not only crucial, but central to this teaching endeavor.

Value Added

The STEP Literacy Assessment is designed to support an interactive process of teaching and learning. It provides rich data-based descriptions of students' developmental profiles that facilitate classroom-level instructional planning. It also provides more detailed individual student-level data for diagnosing the needs of particular student readers.

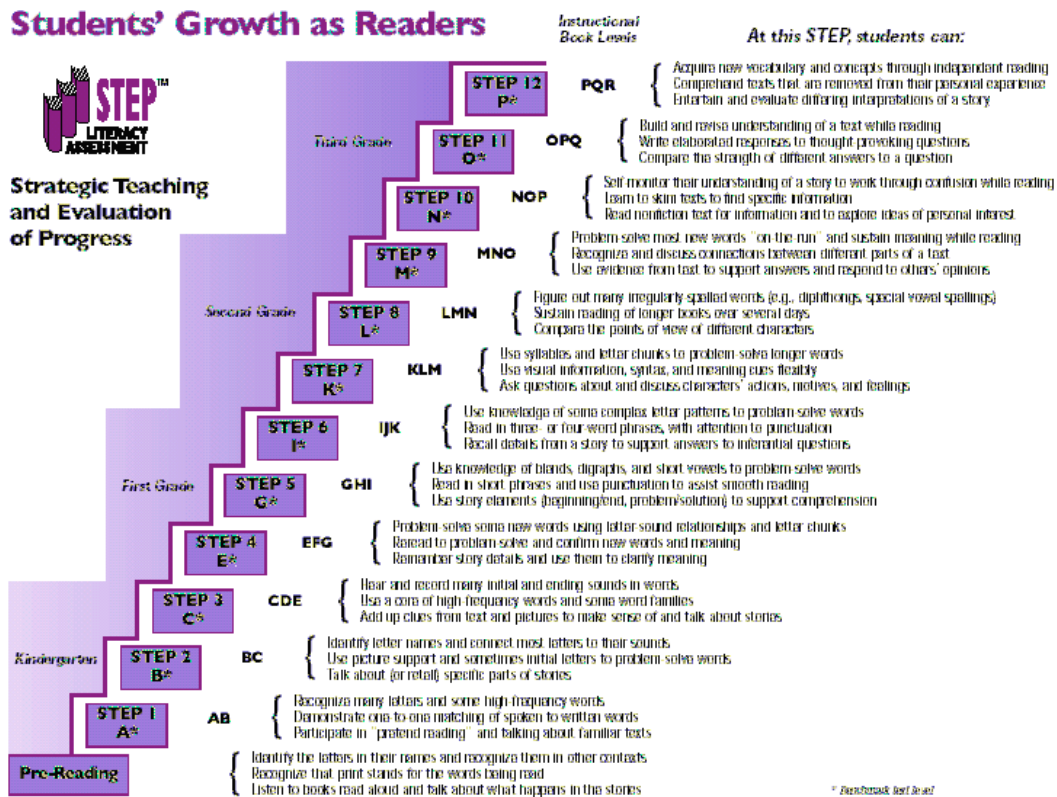
The STEP Literacy Assessment was developed at the Center for Urban School Improvement (USI) at the University of Chicago by researchers in collaboration with affiliated USI teachers.

STEP Features include:

- Conceptual Map of Reading Development*
- Systematic Set of Tools*
- Empirically Validated Metric of Student Growth*

A Conceptual Map of Reading Development

The assessment is organized around a developmental “map” of how students grow as readers -- creating a coherent conceptual framework. At the heart of this is the question of what strategies and skills students need to read and understand increasingly complex text. This includes a broad framework of how the assessment functions within *Developmental Stages of Reading* and as well as more detailed descriptions of how student *Students’ Growth as Readers* progresses across Steps.



