Content and Item Development

Content Specification

Star Early Literacy consists of 3,424 operational items that align to a set of early literacy skills derived from exemplary state standards as well as the Common Core State Standards and current research.

The initial 2001 release of Star Early Literacy 1.0 was a 25-item adaptive test of early literacy skills, with the test items aligned to 7 literacy domains. Since the revised version of the program was released as Star Early Literacy Enterprise in 2011, it has been a 27-item test, with the test items aligned to 3 broad blueprint domains which are organized into 10 blueprint sub-domains as follows:

Blueprint Domains:

▶ Word Knowledge and Skills

▶ Comprehension Strategies and Constructing Meaning

▶ Numbers and Operations

Blueprint Sub-Domains:

▶ Alphabetic Principle

▶ Concept of Word

▶ Visual Discrimination

▶ Phonemic Awareness

▶ Phonics

▶ Structural Analysis

▶ Vocabulary

▶ Sentence-Level Comprehension

▶ Paragraph-Level Comprehension

▶ Early Numeracy

Star Early Literacy has separate content specifications for each grade, pre-K to 3, as well as for each of 5 literacy levels defined by scale score intervals.

Blueprint skill sets and blueprint domains in Star Early Literacy are based on extensive analysis of curriculum materials, state standards, and the CCSS, and has been reviewed by early learning consultants.

Early numeracy content will be specified for all tests. Star Early Literacy explicitly includes specified numbers of early numeracy items at each grade level and literacy classification.

This structure encompasses four of the five critical areas of reading instruction identified by the National Reading Panel and CCSS. The one area not covered fully by Star Early Literacy is fluency, a reading behavior that is best assessed by other means. However, fluency is well-known to be highly correlated with other reading skills, such as comprehension and using context to determine word meaning, both of which are assessed in Star Early Literacy.

Furthermore, the assessment estimates students' oral reading fluency and displays these estimates on certain reports. (See page 95 for information on the Estimated Oral Reading Fluency scores.)

Test Blueprint Characteristics

Every Star Early Literacy assessment consists of items that tap knowledge and skills from as many as ten different literacy sub-domains. The items comprise several sets of skills for each sub-domain, with 41 different sets of skills in all.

Content balancing specifications, known as the test blueprint, ensure that a specific number of items from each blueprint sub-domain are administered in every test. A summary of the test blueprint for Star Early Literacy appears here, followed by a summary table of item counts by grade level, literacy classification, and content sub-domain.

The test blueprint specifies item counts from each blueprint sub-domain.

Each Star Early Literacy test consists of 27 scored items, and a separately-specified number of uncalibrated items.

The test is organized into three sections:

1. Section A consist of 14 early literacy items with relatively short audio play times.

2. Section B consists of 8 early literacy items with longer audio play times.

3. Section C consists of 5 early numeracy items presented at the end of each test.

During a single test, with some exceptions, no more than 3 items are administered from the same blueprint skill set.

Blueprint Sub-Domain Prescriptions

For the first test a student takes during a school year, the number of items administered from each blueprint sub-domain is prescribed by grade (pre-K, K, 1, 2, 3).

Subsequent to that initial test, the prescriptions are governed by bands of scale scores on the previous test. Additionally, restrictions in the software program ensure that questions that require the ability to read are not administered to students below the first grade. The previous section,Content and Item Development" contains a detailed list of the ten literacy sub-domains and the 41 skill sets assessed by Star Early Literacy.

The Star Early Literacy Item Bank

Within each of the three Star Early Literacy blueprint domains, closely related skill sets are organized into blueprint sub-domains. The resulting hierarchical structure is domain, sub-domain, skill set, and specific skill. Each Star item is designed to assess a specific skill within the test blueprint. The test blueprint is structured so that it may stay consistent even as state specific Renaissance Reading Learning Progressions may change, as well as the items testing the related skills. Table 2, Table 3, and Table 4 display the domains, sub-domains, skill sets, and skills.

