Questing for Knowledge: A Deep Dive into Exploring the Unknown

BLANDY EXPERIMENTAL FARM

University of Virginia

Virginia Association of Environmental Education

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Airfield Conference Center, Virginia

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In this session, our aim is to model the process we use for exploring and adding to our learners' (and our own) knowledge and questioning nature, share resources and techniques.

As we get started, please:

Consider: what do YOU hope to get out of this session?

Blandy Experimental Farm

University of Virginia

Field Ecology Research Station

State Arboretum of Virginia

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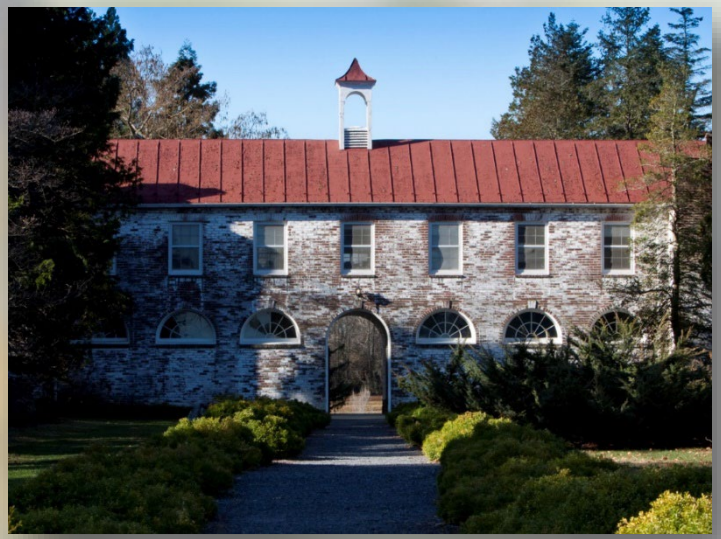
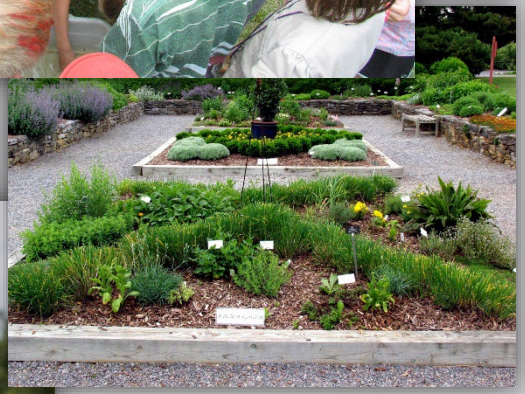


Our Mission: To increase understanding of the natural environment through research and education.



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Education Outreach

- Hands-on, outdoor, experiential field investigations
- ~7000 PK-12 students per year
- Inquiry, Science Process and Skills focused programs
- Correlated to state and national standards
- Field-based STEM Learning
- Teacher professional development

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Land Acknowledgement

UVA was designed to educate southern white gentle*men*. Built by enslaved laborers, on Monacan tribal land, and enslaved or free Black people provided the labor and capital that supported the students and faculty through the Civil War.
In the early 1900s, the University was a pioneer in the eugenics movement and supported segregated schools.
The education denied to Indigenous nations was publicly acknowledged by what is now recognized as the Commonwealth of Virginia in 2007, yet few institutions have made significant progress on increasing representation of Indigenous students.
We at UVA continue to seek opportunities to engage in meaningful relationship building for our shared futures and acknowledge with respect that we live, learn, and work on the traditional territory of the Monacan Indian Nation. We pay respect to their elders and knowledge keepers past, present, and emerging.
As we engage greater care and sustainable actions in our relations with many Indigenous nations, we invite you to learn more about the Monacan Indian Nation and encourage you to visit the Monacan Ancestral Museum, located just 50 miles from Charlottesville.
https://eocr.virginia.edu/monacan

Blandy is removed from the grounds of UVA and has its own challenging and painful history.
To learn more, visit Blandy History and Statement on Diversity, Equity, Inclusion and Anti-Racism

Structure

- Introduction: time is tight! We'll be focusing on process, not specific curiosities (this time)*
- Practice the Process
- Review what we did and share techniques and resources
- Reflect and conclude

*If you are curious about something, we love going deep and sharing in learning. Feel free to find us after the session or use our contact info!

Let's Dive!

