Disciplinary Literacy:

Literacy lenses for engaging children and adolescents with the
Next Generation Science Standards

Heather Kenyon Casey, Ph.D.
Rider University
hcasey@rider.edu
via twitter @HeatherCasey19
STARS grant conversation
Conversation starters...

• What are you noticing about the literacy habits and needs of students as you work with the NGSS?

• What questions do you have?

• What are your goals for today?

• Please use our padlet...
  https://padlet.com/hcasey/38t1ndlx1qre
Disciplinary literacy

• “...the specialized skills and codes that someone must master to be able to read and write in the various disciplines (science, math, literature, history and technical fields)” (Shanahan & Shanahan, 2012, Shanahan, C. 2014)

• It is about teaching kids to put on the lenses of the discipline not to apply one size fits all general strategies

• A “bottom up” view of literacy in the content fields

Related readings/viewings
ILA Disciplinary Literacy Position Statement
ILA Essentials Series - Disciplinary Literacy
Trying it out...

*From Seymour Simon Insects*
THE VERY HUNGRY CATERPILLAR

In the light of the moon a little egg lay on a leaf. One Sunday morning the warm sun came up and pop! – out of the egg came a tiny and very hungry caterpillar.

He started to look for some food.

On Monday he ate through one apple. But he was still hungry.

On Tuesday he ate through two pears, but he was still hungry.

On Wednesday he ate through three plums, but he was still hungry.

On Thursday he ate through four strawberries, but he was still hungry.

On Friday he ate through five oranges, but he was still hungry.

Eric Carle’s The Very Hungry Caterpillar

https://www.slideshare.net/juliethgil77/the-veryhungrycaterpillar12249944503258029?next_slideshow=1

http://wildlifegarden.org/is-a-caterpillar-an-insect
What does that mean?

- Mathematicians read for error and superfluous information. Read and reread and know each word \( a + b = c; \ 2 + 3 = 5 \)
- Scientists engage in reading for accuracy and replication and the ability to compose using multiple forms of representation (i.e., chart, graph, description). Passive voice is a hallmark. Readers are collecting evidence.
- Historians contextualize and understand linear progression. Read for depth and breadth and engage in multiple sources as readers and writers.
- Literature invites readers and writers worlds into the construction of meaning. This negotiation may mean there are different levels of reading – skimming and scanning, etc.
- Musicians see text as symbols that tell a story.

https://www.literacyworldwide.org/get-resources/ila-e-ssentials
Reading and Writing like a scientist...

**CLAIM**

Statement about the results of an investigation
- A one-sentence answer to the question you investigated.
- It answers, what can you conclude?
- It should not start with yes or no.
- It should describe the relationship between dependent and independent variables.

**EVIDENCE**

Scientific data used to support the claim
- Evidence must be:
  - Sufficient — Use enough evidence to support the claim.
  - Appropriate — Use data that support your claim. Leave out information that doesn’t support the claim.
  - Qualitative — (Using the senses), or Quantitative (numerical), or a combination of both.

**REASONING**

Ties together the claim and the evidence
- Shows how or why the data count as evidence to support the claim.
- Provides the justification for why this evidence is important to this claim.
- Includes one or more scientific principles that are important to the claim and evidence.

*Remember: Read what you’ve written to be sure it makes sense as a whole explanation.*

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**Claim**

- Give an answer to the question based on your observations.

**Evidence**

- Find information from a text or other sources that supports the claim.

**Reasoning**

- Explain how your evidence supports your claim.

**Sentence starters:**
- One example from the text:
- Sentence:
- According to the text:
- Sentence Starters:
- Based on this evidence, we must conclude (restate your claim) because (your analysis)
Literacy and science are layered...

Claim, Evidence, Reasoning in action...

• Double journal entry as a vehicle for exploring...
• What are you noticing about the literacy lenses responsible for success here?
• How does this relate to your work?
Let’s try this out...
Literacy lenses of scientists

- Investigate *phenomenon*
- Engage in the *practices* of the discipline
- Recognize and use the *academic vocabulary and language* of the discipline
- Blurring of disciplines – standards ask us to understand the influence of disciplines on one another
- Text *structure*
- Organization of the *standards* provides roadmaps for the intersection/integration of literacy habits needed for success in the discipline
Literacy strategies to introduce...