Table 2: Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Alphabetic Principle	Alphabetic Knowledge	Recognize lowercase letters
		Recognize uppercase letters
		Match lowercase with uppercase letters
		Match uppercase with lowercase letters
		Distinguish numbers from letters
	Alphabetic Sequence	Identify the letter that comes next
		Identify the letter that comes before
	Letter Sounds	Recognize sounds of lowercase letters
		Recognize sounds of uppercase letters

Table 2: Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Concept of Word	Print Concepts: Word Length	Identify longest word
		Identify shortest word
	Print Concepts: Word Borders	Identify number of words (2–3)
	Print Concepts: Letters and Words	Differentiate words from letters
		Differentiate letters from words
Visual Discrimination	Letters	Differentiate lowercase letters
		Differentiate uppercase letters
		Differentiate lowercase letters in mixed set
		Differentiate uppercase letters in mixed set
	Identification and Word Matching	Identify words that are different
		Match words that are the same
		Identify words that are different from a prompt
Phonemic Awareness	Rhyming and Word Families	Match sounds within word families (named pictures)
		Match sounds within word families (unnamed pictures)
		Identify rhyming words (named pictures)
		Identify nonrhyming words (named pictures)
	Blending Word Parts	Blend onsets and rimes
		Blend 2-syllable words
		Blend 3-syllable words
	Blending Phonemes	Blend phonemes in (VC) or (CVC) words
		Blend phonemes in single-syllable words
	Initial and Final Phonemes	Determine which word (picture) has an initial phoneme different from a prompt
		Determine which word (picture) has a different initial phoneme
		Match initial phoneme to a prompt (pictures)
		Recognize same final sounds (pictures)
		Determine which word (picture) has a final phoneme different from a prompt
		Determine which word (picture) has a different final phoneme
	Consonant Blends (PA)	Match consonant blend sounds (pictures)

Table 2: Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Phonemic Awareness (continued)	Medial Phoneme Discrimination	Identify short vowel sounds (pictures)
		Identify and match medial sounds (pictures)
		Distinguish short vowel sounds (pictures)
		Match long vowel sounds (pictures)
		Distinguish long vowel sounds (pictures)
	Phoneme Segmentation	Segment syllables in multisyllable words
		Segment phonemes in single-syllable words
	Phoneme Isolation/Manipulation	Substitute initial consonant (named pictures)
		Substitute initial consonant (unnamed pictures)
		Determine missing phoneme, initial or final
		Substitute initial consonant in a prompt (pictures)
		Substitute final consonant sound in a prompt (unnamed pictures)
		Substitute final consonant (named pictures)
		Substitute final consonant sound (unnamed pictures)
		Substitute vowel sounds (pictures)
Phonics	Short Vowel Sounds	Match short vowel sounds (words)
		Match short vowel sounds to letters
		Decode CVC words
		Recognize short vowel sounds (words)
		Distinguish short vowel sounds (words)
		Decode grade-appropriate words
	Initial Consonant Sounds	Identify initial consonant sound (words)
		Identify letter for initial consonant sound (words and letters)
	Final Consonant Sounds	Match word to a given final consonant sound
		Identify letter for a final consonant sound
	Long Vowel Sounds	Identify long vowel sounds (words)
		Match long vowel sounds to a prompt (words)
		Distinguish long vowel sounds (words)
		Match long vowel sounds to letters

Table 2: **Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain**

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Phonics (continued)	Long Vowel Sounds (continued)	Decode and recognize associated spelling patterns with long vowels (C-V-C-e)
		Decode and recognize associated spelling patterns with long vowel open syllables
		Decode and recognize associated spelling patterns with long vowel digraphs (including y as a vowel)
	Variant Vowel Sounds	Identify variant vowel sounds
		Identify variant vowel sounds (words)
		Decode words with variant vowels and recognize associated spelling patterns
	Consonant Blends (PH)	Recognize initial consonant blends (words)
		Distinguish consonant blends (words)
		Recognize word with a consonant blend in a contextual sentence
		Recognize associated spelling patterns of initial consonant blends
		Recognize associated spelling patterns of final consonant blends
	Consonant Digraphs	Identify a consonant digraph in a named word
		Identify a consonant digraph in an unnamed word
		Identify a contextual word containing a consonant digraph
		Identify correct spelling of consonant digraphs in words
	Other Vowel Sounds	Identify diphthong sounds in words
		Decode words with diphthongs and recognize associated spelling patterns
		Identify *r-controlled* vowel sounds in named and unnamed words
		Decode words with r-controlled vowels and recognize associated spelling patterns
	Sound-Symbol Correspondence: Consonants	Substitute initial consonants (words)
		Substitute final consonants (words)
		Substitute final consonant sound (named words)
		Substitute final consonant sound (unnamed words)

