**For the Teacher: Literacy Strategies**

Below are seven literacy strategies that were emphasized in the unit. Below describe all seven of them that include additional resources.

# **Think Aloud**

The think aloud is a strategy that allows the students to hear and see what it looks like to be an expert reader from the teacher. The think aloud strategy provides an opportunity for science teachers to demonstrate the strategies of effective science readers. The think aloud is a simple strategy, but it does require quite a bit of preparation.

Teachers should:

* Select an appropriate text
* Mark up the text as s/he read
* Decide on one or two strategies to share with students (determining the main idea, asking questions, visualization, monitoring, inferring, making connections, etc.) See: Adolescent Literacy at <http://www.adlit.org/article/19844/>
* Plan to read a “clean” copy of the text with students and demonstrate the strategy while thinking aloud, sharing the *how* and *why* of the strategy

**Think Aloud Resources:**

Reading Rockets: <http://www.readingrockets.org/strategies/think_alouds>

Adolescence Literacy: <http://www.adlit.org/strategies/22735/>

# **I Think, We Think**

The *I Think, We Think* strategy first provides individual students opportunities to think and record what he or she initially knows about science phenomenon. This is followed by either small groups or a whole class scientific discussion that can help clarify and then possibly modify the groups ideas about science phenomenon (Keeley, 2008). During this strategy, the teacher creates or has students create a two-column chart, one with individual and the other with the group’s ideas. During the group discussion the teacher helps elicit students’ ideas by uncovering what students are thinking as well as help students recognize how closely or different others ideas might be compared his or her own. This process helps students with senesce making of a science phenomenon they are investigating.

Resource: Keeley, Page (2008). Science Formative Assessments. Corwin and NSTA Press. Thousand Oaks, CA.

# **Text Coding**

Proficient readers of scientific text read closely for a variety of purposes—all of which include developing their own understanding of the text that makes sense of what they already know and the new information the author is sharing. In this way, reading is like a conversation between the reader and the author of the text. A productive conversation leads to the reader being able to self-monitor and use strategies to maximize comprehension. This strategy specifically teaches students how to have that conversation with the author of a text. Scientists often do this—read other scientists’ work to confirm or refine their own understanding of phenomena.

Below are possible Text Coding Abbreviations one can use with students before, during, and after reading. You can even make up your own and have students make up their own codes to fit with the text or the purpose for reading.

**Text Coding Abbreviations**

|  |  |
| --- | --- |
| **\*** | (Star) This idea/concept supports my initial description |
| **+** | (Plus Sign) This idea/concept adds to my initial description |
| **-** | (Minus Sign) This idea/concept contradicts my initial description |
| **?** | (Question Mark) I don’t understand this idea/concept or I have a question about it |
| **!** | (Exclamation Point) To signify important information in the text; this may also signify “this is new information for me” |
|  | You may also create your own text code as you see fit |

# **Gotta-Have-It Checklist**

The “Gotta Have It Checklist” provides students a scaffold for what to include in their written explanation. For students in the process of writing, a checklist is often more valuable than a rubric. Having the checklist allows students to set appropriate writing goals. It also provides students an opportunity to self-reflect and self-assess their writing in progress. The “Gotta Have It Checklist” can be developed by the teacher or by the teacher *with* the students throughout the unit. It details the key content that must be included in the written explanation.

*Example from the Plate Tectonics Unit*

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| --- |
| **Gotta Have it Checklist** |
| **Content:**   * Understands the purpose of writing a scientific explanation —explains how and why the geologic evolution of CT happens using factual information   + Describes the formation of Pangaea, including how Connecticut was part of this formation   + Describes the breakup of Pangaea, including how Connecticut was part of this breakup   + Describes present-day Connecticut including how Connecticut is part of the present-day plate boundary system   + Explains how the science behind the plate tectonic model is associated with the geologic evolutionary changes of Connecticut.   *Wow-me Points*   * Connections to Connecticut dinosaurs, fauna, climate, weathering and erosion   **Writing**:   * Expresses ideas using own language as opposed to copying down what others say * Begins writing with an opening general statement about the subject * Develops explanation with concrete examples from the unit activities. * Uses topic-specific vocabulary * Concludes with a summary statement |

See Ambitious Science Teaching (<http://ambitiousscienceteaching.org/tools-face-to-face/#Gottahave>) for more information.