Developmental Stages of Reading

Emergent Readers

Pre-Reading to Step 2 (Book Levels A-B)

- Develop the ability to hear separate sounds in words (phonemic awareness)
- Know most letter names and associated sounds
- Read familiar text orally, matching word-by-word (often following with their finger)
- Use information from pictures for understanding and for support in words solving

Early Readers

Step 2 to Step 6 (Book Levels B-I)

- Recognize many high frequency words automatically
- Use letter-sound information along with meaning and language to solve words
- Read easy text with some fluency and attention to punctuation
- Develop the ability to make inferences and interpret text using various strategies

Transitional Readers

Step 6 to Step 9 (Book Levels I-M)

- Use multiple sources of information flexibly while reading for meaning
- Begin to sustain silent reading of longer texts
- Use pictures for information but do not overly rely on them for comprehension
- Build meaning as they read stories, connecting earlier and later parts of a text

Self-extending Readers

Step 9 to Step 12 (Book Levels M-P)

- Problem solve words flexibly with minimal disruption of the flow of reading
- Sustain reading of texts independently over several days
- Try out multiple strategies to support comprehension in difficult text (e.g., test out own understanding by paraphrasing or self-questioning)
- Incorporate new information into their own understanding of a topic while reading nonfiction text

Employing a Systematic Set of Tools as a Window into Student Development

The STEP assessment is conducted using two different book series, each with fifteen books each, leveled according to difficulty. These leveled books correspond to each Step and are used to evaluate reading accuracy as well as the problem-solving strategies a student uses to figure out new words or to make sense of new concepts and ideas. During the student's oral reading of the book, the teacher takes a running record of miscues and self-corrections, as well as times the oral reading to determine reading rate. In addition, teachers use a rubric to follow the student's growing fluency.

A comprehension conversation follows the reading and includes questions that span literal, inferential, and higher-order critical thinking. These questions begin at the early step levels and become increasingly central to the assessment as students mature as readers. The intention is not to simply score a student's answers as right or wrong. Instead, this is a discussion between the student and the teacher organized around a set of questions to give the teacher a sense of how a student is building meaning as he or she reads and, consequently, what strategies the student needs to build and grow as a reader. This conversation models the kinds of questions and discussions that occur within classroom instruction.

The formal assessment also includes key supplemental components that research shows are building blocks to reading. These provide a deeper look into some specific skills in reading that supplement what is learned from the oral reading of the leveled text. The areas that are assessed have a developmental sequence that includes concepts about print, phonemic awareness, letter/sound correspondence, and developmental spelling. These components are not separate assessments. Instead, they are integrated into the appropriate Step and have targets for achievement for students to demonstrate their understanding and continued development as readers.

The following table on page 5 shows the *Components of the Formal Assessment* at each Step.

Components of the Formal STEP Assessment

	Pre- Reading	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
Name Assessment	✓												
Phonemic Awareness	✓												
Rhyming Words													
Concepts about print	✓	✓											
Letter Identification													
Names	✓	✓	✓										
Sounds		✓	✓	✓									
Phonemic Awareness													
First sounds		✓											
Segmentation			✓	✓									
Developmental Spelling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reading Record - Text Level		✓-A	✓-B	✓-C	✓-E	✓-G	✓-I	✓-K	✓-L	✓-M	✓-N	✓-O	✓-P
Reading Rate and Fluency				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Comprehension Conversation													
Oral questions				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Story Retelling									✓	✓	✓	✓	✓
Written questions										✓	✓	✓	✓

An Empirically Validated Metric of Student Growth

A primary difficulty using data from early literacy assessments is understanding how the various components fit together to inform student progress and next steps for instruction. Through the application of an Item Response Theory (Rasch modeling), we are able to empirically address these questions. By examining individual difficulties of key items and concepts, we can see how these components “map” for individual students.

Rasch modeling explanation

Under the Rasch analysis, each item has an estimated difficulty which places it in a unique position on the overall scale. If STEP functions as a developmental scale, items should cluster within the scale by sub-component. That is, the Concepts about Print items, for example, should tend to be easier than the Phonological Awareness items which in turn should be easier than most of the reading accuracy ratings. Similarly, within each sub-component, the items difficulties should also order in theoretically predictable ways, e.g. the rhyming items within Phonological Awareness should generally be easier than items that examine a child’s skill at segmentation.

