

# Science and Literacy Outside and In: Infusing Literacy into Garden-Based Learning

National Children's and Youth  
Garden Symposium

July 8-11, 2024  
Chicago's North Shore

**BLANDY**  
EXPERIMENTAL FARM



University  
of Virginia

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# Plan/Roadmap

- Introduction
- Project Background
- Resource development
- Model an activity
- Reflect & Share



# Blandy Experimental Farm

## University of Virginia

Field Ecology Research Station  
&  
State Arboretum of Virginia



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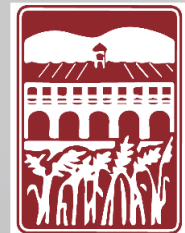


University  
of Virginia

**Our Mission:** To increase understanding of the natural environment through research and education.



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# Education Programs



- Hands-on, outdoor, experiential field investigations
- Correlated to state and national standards
- ~7000 pK-12 students/yr
- Public, private, & homeschools
- Teacher professional development
- Scientist training

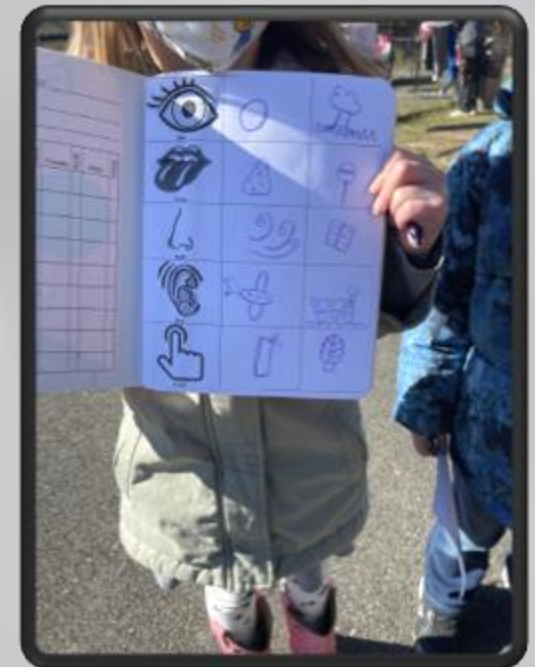
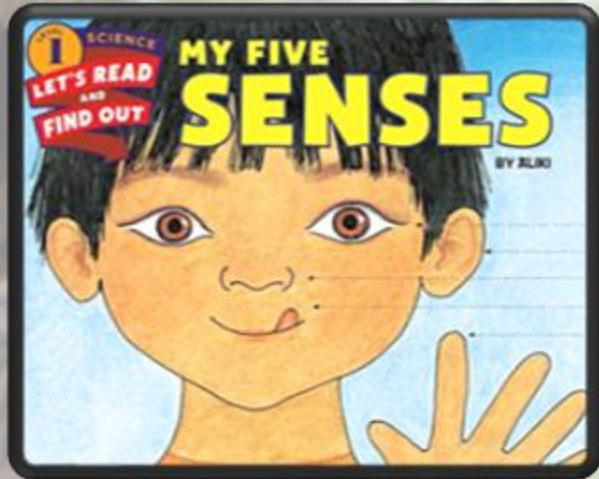


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# K-3 Literacy in the Schoolyard



<https://blandy.virginia.edu/content/ccps-noaa-k-3-literacy-project>

*This project was funded by the National Oceanic & Atmospheric Association  
Award # NA18NMF4570315*









# Resource Development



# Collaboration and Expertise

<b>Blandy Educators</b>	<b>Teacher Leaders</b>
<ul style="list-style-type: none"><li>• Authentic Outdoor Learning</li><li>• Science Accuracy</li><li>• Science Knowledge &amp; Content</li><li>• Outdoor Teaching Practices</li><li>• Outdoor Learning Supplies</li></ul>	<ul style="list-style-type: none"><li>• Literacy Instructional Practices</li><li>• Developmentally Appropriate</li><li>• Connections to the Standards</li><li>• Advice on Professional Development Elements</li><li>• Lesson Plan Template</li></ul>