Table 2: **Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain**

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Phonics (continued)	Word Building	Identify words made by adding an initial consonant (unnamed words)
		Identify words made by adding an additional medial letter (unnamed words)
		Identify words made by adding an additional final letter (unnamed words)
		Identify words built by adding one letter to an audio prompt
	Sound-Symbol Correspondence: Vowels	Substitute vowel sounds (words)
	Word Families/Rhyming	Identify rhyming words (words)
		Identify nonrhyming words (words)
		Identify rhyming words (unnamed answers)
		Identify rhyming words (unnamed prompt and answers)
		Identify nonrhyming words (unnamed prompt and answers)
		Identify onset/rime in named words
		Identify onset/rime in unnamed words
		Identify sounds within word families (named words)
		Identify sounds within word families (unnamed words)
Structural Analysis	Words with Affixes	Use knowledge of common affixes to decode words
	Syllabification	Use knowledge of syllable patterns to decode words
		Decode multisyllable words
	Compound Words	Identify compound words (named words)
		Identify words that are not compounds (named words)
		Identify compound words (unnamed words)
		Identify words that are not compounds (unnamed words)
		Identify correctly formed compounds

Table 2: **Hierarchical Structure of the Star Early Literacy Item Bank: Word Knowledge and Skills Blueprint Domain**

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Vocabulary	Word Facility	Match words to pictures
		Read high-frequency words by sight
		Identify new meanings for common multi-meaning words
		Determine categorical relationships
		Understand position words
		Read grade-level sight words
		Understand multi-meaning words
	Synonyms	Identify synonyms of grade-appropriate words
		Match words with their synonyms (words)
		Identify synonym of a grade-appropriate word in a contextual sentence
		Match words with their synonyms in paragraph context (assisted)
		Match words with their synonyms in paragraph context (unassisted)
	Antonyms	Identify antonyms of words
		Identify antonyms of words in context (assisted)
		Identify antonyms of words in context (unassisted)

Table 3: **Hierarchical Structure of the Star Early Literacy Item Bank: Comprehension Strategies and Constructing Meaning Domain**

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Sentence-Level Comprehension	Comprehension at the Sentence Level	Listen and identify word in context
		Read and identify word in context
Paragraph-Level Comprehension	Comprehension of Paragraphs	Identify the main topic of a text
		Listen to text and answer literal *who, what* questions
		Listen to text and answer *where, when, why* questions
		Read text and answer literal *who, what* questions
		Read text and answer *where, when, why* questions

Table 4: Hierarchical Structure of the Star Early Literacy Item Bank: Numbers and Operations Domain

Blueprint Sub-Domain	Blueprint Skill Set	Blueprint Skill
Early Numeracy	Number Naming and Number Identification	Recognize numbers 0–20
	Number Object Correspondence	Count 1–20
		Recognize ordinal numbers 1st–10th
		Compare sets of up to 5 objects
		Identify the number of 10s in 10, 20, 30, 40, 50, 60, 70, 80, 90
	Sequence Completion	Complete a picture pattern
		Complete a sequence of numbers between 0 and 10 in ascending order
	Composing and Decomposing	Add 1 to a set
		Subtract 1 from a set
		Add numbers with a sum up to 10 (pictures)
		Subtract numbers with a minuend up to 10 (pictures)
	Measurement	Compare sizes, weights, and volumes

Item Design Guidelines

Each of the items was written to the following specifications:

Simplicity

Items directly address the skill in the most straightforward manner possible. Evaluators should have no difficulty deducing the exact nature of the skill set or skill being assessed by the item. Instructions should be explicit, clear, simple, and consistent from one item to the next.