STEP Developmental Literacy Scale (see attached graph)

Concepts about Print / Letters Names and Sounds

As expected, the easiest items within the STEP Developmental Literacy Scale focus on concepts about print and letter names and sounds. Within Concepts about Print, the easiest item is “knowing that you read the text” (and not the pictures). Next, students learn about directionality – reading left to right. The most difficult concept about print is understanding 1-to-1 matching of voice to words on the page.

Looking at the next boxplot, representing letter names and sounds, we see that as students gain more understanding of Concepts about Print, they are also learning to identify letters. Children tend to learn upper case letters first (-6.1 mean difficulty for 26 items for upper case; -5.2 mean difficulty for 28 lower case including print and type face fonts for ‘a’ and ‘g’) and to eventually associate letters with the sounds that they make (-3.0 mean difficulty for 26 items.)

Phonological Awareness

The item difficulties for the Phonological Awareness sub-component indicate that these skills are developing in tandem with Concepts about Print and Letter Names and Sounds. Rhyming words comes first (-4.3 mean item difficulty), followed by matching words that begin with the same first sound, (-3.4 mean item difficulty) and finally learning to segment words into individual phonemes(-1.6 mean item difficulty). Note that being able to consistently segment words into phonemes does not occur until students are accurately reading text between Step 3 and Step 4.

Text Reading Accuracy

Next come the results for Text Reading Accuracy, which follows a monotonic progression. The jumps in item difficulty across Steps 2 through 5 are relatively large. Students at this stage in learning to read are acquiring many new strategies and skills, and correspondingly, the ability to read accurately the next level text represents a significant developmental gain. A child with a

scale score of -4.1 has a probability of 0.90 for reading a Step 2 text with mastery. To achieve a similar likelihood of mastery at Step 3 implies a scale score of -3.2; the corresponding jumps to reading accurately at Steps 4 and 5 translate into scale scores of -1.6 and -0.1 respectively. In contrast, for Step levels 5 and beyond, the distance between item difficulties become significantly smaller. Although students are continuing to learn new strategies and skills to decode more complex texts, the actual amount of development occurring here appears less than at lower step levels.

Reading Rate

Reading Rate item difficulties and Text Reading Accuracy levels display an interesting relationship with one another. As expected, the ability to read a text accurately precedes being able to read the same text with appropriate speed or rate. That is, the item difficulty associated with the reading rate at each step is significantly higher than the corresponding reading accuracy for that step. Of significance, these gaps become larger as students progress into reading the more complex texts involved in the upper levels of STEP. For example, the gap between accuracy and rate at Step 5 is approximately 0.5 logits on the scale. By Step 10, the gap has increased to 2.0 logits. These results are consistent with published research that the ability to decode accurately more complex texts represents modest developmental gains, whereas to read such texts with fluency represents substantially greater improvement. This is highly significant because fluency in turn links most directly with comprehension.

Comprehension

The boxplot for Comprehension displays the median item difficulty for the 5 to 8 comprehension questions associated with each text at each step level. Through Step 5, the difficulties for accuracy, rate and comprehension are fairly similar at each respective step. This implies that students at these levels are learning in tandem to read accurately, with a reasonable rate, and to comprehend these simple texts. As the text become more complex, however clear skill differentiation begins to emerge. As we saw with reading rate, a substantial gap appears at Step 6 and beyond that separates the comprehension item difficulties from a simple accurate decoding of text. To decode accurately these more complex texts represents an improvement, but the big developmental gains are associated with doing this with fluency and comprehension.

Developmental Spelling

Finally, we see that items difficulties for Developmental Spelling also follow the expected pattern moving from writing initial and ending letters to short vowels and blends to long vowels and so on. Moreover, these item results align in a reasonable fashion with the other sub-components in STEP. For example, we see that students who are accurately reading text at Step 5 are also likely to be writing short vowels in developmental spelling (i.e., Step 5 accuracy and writing short vowels have approximately the same item difficulty.) Similarly, students who are reading a step 9 text accurately are spelling long vowel and r-controlled vowel patterns as well.

Taken overall, the item difficulty alignment of the sub-components within STEP (as well as the sub-tasks within each sub-component) is fully consistent with established scientific research on reading skill acquisition. These empirical results add credence to the construct validity of STEP as an integrated development scale.

STEP Developmental Literacy Scale