- Choose your sample & observation tools
- Look closely, ask questions, make notes
- Is it tall, is it flat? Is it this, is it that?
- Write/record your thoughts.
- If you have questions, ask a buddy or a Blandy!

Share your Discoveries.

How can you apply strategies we used here in your learning habitat?

USDA and Forest Service: Learn about Lichens

Techniques we used or can use

- Think time and wait time
- I see, I think, I wonder
- Replaced lack of knowledge with a demonstration of curiosity.
  - Why gather knowledge?
- Questioning strategies: varying the TYPES of questions we asked.
  - Ask open-ended questions that need more than a yes/no
  - Iterative Questions (recognizing how BIG questions can be broken down to smaller chunks.)
  - Specify the number or type of responses
- What else?

Inquiry varies depending on learners' needs: Scaffolding learning meets students where they are.

Open inquiry
Learners form their own questions, design investigative methods, carry out the inquiry, come to their own conclusions, and communicate their experience

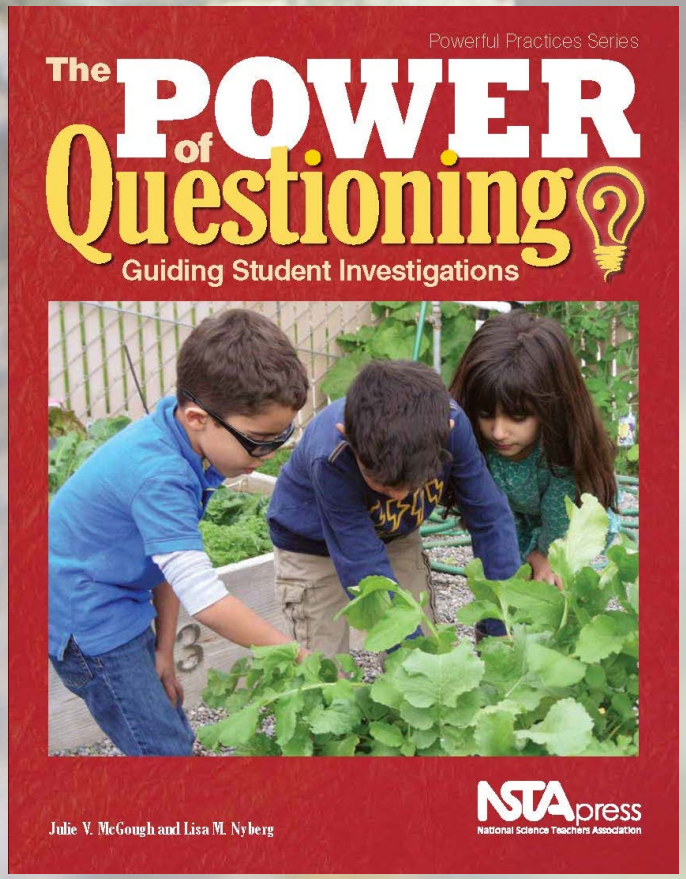
Guided inquiry
Learners are given a question. Their goal is to design the method of investigation and then test the question itself.

Structured inquiry
Learners are provided with a question and method, but the goal is to provide an explanation that is supported by the evidence gathered during and through the investigative process.

Confirmation inquiry
Learners are given a question, as well as a method, to which the end result is already known. The goal is to confirm the results. This enables learners to reinforce already established ideas, and to practice their investigative skills.

Adapted from https://elearningindustry.com/inquiry-based-learning-model

Resources



Question Type	Question Purpose	Teacher Questions
Divergent (Multiple answers)	• Open-ended questions may determine prior knowledge, misconceptions, and possible areas to investigate.	• What do you know about plants? • What do you know about animal life cycles?
Convergent (One correct answer)	• Closed-ended questions check for understanding. • Review concepts.	• Where are the roots? • What are the stages of a chick's life cycle?
Clarifying	• Describe ideas in more detail. • Explain ideas in a different way.	• How do roots grow? • How does the chick hatch from the egg?
Probing	• Explain reasoning and deepen understanding. • Analyze ideas. • Compare and contrast.	• Are the roots on a tree the same as the roots on a carrot? • What if the chick egg is cracked before it is ready to hatch?
Justifying and Extending	• Hold the learner accountable for their thinking. • Providing evidence requires the learner to support and extend their ideas.	• Why do you think that? • What evidence supports your idea?