Required information during the PD

<b>Lesson Title</b>	<b>Animal Adaptations</b>	<b>Planned Teaching Date</b>	
<b>Learning Objective</b>			
Through reading, writing reflection, and an outdoor investigation <u>students gain an understanding of</u> some physical (camouflage, mimicry) and behavioral adaptations that can protect an animal from predation.			
<b>Essential Question (s)</b>			
<ol style="list-style-type: none"> <li>How do physical and behavioral adaptations (such as camouflage, behaviors, and mimicry) help an animal survive in its habitat?</li> <li>How are these physical features and behaviors examples of an animal adapting to its environment?</li> </ol>			
<b>Materials/Supplies/Data Sheets</b>			
Reading: Student journals & pencils for writing Outdoor activity: Variety of toy animals with various coloration patterns Whiteboard clipboards, datasheet & pencil			
<b>Bloom's Level and Question(s) or DOK</b>			
<b>Bloom's levels 1-5:</b> Recognize & describe (level 1) Summarize (level 2) Generalize (level 3) Compare, analyze & infer (level 4) Design (level 5)			
<b>Reading, Writing, &amp; Science Literacy Connections</b>		<b>Standards Emphasis</b>	
<u>National Geographic Book</u> <i>Tricks, Traps, and Tools</i>		<b>VA Science (2018)</b> 3.1f (science & engineering practice),3.4b (organism adaptations may be physical or behavioral) NGSS Performance Expectation <a href="#">3-LS4-2 Biological Evolution: Unity and Diversity 1 Next Generation Science Standards</a>	
<u>Supplementary Book Options</u> <i>Looking for Animals</i> by Lawrence F. Lowery (NSTA Press) Verdi <i>Paddle, Perch, Climb and BEAKS!</i>		<b>VA Science (2018)</b> 3.4b  <b>VA English (2023)</b> <a href="#">3.RI</a>	
<u>Outdoor Activity</u> (connected to the readings)- <a href="#">Color Crazy from Project Wild</a>		<b>VA Science (2018)</b> 3.4b	
<u>Writing Activity</u> Record observations about camouflage during the outdoor activity.		<b>VA English (2023)</b> 3.LU (language usage-grammar & mechanics)	
<b>Differentiation</b>			
For the journaling activity, some students may draw and color examples of animals with camouflage and mimicry instead of writing in their journals. They can explain their examples to you.			

Blandy educators & Clarke Co. teachers reviewed lesson templates, then modified a template that teachers were familiar with.

