USING A GENERATIVE VOCABULARY MATRIX IN THE LEARNING WORKSHOP

Sue C. Larson

This article describes an approach for generating background knowledge and sustaining inquiry and introduces the Learning Workshop.

Gabrielle	Look at this giant alligator!
Luke	My book has a diving beetle eating a tadpole!
Zoe	Look, this plant eats flies! They fall down in here and land in this pool and never come out.
Matt	I found lots of words about wetlands for the matrix. I have *water spider*, *food chain*, *freshwater*, and *adapt* on my sticky notes.
Jodi	These birds have long legs and long bills so they can wade in the water and catch fish to eat.

Eagerly sharing discoveries with classmates in the Learning Workshop, these second-grade students (pseudonyms used) displayed joyful learning as they were deeply immersed in exploring a nonfiction text set of books about the wetlands habitat. As they read, students determined important words and wrote them on sticky notes.

When the class came back together, students talked about their domain-specific words, such as *amphibian*, and arranged them on an interactive class organizer called a Generative Vocabulary Matrix (GVM; Figure 1). On a separate companion language chart, the teacher recorded academic language showing relationships among core concepts, such as *if/then* and *so that*, and specialized word choice, such as *predator* and *devour* (Figure 2). As novice scientists, students were using the vocabulary and practices of experts as they conducted investigations and organized information for a class book about the importance of wetlands.

Because words are labels for concepts, vocabulary learning should be embedded within a larger schema in a content area domain as a necessary condition for comprehending content and text (Nagy & Herman, 1987). Consistent with generative learning theory (Wittrock, 1974), the GVM supports *generative processes of learning* to actively make sense of content.

Generative processes include building rich relations among concepts, linking prior knowledge to new information, actively constructing meaning, and transferring experience and knowledge to new

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Figure 1 Interaction with a Generative Vocabulary Matrix in a Second Grade Classroom

situations. These processes help students learn with understanding and remember information. Generative learning is motivating because students control meaning making during active learning experiences.

The Learning Workshop is a four-step inquiry approach, and the GVM is a tool for promoting increasingly sophisticated generative processes within each step (Table). The nature of meaning-making discourse with the teacher shifts as students organize concepts and gain increasing control over new language and vocabulary. Students' schema is gradually transformed, leading to higher levels of intellectual development and productive thinking for addressing new situations (Vygotsky, 1962).

This article explains (a) how teacher teams designed and implemented a disciplinary science unit according to the four-step Learning Workshop sequence and (b) how the GVM was used in each step of the Learning Workshop to support meaning-making engagement with vocabulary and academic language.

Time for a Learning Workshop

We know that children benefit from classroom conditions that allow time for immersion in interesting texts, active engagement with words and language, and use of readings in meaningful and authentic ways (Cambourne, 2000). However, how can teachers find more time, given daily scheduling constraints? How can teachers meet standards, complete curriculum requirements, and provide vocabulary instruction without sacrificing students' natural curiosity, wonder, and enjoyment of informational texts?

To address these concerns, elementary teachers seamlessly blended all instructional time from reading workshop, writing workshop, and content area learning into one unified Learning Workshop. Extended time afforded quality literacy and learning engagement.

A Context for Sustained Vocabulary Engagement

By itself, extended classroom time does not guarantee motivation or meaningful engagement with vocabulary. Research suggests that *sustained* engagement in literacy activity is the avenue to learning (Guthrie & Wigfield, 2000). Seeking to motivate and sustain rich vocabulary experiences in the classroom, our teacher teams incorporated relevant research on vocabulary interaction, disciplinary literacy, and sustained engagement.

Figure 2 Sample Language Chart

Pause and Ponder

- What are the benefits of using a Generative Vocabulary Matrix as a tool for thinking and learning?
- How might you structure the GVM differently for the various units you teach?