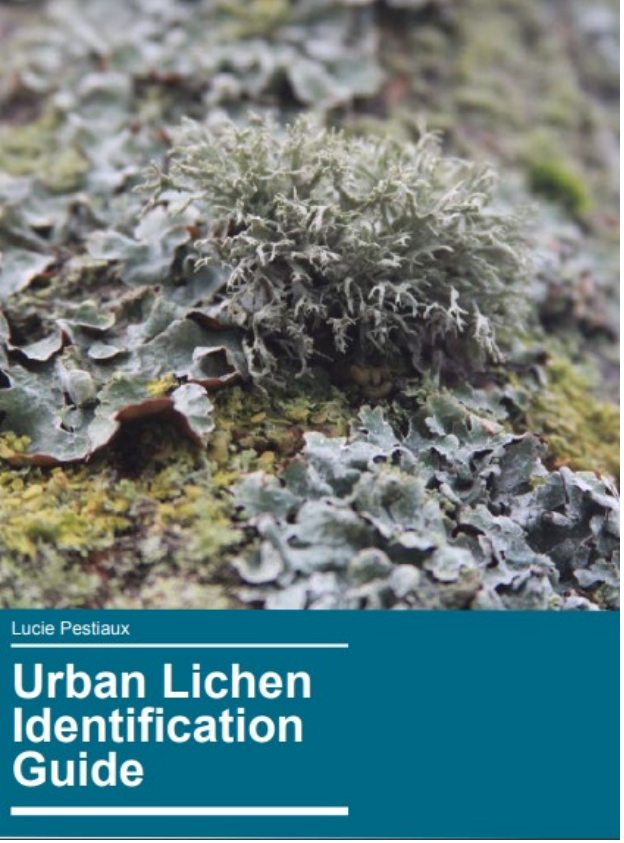
https://my.nsta.org/resource/100233 Table 1.2 Types of questions.