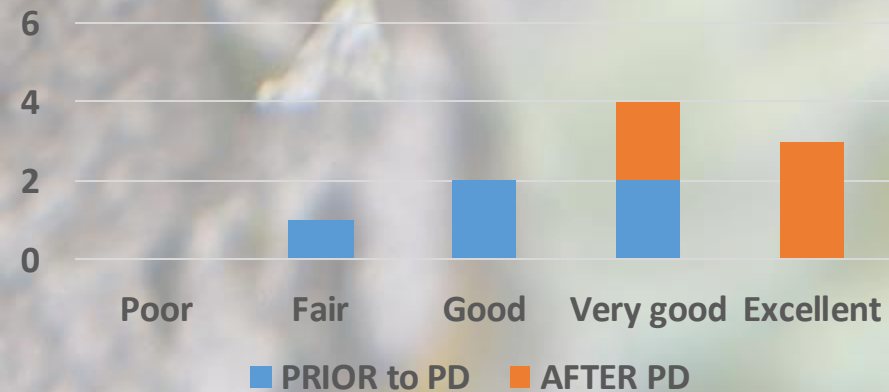


Modeling Two Activities

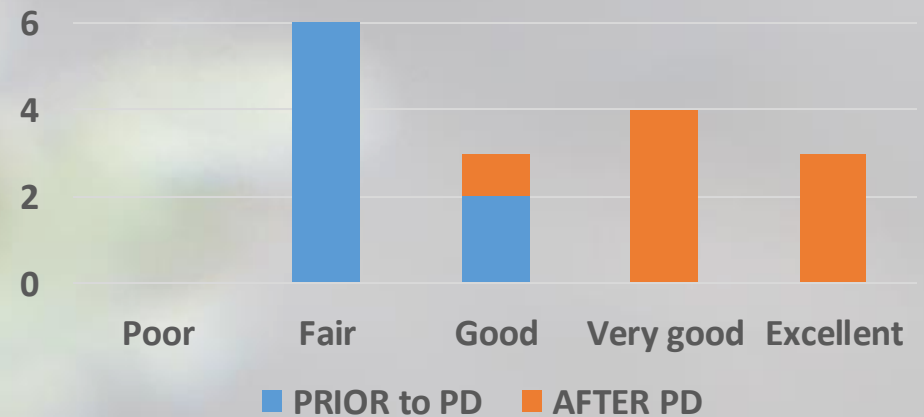
# Pre & Post Assessment: K-3 Professional Learning

## My understanding of how to integrate reading and writing with outdoor science-based discovery activities

Understanding Integrating Reading and Writing n=5 K-1 teachers



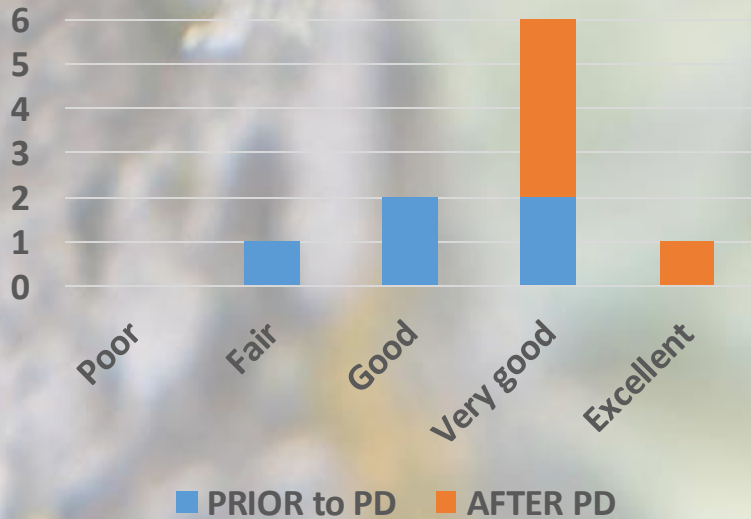
Understanding Integrating Reading and Writing n=8 Grade 2-3 teachers



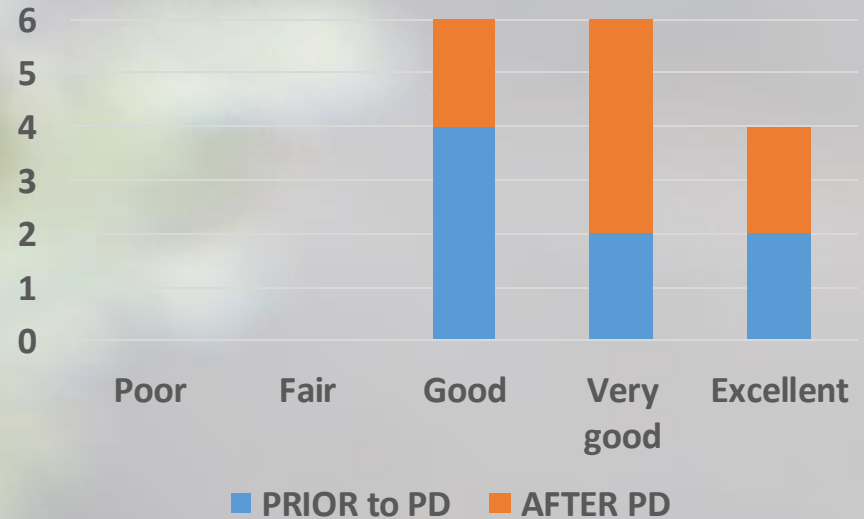
# Pre and Post Assessment: K-3 Professional Learning

My confidence in being prepared to implement a schoolyard investigation (outdoor science-based discovery) activity