Screen Layout

The testing screen should feel comfortable for the student and teacher. Background colors should be unobtrusive and relatively muted, and text and graphics should stand out clearly against the background. The item background must be the same for all items on the test.

Each item consists of a combination of audio instructions, an on-screen prompt in the form of a cloze stem containing text or graphics, and three answer choices containing letters, words, graphics, or numbers.

Text

For letter and word identification items, the type size should be large, but may become smaller for higher grades. The type size should be tied to items, so that it varies according to the developmental level of a student. Text size should always be consistent from one answer choice to the others so as not to make one answer choice stand out visually.

The student instructions for every Star Early Literacy test item is administered aurally by the computer, so there is no need for printed directions on-screen. For any items that utilize on-screen text, either as part of answer choices or for items that require reading, the type is be a sans-serif font of appropriate size.

Every effort is made to use common words as the target and distractor words in test items.

Graphics

Any art should be easily recognized by students. Color should be functional, as opposed to decorative, and lines should be as smooth as possible. For complex graphics, such as those needed for listening comprehension, line drawings on a light background should be used. The size and placement of the graphics should be consistent throughout.

The art for correct answers and distracters should be consistent in order to avoid introducing an extraneous error source. Answer choices will primarily consist of graphics and text, but sound or animation occasionally will be needed. Art should be acceptable to a broad range of teachers, parents, and students, avoiding controversial or violent graphics of any kind.

Phonics and Phonemic Awareness

For phonemic awareness and phonics items, the 44 phonemes (speech sounds) that make up the English language are used. Phonemes should be depicted by one or more letters enclosed in a beginning and ending forward slash mark, as in Table 5.

Table 5:   Phonemes Included in the Phonemic Awareness and Phonics Items

Consonant Phonemes		Vowel Phonemes[a]	
/b/	Big, robber	Short	
/d/	Down, called, daddy	/ă/	Am, at, apple, pan, laugh
/f/	Phone, if, differ, cough, half	/ĕ/	Ed, end, bread, many, said, friend
/g/	Go, wiggle, ghost	/ĭ/	In, fill, bit, mist
/h/	Had, whole	/ŏ/	On, cot, doll, top
/j/	Gym, job, edge, gem	/ŭ/	Up, but, touch, come, was, does
/k/	Come, keep, back, chrome		
/l/	Let, fell, ample, label, pupil	Long	
/m/	Me, swimmer, dumb, Autumn	/ā/	Able, make, aid, day, they, eight, vein
/n/	No, know, winner, gnaw, pneumatic	/ē/	She, seat, bee, key, piece, many, ceiling
/p/	Pay, apple	/ī/	Find, ride, by, pie, high, height
/r/	Read, write, marry, are, rhyme	/ō/	No, note, soul, boat, low, door
/s/	So, cent, pass, house, castle, screw	/ū/	Unit, use, few, you
/t/	To, fatter, debt, ptomaine		
/v/	Very, give, of	Blended	
/w/	We, when, quite, once	/o͞o/	Too, super, do, crew, due, two, soup, shoe
/y/	Yes, yellow	/o͝o/	Look, put, could
/z/	Zoo, has, please, buzz, sneeze	/ou/	Mouse, now, drought
/ku/	Quit (really two phonemes /k/ /w/)	/au/	Haul, talk, draw, water, bought, caught
/ks/	Box, fix (really two phonemes /k/ /s/)	/oy/	Oil, boy
	/c/ is always /k/ or /s/		
Digraphs[b]		/r/ Influenced	
/sh/	Show, motion, sure	/ar/	Car, far, star
/th/	Thin (unvoiced)	/er/	Her, fur, sir, work, learn, syrup, dollar
/th/	This (voiced)	/or/	For, ore, oar, pour, poor
/ch/	Much, nature, match	/ear/	Rear, ear, hear
/ng/	Song, think	/air/	Air, hair, pair
/wh/	What, when (/wh/ and /w/ often overlap)		

a. 6 vowel letters are used in 70 different spellings and 20 vowel sounds.
b. Single consonant sounds, two letters.