Table Generative Processes Within Each Step of the Learning Workshop

Learning Workshop Step	Generative Processes Supported by the GVM	Source of Words	Students' Language Control	Teacher's Role
1 *Situate the Inquiry—Make It Real and Relevant*	*Initiating* the matrix: ■ Tell why two words go together/Connect ■ Label some groups of words/Infer ■ Integrate relevant prior knowledge/experiences ■ Integrate words from the read aloud ■ Ask curiosity questions ■ Draw conclusions about the shared experience to enhance understanding	■ The "trigger" experience ■ Interactive read aloud ■ Discussion about an image ■ Prior knowledge and experiences ■ The real-world learning scenario ■ Spotlighted during all shared experiences	■ *Exposure* to new vocabulary and academic language ■ Everyday language is also key for making initial meaning	*Instigator* ■ Ignite interest ■ Provide a relevance-generating scenario
2 *Investigate and Construct Knowledge—Keep It Engaging*	*Conceptualizing* the matrix: ■ Determine important concept words ■ A text structure emerges ■ New ideas are merged and justified ■ Categories are labeled ■ Meaning-making talk with peers, such as Think-Write-Pair-Share, analyzing results of experiments, generating summaries	■ Self-selected from a text set during an exploratory investigation to identify personal interests and learning goals ■ Spotlighted during classroom activities such as experiments, action strategies, simulations, informational songs/poems	■ *Experimentation* with academic language and vocabulary to enhance understanding and show relationships	*Director* ■ Maintain interest ■ Model and guide meaning-making discourse and thinking ■ Spotlight academic language and vocabulary
3 *Select and Synthesize Knowledge—Support Autonomy*	*Enriching* the matrix: ■ Obtain and evaluate additional relevant information ■ Synthesize information from multiple sources ■ Enhance or restructure conceptual categories to produce a clear, well-organized visual structure	■ Self-selected during a targeted search within and beyond the text set ■ Digital sources ■ Interviews, observations ■ Increasingly complex texts	■ *Synthesis* of information using academic language and core vocabulary ■ Word choice enhances specificity ■ Personal semantic maps reveal independent thinking	*Facilitator* ■ Cultivate individual interest ■ Mediate a strong and accurate GVM ■ Support autonomy ■ Guide choices
4 *Generate and Demonstrate Knowledge—Support Critical Literacy*	*Accessing* the matrix: ■ Transfer knowledge to an authentic task ■ Use the GVM to create writing, explanations, solutions, arguments	■ Students' voices, passions, perspectives ■ The GVM, student journals, other student products	■ *Critical use* of increasingly complex academic language and vocabulary to address a real-world scenario ■ Reading, writing, and learning to affect change or promote awareness of an issue	*Mentor* ■ Nurture creativity and academic voice within an area of interest

The Importance of Vocabulary Interaction

Actively organizing information into a conceptual framework helps students learn related information quickly and facilitates application of knowledge to new situations (Bransford, Brown, & Cocking, 2000). Student self-collection of words is associated with choosing important and challenging vocabulary, retention of learning, and motivation (Ruddell & Shearer, 2002).

After students and the teacher contribute and arrange words meaningfully on the GVM, conceptual categories of words are labeled (Taba, 1967) and a semantic framework emerges. As with any concept organizer, the GVM may be organized as a web, table, flow chart, array, cycle, Venn, sequence, problem/solution, or other text structure, depending upon the curricular goal. While one meaning of the word *matrix* refers to a specific graphic organizer that resembles

"In the Learning Workshop, vocabulary is spotlighted at the point of relevance during learning experiences, integrated into the GVM, and meaningfully used to generate knowledge."

a table format, the definition of *matrix* for the GVM technique reflects a deeper sense of the word. Originating from the Latin *mater,* or mother, a *matrix* is a place where something originates and develops ("Matrix," n.d.).

Likewise, the GVM provides a place where meaning is generated from the starting point of students' experiences and prior knowledge. With teacher guidance, understanding increasingly develops as students actively integrate and organize new information into what becomes a clear and coherent framework.

Because the GVM technique scaffolds the *process* of generating conceptual knowledge, the resulting format will depend upon the nature of the content. For example, the life cycle of a butterfly might be represented as a cycle diagram. Attributes of an animal might be displayed as an array.

The development of the GVM was informed by features of Vocabulary Visits (Blachowicz & Obrochta, 2005) and Text Talk (Beck & McKeown, 2001), which target vocabulary development in interactive language contexts. The GVM and the Learning Workshop build on this research by (a) adding a central conceptual structure that serves as a dynamic placeholder for schema and language development and (b) creating a motivating workshop environment.

Just as identifying text structure aids comprehension while reading (Armbruster, Anderson, & Ostertag, 1987), the GVM helps students build a meaningful conceptual schema while learning. Students benefit when they retrieve relevant information at just the right time and add it to their schema to construct meaning (Kinsch, 2004).

In the Learning Workshop, vocabulary is intentionally *spotlighted at the point of relevance* during learning experiences and integrated into the GVM. Meaningful use of both academic language and domain-specific vocabulary is associated with conceptual understanding, reasoned thought, and development (Gee, 2004; Larson, 2011). Known as Tier 2 and Tier 3 words (Beck, McKeown, & Omanson, 1987), both academic language and core vocabulary were used by our students to make meaning with others.

