

EXTENSIVE PARTNER READING TO IMPROVE SCIENCE READING FLUENCY AND
COMPREHENSION IN FOURTH GRADE ENGLISH LANGUAGE LEARNERS

by

Brandon Craig Berthelson

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DEDICATION

My paper is dedicated to my students. Being even a small part of their educational adventure has inspired me to be equally creative and curious. Seeing my former students graduate from high school and achieve their life goals drives me to seek adventure, push barriers, and explore creativity along with every new group of students I teach. The contents of this paper are the culmination of what started long ago with my first experience teaching science to fifth graders as an undergraduate student teacher. My students' involvement over the last school year has inspired me more than anything to keep living and teaching and learning because they show me the difference I make, and it makes a difference on me. They help me find resilience when the path gets tough. We've overcome obstacles together, the kind that will always remind me how important it is to strive to be a better teacher. The destination is worth the effort, and I thank them for the memories along the way.

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ABSTRACT

Students who are English Language Learners (ELL) require specific tools to acquire science literacy. When children read several grade levels behind their classmates, they struggle to understand more complex ideas due to lack of familiarity with words frequently used in science discourse. Traditional English language instruction fails to take into account different methods of knowledge transmission. The Blackfeet Nation, one of the Indigenous plains tribes of North America were introduced to written language after centuries of teaching successive generations by speaking in their native language. The implementation of extensive reading aloud of multiple texts with a grade-level partner gives consideration to cultural values and respects the preferences of the students in need of increased vocabulary while acknowledging the correlation between oral reading fluency and overall reading comprehension. Extensive reading is presented to elicit curiosity and give students a voice in choosing fields of science to explore broadly. Partner reading of science text allows students who are ELL to receive meaningful instruction consistent with their traditional modes of learning. The extensive partner reading program takes place during science and English instruction, and science literacy-building routines are embedded in each step of the 5E (Engage, Explore, Explain, Elaborate, Evaluate) science lesson format. When implemented, extensive partner reading provides students who are ELL in science literacy with more engaging literacy instruction, creating noticeable improvements in science engagement and reading ability. This instruction method can be adapted to any grade level and any reading level, and can be used to teach non-Indigenous ELL students.

CHAPTER ONE

INTRODUCTION AND BACKGROUND

Context of the StudyScience Literacy

For a child, time spent reading is time spent learning. Even when reading is done for pure entertainment, children are gifted the invaluable skills needed to pursue serious education in the future (Weadman et al., 2023). In its simplest form, early childhood exposure to various types of literature through routine oral reading sets a precedent for a love of reading. With a love of reading, students are able to turn to their talents and passions and refine them. Over time, the students become fluent readers with purpose, adept at gathering and synthesizing information critical to their intellectual growth.

Because reading ties other subjects together, such as math, science, and social studies, it is crucial that the skills needed to understand grade-level texts be ingrained in children at an early age. Nowhere is this need for subject-relevant literacy more evident than in the field of science. With rapid advancements in technology and understanding, scientific fields are moving forward at a rate that demands higher-order thinking capable of keeping up with progress. When students are given time to read texts involving scientific inquiry, they are given opportunities to explore the vocabulary and ideas integral to the concepts they are simultaneously learning through hands-on investigations in science courses. As students develop a passion for science through experience and experimentation, scientific literacy serves as a foundation for them to build background knowledge to guide their investigations. These general principles of literacy

take on particular urgency in reservation school contexts such as Napi Elementary in Browning, Montana.

Demographics

Despite the clear need for literacy in the context of science, there are major hurdles in providing these opportunities to underserved populations. Native students attending reservation schools, like Napi Elementary, face challenges to their education compounded by a history of social and political factors. Twenty-nine percent of elementary age students in the Browning Public School district are English language learning (ELL) students (National Center for Education Statistics, 2019). Of the school's 233 students across grades four and five, 98.3% identify as one or more minority group, with 97.4% Native American (mostly Southern Piegan Blackfoot, or *Amskapi Piikani*). The school also has a favorable student-to-teacher ratio of 11:1. While standardized test scores indicate that only 1% of students at Napi Elementary scored at or above the proficient level in math and 2% in reading (U.S. News, n.d.), the students demonstrate remarkable enthusiasm and engagement when participating in meaningful scientific learning experiences. This contrast highlights the importance of leveraging students' natural curiosity and cultural strengths to support their academic growth. By building on the students' existing interests and traditional ways of learning, educators can create more effective and culturally responsive approaches to teaching and learning. Those traditional ways of teaching and learning are important to remember when trying to address the gaps in standardized test scores.

Despite students' cultural funds of knowledge and enthusiasm for learning, reading proficiency data at Napi Elementary shows that many fourth-grade English language learners need a change in learning. Limited exposure to structured, high-volume reading in academic

science contexts may contribute to gaps in comprehension and vocabulary development.

Therefore, it is necessary to explore literacy approaches that both honor students' oral traditions and purposefully build reading fluency and comprehension.

Purpose of Study

While these educational challenges exist, the students maintain healthy cultural systems that can be beneficial to overcoming obstacles to literacy. Traditional modes of storytelling in the form of oral histories have endured the transition of assimilation into modern education.

Acquiring knowledge through written language is, for the Blackfeet, a relatively new way of learning. Shared readings and group discussions innately channel the linguistic skills that had predominantly transmitted information for centuries. By coupling extensive reading practices with oral reading activities, such as partner reading, Native children can acquire relevant knowledge in meaningful ways while building foundational literacy skills. These skills will be needed in a highly scientific and technologically evolved workforce of the future, a future in which they will be able to innovate, compete, and thrive (Garcia, 2024).