# **Talk Moves**

Scientists often have discussions with other scientists about their explanations and arguments. The goal of these conversations is to further develop the scientists’ understanding of the phenomena in order to come to the best explanation of the phenomena based on the available evidence and reasoning. We can structure these conversations using scientific “Talk Moves” in order to develop our collective understanding of a topic. The instructor will model some of these “moves” and ask you to try them out in the discussion that follows.

See the *Talk Science Primer* from the Inquiry Project from TERC: <https://inquiryproject.terc.edu/shared/pd/TalkScience_Primer.pdf>

# **Paragraph Shrinking**

Paragraph shrinking is an evidence-based practice that helps deepen reading comprehension. It is usually part of the Peer Assisted Learning Strategy system, which has multiple components. Students are paired (a stronger reader with a weaker reader), and are taught several different strategies for paired reading. We will only be using the ‘paragraph shrinking’ strategy from PALS. In this strategy, pairs of students work to read sections of text and then stop and summarize the text. The key is to summarize the section in 10 words or fewer. This helps the students to focus only on the key ideas. Additional Scaffold: If students are struggling with identifying the key ideas, the teacher can provide anchor words to include in each paragraph/section summary to ensure students focus on the key information. It is also helpful for the teacher to model this strategy in depth before releasing students to complete the activity on their own.

**Step 1.**One partner reads aloud a paragraph or section. The higher-performing reader reads first.

**Step 2.**At the end of each paragraph or section, the higher-performing reader identifies the key ideas and summarizes the section in 10 words or fewer.

**Step 3.**After switching roles, the lower-performing student picks up where the higher-performing reader left off in the text, reading and stopping at the end of each paragraph or section.

**Step 4.**At the end of each paragraph or section, the lower-performing reader identifies the key ideas and summarizes the section in 10 words or fewer.

**Other Paragraph Shrinking Resources:**

Reading Rockets: [www.readingrockets.org/strategies/paragraph\_shrinking](http://www.readingrockets.org/strategies/paragraph_shrinking)

Adolescent Literacy: <http://www.adlit.org/strategies/23331/>

IRIS Center: <http://iris.peabody.vanderbilt.edu/module/pals26/cresource/q2/p05/#content>

# **Unit Summary Table**

The unit summary table is an effective strategy for helping students to develop explanations across a unit. It provides students with a cognitive scaffold for building a scientific explanation based on evidence gathered in multiple lessons and experiences. The graphic organizer captures ‘in time’ thinking, and then becomes a record that students can use when drafting their written explanations. Supporting and tracking the thinking during the *prewriting* process greatly supports students when they begin their drafts.

“The summary table is one of the most indispensable tools in ambitious science teaching….Because a model is supposed to change over time, and in response to new evidence or arguments, students need to have some record of what they have done over the past few days, in order to draw upon different activities or readings. Without some representation of what they have done or read, they would have to depend on memory, and each student’s memory is different. So, just as scientists do, the teacher can help students keep a record of activities and ideas. We have found that the best way to keep a record of activity and ideas is to create a table with four columns—1) Activities we did, 2) Patterns or observations, what happened? 3) What do you think caused these patterns or observations? 4) How do these patterns help us think about the essential question or puzzling phenomenon?”

See Ambitious Science Teaching: <http://ambitiousscienceteaching.org/tools-face-to-face/#Summtable>) for more information.

We adapted the summary table for this unit to include more writing, to bolster the transition from prewriting to drafting of the scientific explanations.