• Integrate into the literacy workshop and/or use the workshop model
• Stepping inside one classroom – www.choiceliteracy.com (2nd grade class)
• What skills are being introduced/should be introduced here?
• Mini lesson on text structure/type such as:
  • -using context to infer new meaning
  • -teaching key academic vocabulary
  • -composing using the structures of the genre
  • -explicit attention to image and graphs/charts as contributing to comprehension
  • -review, retell, reread
  • -model use of TOC and appendixes
  • -www strategy (when using electronic resources)
Strategies to bring back

- “...obtaining, evaluating, and communicating information” is an essential practice according to the NGSS (Mawyer & Johnson, 2017).
- By grade 12 students should be able to “read scientific and engineering text, including tables, diagrams, and graphs,” and to “engage in a critical reading of primary scientific literature (adapted for classroom use” or of media reports of science” (NGSS, p 76).
- What do we need to begin developing starting in K to reach this goal?
  - academic language
  - build prior knowledge and experiences
  - awareness of text structures
  - effective reading and writing strategies
Types of texts

- Popular texts
- Textbooks
- Primary scientific sources
Blending resources...

Harborville's Beach Snack Shop had been open only an hour when Max stopped in and noticed new poster announcing a price increase. "I put the sign up this morning," Mr. Levine told him. "Had to raise my prices ten percent because I have so many new expenses. Like now I need a new window for my back room. Somebody broke it, trying to get into my store last night."

"Have you called the police?" Max asked.

"No. Nothing was stolen." He led Max to a small storeroom in the back. "I use this space as an office. Sat here and ade my price change poster last night. Soon's I was done, I left it on that old desk. When I went out, I locked the door to the main part of my store. So whoever got in was stuck in this little storeroom. Nothing here to steal."

When Max left he wandered down to the break wall, where Nathan and Trevor were fishing. "Did you hear that somebody broke a window at the Shack?" he asked.

"Nope," Nathan said. "We've been here since dawn. Haven't talked to anybody." Trevor gestured to the bucket. "We've caught some big ones." Nathan stood. "But now I'm starving. I've got a dollar left from my allowance. If Mr. Levine is there now, I'm going up to the Shack to get a Big Beach Bun."

"Better get another dime from somewhere," Trevor told him. "A dollar's not enough any more. As for me, I'm going home to get a couple sandwiches for myself."

"You both stay right here," Max said. "I know which one of you broke that window. You'd better think of a way to pay for it, because I'm telling Mr. Levine."

3rd grade word problem

Dale has 8 red beads, and he has 6 fewer yellow beads than red beads. Dale also has 7 more green beads than red beads. How many beads does Dale have in all?
What are you doing as a literacy learner to access and create these types of texts?
Accessed at: http://www.corestandards.org/assets/Appendix_B.pdf

Social Studies


• Low fences, some of which are thousands of years old, divide much of England’s countryside. These fences, called hedgerows, were first built by the Anglo-Saxons, a group of warriors from Germany and Scandinavia who arrived in England around 410 A.D. As they gained control of sections of land, they protected their property with walls made from wooden stakes and spiny plants. Dead hedgerows, as these fences were called, were eventually replaced by fences made from live bushes and trees. Recently, people building large farms and homes in the countryside have destroyed many live hedgerows. Other people are working to save the hedgerows, which are home to a variety of wildlife, including birds, butterflies, hedgehogs, and hares.

Science


The Inventory categorizes plants as High, Moderate, or Limited, reflecting the level of each species’ negative ecological impact in California. Other factors, such as economic impact or difficulty of management, are not included in this assessment. It is important to note that even Limited species are invasive and should be of concern to land managers. Although the impact of each plant varies regionally, its rating represents cumulative impacts statewide. Therefore, a plant whose statewide impacts are categorized as Limited may have more severe impacts in a particular region. Conversely, a plant categorized as having a High cumulative impact across California may have very little impact in some regions. The Inventory Review Committee, Cal-IPC staff, and volunteers drafted assessments for each plant based on the formal criteria system described below. The committee solicited information from land managers across the state to complement the available literature. Assessments were released for public review before the committee finalized them. The 2006 list includes 39 High species, 65 Moderate species, and 89 Limited species. Additional information, including updated observations, will be added to this website periodically, with revisions tracked and dated. Definitions The Inventory categorizes “invasive non-native plants that threaten wildlands” according to the definitions below. Plants were evaluated only if they invade California wildlands with native habitat values. The Inventory does not include plants found solely in areas of human-caused disturbance such as roadsides and cultivated agricultural fields.

• Wildlands are public and private lands that support native ecosystems, including some working landscapes such as grazed rangeland and active timberland.

• Non-native plants are species introduced to California after European contact and as a direct or indirect result of human activity.

• Invasive non-native plants that threaten wildlands are plants that 1) are not native to, yet can spread into, wildland ecosystems, and that also 2) displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes.
Solutions...

The mystery...
How did Max figure it out?

Mr. Levine had just put up his poster about the price increase that morning. Nathan and Trevor said they had been fishing since dawn and had spoken to no one. Since Trevor knew that a dollar bun was now a dollar and ten cents, he must have been the one who broke the window and got inside the back room, where he read the poster lying on the old desk.