I chose my classroom as the setting for this project because it is the same setting where students receive both reading and science instruction (including most hands-on investigations connected to new science concepts). First, the reading is extensive, meaning it is broad in scope and allows for a wide array of topics to be read according to student interests. Second, the reading is shared orally, with students reading out loud with a partner and with the instructor to scaffold understanding. Third, the reading is monitored for progress using the Achievement Improvement Monitoring System (AimsWeb) as a tool for tracking gains in comprehension, vocabulary, word choice, and reading rate. The reading program, once developed and initiated,

will yield testable data against other classes to determine the effectiveness of extensive partner reading on students' benchmark reading levels. In the end, the goal of the project is to support teachers in exploring literacy approaches that are aligned with students' cultural and linguistic strengths.

Focus Statement/Question

This paper addresses the question: To what degree does extensive partner reading improve students' science literacy? The program is designed to generate measurable indicators of progress so that teachers may evaluate its effectiveness through consistent and frequent progress monitoring.

CHAPTER TWO

CONCEPTUAL FRAMEWORK

Why Literacy Access Matters in STEM for Native ELL Students

The pre-Caucasian Crow (Indian) was not a philosopher. He was a pragmatic opportunist. That is to say, if the things he perceived worked, they are true. He did not question the why of things in nature nor in the metaphysical realm. (Joseph Medicine Crow, 1939, p. 80)

English Language Learners and STEM

The needs of English Language Learners (ELL) in Montana's reservation schools deserve special attention when considering the importance of literacy skills in careers in STEM (science, technology, engineering, mathematics). Montana's implementation of the Indian Education for All Act (IEFA) strives to address the inequities of biased teaching, both past and present, through shifting educational policies and curriculum toward a transformation/activist approach. When lesson plans reflect best practices to a high degree of IEFA implementation, students are tasked with engaging in constructing background knowledge by applying various reading strategies (OPI, 2010). Simultaneously, there exists a prevailing need for Native students to pursue educational opportunities that expose them to STEM practices in college and careers. Various aspects of managing tribal resources, economies, and institutions demand the expertise of Native scientists and engineers who are in tune with local languages, customs, and identities (Augare, et al., 2017).

Unfortunately, the demand for STEM education often neglects Native students who struggle to engage in learning beyond the scope of their English fluency. It is also true that the

demand for standardized testing in English language arts has diminished STEM instructional time in elementary schools (Pringle & Carrier Martin, 2005). In turn, engagement with science and engineering is often minimal for children growing up in communities where English is not predominantly spoken or has not been generationally reinforced to the degree of non-reservation public schools. This disparity is evident in America's modern workforce, as only about 11% of workers in STEM fields are representative of Black, Latino, and Native communities. Native students comprise only 0.5% of those earning bachelor's degrees in engineering (Chubin, et al., 2005).

With this understanding, it is evident that students still mastering the English language need significantly greater degrees of support than their English-fluent counterparts. Native students identified as ELL include American Indian, Alaskan Native, and Native Hawaiian students that have been identified as English language learners (Carjuzza & Ruff, 2016). Academic language proficiency is critical to helping any student achieve success, and many Native ELL students may lack exposure to prerequisite vocabulary, inquiry skills, and academic models relevant to scientific discourse. Frequently, ELL students read texts that are four or five grade levels above their ability, limiting their exposure to critical foundational understandings (Carjuzza & Ruff, 2016). Though daunting, this problem can be addressed through rigorous reading opportunities, such as rereading text, vocabulary integration, and read-aloud practices (Unruh & McKellar, 2017).

The Effect of Extensive Reading on Reading Comprehension,
Vocabulary, and Fluency

The process of immersing students in opportunities to read enhances their exposure to vocabulary critical to successful STEM education. A study involving Korean university students learning English tracked reading comprehension, vocabulary, and reading rate across two groups (Namhee, 2017). The groups received different instruction involving one of two methods, extensive reading (immersive language instruction where students read a large amount of easily understood literature for enjoyment) and intensive reading (narrowly analyzing one piece of text in depth to address specific targeted reading goals. Namhee's study revealed that students in an extensive reading class improved their mean reading rate by 35.13 words per minute, as compared to students in an intensive reading class whose mean reading rates improved by only 15.53 words per minute. The extensive reading group also showed statistically higher gains in vocabulary and reading comprehension than students using intensive reading strategies (Namhee, 2017).

Engaging ELL students in substantial amounts of time to read enjoyable text is intellectually beneficial when the text is challenging enough to stimulate intellectual growth and accessible enough to eliminate time spent reading in their frustration levels (Ankrum, 2021). There are strong cases to be made for English language learning students learning to read both leveled readers and more complex texts of higher reading difficulty. A student-specific balance of both is attainable and is an example of how the Gradual Release of Responsibility (GRR) can help ELL students achieve success in reading independently. GRR involves the instructor

explaining the cognitive skills and strategies used to examine and understand the text during reading, before slowly removing scaffolding from the student as they display progress toward measurable goals in areas of reading. When teachers use the GRR model, their goal is for students to be able to apply the new strategy independently and to take responsibility for their learning process and outcomes (Ankrum, 2021). While extensive reading increases exposure and fluency, partner reading provides the structured scaffolding necessary for ELL students to access increasingly complex text.

Partner Reading as Gradual Release of Responsibility

Reading aloud with a partner creates a shared responsibility for learning. In small group settings, students are given reading instruction tailored to their specific range of performance across the previously mentioned indicators of vocabulary acquisition, reading rate, and reading comprehension. In practice, these routines and procedures rely on intensive reading of single pieces of text over several days to probe into specific skills and strategies being presented in the instructional unit (Namhee, 2017). While intensive reading does allow students to practice and foster independent reading skills, it limits the amount of exposure to text variety, which is necessary to build appropriate background knowledge in areas related to STEM. Extensive reading not only allows for more diversity of text selection but also creates more avenues to introduce text readings and opportunities to practice and refine skills (Namhee, 2017).