Confidence in Being Prepared  
n=5 K-1 teachers



Confidence in Being Prepared  
n=8 Grade 2-3 teachers





**Share your Discoveries.**

**How can you apply ideas  
& resources used here in  
your learning habitat?**

[USDA and Forest Service: Learn about Lichens](#)

"Lichen forest" by jim\_mcculloch is licensed  
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# Online Resources

- Blandy K-3 <https://blandy.virginia.edu/content/ccps-noaa-k-3-literacy-project>
- K-3 Lesson Plans [https://drive.google.com/drive/folders/1Hr0o4Y8hL34m7Z6drFeHlksumbGx-0oq?usp=drive\\_link](https://drive.google.com/drive/folders/1Hr0o4Y8hL34m7Z6drFeHlksumbGx-0oq?usp=drive_link)
- Picture Perfect Science <https://www.nsta.org/book-series/picture-perfect-science>
- Next Time You See Series <https://www.nsta.org/next-time-you-see>

# Thank you!

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**Blandy Education Web Pages & Resources** <https://blandy.virginia.edu/pk-12-education>

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Extra Slides—  
for your  
information!





Required information during the Professional Learning

<b>Lesson Title</b>	<b>Letters and Leaves</b>	<b>Planned Teaching Date</b>	
<b>Content Objective</b>			
Exploring and understanding the physical properties of leaves through multiple senses			
<b>Essential Question (s)</b>			
How can we compare the physical properties of leaves? How can we use those properties to create something new?			
<b>Materials</b>			
<ul style="list-style-type: none"> <li>• Journals or pages (with letters if needed); writing tools if needed</li> <li>• Gluesticks</li> <li>• Paper grocery bag</li> <li>• <i>Different Trees</i> book</li> <li>• <i>Leaf Man</i> book</li> </ul>			
<b>Bloom's Level and Question(s) or DOK</b>			
Recall: identify letters, different body parts are used for different senses (Bloom's level 1) Skills/Concepts: Observe, Collect, and Compare leaves using different senses, graph the frequency of letters (Bloom's level 2) Strategic thinking: Construct a letter using leaves (Bloom's level 2)			
<b>Reading, Writing, &amp; Science Literacy Connections</b>		<b>Standards Emphasis</b>	
<u>National Geographic Book Title:</u> <i>Trees, Seeds, and Leaves</i>		VA 2018 Science: K.1 (science & engineering practices) K.3 (physical properties), K.7 (basic life needs) NGSS 1-LS1 <a href="#">From Molecules to Organisms: Structures and Processes   Next Generation Science Standards</a>	
<u>Supplementary Book Title:</u> <i>Leaf Man</i> by Lois Ehlert		VA 2018 Science: K.3 VA 2024 English: K.LU (language usage: adjectives)	
<u>Outdoor Activity (connected to the readings)</u> Leaf collection, sensory observation		VA 2018 Science K.1, K.3, K.5 (using our senses)	
<u>Writing Activity</u> Leaf letter mosaic		VA 2024 English: K.FFR.1 (print concepts: letters)	
<b>Differentiation</b>			
Reading/writing instruction adjusted to the ability of the students.			
<b>Assessment</b>		<b>Vocabulary</b>	
<p><b>Formative-</b> Observe students as they are learning outside. Note the level of engagement, excitement/motivation to learn, behavior/focus, journaling details, and use of descriptive words.</p> <p><b>Summative-</b> Students collect two leaves outside. They trace or draw them and label the parts of the leaves using describing words (adjectives)</p>		Physical properties: colors; shape, texture, relative size & weight Basic life needs: food, water, air, shelter, space Senses: sight-ears, touch-skin, smell-nose, hearing-eyes	

Developed by Blandy Experimental Farm/UVA educators in partnership with Clarke Co., VA Public School Teachers, 2022. Blandy lesson plan template adapted from K. Lison, Clarke Co. VA teacher.