The Importance of a Disciplinary Literacy Approach

The Learning Workshop emphasizes a disciplinary literacy approach in which learning and literacy activity resemble the language and practices that experts actually use in their field. These include asking questions; collaborating with others; carrying out investigations; valuing and interpreting evidence; constructing explanations and arguments; building background knowledge from content-rich texts; and obtaining, evaluating, and communicating information (Achieve/Next Generation Science Standards, 2013a; National Council for the Social Studies, 2010; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

Experts in every field draw from a richly structured knowledge base that helps them select and remember information (Bransford, Brown, & Cocking, 2000), making the GVM an authentic tool in a disciplinary literacy approach. Immersion in meaningful, situated use of vocabulary and language is essential for acquiring the norms of discourse for a particular subject area (Gee, 2001).

When reading tasks and topics are relevant to students' lives, motivation is enhanced (Gambrell, 2011). A disciplinary literacy approach may contribute to sustained engagement because of the emphasis on authentic, relevance-generating learning activity.

The Importance of Sustained Engagement

Motivation is defined as "the process whereby goal-directed activity is instigated and sustained" (Pintrich & Schunk, 2002, p. 5). To keep students interested and engaged in learning, our teachers infused research-based elements of backwards design (Wiggins & McTighe, 2005), flow (Shernoff & Csikszentmihalyi, 2009), and interest development (Hidi & Renninger, 2006) into their content area plans.

Interest is a motivational aspect of learning, and it develops in four cumulative phases from triggered situational interest to individual interest. This research led to the development of the EngageALL planning model, a sequence of instruction designed to sustain engagement by helping teachers organize instructional activity according to the way interest naturally develops: Engagement in Academic Literacy for Learning (Larson, 2011). EngageALL has also been used successfully with older students (Larson, 2014).

"Teachers trigger situational interest by drawing students into inquiry-provoking activity to spark meaningful talk."

The Generative Vocabulary Matrix in a Second-Grade Learning Workshop

Planning

To target the disciplinary core ideas of biodiversity and relationships in ecosystems, second-grade teachers collaborated to design a life science unit on the wetlands biome. Teachers created the big idea questions first, which guided their decision to use a table format (Figure 3) to structure the GVM:

Big idea of the curriculum: Biodiversity: "There are many different kinds of living things in any area, and they exist in different places on land and in water." (Achieve/NGSS, 2013b)

Big idea questions for students:
- What are the layers of the wetlands?
- What plants and animals live there?
- What is special about wetlands life?

Teachers created the scenario-based performance assessment using the RAFTs technique (Groenke & Puckett, 2006):

Role: You are an environmental scientist.

Audience: You are writing to children and families and to the principal and a neighboring class.

Format: You will contribute a chapter to a field guide.

Topic + strong verb: Explain a feature of the wetlands environment.

Vocabulary selection was adapted from the three tiers of words framework (Beck, McKeown, & Omanson, 1987) and proximal to students' current knowledge (Figure 4). Instructional activities were sequenced according to the characteristics of the four-step EngageALL model. Teachers prepared a text set, a learning wall, and materials.

Step 1: Situate the Inquiry—Make It Real and Relevant

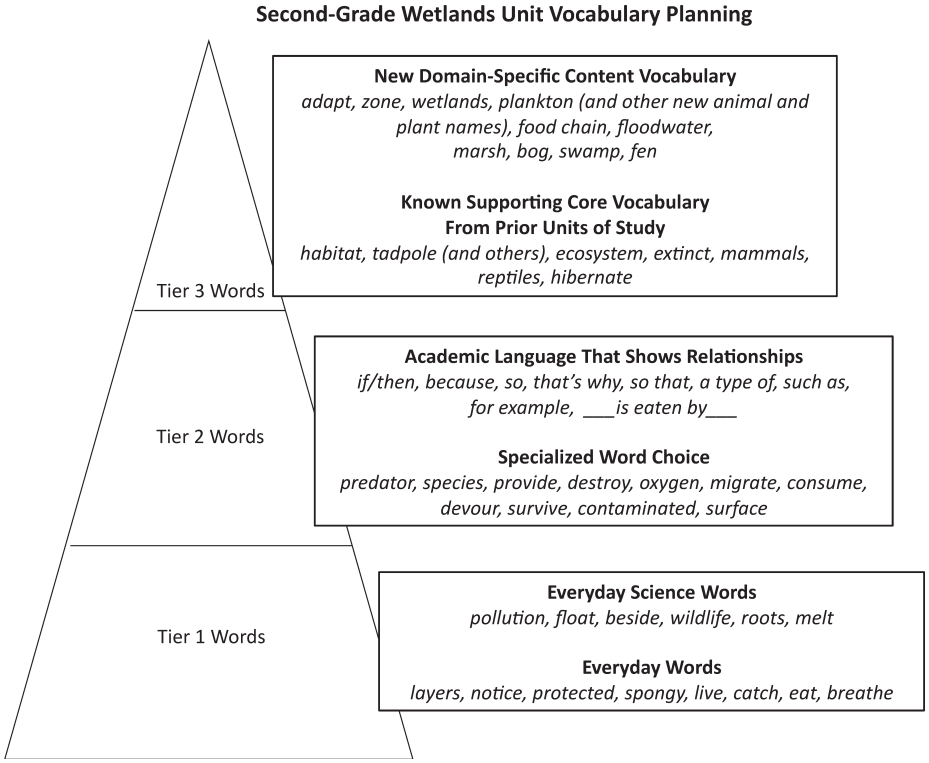
Characteristics of Step 1 of the Learning Workshop. To trigger situational interest, the teacher draws students into a surprising or inquiry-provoking activity to spark active, meaningful engagement in a real-world topic. A problem-based scenario connects the inquiry to the big idea of the curriculum and puts a focus on an authentic performance goal. Students are exposed to new vocabulary and academic language and also use everyday language to make initial meaning with others.