More time spent reading correlates directly to more ways of reinforcing the type of background information that Native ELL students need if they are to be successful in educational pursuits relevant to STEM (Carjuzza & Ruff, 2016). A partner reading routine not only allows for extensive reading to manifest a gradual release of responsibility, it also maintains situational

interest both in students with higher and lower reading levels. One study (Youngju et al., 2021) concluded that partner reading activities showed significant gains in engagement when compared to individual reading. Additionally, when low-level readers' growth in engagement was compared with high-level readers, their gains were to such a degree that they competed with their more literate classmates (Youngju et al., 2021). If extensive reading builds capacity, gradual release ensures that capacity develops into independent skill.

Linking Oral Reading Activities with Overall Reading Ability

As an indicator of overall reading ability, the ease with which students can orally read text aloud provides a reliable measure of both vocabulary acquisition and reading comprehension. Tracking oral reading fluency (ORF) as a measure of reading ability through screening and progress monitoring gives teachers progressively more reliable data. This information may help determine whether or not instruction is effective. The correlation between ORF and comprehension scores is prevalent enough that teachers can use ORF as a predictor or indicator of overall reading ability (Suchey, 2009). Reading text aloud with a class partner also allows for ELL students to hear how sounds blend together to make words, which reinforces and refines their ability to decode new and unfamiliar words. It also lets struggling readers see and hear how their peers successfully use word-solving strategies when reading increasingly difficult text (Youngju et al., 2023).

The Role of Teachers

Science teachers are tasked with preparing students for the rigors of scientific inquiry. This involves providing students engaging in STEM education with learning environments that

are open to collaboration, creativity, innovation, and skill development. Exchanging knowledge and information, accessing external information networks, and communicating new understandings are important for maintaining STEM projects and skills (Falloon et al., 2020). As students become engaged in more in-depth scientific discovery, the need for STEM literacy grows. The strategies outlined in these lessons provide a framework for STEM skill development to take place alongside English language fluency. By creating engaging classroom conditions that nurture student needs for independent learning, teachers can encourage student self-regulation behaviors and support student peer relationships (Zollman, 2012). With this goal of learner independence in mind, extensive peer-reading will facilitate the self-regulation behaviors and student peer relationships necessary for STEM literacy.

When working together, the combined impact of extensive reading with partner reading creates the gradual release of responsibility allowing for ELL students to master grade-level science texts. By tracking students' ORF, teachers can measure progress toward STEM literacy while encouraging and promoting cultural identity. Emphasizing storytelling routines to determine measurable indicators of progress will yield data that more accurately reflects reading abilities for Indigenous ELL students. Extensive partner reading creates a literacy environment where all students are able to use their unique funds of knowledge and shared cultural backgrounds to increase scientific understanding.

CHAPTER THREE

INSTRUCTIONAL STRATEGIES AND IMPLEMENTATION

Reading Program Overview

The reading program involves instruction in science and English language arts (ELA) and involves partner reading activities in both contexts. Students conduct investigations in the science lesson following the 5E format (engagement, exploration, explanation, elaboration, evaluation). After investigating, they participate in partner reading of a relevant text to help synthesize ideas. Tier 3 English-language learners (ELL) are partnered with fluent tier 1 readers for support. Each lesson concludes with an exit ticket question to check for comprehension. In the ELA lesson, tier 3 students participate in a small-group reading of a science text with the teacher leading instruction, modeling partner reading expectations. After concluding the group reading, students are paired with their tiered reading partners and given time to read text of their choice from the selection of leveled readers available in the class curriculum.

The instructional context outlines where the extensive partner reading program takes place and describes the participants. The structure of the reading program describes how extensive reading and partner reading routines lead to a gradual release of responsibility where the student takes ownership of their learning. A step-by-step approach to the 5E lesson plan explains where reading and literacy support science learning in the science curriculum. In turn, a brief outline of how extensive partner reading in the ELA curriculum connects to science follows. The chapter concludes with a specific example of how this program incorporates

literacy-building routines in a 5E lesson plan designed for fourth-grade students. By following this guide, teachers can expect to learn how to utilize partner reading routines that help Indigenous ELL students master scientific literacy while strengthening cultural practices.

Instructional Context

The extensive partner reading program took place at Napi Elementary and included students in fourth grade. The participants were all in the same general education classroom consisting of seventeen students, and each child participated in the extensive partner reading activities. Nearly one-fourth (23.5%) were English language learning (ELL) students in the program partnered with four non-ELL students reading at or above grade level. The grade-level readers took turns reading with ELL students. Student lexile reading scores ranged from a low of 250 (first grade) to 695 (fourth grade) according to winter AimsWeb benchmark reading test results. Additionally, students were divided into reading tiers based on composite AimsWeb reading scores compared to national benchmarks. Statistically, 47.1% of the class were tier three readers (well below grade level), 17.6% were tier two readers, and 35.3% were tier one readers.

Each tier three ELL student in the class was given a tier one partner reader without ELL designation. The student with the lowest AimsWeb percentile ranking was partnered with the student with the highest, with subsequent pairings for students in ascending (tier 3) and descending (tier 1) order. In this way, the student with the lowest scores is paired with the most fluent reader, the student with the next lowest scores is paired with the student with the second highest percentile ranking, and so on. For teachers lacking access to benchmark oral reading fluency (ORF) test results, differentiation can be accomplished through reviewing student reading and writing grades and standardized test scores. Informal comprehension checks in the

form of exit ticket data or quick-checks for comprehension and engagement during and after group reading activities can be analyzed. This method ensures that the students struggling the most with oral reading fluency will have reading partners capable of assisting them with grade-level appropriate vocabulary and terminology.