<b>Hook/Engage</b>	
Indoor/outdoor: Read <i>Trees, Seeds, and Leaves</i> Indoor/outdoor: Discuss parts of a <u>tree</u> , and the words that describe the trees as different. What parts of a tree were compared? What senses were used to explore the different trees?	
<b>Guided Lesson/Instructional Strategy</b>	
<p><u>Outdoor:</u> Leaf collection - fill a paper grocery bag with leaves. Consider giving specific instructions, for example: find one big leaf and one small leaf, find a smooth leaf and a leaf with jagged edges, find leaves of different colors...</p> <p><u>Indoor/outdoor:</u> Leaves and senses - "Looking at Leaves" from <i>Growing Up Wild</i>. During the PD we will complete this activity together on one big poster, however, this could be done in small groups or independently. Alternatively, students could develop oral skills by making video recordings of themselves describing what they sense.</p> <ul style="list-style-type: none"> <li>• Students select and carefully observe a leaf. They describe and record what they smell, see, hear, and feel (omit taste unless food leaves are used).</li> </ul> <p><u>Indoor/outdoor:</u> Read <i>Leaf Man</i></p> <p><u>Indoor/outdoor:</u> Letters and Leaves collage: Depending on the abilities of your students, have prepared block letters (upper and lower cases) of the first letter of their name, have them write the letters in larger print in their journal, have them write their entire full name, or perhaps have them write the name of a type of tree. Students glue leaves over the letters to fill it up. Then use extra leaves to create a leaf creature/picture that starts with their letter. Leaves may be cut or torn to fit. It could be fun to have a hole punch to make leaf confetti</p> <p>Indoor/outdoor: Have students arrange open journals in alphabetical order. Graph the frequency of the letters.</p>	
<b>Technology/Computer Science</b>	<b>Expected student products or learning objectives met</b>
Students can make video recordings of what they sensed. Use a smartboard to make a simple graph of letters used	-Mandatory: Use of senses other than taste to describe leaves, letter leaf collage -Optional/preferred:
<b>Reflection/Notes</b>	<b>Supporting Resources</b>
	Extension activities: <i>Growing Up Wild</i> p 30 - "Who Lives in Trees?" and <i>More Picture Perfect Science</i> p 109 - "Be a Friend to Trees", <i>My Leaf Book</i> by Monica Wellington - create a leaf nature journal, focusing on colors, textures, shapes, and senses.