How Teachers Implemented Instruction in Step 1. To captivate curiosity, each teacher put on swimming

Figure 3 Example of a Generative Vocabulary Matrix in Table Format

	Animals	***Plants***	***Other Words for Talking About Wetlands***
***Above** the shore*	eagle dragonfly owl mosquito hawk mayfly robin		*snow* *rivers* *overflow* *field guide* *undercoat* *resources* *waterfowl* *generation* *valuable* *environment*
*At the **shore** (beside the water)*	egret heron raccoons frog garter snake	reeds iris cattail willow ferns	
*On the **surface** of the water*	mallard duck alligator water spiders beaver	water lilies duckweed	
***Below** the surface of the water*	turtle carp nymph tadpole crayfish frog freshwater shrimp diving beetle	pondweed water milfoil coontail	

Figure 4 Vocabulary Selection for a Second Grade Wetlands Unit



fins and attempted to walk across the room. Laughter and questions filled the air as students speculated about the upcoming learning activity. Teachers asked students: "If I were an animal, why would I need feet like this? What animal might I be? Where would I live? What would I need? What would I worry about?"

Teachers engaged students in observing and discussing large photographs of a mallard duck, a turtle, and a frog. Students gathered around a table to examine several live animals—a frog, a garter snake, a turtle, and a fish—noting movements and physical features, sharing known information and experiences, and predicting where these animals might live. Teachers asked students what they wondered as they looked at the animals and then explained that observing for patterns and asking questions are important in the work of real scientists.

Teachers projected a cut-away illustration of a wetlands habitat to point out the different zones, or layers where wetlands plants and animals live: below the surface of the water, at the surface of the water, and beside the water. As students shared their thinking, teachers wrote key understandings on sticky notes and posted them on the learning wall: *frog*, *duck*, *fish*, and *crayfish*. The big idea questions were presented to students in kid-friendly language: *What are the layers of the wetlands? What plants and animals live there? What is special about wetlands life?*

To further hook students into the real-world topic, students were asked to engage in the work and words of scientists through active inquiry. Each student was provided with a brand-new inquiry notebook in which to collect observations, note patterns, and record thinking throughout the unit.

The first task was to record observations and curiosity questions using a three-column format: *What I notice, Why I think it lives ___ (below, at the surface, beside the water), What I wonder.* Teachers asked students to work together as scientists and closely observe their choice of several plants and animals that were on display in stations around the classroom.

Students rotated in trios among the stations, in which either live specimens or large colorful photographs were displayed and labeled: turtle, salamander, snake, frog, dragonfly, cattail, fern, duck, hawk, diving beetle, red-winged blackbird, fish, snail, willow, freshwater shrimp, leech, beaver, duckweed, pondweed, crayfish, mosquito. As students talked about their observations and recorded their thinking, teachers circulated to guide the investigations.

Students returned to their seats for a whole-class sharing of ideas. Each student wrote a favorite curiosity question on a sticky note and posted it near the big idea question on the learning wall (see Figure 1).

Teachers wrote the names of plants and animals on individual sticky notes and passed them out to partners. Together, partners determined and justified the placement of their plant or

"To maintain situational interest, personal interests are nurtured through text set explorations and conversation."

animal in a wetlands layer (Figure 5). Students were encouraged to use words and language to orally communicate their thinking process:

Jamal *Crayfish* goes *below the surface* because it lives underwater.