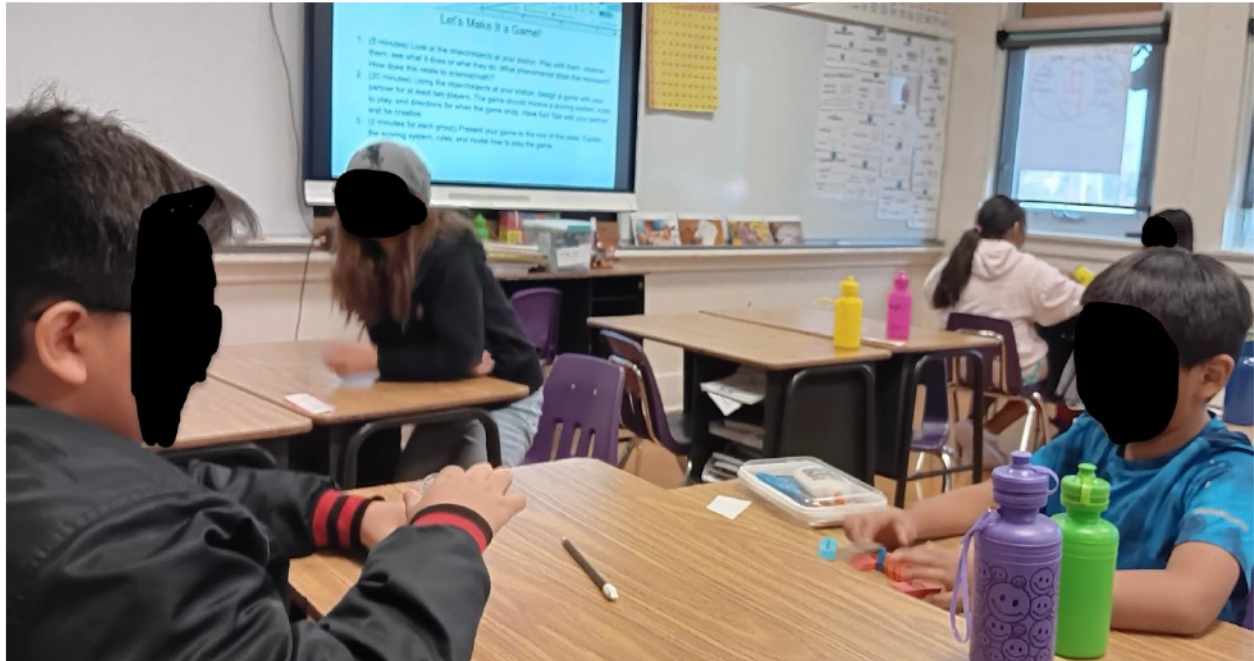


Figure 1. Students are introduced to the phenomenon of random probability by playing games with their reading partners. *Note.* Students reading at or near grade level read directions on the screen aloud with their partner. They ask questions and discuss observations as they interact with new science concepts.

Structure of the Reading Program

This section outlines the components of the reading program and describes how these components naturally lead to a gradual release of responsibility for the students. The goals of extensive reading are explained, along with structures and routines for independent extensive reading and supported group reading. The instructional purpose and use of extensive reading is summarized with notes for how teachers can adapt their curriculum to accommodate extensive

reading opportunities. The partner reading component is discussed next, along with goals, instructional purposes, and routines for implementation in the classroom.

Program Component: Extensive Reading Routine for Differentiated Literacy Development

The extensive reading routine is designed to increase students' exposure to a high volume of accessible text while supporting vocabulary development and reading fluency. Grounded in research on extensive reading and gradual release of responsibility (Ankrum, 2021; Namhee, 2017), this routine provides structured opportunities for students to engage with texts at appropriate levels while developing independence as readers.

This routine is implemented regularly within a literacy block and can be adapted to fit a variety of classroom schedules and curricula. Students are grouped flexibly based on reading proficiency (see Instructional Context for grouping procedures) to ensure that instruction is responsive to individual learning needs.

Structure of the Extensive Reading Routine

The routine consists of two differentiated pathways: 1) independent extensive reading and 2) supported group reading.

Independent Extensive Reading (Developing and Proficient Readers)

Students reading at or near grade level engage in independent reading of self-selected texts. These texts may include classroom library books, school library materials, or other accessible sources across a range of genres (e.g., informational texts, narrative nonfiction, biographies, and fiction). To support vocabulary development and comprehension, students complete structured vocabulary activities (e.g., Frayer models) connected to their reading.

During this time, the teacher monitors student engagement and comprehension through brief check-ins, asking probing questions and providing feedback as needed.

Supported Group Reading (Emerging Readers)

Students requiring additional support engage in guided or shared reading using leveled texts. These texts are selected to align with students' instructional reading levels while maintaining access to grade-level concepts through scaffolding.

During this portion of the routine, the teacher facilitates reading through strategies such as choral reading, modeled reading, and guided discussion. Instruction focuses on vocabulary development, comprehension through questioning, and oral language practice using complete responses. Texts may span multiple genres to build background knowledge and expose students to a range of text structures. Instruction is responsive and includes direct support for decoding, comprehension strategies, and language development. This component supports access to text for students below grade level, oral language development for English language learners, and scaffolded participation in literacy tasks.

Instructional Purpose and Use

The extensive reading routine is intended to build reading fluency through sustained engagement with text, support vocabulary development across disciplines (including science), and provide differentiated pathways that allow all students to participate meaningfully in literacy learning. Teachers implementing this routine can adjust grouping structures, text selection, and time allocation based on student needs and available resources. The routine is most effective when paired with opportunities for discussion and application, such as partner reading or content-area integration.