"That was good detective work," Nina told Max later.

"Mr. Levine thought so too." Max opened a bag. "He gave me a Big Beach Bun for free. Want some?"

"Yes. At least ten percent of it," Nina told him, reaching for the bag.

The word problem...

- **Step 1:** Find the number of yellow beads.
  
  \[ 8 - 6 = 2 \]

- **Step 2:** Find the number of green beads.
  
  \[ 8 + 7 = 15 \]

- **Step 3:** Find the total number of red, yellow, and green beads.
  
  \[ 8 + 2 + 15 = 25 \]

* Dale has 25 beads. *
Strategies/Ideas I may bring back...

Ideas for my classroom...  Questions/comments I have...
Inside project based learning

Cross Disciplinary
• https://www.edutopia.org/article/projects-have-been-put-test-anne-lise-halvorsen-nell-duke

Integrating NGSS
• https://www.teachingchannel.org/videos/claims-evidence-science-lesson-achieve
Literacy learning clubs...one method for launching an investigation

Literacy learning clubs, as presented here, can be understood as a linear progression beginning with focusing time, moving to gathering time, continuing on to club time, transitioning to a focused finish and then concluding with a teacher think aloud. In many cases, that linear progression makes sense for supporting student learning. It would be an oversimplification of the learning process, however, to assume that facilitated learning always follows this linear progression. Instead, it is more useful when looking across disciplines to understand these are core pieces of the learning puzzle that can be reconfigured to best suit the goals of the discipline or task.

A glimpse inside...

• Ms. L engages students in a LLC to study of understanding difference motivated by book club study
• Mr. C engaged students in a LLC in Social Studies as a way to study ancient civilization through the themes of religion, habitat, social systems and employment
• Mr. S engages students in an LLC to study plants and gardening where they develop a farming proposal
• Ms. K engages students in a study of developing a budget for the school fair
Why Literacy Learning Clubs?
Collaborative structures for supporting DISCIPLINARY LITERACIES

**Guided Literacy Groups**
- Teacher assessment
- Flexible groups organized by need
- Focused, direct instruction
- Materials students can read with support
- Ongoing assessment

**Literacy Learning Clubs**
- Teachers inventory students’ interests
- Develop flexible groups based on student choice
- Range of materials that students can navigate with support
- Teacher facilitates student led learning and discussion
- *Clip of learning clubs...*
Engaged literacy learners: pleasure and purpose
Our goals are to investigate the relationships among...

Next Generation Science Standards

Disciplinary Literacy & Critical Literacy

Pedagogy that supports the study of essential questions/exploring phenomenon

Strategies for engaging with scientific texts

Engaging children in the science that surrounds them...

Fundamental to this are: The NJ Standards for Student Learning in English/Language Arts and the intersection with the Next Generation Science Standards
What do we want our classrooms to be? What do you believe they are?

- Content Learning
- Literacy Learning
- Exploring Real World Issues
- Community Context
- Standards and Curriculum
Making it relevant - http://www.howmanyisthat.org/

"Kids" doing big things...

April 12, 2014

"Kids" doing big things...

A while back, I received the following email from Zak Kolar, a high school senior, asking me to post his website on my blog. Although it took some time, I am living up to my promise — check it out! He is doing some great things for a person so young. Here is his message:

Dear Ms. Whitney,

My name is Zak Kolar and I am a senior in high school. Over the past few months, I have been working on a website called "How many is that?": http://www.howmanyisthat.org. The purpose of the site is to take large numbers associated with social justice issues and compare them with local information to put them into perspective. For example, there are 66 million girls in the world who do not have access to education. Athens, GA has a population of 116,004. 66 million people would be about 569 Athens. The goal of How many is that? is to make it easier to see how these human rights violations have affected people as individuals, and not just faceless statistics, ultimately inspiring action to prevent them from happening in the future. I think that How many is that? is a good educational resource because it can be used to get people’s attention about human rights issues when they realize the magnitude of these tragedies. I was hoping that you would consider posting a link to How many is that? on your "For students" or "For teachers" pages. Also, I have many social and historical issues presented on my site (e.g., bullying, domestic violence, genocide), so if there are any issues that you would like me to publish on my website, please let me know and I would be happy to add them.

Thank you!

Zak
Resources that structure and inspire...

