

## Systems Thinking Tools

In addition to the iceberg model, several other systems thinking tools can help students deepen their understanding of literary and informational texts.



Behavior over time diagrams are used to track how variables change over

time. They can be used to show the behavior of “hard” variables—such as money and temperature—and of “soft” variables—such as morale and love.



Causal loop diagrams are used to show the interrelationships among the parts of a system. They

take the form of one or more loops that depict cause-and-effect relationships.



Stock/flow diagrams are another way of showing a system’s structure. Stocks are things that can accumulate, such as population and savings. Flows represent things that change over time, such as the birth rate and deposits to a checking account.

## Constructing Meaning by Understanding Structure

The whirl of controversy surrounding the Common Core State Standards (CCSS) has at times overshadowed the purpose of these consistent learning goals. The main intention of the CCSS is to prepare students in the U.S. for success in higher education and in the workforce. To that end, the CCSS establish guidelines for what every student should know and be able to do in math and English language arts from kindergarten through 12<sup>th</sup> grade. By leaving *how* the CCSS are implemented up to individual states and school districts, policy makers have invited the use of innovative tools and approaches for achieving the standards’ goals and expectations.

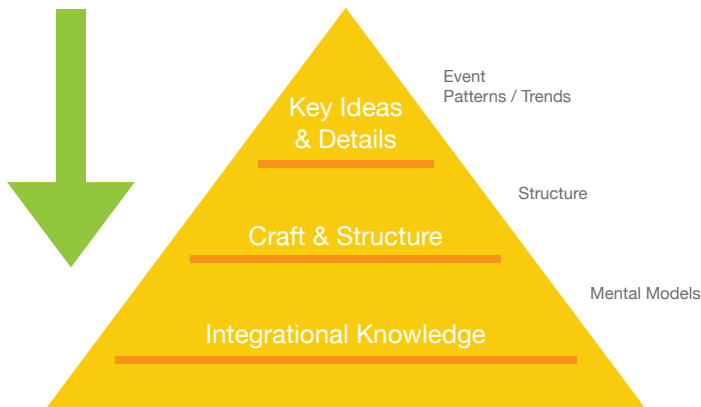
### New Approaches to Making Meaning

Reading is defined as a process of constructing meaning. **The English Language Arts** standards offer a well-defined path of skills to move children from being non-readers to ultimately having the ability to read thoughtfully and comprehend unfamiliar texts. Systems thinking—a set of concepts and tools that focus on the web of relationships that make up any given system—provides specific strategies that can promote the deep learning and critical thinking called for in the CCSS.

The English Language Arts CCSS for reading both literature and informational texts are categorized into three clusters: Key Ideas and Details, Craft and Structure, and Integration of Knowledge and Ideas. A systems thinking tool called the iceberg model provides a simple visual way to support students in mastering these standards. By considering a text in light of the layers of the iceberg, readers continually deepen their understanding and internalize the key concepts of each of ELA CCSS standards.



## Progressively Deeper Levels of Understanding



The iceberg model illustrates progressively deeper levels of understanding of a system. In the Key Ideas and Details section of the standards, readers are asked to read closely to determine what the text says, cite textual evidence, determine central themes, analyze the development of those themes, and summarize key ideas and details. Those skills fall at the top of the iceberg; they are things we can observe.

Moving down the iceberg to the next cluster of standards, Craft and Structure, readers are expected to analyze the structure of texts, including how specific sentences, paragraphs, and sections shape meaning. They are also required to assess how content and style influence the point of view and purpose of a text. By using additional systems thinking tools such as behavior over time graphs, causal loops, and stock/flow diagrams, students can map the connections among the key elements of the text. Teachers using these tools report that the language of systems gives students additional ways to discuss and understand a text's meaning.

Students reach the deepest level of meaning through the Integration of Knowledge and Ideas cluster of standards. At the base of the iceberg, readers are asked to exercise high-level critical thinking skills, including integrating, evaluating, delineating, and analyzing the text as a whole. All readers bring their own mental models—their deeply ingrained assumptions or beliefs—every time they engage in the process of reading. Good readers continually refine their mental models, based on their understanding of what they have read. They can eventually apply their knowledge to compare one text to another and to look at texts within a historical context.

## Tools for Supporting Student Success

Novice readers attempt to assimilate everything they read as discrete pieces of information. This layering of information leaves them with a large set of random facts they seldom can remember, which impairs their comprehension. Good readers automatically process the information they read, comparing it to what they already know, analyzing its accuracy, and making judgments about their level of agreement with the text. By using tools to visually represent story structure—such as those offered by systems thinking—students can build their skills in retaining story details and in deeply understanding what the author is communicating. In this way, these tools provide teachers a proven, specific strategy for addressing the increased rigor required by the English Language Arts Standards.