Program Component: Partner Reading Routine for Differentiated Literacy Development

The partner reading routine is designed to improve students' oral reading skills while encouraging discussion about the text and concepts related to science understanding. Grounded in research on partner reading and engagement levels (Youngju et al., 2021), this routine provides students opportunities to improve reading ability and engage in scientific discourse with classmates able to provide scaffolding with challenging vocabulary.

This routine is implemented regularly within both the science and literacy blocks and can be adapted to fit a variety of classroom schedules and curricula. Students are grouped the same way as in the extensive reading routine, allowing for consistency across settings and to ensure that instruction is tailored to each student's literacy needs.

Structure of the Partner Reading Routine

The routine consists of two differentiated pathways: 1) Teacher-directed oral reading fluency with comprehension checks and 2) partner oral reading between ELL and non-ELL students.

Teacher-Directed Oral Reading Fluency (For All Readers)

Students engage in one-minute oral reading fluency practice with the teacher, reading from short passages assigned in the science or ELA curriculum. These texts may include workbook passages, short stories, leveled readers, or other accessible materials appropriate for the grade level. Genre variety is encouraged, as with extensive reading routines. This can take place simultaneously with the supported group partner reading component.

Students individually read aloud for one minute to the teacher, who calculates an adjusted words per minute score by marking miscues (e.g., misread words, word substitutions, adding/omitting words, and skipping lines of text) and subtracting the number of miscues from the total number of words read in a minute. The instructor may allow the student to complete the passage after the minute has passed. To support vocabulary development and comprehension, students respond to comprehension questions presented orally by the teacher after they have read the passage completely. Questions should be detail-specific to the text, but should not require students to reread the text for evidence. More comprehensive oral reading fluency and reading comprehension data can be gathered using software like Aimsweb.

This component supports oral reading fluency, reading comprehension and recall, and expectations for further differentiated partner reading engagement.

Supported Group Partner Reading (Emerging Readers and Peer Mentors)

Students reading with differentiated partners (tier 3 with tier 1) engage in partner reading using leveled texts. These texts are the same used for extensive reading procedures with the support group. ELL students select the text to read with their partner to maintain extensive reading opportunities related to science while allowing for a gradual release of responsibility in the form of student choice and voice.

During this portion of the routine, the teacher monitors student engagement and comprehension by observing partners reading aloud, listening to questions and answers about the texts, and providing feedback when appropriate. Texts should include science literacy components but should be available in a variety of genres and structures. This component

supports cultural traditions of oral storytelling, confidence in reading ability, and scientific discourse in the form of partner discussion.



Figure 2. Students play a boardgame (“Bearly There”) with their reading partners to learn about how baby bears behave and survive in the first year of their lives. *Note.* The gamification of scientific text can make it more accessible and engaging for English Language Learners familiar with principles of scorekeeping, level progression, and clearly defined goals. Consider alternatively structured text to increase student engagement.

Instructional Purpose and Use

The partner reading program is intended to strengthen reading skills while allowing for critical examination of new ideas. It supports emerging readers through peer engagement and encourages fluent readers to serve as science literacy mentors. Teachers implementing this routine can change groups, texts, and times based on individual needs and resource availability. The routine is most effective when followed-up with opportunities for reflection and application, such as planning investigations or student-driven research.

Program Component: Gradual Release of Responsibility

The gradual release of responsibility is designed to give students independent reading skills for decoding and understanding science texts through progressive scaffolding. This structure reflects the gradual release of responsibility (Ankrum, 2021) by emphasizing culturally-sustaining pedagogy in the partner reading component and allowing for student-directed learning in the extensive reading component. ELL students progress from reading with the instructor to reading with a grade-level peer to designing questions and discussions based on their readings. Students reading at or near grade level receive vocabulary instruction which they use during independent reading, then they practice these skills with an ELL partner for further reinforcement. Progress is monitored through recurring oral reading fluency assessments, comprehension assessments, and student engagement checks, and instruction is adjusted to meet individual student goals.

Instructional Purpose and Use

With fewer restrictions on types of text available, students are exposed to new interests and build curiosity about new scientific ideas. With a wide variety of texts to choose from, students not only meet their individual reading needs through selecting level-appropriate texts, they also gain the ability to create meaning from unfamiliar sources and genres. From reading with a partner, students struggling with building foundational skills build relationships with reading through social interaction. This culturally-sustaining practice makes use of modes of learning that have been primary to many Indigenous peoples for centuries. As reading and learning become connected to the students' personal goals and cultural heritage, so do the skills and strategies necessary for understanding scientifically-demanding text later in their education.

Where Reading and Literacy Support Science Learning

In many elementary science classrooms, teachers work within established or adopted curricula that guide lesson structure and content. Rather than replacing these materials, the instructional strategies presented in this section are designed to be integrated into existing curriculum frameworks, such as the 5E instruction model. Literacy supports can be embedded through small, intentional adjustments during each phase of instruction, including adding opportunities for oral language use, incorporating structured reading tasks, and prompting students to communicate their thinking using academic language. These adaptations allow teachers to maintain fidelity to required curriculum materials while enhancing accessibility for English language learners and strengthen the integration of literacy and science. These strategies integrate literacy into each phase of the 5E model to support oral language development, vocabulary acquisition, and early comprehension of scientific phenomena. Embedding each phase aligns with research on language acquisition and science learning, which emphasizes the importance of providing ELL students with opportunities to engage in structured language use during content instruction (Carjuzza & Ruff, 2016).