Zach *Alligator* goes *on the surface*, because that's where he swims… but he can also go *below the surface* and *on the shore* if he wants to!

Yesenia *Duckweed* lives *on the surface* because the leaves float on the water and the roots hang down.

Teachers spotlighted Tier 2 words that students used and posted them on the language chart with the label *Words that scientists use*. Words included academic language, or "Language for thinking," such as *because*, *a type of*, *when*, *according to*, and *if/then*, and "Word choice for science," such as *survive*, *hibernate*, *feed on*, *observed*, and *species*.

Each teacher engaged students in an interactive read-aloud of *Life in the Wetlands* by Carolyn Scrace to expose them to new vocabulary, content, and academic language. New words were periodically spotlighted at the point of relevance in the context of reading, discussed with students, and written on sticky notes.

During the read-aloud, teachers would occasionally ask students to turn to a partner and use the words and language to either explain an idea or talk about why the words go together. For example, the teacher pulled several sticky notes together to elicit an explanation:

Teacher Use these words to tell how a wetland can be made: *if*, *snow*, *rivers*, *overflow*, *wetland*.

Partners If a lot of snow melts, or if rivers overflow, then the extra water can make a wetland.

Sometimes the teacher wrote these sentences on the board for students to read chorally.

The teacher provided book talks on several interesting nonfiction texts that represented a variety of formats. A field guide structure was selected for its authenticity as a manual that scientists might create. The book, *Wetlands* by Rose Pipes, would be used as the mentor text for the class big book project.

The performance goal and real-world scenario were communicated to students. Teachers explained that real scientists often come together and contribute their special expertise to create one book about a big topic. Each student scientist would be a contributing author and provide details about an interesting relationship in the wetlands biome.

Rather than choose general subjects such as hawks or frogs, students were encouraged to investigate a topic that showed some kind of relationship in the wetlands, such as a particular food chain, or a specialized feature that helps a plant or animal survive in the wetlands. Information from the GVM and students' personal semantic maps would be used to organize the writing and promote the use of core vocabulary and language.

Step 2: Investigate and Construct Knowledge—Keep It Engaging

Characteristics of Step 2 of the Learning Workshop. To maintain situational interest initiated in the first step, the teacher keeps students actively involved in the learning activity. Group activity is enjoyable, meaningful, and intended to sustain attention and persistence. Personal meaning and interests are nurtured through opportunities for exploration. Students experiment with academic language and vocabulary to enhance understanding.

Figure 5 Students Organize Words Conceptually and Explain the Relationship

How Teachers Implemented Instruction in Step 2. To address the learning goal and to maintain situational interest generated in the first step, teachers engaged students in an exploratory investigation of a text set. Students eagerly scrambled toward the beautifully displayed set of nonfiction texts with blank sticky notes and markers in hand.

Students were encouraged to choose and enjoy the books first and then select and write key words on sticky notes (Figure 6). Natural curiosity and wonder prevailed as spontaneous comments filled the air:

Daniel	Whoa, the alligator can get the duck!
Madison	I like the water lilies.
David	I wonder if all the animals in the wetlands hibernate.
Priya	Look at this! When the beaver is swimming under the water, he can see through his eyelids like goggles!
Luis	I wonder what it would be like to be a crayfish.
Ravi	I found out that herons eat fish and mice and bugs—ew!
Kelsey	Diving beetles bring a bubble of air with them under the water to breathe!

Each teacher circulated among students to confer, guide reading, and share in the wonders of nature. Focused attention and persistence were observed as partners shared their discoveries with each other and as personal interests began to emerge.

When whole-class discussion resumed, students explained to the class how their sticky notes could be organized into the GVM. Then teachers carefully focused their instruction on language and content:

Teacher	We are reading about food chains in the wetlands habitat. Come up with a partner and think about words from our vocabulary matrix that might make sense together about a food chain.

(Brandon and Cody come up and confer with each other.)

Brandon	*Tadpoles* and *plankton* go together.
Cody	And *raccoons* and *carp.*
Teacher	Why?
Cody	Because tadpoles feed on plankton.
Teacher	Wow, I like that you used the words *feed on*. Let's write that on our language chart. That's the kind of language that scientists use. Now tell your whole food chain idea to the class.
Brandon	Tadpoles feed on plankton in the wetland food chain; then bigger animals eat the tadpoles, like raccoons and carp.
Teacher	Great! Let's write that science sentence here and then read it together with the class. *(Choral reading.)* You know, I'm thinking of a word that we added to our language chart that we could use here instead of *animals*. Brandon and Cody, you can call on someone from the class if you like.
Alexis	*Predator.*
Teacher	Let's see how it sounds. Bigger *predators* eat the tadpoles. Why might we choose *predator* instead? … Another word we might add to our language chart is *prey on.* …What are some other words for *eat*? (devour, consume) When you read in your books about food chains, you will sometimes see it written this way: *Tadpoles are eaten by fish*. That might be confusing, so let's draw a picture of that…
Teacher	Turn to a partner and choose some words from our vocabulary matrix and language chart and talk about another wetlands food chain. You may check your facts in our text set. Remember to say it like a scientist! Then write it in your inquiry notebook. After that, turn and read it to a new partner. Then we will add some food chains to our language chart.