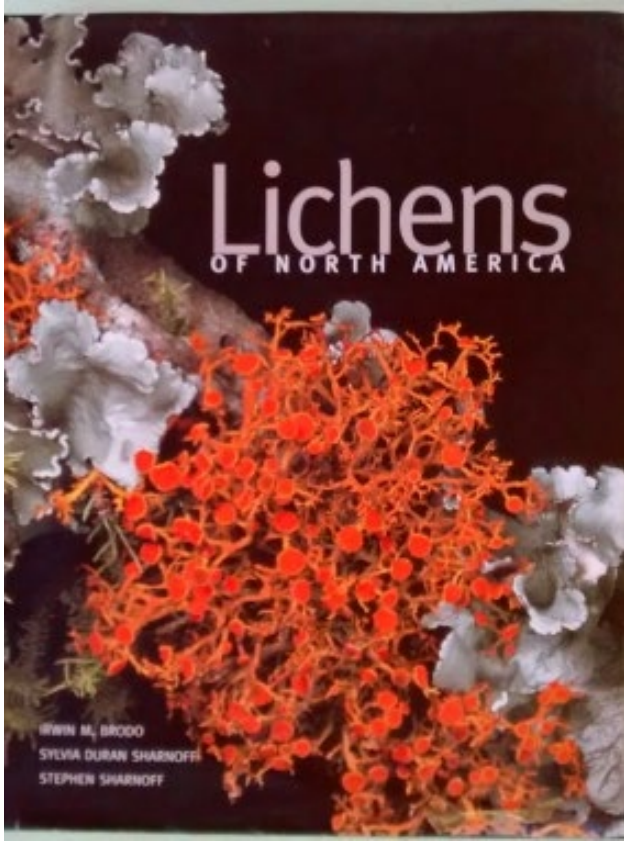
Resources

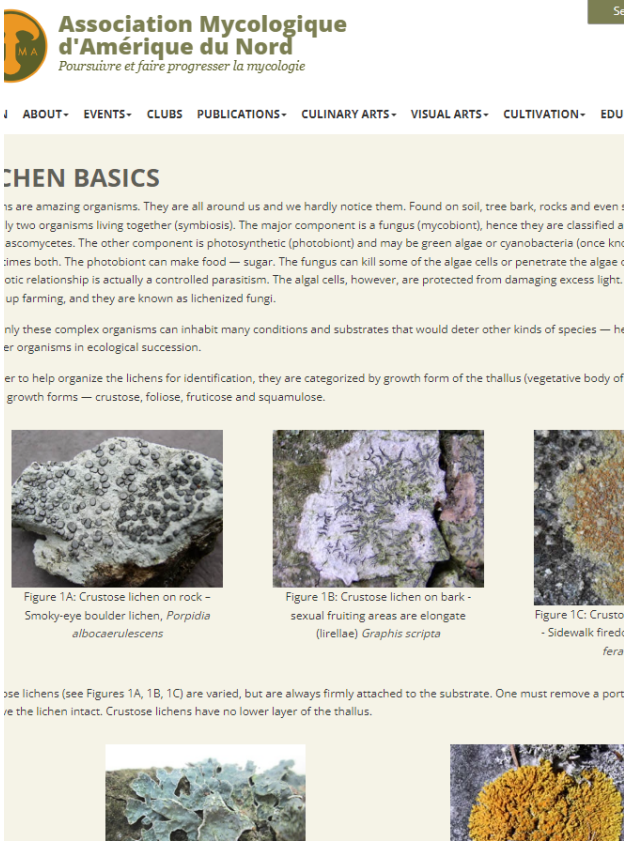
http://gis.

Lichens, two lives in one….

A third organism, various species of yeasts that likely produce chemicals that help lichens ward off predators and repel microbes!



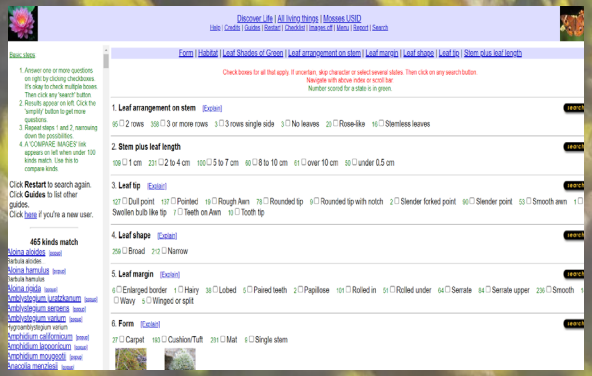




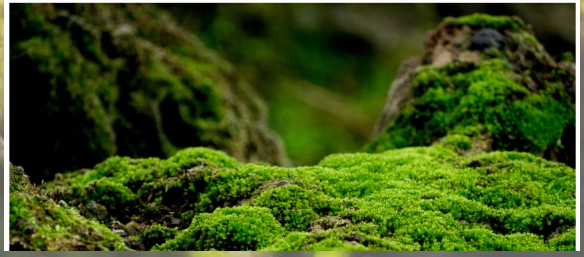
- https://blogs.ed.ac.uk/lichenwalk/wp-content/uploads/sites/4888/2021/08/ID_GUIDE.pdf
- https://namyco.org/lichen_basics.php
- https://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/opal/AIR-4pp-chart.pdf
- https://www.discoverlife.org/mp/20q?guide=Lichens_USGA
- https://www.nhm.ac.uk/take-part/identify-nature/lichen-id-guide/index.dsml

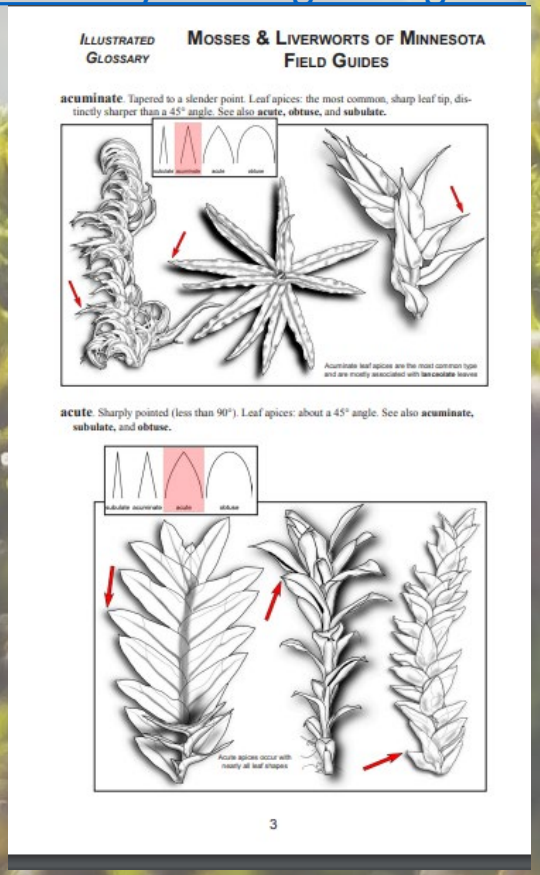
Moss ID online

- https://www.discoverlife.org/mp/20q?guide=Mosses_USID&mobile=1
- https://www.plantsnap.com/plantblog/types-of-moss/
- https://files.dnr.state.mn.us/eco/mcbs/moss_booklets/mn_bryo_fieldguide_glos_illus.pdf