Embedding Literacy in the Engage Phase of the 5E Model

The Engage phase of the 5E instructional model is designed to activate prior knowledge and introduce a phenomenon that challenges students' existing understanding of how the world works. For English language learners (ELLs), this phase also presents an opportunity to build foundational literacy skills alongside scientific curiosity. Engagement with a new scientific concept drives students to ask, and look for, answers to questions. Giving students time to discover their own questions may require additional vocabulary support. This is where having a

science investigation partner is beneficial. Giving ELLs lab partners reading at or above grade level scaffolds their ability to confidently express their curiosities.

Instructional Approach

During the Engage phase, teachers can intentionally embed literacy tasks with hands-on or observational science activities. Rather than treating reading and writing as separate from science instruction, literacy is incorporated as a tool for sensemaking.

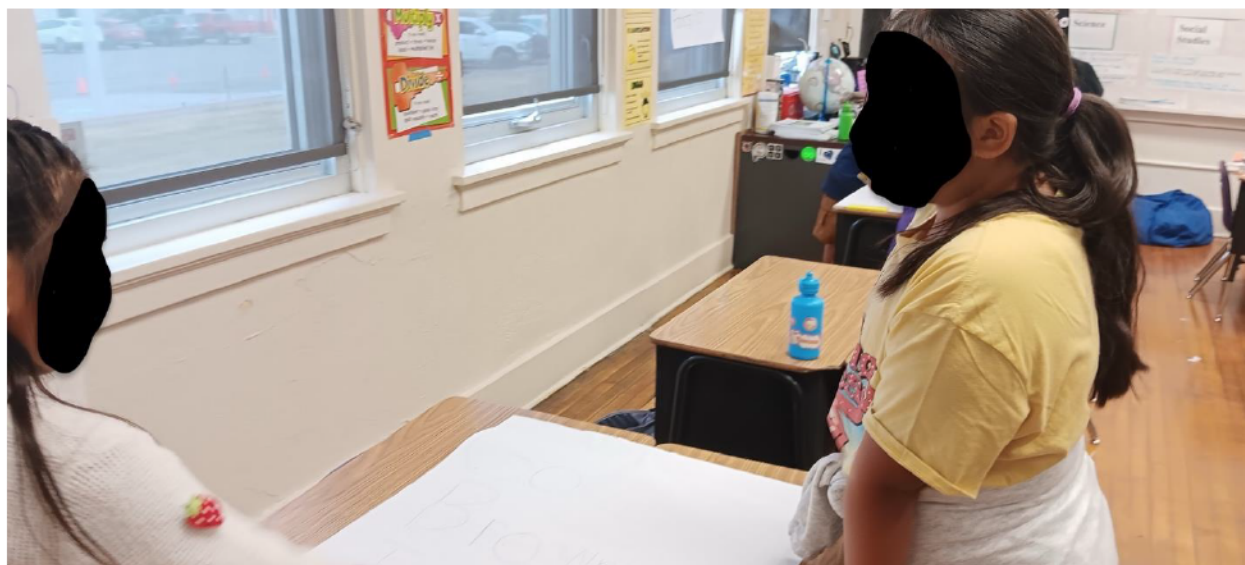


Figure 3. Students create a poster displaying frequently used words during a science lesson. *Note.* Simple language is used to define the words. English Language Learners increase their level of science literacy by talking about the words with their reading partner.

For example, when introducing a phenomenon such as the surface tension of water (e.g., placing droplets of water on a penny), students can read and interpret text visible on both sides of the penny, practice oral reading by describing letters, numbers, and symbols, and describe observations using complete sentences (supported with teacher prompts if needed). Teachers can support this process by prompting students to describe what they see using academic language. Encouraging students to read aloud labels or short text connected to the phenomenon and asking

questions that connect literacy to scientific reasoning are other ways teachers can provide this support.

Connection to Science Learning

Embedding literacy into the Engage phase allows students to begin constructing meaning about a scientific phenomenon while simultaneously developing language skills. As students describe, read, and discuss their observations, they are better prepared to participate in later phases of the lesson, particularly explanation and elaboration. For ELL students, this approach reduces the barrier between language development and scientific inquiry by positioning literacy as a natural and necessary part of doing science, rather than a separate task.

Embedding Literacy in the Explore Phase of the 5E Model

The Explore phase of the 5E instructional model is designed for students to investigate the new phenomenon further through hands-on inquiry or observation. For ELLs, this phase is a chance to make connections to familiar concepts and to create a mental framework for the new information.

Instructional Approach

During the Explore phase, teachers can purposefully embed literacy tasks with procedures tied to the investigation process (e.g., making a list, following a series of steps, or putting data in a database). While exploration is inherently a hands-on endeavor, literacy is incorporated to help students make sense of useful information and to relate findings to lab partners.

For example, when students test cohesive properties of water by seeing what items can remain above the surface without breaking tension and sinking, they can first discuss the procedures they will use for the investigation. Students can create a two-column chart to differentiate and list each item appropriately. They can also explain cause-and-effect relationships they notice when comparing objects that stay above the surface to those that sink. Teachers can support this process by providing cause-and-effect sentence stems (e.g., “I noticed [fill in the blank] happened because [fill in the blank]). Teachers can also display a poster with investigation guidelines that students can read aloud as they complete the steps of the Explore phase.

Connection to Science Learning

Embedding literacy into the Explore phase allows students to build relationships between prior knowledge and new understandings through written and verbal communication. It also encourages students to interact with a partner or group and share observations, questions, and misconceptions. Being an active member of the team through verbal and written analysis allows them to better explain their findings later in the 5E model.

Embedding Literacy in the Explain Phase of the 5E Model

The Explain phase of the 5E model asks students to present findings from the investigation conducted in the Explore phase. Students synthesize observations to determine overarching themes and patterns (e.g., problem and solution relationships, cause-and-effect relationships, data consistencies or inconsistencies). For ELLs, this phase is a chance to communicate ideas and details using scientific language.