Answer Options

All items have three answer choices. Only one of the choices is the correct answer. Answer choices are always arranged horizontally. For students using the keyboard as the means of choosing their answer, the answers have small text below each answer choice labeling A, B, and C, moving from left to right.

Distractors are chosen to provide the most common errors in recognition, matching, and comprehension tasks.

Words and artwork used in answer choices should be reused in no more than 10% of the items within a skill set, a sub-domain, or within the item bank as a whole. For example, a picture of a cat should only appear as an answer choice in no more than 10 out of 100 items in any given skill set.

Language and Pronunciation

All item directions will be delivered auditorily so as to support students that are not yet reading or emergent readers. Instructions will clearly state the item stem with the instruction for the student to "pick the…" Vocal talent should read questions with a neutral, un-accented American English voice. Pacing should be slow enough to be clearly understood while still be engaging for students.

Language should be used consistently throughout the assessment. Standard protocols should be established for item administration that reflect consistent instructions. For example, if an item stem is repeated twice, the same repetition should be used for all items of the same type. One exception to this rule is those situations where the same item type is used across grades, and one of the factors that changes is the level of instruction provided to the student.

In Phonemic Awareness items, words should be segmented into phonemes, that is, divided into their individual sounds. As much as possible, the individual sounds should be preserved, and not distorted in any way. In the item instructions, individual phonemes will be enclosed by two slash marks, as shown in Table 5.

In the recording of item instructions and answer sound, the audio segments should minimize the tendency to add a vowel sound after a consonant sound, especially for unvoiced consonants, such as /p/, /k/, and /t/. For example, /p/ should not be pronounced "puh." Instead, it should be spoken in a loud whisper and in a clipped manner.

For voiced consonants that cannot be pronounced without a vowel sound, such as /b/ and /g/, the audio segments should keep the vowel sound as short as possible. For example, /g/, not /guh/.

Constituent consonants, such as /m/, /f/, and /n/, should not be followed by a vowel sound. They can, however, be extended slightly, as in /mmmmm/, but not /muh/.

Short and long vowel sounds should be pronounced by simply lengthening the sound of the vowel. The long a sound, for example, should be pronounced /āāāā/.

Item Development: Star Early Literacy (Prototype Testing)

Because Star Early Literacy is intended for computer-administered assessment of early literacy skills of pre-K to grade 3 children who may have limited reading ability, a prototype of the original test delivery software system was developed prior to full-scale item development to evaluate whether this goal was feasible. As part of the product development of Star Early Literacy, prototype test items were written and prototype test administration software was developed, following the guidelines in the previous section. Tryout research of the prototype was carried out in April 2000, with over 1,500 children in pre-kindergarten, kindergarten, and grades 1 and 2 participating. The specific objectives were the following:

▸ Measure and compare the ability of pre-kindergarten, kindergarten, first, and second grade students to respond to a set of early literacy items, representative of the overall skill set, administered non-adaptively on the computer.

▸ Gather observations and comments from teachers on the user interface, the overall test, and on individual items as students worked through the test.

▸ Collect data on how well students interact with the user interface, and determine criteria for testing out of hands-on exercise, repeating instructions, putting up "Get Help" alerts, and other design issues.

▸ Gather item statistics (percent correct, response latency, amount of mouse travel for students using the mouse, etc., by item and by age/ grade) on sets of early literacy items containing text, sound, and graphics.

Extensive analyses were conducted on the data collected in the prototype study to evaluate the software, its user interface, and the psychometric characteristics and teacher opinions of the test items. The results indicated that the prototype tryout study was a success in terms of demonstrating the viability of the software prototype and of the tryout items in classrooms ranging from pre-kindergarten through grade 2.

The user interface proved to be usable at all levels. The tasks were well within the ability of children to complete in a minimum of time. The tryout test items