Moss is a ubiquitous plant that often goes underappreciated and overlooked. As one of the first land plants, moss was able to spread across the entire globe. It's now found on every continent including Antarctica, thanks to its ability to grow in Earth's harshest environments. Moss loves to colonize new ground, so it commonly grows on rocks, brick walls, cracks in the sidewalk, and everything in between. Although moss isn't the most diverse group of plants out there, there are still around 12,000 species! Some of the most common species can be found on multiple continents. In this article, we'll go over more than 25 common types of moss and how to recognize them. But first, what even is moss?





[Main website]

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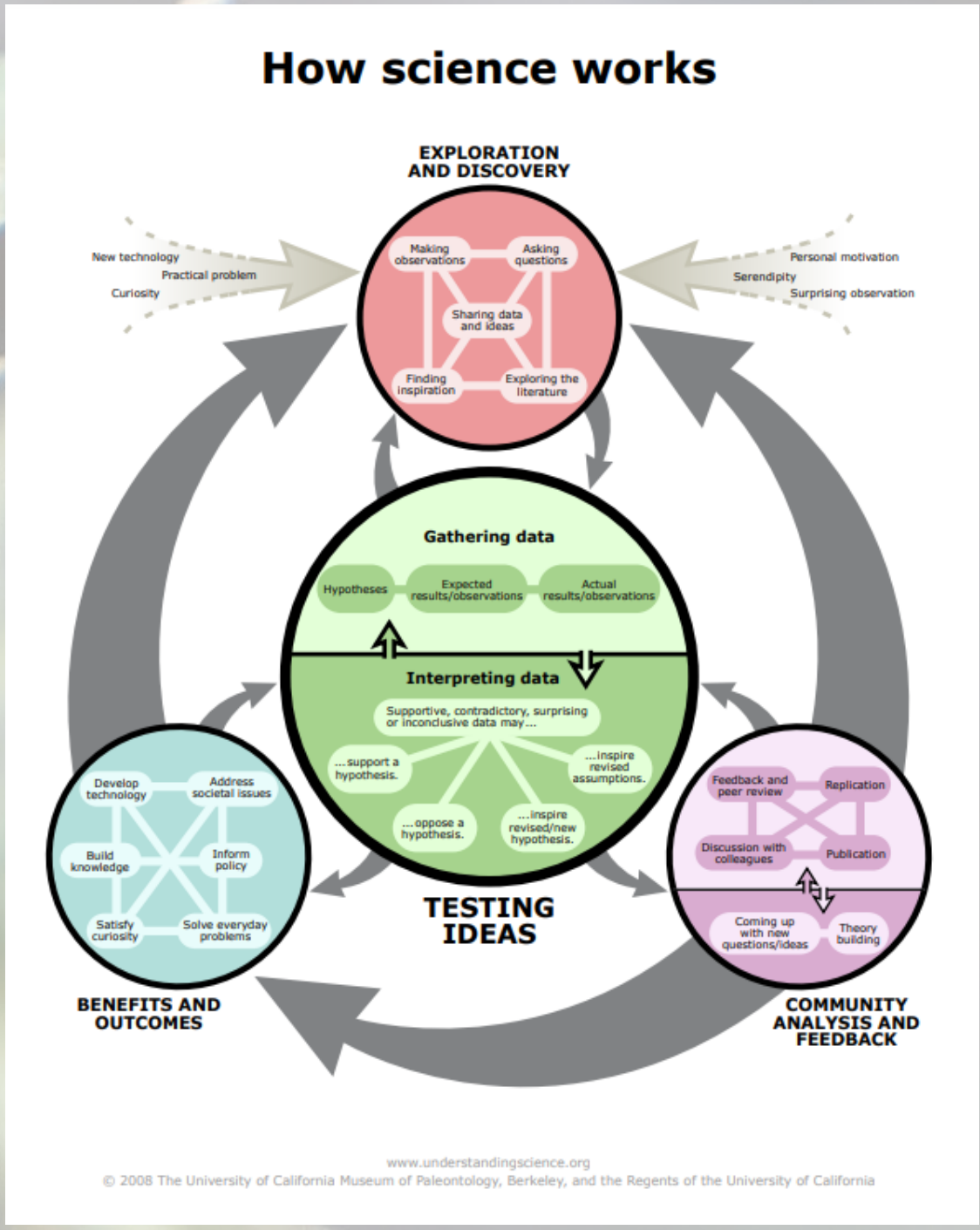
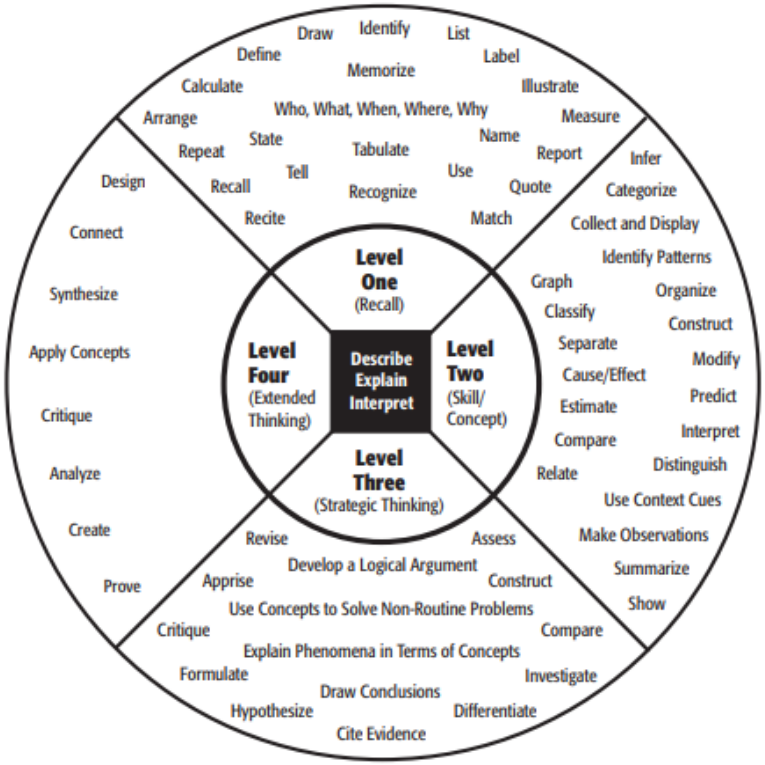