Instructional Approach

During the Explain phase, teachers can embed literacy activities by presenting them as expectations for communicating scientific learning. It can flow naturally from the previous Explore phase and be as simple as asking questions for students to respond to. Multiple-choice questions about which objects will or will not adhere to the surface tension of water, short oral responses to investigation prompts, and describing the steps of the investigation that led them to new knowledge in the correct sequence are all ways students can connect literacy and explanation. To assist students, teachers can create questions tailored to specific reading levels, provide anchor charts with high-frequency transition and sequence words (e.g., *because*, *then*, *after*, *until*, and *before*), and encourage students to read aloud from notes in their investigation journals. Literacy goes hand-in-hand with the explain phase of the 5E lesson plan, but when teaching ELL students, it is even more important to emphasize this skill.

Connection to Science Learning

Embedding literacy into the Explain phase gives students the skills necessary to connect new understandings to concrete examples. They are able to answer the question “why” with appropriate vocabulary and word use. Their confidence in their ability to understand a new concept increases with their ability to explain how scientific principles can be applied to tangible activities with their friends and classmates. Personal relationships with science grow from being able to put into words a revelatory piece of information that may have seemed difficult to describe before learning correct science terminology.

Embedding Literacy in the Elaborate Phase of the 5E Model

The Elaborate phase of the 5E instructional model gives students a chance to synthesize new knowledge, correct any misunderstandings, and identify possible applications beyond the initial investigations. For ELLs, this phase helps build foundational literacy skills alongside scientific reasoning and the ability to present an argument.

Instructional Approach

During the Elaborate phase, literacy tasks can be embedded with direct demonstrations of learned skills. Students can respond to teacher prompts involving hypothetical scenarios by referring to results of their investigation. They can refer to sections of assigned text that explain concepts learned during the Explore phase. Students might refer to other sources, such as news articles, documentary films, or podcasts that help them understand the content of the lesson. They may even relate personal experiences realized as scientific learning opportunities during the course of the investigation. For example, when studying a list of objects that do not break the water's surface, students may remember seeing insects that move along the top of still bodies of water and add those experiences to their data. Teachers can facilitate this by creating graphic organizers (e.g., flowcharts, conceptual frameworks, and relationship webs) or by giving students access to the internet and online resources for further study.

Connection to Science Learning

Embedding literacy into the Elaborate phase allows students to extend and expand concepts related to the science lesson to other topics while also building working models for specific literacy goals. As students argue their positions, defend their claims, and refute invalid ideas, they develop language skills necessary for a variety of communication goals (e.g., to

inform, to convince, or to entertain). For ELL students, this approach catalyzes different aspects of literacy into a connected model of understanding using language as the foundation.

Embedding Literacy in the Evaluate Phase of the 5E Model

The Evaluate phase is the last stage of the 5E model, where students demonstrate knowledge and applied understanding to respond to formative and summative assessment. For ELLs, this phase is a chance to include literacy skills as a way to enhance their investigation summaries, responses to questions, and analysis of data.

Instructional Approach

In the Evaluate phase, teachers can assign students to prepare project reports, conclusions to arguments, and responses to assessment prompts. For ELL students, scaffolds like sentence stems, reworded questions, and vocabulary cards can help with literacy building. Having a reading partner involved in the evaluation process can help communicate nuanced opinions of ELL students' scientific understanding and elicit deeper discussion related to the concept. Teachers can facilitate this by offering students a chance to present graphic organizers used during the investigation with their finished work. Written feedback from the teacher offers students an additional venue for reading, encouraging critical thinking and personal examination of growth.

Connection to Science Learning

Embedding literacy into the Evaluate phase allows students to see the scope of literacy and how it applies to every aspect of scientific inquiry while reinforcing gains and identifying areas in need of further instruction. It serves as a method for the teacher to provide additional

investigations, readings, and activities with elements of literacy incorporated throughout. For ELL students, this approach gives them foundational skills and feedback necessary to investigate further phenomena and create more connections with this new information in the future.

How Literacy Supports Evaluation

In the Evaluate stage of the 5E lesson plan, students demonstrate understanding of the concept. This can take the form of a written explanation or response to a prompt, summary of a text, or evidence-based reasoning. Students may create data displays like charts and graphs that show measurable evidence reflecting their newfound knowledge. For ELL students, scaffolds like sentence stems, reworded questions, and vocabulary cards can help with literacy building. Written feedback from the teacher offers students an additional venue for reading, encouraging critical thinking and personal examination of growth. Finally, having a reading partner involved in the evaluation process can help communicate nuanced opinions of ELL students' scientific understanding and elicit deeper discussion related to the concept. Evaluation is an important way to implement literacy in scientific research.

How Extensive Partner Reading in English Language Arts Connects to Science

Extensive partner reading takes place primarily during English Language Arts (ELA) instruction. Students are given time to read a variety of texts that supplement what they have learned through investigations and observations in the 5E science lesson. After they develop ideas about the science phenomenon, students receive differentiated instruction during ELA small group time. They are given a partner to read aloud with and are presented a wide variety of texts with connections to scientific understanding. The texts they are offered are tailored to their

individual reading levels and integrated into the reading curriculum. They are available both online and in physical format. Online leveled readers have interactive features to help students understand the text, such as read-aloud, zoom, and highlighted text. Informative and expository texts make up the majority of passages available, but many genres of writing are included in the leveled reading library (biographies of famous scientists, poetry about animal adaptations, etc.).