## Example lesson plan

# Relationships and Convergences

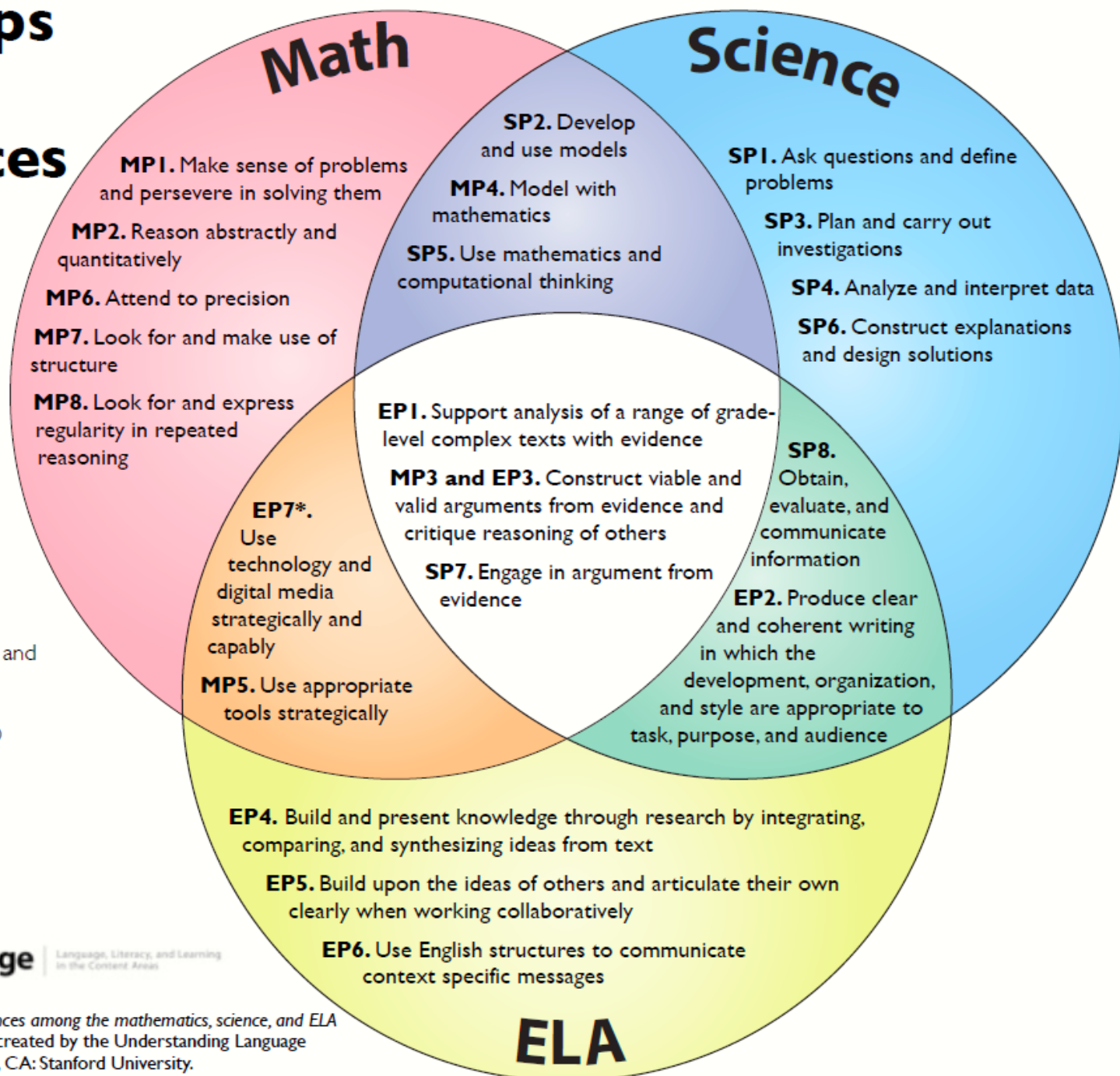
- Found in:
1. CCSS for Mathematics (practices)
  - 2a. CCSS for ELA & Literacy (student capacity)
  - 2b. ELPD Framework (ELA “practices”)
  3. NGSS (science and engineering practices)

- Notes:**
1. MPI–MP8 represent CCSS Mathematical Practices (p. 6–8).
  2. SPI–SP8 represent NGSS Science and Engineering Practices.
  3. EPI–EP6 represent CCSS for ELA “Practices” as defined by the ELPD Framework (p. 11).
  4. EP7\* represents CCSS for ELA student “capacity” (p. 7).

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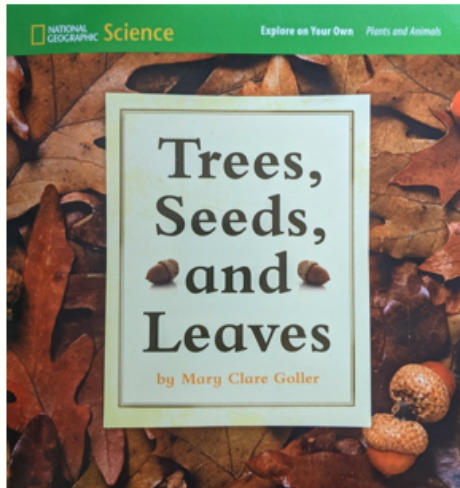
**Understanding Language** | Language, Literacy, and Learning  
in the Content Areas

Suggested citation:  
Cheuk, T. (2013). *Relationships and convergences among the mathematics, science, and ELA practices*. Refined version of diagram created by the Understanding Language Initiative for ELP Standards. Palo Alto, CA: Stanford University.



## Example of book use suggestions we provided the K-3 teachers

### 2nd Grade: *Trees, Seeds, and Leaves*



Suggested  
paired texts:

#### Activity ideas:

##### Seed Hunts:

- ❖ Seed wand walk and plant: Tape worn out socks to the end of a long stick in an overgrown area in the beginning of the school year. Look at the seeds you collected, plant them (or the whole sock) to observe the life cycle.
- ❖ Find at least 2 types of seeds from trees. Identify the type(s) of tree.
- ❖ Make a sculpture with found seeds (at least 3) like the ones in the book. Check out the work of artist Andy Goldsworthy for a career connection.