- *Literacy Practices that Adolescents Deserve: An ILA E-ssentials series* found at [https://www.literacyworldwide.org/get-resources/ila-e-ssentials](https://www.literacyworldwide.org/get-resources/ila-e-ssentials) (Castek and Dunkerly-Bean pieces...)
- [https://letters2president.org/](https://letters2president.org/) (linking to real time issues)
- [http://www.edutopia.org/blog/social-justice-whole-school-approach-jeanine-harmon](http://www.edutopia.org/blog/social-justice-whole-school-approach-jeanine-harmon) (school level)
- [http://www USING THEIR WORDS ORG/6elements/](http://www USING THEIR WORDS ORG/6elements/) (design)
- [http://www.teachingforchange.org/](http://www.teachingforchange.org/) (resources)
- [http://www.rethinkingschools.org/index.shtml](http://www.rethinkingschools.org/index.shtml) (resources and ideas)
- [https://teach.kqed.org/](https://teach.kqed.org/) (digital platform)
- [www.dosomething.org](http://www.dosomething.org) (audience)
Bringing it back to the classroom...opportunity for planning and sharing
A literacy learning club...motivating learning across the disciplines
(a modified version...)

1. Select an area of inquiry:
   - **Area 1** – classroom level
   - **Area 2** – school level
   - **Area 3** – community level

2. Gathering time (jot your rationale)
3. Club time – talk, text, try...
4. Focusing finish - Come up with at least one idea for yourself and/or others
5. Teacher think aloud – where can we go next?
Happily Ever After?

Some resources to investigate:

* Literature can inspire an emotional connection that leads to the need to investigate through non-fiction text

[http://www.tfcbooks.org/best-recommended/earlychildhood](http://www.tfcbooks.org/best-recommended/earlychildhood)

Non-fiction resources

• Cricket publications – [www.cricketmag.com](http://www.cricketmag.com)
• Time for Kids – [www.timeforkids.com](http://www.timeforkids.com)
• Ezines (i.e. Amazing Kids) [http://mag.amazing-kids.org/about/amazing-kids/](http://mag.amazing-kids.org/about/amazing-kids/)

• Continued study of resources to inspire...
Resources for Further Study

• Roni Jo Draper (2012). Reinventing Content Area Literacy. TC Press.
• Work by Cynthia Shanahan and Tim Shanahan
• ILA e-ssentials series – Literacy Practices...
• https://www.literacyworldwide.org/get-resources/ila-e-ssentials
• Choice Literacy – www.choiceliteracy.com
Resources to bring back: Literacy Learning Clubs planning guide...

- Grade Level:
- Content Area:
- Curriculum content:
- Content area standards:

- How many meetings are planned?
- When will students meet and for how long?
- What topics are available for students to choose from?

- What special grouping considerations need to be made?

- What types of resources (consider print and digital) are needed to support student work?

- How will student learning be assessed?

- What will need to be modeled or demonstrated for students in order to scaffold their investigations?
Resources to bring back: Student inventories

**Open Interest Inventory**

What are you curious about? What do you wonder about? Think about what you have been learning in your classes. What would you like to revisit? What came up in discussions and/or readings that you didn’t have the opportunity to explore further?

We are about to begin an investigation of topics that our class is interested in learning more about. Before we can begin, however, we need to know more about what you want to learn. Please list topics that you are curious about below. There are two columns. On the first column please indicate what you are interested in exploring. In the second column, please indicate why you are interested in that topic. Topics should be placed in order of interest.

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<tr>
<th>What I am interested in learning more about…</th>
<th>Why I am interested in this topic…</th>
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**Closed Interest Inventory**

Below is a list of topics that we will be investigating in our next unit of study. Please indicate your preferences for each topic. For example, the topic that is of greatest interest is #1 and the topic of least interest is #5. Please also indicate why you feel that way about the topic.

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<th>Topic of study</th>
<th>Level of interest with explanation</th>
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Resources to bring back:
Student planning guide

- Literacy Learning Clubs Club meeting planning guide for students
- Pre-planning guidelines to allow for a productive meeting:
  1. Today at literacy learning clubs I plan to:
  2. The resources I will likely need are:
  3. The people I will need to work with /consult include:

- Keeping organized during the work:
  4. I am learning that:
  5. The literacy strategies I am drawing on are:

- Preparing for the Focusing Finish
  6. The methods most useful in sharing what I have learned will be (i.e. group share, a digital document, a written narrative, etc.) This will vary according to the discipline and structure of the literacy learning club. Write your method for sharing here:
Resources to bring back: Student planning guide

• I will _______

• I need _________

• I will work with ______________

• I learned __________

• I will tell others about this by ______________
Resources to bring back: Student exit slips

- Name_________________________ Date________
- Complete at the end of a literacy learning club session and hand to the teacher.
- • What did we learn today?
- • How did we come to this new information?
- • What are we still uncertain about?
- • How will we access the information/knowledge still needed?
- This will help you make good use of your next meeting!
Resources to bring back:
Student exit slips

• Name_________________ Date____________

• Today I ________________

• Tomorrow I will ________________
Review, Reflect, Repurpose...

• Short term goals?

• Long term goals?

• Accountability?

• How can this afternoon help you reach those goals?