

What Are MindStar Books?

MindStar Books (MSBs) are online interactive books that both foster and assess listening comprehension and reading comprehension. Current MSBs focus on science content and stories at Pre-K through second grade. There are currently over sixty MSBs online -- sample titles include *Z is for Zebra*, *Humpty Dumpty*, *The Monarch Butterfly's Life Cycle*, *What's Your Habitat?* and *How Grandpa Got His Dog*.

Each MSB includes three activities for each student: a multimedia presentation that a virtual tutor narrates; a formative assessment of the student's listening comprehension; and reading practice. MSBs are self-paced: students can navigate within these three activities and control the flow of their experience.

MSB design incorporates extensive state-of-the-art research and the Simple View of reading. Three separate feasibility studies in K-2nd grade classrooms in the US and Finland have evaluated MSBs and have demonstrated their efficacy.

MSBs Foster and Assess Listening Comprehension

Narrated Multimedia Presentations: Each MSB begins with a self-paced narrated multimedia presentation that teaches a topic or tells a story with a sequence of pictures or short videos. A "virtual tutor" within each MSB is the voice that narrates and guides the student. No words appear on screen during narrated multimedia presentations. Extensive research shows that including text in narrated presentations inhibits listening comprehension.











Fostering Listening Comprehension: This sequence of images appears with the narration below. Because this is the listening comprehension component, no words appear with the image.

			
Narration: "The caterpillar is about to begin the next stage of its life cycle."	"It attaches itself to a branch."	"It hangs upside down."	"Then, the caterpillar changes into a chrysalis."

Formative Assessment with Feedback: A listening comprehension assessment follows each narration. The assessment provides valuable feedback to each student with immediate opportunities to correct errors. The assessment includes one or more spoken multiple-choice questions with spoken answer choices or pictures, as the image on the next page shows. Correct first choice answers are followed by positive feedback and an expansion of the answer. A hint and a second choice follow incorrect first choices. If the student's first and second choice answers are both incorrect ($\approx 5\%$ of cases over three studies) the question is repeated and the correct choice is presented, along with a brief elaboration of the answer. Thus, the formative assessment always concludes with the student hearing the correct answer, and an expansion of the answer. The combination of narrated multimedia presentations and formative assessments in MindStar Science Books fosters and assesses students' *listening comprehension*.

Feasibility studies conducted in the US and Finland indicate that *K-2nd grade students learned science vocabulary and scientific concepts while using MindStar Books*. These questions included a high proportion of reasoning questions. The studies suggest that MindStar Books enable students to learn vocabulary and concepts and foster listening comprehension.





Assessing Listening Comprehension

					
<p>What animal turned into this?</p>			<p>What animal turned into this?</p>		
<p>The student opening this screen sees the chrysalis highlighted and hears the question, "What animal turned into this?"</p>			<p>The student selected an incorrect first choice (butterfly). After listening to the hint, the student selected the correct choice (caterpillar).</p>		

MSBs Foster Oral Reading Fluency

Reading Practice: Reading practice sessions occur after the listening comprehension activities. The sentences in the students reading practice incorporate the vocabulary and concepts presented in the listening comprehension activities. Upon entering reading practice, the virtual tutor reads each sentence to the student. The words in each sentence are highlighted in synchrony with the virtual tutor's speech. Following the initial "read aloud" by the tutor, the student takes control of the activity. The student activates the first sentence, listens to it read aloud by the tutor as each word is highlighted, can click on individual words to hear them read aloud, or record the sentence in their own voice. After the student records the sentence, each word the student read correctly is highlighted.

Analysis of over 12,000 reading practice sessions in two of the evaluative studies showed that all students actively engaged in reading practice, and students practiced reading sentences until they could read each sentence accurately, fluently, and expressively. Across all books, students activated individual sentences at a rate exceeding 95%. (That is, they listened to, recorded, or clicked on a word in the sentence.) Specifically, students listened to individual sentences 85% of the time, and both listened to and recorded sentences 63% of the time. The figure below shows one of the reading practice sessions in *The Life Cycle of the Monarch Butterfly*.

Fostering Reading Comprehension			
			
<p>☞ The caterpillar eats and eats. →It eats and it grows for about two weeks. →Inside, its body is rapidly changing. →What happens next is truly amazing.</p> <p style="text-align: right;">➡</p>	<p>☞ The caterpillar eats and eats. ☞ It eats and it grows for about two weeks. →Inside, its body is rapidly changing. →What happens next is truly amazing.</p> <p style="text-align: right;">➡</p>	<p>☞ The caterpillar eats and eats. →It eats and it grows for about two weeks. ☞ Inside, its body is rapidly changing. →What happens next is truly amazing.</p> <p style="text-align: right;">➡</p>	<p>☞ The caterpillar eats and eats. →It eats and it grows for about two weeks. →Inside, its body is rapidly changing. ☞ What happens next is truly amazing.</p>