Figure 6 Student Reading from the Text Set and Selecting Key Words to Add to the GVM

"Students quickly embraced and grappled with increasingly complex texts after gaining confidence through vocabulary and academic language interaction; students 'worked up to reading' complex texts."

This dialogue illustrates how the GVM and language chart can be used to support verbal expression and knowledge generation. Intensive engagement in "cognitively challenging talk" helps students deepen understanding and memory of concepts (Gee, 2001, p. 724).

To cultivate personal interest, students were asked to choose a favorite feature associated with the wetlands environment and meet with others to talk about shared interests. Teachers used the discovery circles discussion technique (Kristo & Bamford, 2004), in which students meet in small groups to critically examine nonfiction books about a similar topic.

Students gathered their chosen books and inquiry notebooks and assembled in groups designated as *Wetlands life below the water, Wetlands life on the surface of the water,* or *Wetlands life at the shore.* Groups sat in tight circles on the floor with their books, enthusiastically sharing photographs and reading short fact-filled passages and fascinating captions they had bookmarked. Students demonstrated a sense of academic belonging within a community of learners who listen to and respect one another's ideas.

Each group shared their findings with the whole class, and new information was added to the GVM. The teacher strategically added curriculum content at the point of relevance as a contributing participant. The language chart was used to portray a variety of other wetlands relationships.

Step 3: Select and Synthesize Knowledge—Support Autonomy

Characteristics of Step 3 of the Learning Workshop. To support emerging individual interest, students may initially work with others who share an interest. Soon, students engage in independent explorations, choosing from multiple sources of information to address the scenario. Conferring is essential as students read and write from increasingly complex texts, including online sources. Timely apprenticeship in the skills needed to meet the learning challenge keeps students in flow. Students use academic language and core vocabulary to synthesize information and express knowledge.

How Teachers Implemented Instruction in Step 3. Referring to the text structure of the GVM, teachers re-engaged students with the big idea questions and learning goal of the inquiry. To promote independence, teachers used several books from the text set to model the reading/writing/thinking process of selecting and synthesizing information. Students returned to the text set for a targeted search for information about their chosen area of expertise.

With teacher guidance, some student-selected topics included animals with specialized feet, a variety of food chains, breathing and seeing underwater, meat-eating plants, the importance of bugs, underwater plants, how animals survive in the winter, predators, unusual wetlands life, plant-eating animals, why plants on the shore are important, animals that hibernate, the four kinds of wetlands, and animals that live both underwater and on the shore. Time and guidance were provided to students as they read, chose, and recorded information in inquiry notebooks.

We noted that our second-grade students quickly embraced and grappled with increasingly complex texts due to the confidence they had gained through vocabulary and academic language interaction. The teachers had consciously helped students "work up to reading" complex texts with GVM support.

Teachers noted a generative learning orientation as students actively worked toward individual goals, took control of their own learning while exploring the text, and enthusiastically immersed themselves in meaning-making

"Individual interest sustains engagement as students use academic language and vocabulary to synthesize from multiple sources and critically use knowledge to address a real-world issue."

"Because semantic, morphologic, syntactic, and pragmatic systems of language are pathways to meaning, we examined evidence of language development through each of these lenses."

discourse with peers. The interactions of these young scientists demonstrated high levels of enjoyment, concentration, and interest, which are the ingredients for engagement (Shernoff & Csikszentmihalyi, 2009).

Students met again in their discovery circles to share new information. Because the discovery circles technique emphasizes a critical examination of nonfiction content, students were directed to talk about ways authors portrayed how a plant or animal was suited for a particular layer of the wetlands environment.

When the whole class came back together, students organized new findings on the GVM. Discussions demonstrated increased schema development and vocabulary acquisition:

Ashley	Some trees and plants adapt to the wetlands. They have roots that stick out of the water to get oxygen. They are cypress trees and mangroves.
Brian	Beavers have long, sharp teeth so they can cut plants and build a dam in the wetlands. They can see through their eyelids so they can see under the water and protect their eyes.