Depth of Knowledge (DOK) Levels



Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/ solutions.
Conduct basic mathematical calculations.	Use context cues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	Apply mathematical model to illuminate a problem or situation.
Label locations on a map.	Solve routine multiple-step problems.	Identify research questions and design investigations for a scientific problem.	Analyze and synthesize information from multiple sources.
Represent in words or diagrams a scientific concept or relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Describe and illustrate how common themes are found across texts from different cultures.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Design a mathematical model to inform and solve a practical or abstract situation.
Describe the features of a place or people.	Formulate a routine problem given data and conditions.	Apply a concept in other contexts.	
	Organize, represent and interpret data.		

Webb, Norman L. and others. "Web Alignment Tool" 24 July 2005. Wisconsin Center of Educational Research. University of Wisconsin-Madison. 2 Feb. 2006. <http://www.wcer.wisc.edu/WAT/index.aspx>.

[Dept of Knowledge chart shared by New Jersey Department of Education]

Virginia Standards of Learning

Connecting to the standards:

These Quests for Knowledge are at the heart of many of the
Science and Engineering Practices described in the VA SOL (and NGSS).

- Carrying out Investigations
- Asking Questions
- Construct & Critique Conclusions and Explanations
- Obtain, Evaluate, and Communicate Information

Questions/observations/learning

- On a sticky note, please write three things from any category:
  - Questions
  - Observations/reflections
  - What was new to you, what did you learn

  If you choose to include your name and put contact info on our sheet, we will do our best to respond!

Contact Information

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Blandy Developed Lessons & Resources

https://blandy.virginia.edu/content/ed-programs-activities-and-lessons

Thank you!

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