Observe plant life cycles: find a seed, sprout, flower...

Project Learning Tree: [Mystery box \(from \*Get in Touch With Trees\*\)](#), [Trees as Habitats](#), [How Plants Grow](#), [Have Seeds, Will Travel](#), [Looking at Leaves](#)

Project WILD: [SEED Needs](#)



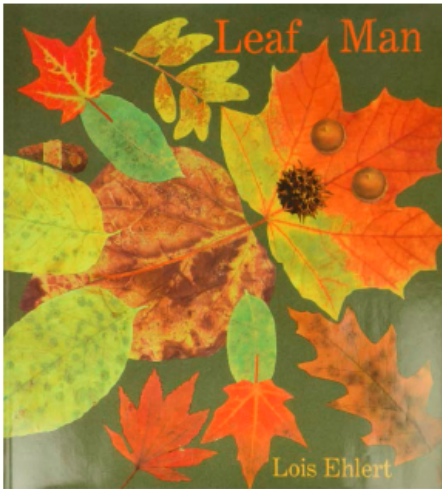
[Leaf Man](#)  
**2018 Sci SOLS**  
K.3, 1.4, 2.5



[Red Leaf, Yellow Leaf](#)  
**2018 Sci SOLS**  
K.10, 1.4, 2.4, 2.5, 2.7

## Example of book use suggestions we provided the K-3 teachers

Reading level: PK-3  
Lexile: 260L



### Book Description:

Whole and cut leaves are arranged into scenes containing animals, plants, and other elements of the habitat. "Leaf Man" is blown by the wind over these various landscapes. Leaves used in the book are identified on both inner covers.

This would make an excellent example of an artistic nature journaling activity.

Video of Reading: [Leaf Man](#)

### Availability:

Handley Public Library  
- Hardcopy (11 copies)  
Loudoun Public Library  
- Hardcopy (17 copies)

### Topics:

Leaf shapes (classification & physical properties)  
habitats  
Art Activity  
Journaling/ storytelling

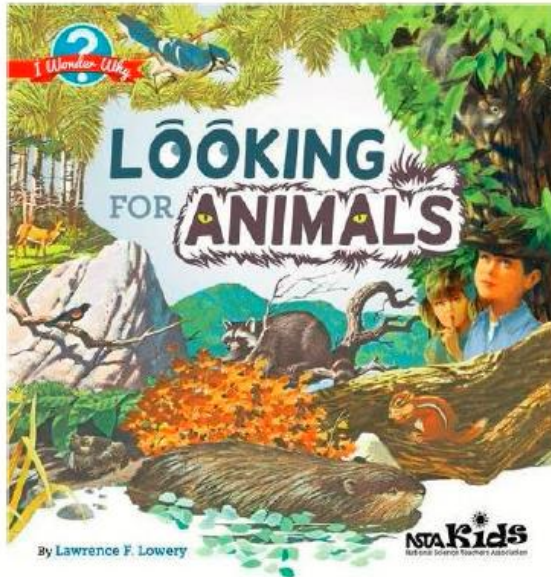
### 2018 Sci SOLS

K.3 (size, color)  
1.4 (plant structure)  
2.5 (habitats)



## Example of book use suggestions we provided the K-3 teachers

Reading level: K-3  
Lexile: 480L



### Book Description:

Each two-page spread shows an animal in different parts of its habitat: the first in which it is easy to pick out, and the second in which it is camouflaged.

The animals are shown in their natural habitat, engaging in normal behaviors.

Video of Reading: [Looking for Animals](#)

### Availability:

- [National Science Teaching Association](#)
- [Amazon](#)
- Blandy (1 copy)

### 2018 Sci SOLS

1.5 (animal life needs), 2.5 (habitat/ecosystem), 2.8 (plants as resources), 3.4 (adaptations), 3.5 (ecosystems & interactions)

### Topics:

- Colors/Texture
- Ecosystem Interactions
- Adaptations (camouflage)