Step 4: Generate and Demonstrate Knowledge—Support Critical Literacy

Characteristics of Step 4 of the Learning Workshop. To further enhance individual interest and engagement, students are immersed in cognitive discourse for a specific purpose. Students use increasingly complex academic language and vocabulary. By critically using information to address a real-world issue, students reveal their academic voice.

How Teachers Implemented Instruction in Step 4. Individual writing for the class field guide united learning with authentic performance assessment. In a disciplinary literacy approach, students generate texts of a subject area (Moje, 2008), much like real scientists who write about the natural universe (Yager, 2004).

Teachers engaged students in the Language Experience Approach (LEA; Stauffer, 1970) to demonstrate the process of using words and language from the GVM to say, write, read back, and revise text. Students were already familiar with the routines of writing workshop and easily shifted into workshop mode to draft, revise, edit, and illustrate their individual chapters.

Final writing was copied onto 11-inch by 17-inch paper for publication in the class big book. Students demonstrated creativity and knowledge as they illustrated and captioned wetlands relationships.

The more students learned, the more passionate they became about their topics and the wetlands environment.

One teacher led a whole-class shared writing activity in which a final chapter was composed. Because critical literacy is supported through activities that emphasize the intention of a message, the teacher posed several questions for the class to discuss: "What do the authors of our books want you to know and think? Why are wetlands important? What have we learned about pollution contamination in the wetlands? As authors, what important message do you want your readers to understand?"

Consensus was reached to write the final group-authored chapter about the importance of preserving local wetlands. The teacher guided the process as students dictated each sentence. According to Gee (2004), teachers should make explicit comparisons between lifeworld and academic language. A minilesson addressed revising for word choice and reasoning with supporting evidence to evoke empathy, to persuade, and to defend an argument:

Original	Our wetlands are important. Sometimes wetlands get polluted. Many plants and animals live there. We should not hurt the wetlands.
Revised	Our wetlands are valuable and should not be destroyed. Wetlands must be protected from becoming farms, roads, and cities. Chemicals from factories have destroyed wetlands. We need wetlands

"Samples suggested relationships among language systems, GVM interaction, and a schematic system of knowledge"

because they clean our water and stop flooding. The wetland habitat gives a home to endangered species. Many amazing plants and animals would die without food, water, and shelter from the wetlands. Birds rest in wetlands when they migrate. People around the world get food and resources from the wetlands, such as fish and peat for fuel. People can go fishing, canoeing, hiking, and bird watching in the wetlands. We need to save the wetlands for future generations.

In the LEA process, students practice reading back their own expanded oral language. This provides a model for using rich language while writing or for preparing students to meet the linguistic demands of complex texts. To complete the publishing process, subsequent lessons included creating a title, cover art, a table of contents, an index, and a glossary.

Pathways to Meaning

In our final grade-level team debriefings, observation notes and student writing revealed that using the GVM in a Learning Workshop context promoted conceptual understanding, sustained engagement, motivation, vocabulary acquisition, and language development. Because semantic, morphologic, syntactic, and pragmatic systems of language are pathways to meaning (Angell, 2009), we examined evidence of language development through each of these lenses.

Semantic development is associated with word meanings and was revealed as students experimented with core vocabulary as well as everyday words:

"Through a disciplinary literacy approach, students enacted the work and language of scientists, developed a passionate voice, and used literacy to impact their world."

Cayla's writing sample

Animals *adapt* for the *wetlands habitat*. Some animals have *webbed feet* to help move in the water. For example, ducks, frogs, and turtles have webbed feet.

Semantic development was also heightened as students attempted specialized word choice:

Nick's writing sample

Otters can float on the *surface* of the water because bubbles get *trapped* in the *undercoat*.

Morphologic development highlights small units of meaning, such as prefixes, suffixes, and roots:

Shared writing sample

Beavers are *herbi*vores. They eat plants, leaves, bark, and twigs.
Eagles are *carni*vores. They eat meat, like fish and small birds.

Asking students to use words from the GVM and academic language chart supported syntactic development, which emphasizes the structure of sentences to show relationships among ideas:

Kristi's writing sample

Herons and egrets have toes that spread out *so that* they can walk in the muck.

Marc's writing sample

If the wetlands get dry, *then* some animals adapt *so* they can survive. Turtles and frogs burrow in the mud *because then* they can be cool and wet.

Pragmatic development reveals the appropriate use of language for a situational context. We noticed that pragmatic development reflected the notion of language transfer, or purposeful use of language to explain natural phenomena:

Dylan's writing sample in his chapter on wetlands insects:

> Bugs can hide and lay eggs in the wetlands habitat. There is a lot of food for the baby bugs. Wetlands insects are dragonflies, caddis flies, and mosquitoes. Bees collect nectar from flowers in the wetlands. Beetles eat the soft leaves. Butterflies like the milkweed plants. Other animals eat the bugs, so insects are important in the wetlands food chain.

These samples suggest relationships among language systems, interaction with the GVM, and the development of a schematic system of knowledge. Additional studies might explore these relationships further.

Beyond Words

Our teachers didn't want their students merely to know about the environment—they also wanted them to care about it. Using a GVM

in the Learning Workshop supported a disciplinary literacy approach in our classrooms. Students engaged in enacting the work and language of scientists and then, by taking a critical stance, expressed their own passionate academic voice, generated by their blossoming understanding and language.

We learned that when armed with scientific knowledge, even young scientists could develop academic discourse agency and use literacy as a powerful tool to understand and impact the world around them. We shared the expectation and hope that this experience would motivate a deeper individual interest beyond the classroom, cultivate value and love of the natural environment for a lifetime, and instill the belief that reading, writing, and words can be used to promote awareness and positive change.

TAKE ACTION!

Try just one idea to get you started such as using sticky notes to spotlight and sort key vocabulary during your next nonfiction read aloud. Or, follow these guidelines to fully implement a GVM within a Learning Workshop setting.

1. Using a blank sheet of paper, map out your dream schedule for implementing a Learning Workshop. Combine your reading/writing workshop and content-area instructional time. Consider, of course, specials and lunch schedules.

2. Experiment for at least one unit of study! Collaborate with your grade-level team or a close colleague using the guidelines in this article. Consult with your school and town librarians to assemble a spectacular text set. Share your experience with the author of this article!

3. *Guiding questions for planning step 1: Situate the Inquiry—Make It Real and Relevant*

What is your trigger activity that hooks students into a real-world idea? At which key points will the Generative Vocabulary Matrix be used to spotlight new words and support immediate meaning making? What scenario-based formative assessment will you communicate to your students? You will engage students in an entry-point interactive read aloud. What book will you use that contains important core concepts and vocabulary that can be integrated into the Generative Vocabulary Matrix?

4. *Guiding questions for planning step 2: Investigate and Construct Knowledge—Keep It Engaging*

How will you get students up and moving? How will the text set be used to expand the Generative Vocabulary Matrix? How will you nurture personal choice and interest?

5. *Guiding Questions for Planning Step 3: Select and Synthesize Knowledge—Support Autonomy*

What strategy will you use to help students synthesize multiple sources of information? How might the Generative Vocabulary Matrix support this? How will you provide feedback to support independence, flow, and a generative learning orientation?

6. *Guiding Questions for Planning Step 4: Generate and Demonstrate Knowledge—Support Critical Literacy*

How will students demonstrate conceptual understanding authentically and creatively? How will you help each student develop an academic voice? How will you help students use literacy as a tool to understand and intentionally impact the world around them?

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MORE TO EXPLORE

ReadWriteThink.org Lesson Plans

- "Literature as a Jumping Off Point for Nonfiction Inquiry" by Lisa Storm Fink.
- "Cultural Connections and Writing for Change" by Gloria Reading and Michael Rockwell
- "Adventures in Nonfiction: A Guided Inquiry Journey" by Renee Goularte
- "All About Our Town: Using Brochures to Teach Informational Writing" by Emily Manning
- "Strategy Guide: Inquiry Charts (I-Charts)" by Cathy Allen Simon
- "Digging Up Details on Worms: Using the Language of Science in an Inquiry Study" by Jean Landis

IRA Books

- *Content Counts! Developing Disciplinary Literacy Skill, K-6*, by Jennifer L. Altieri
- *Comprehension Instruction Through Text-Based Discussion*, by Linda Kucan and Annemarie Palincsar
- *The Common Core: Graphic Organizers for Teaching K-12 Students to Meet the Reading Standards* (e-book), by Maureen McLaughlin and Brenda J. Overturf

IRA Journal Articles

- "Living Inquiry: Learning From and About Informational Texts in a Second-Grade Classroom" by Beth Maloch and Michelle Horsey, *The Reading Teacher*, March 2013
- "View From the Chalkboard: You May Now Close Your Textbooks" by Jennifer Tyler, *The Reading Teacher*, November 2010
- "Vocabulary Development During Read-Alouds: Primary Practices" by Karen J. Kindle, *The Reading Teacher*, November 2011
- "Singing Across the Curriculum" by William P. Bintz, *The Reading Teacher*, May 2010
- "Teaching History With Literature: Exploring the American Revolution" by Jennifer A. Manak, *Reading Today*, October/November 2012