Students generate questions and begin forming explanations during the 5E science lesson block. These hands-on investigations require collaboration, much like the extensive partner reading that happens in ELA. The routines and procedures in the laboratory setting involving communication with a lab partner carry over to the reading curriculum, where students explore texts that help deepen their explanations and build vocabulary connected to the science concept. A partner, in the laboratory or the library, allows ELL students to have robust discussions about science sparked from curiosity. Interacting with a classmate instead of a teacher eliminates any preconceptions about formality, letting the students freely ask questions without regard for meeting expectations about comprehension. Students of any reading level benefit from having time with their peers to discuss new material, but for students who lack foundational literacy skills, their partners function as both role models of scientific literacy and educational equals in a shared learning endeavor.

CHAPTER FOUR

VALUE: REASONING AND REFLECTION

This design aims to close the literacy gap for ELL students in Indigenous communities by embracing traditional values and increasing exposure to literacy-building activities. The instructional value of the extensive partner reading program is evident in the literature supporting extensive reading over intensive reading cited in the conceptual framework (see Chapter Three). It also maintains culturally-appropriate pedagogy by allowing for students to utilize funds of knowledge in their science education. The implications of this program for science teaching and learning are inclusive in nature. Extensive partner reading can turn struggling readers into scientifically-literate students who are curious about new science concepts.

Instructional Significance

The learning challenge this instructional design addresses is the literacy gap that exists between ELLs and English-fluent readers, specifically in regards to understanding science literature. Students are more likely to stay engaged when presented with multiple texts for enjoyment and a partner to read with. The choice offered by extensive selection of material paired with the shared responsibility of partner engagement encourages all students to participate in literacy-building activities.

With skills learned from this program, students strengthen their abilities to decode text with new science concepts. Discussion leads to elaboration on new vocabulary and terminology. Revisiting the practice of asking and answering questions about the text becomes a self-regulated

behavior students use when reading independently. These are goals that are crucial for emerging readers struggling with acquiring independence in understanding the English language.

Conceptual Implications

Extensive partner reading emphasizes embracing culturally-relevant instructional strategies over umbrella solutions to roadblocks in learning. A shared responsibility for the expectations and goals of instruction allows students to critically examine how they support each other in learning new information. By maintaining oral language as a primary mode of information transmission, extensive partner reading puts students in charge of the direction of inquiry, determining further areas for clarification and opening doors to new literature and texts that can elaborate on the questions elicited from initial readings (Unruh & McKellar, 2017).

The program provides a series of steps other teachers can follow to operationalize science literacy engagement among ELLs and their English-fluent classmates. Instead of removing literacy from science, ELLs are given multiple opportunities to engage in literacy-building skills (Ankrum, 2021). Reading with a partner includes the entire class and avoids the stigma associated with reading below grade level or not understanding the dominant language (Youngju et al., 2021). This design can be implemented in both the English language arts (ELA) or science curriculum, and can be broadened to include emerging readers not designated as ELLs.

Implications for Classroom Practice

The extensive partner reading program can be adapted by other teachers to use with non-Indigenous ELL students with emerging literacy. In any non-English speaking community, partner reading can be used to strengthen cultural bonds with peers sharing the same linguistic

backgrounds. Students' unique funds of knowledge can be incorporated into the practice, including how and what kinds of texts are selected and how background knowledge supports building meaning for new vocabulary.

Culturally-responsive teaching styles are allowed to thrive when embracing extensive partner reading. A wider selection of texts opens students to diverse genres and literary formats not typical of a traditional science curriculum (e.g., graphic novels documenting important moments in science history, poetry expressing emotional reaction as a response to making observations in nature). Reading together with a peer brings unique perspectives to the table in a way that instructor-guided reading does not allow, and can eliminate misunderstandings caused by generation and cultural gaps between the teacher and the students. The program encourages the kind of shared curiosity about science that understands the collaborative nature of professions. It recognizes that science literacy goes beyond merely memorizing textbooks; it involves analyzing journals, communicating with peers, and discussing findings.

Implications for Student Learning

Student engagement and motivation improve when given opportunities to select from a wide variety of texts (Namhee, 2017). When not strictly limited to the text presented by the teacher, they are allowed to engage in reading about science in more personally-fulfilling ways. Their curiosity determines the direction of their learning and demands more relevant sources of information to sufficiently answer the questions they have.

Reading with a partner also increases motivation and engagement. Reliance on each other to understand new text decentralizes the responsibility from the teacher and includes the students in critical thinking opportunities unavailable in traditional direct instruction methods (Youngju et

al., 2023). Enabling cultural modes of learning with their peers helps connect ELLs to their traditions and encourages students to utilize their own funds of knowledge when reading about new science concepts. As discussions develop and new texts emerge, students can build greater conceptual understanding regarding increasingly-demanding scientific ideas.

Professional Reflection

The program can help teachers foster a deeper appreciation for culturally-responsive pedagogy and understand how language barriers can prevent ELL students from engaging in science learning. When students gain the vocabulary and language skills necessary to participate in discussions about science, they allow for their own questions to be presented with the desire to understand topics of interest. Providing opportunities for building literacy in the science curriculum might seem contradictory to accepted ideas of hands-on engagement and problem-based learning, but when language barriers exist, it is a natural way to help struggling readers embrace science and literacy simultaneously.

The program also demands teachers increase their understanding of individual student needs. Through progress monitoring, teachers are able to more accurately identify gains or deficits in student reading ability (e.g., oral reading fluency, silent reading fluency, vocabulary, comprehension). Developing a rapport with students, their families, and the community introduces teachers to important subjects of interest that can be addressed through the lens of science education. For example, hosting family nights at school to engage in science learning activities allows students to communicate the results of their investigations with their parents. In turn, families share backgrounds and experiences that schools can bring to the classroom.

Future Directions

This design can be applied to other units besides ELA and science to help students improve science literacy. For example, a social studies unit covering unfamiliar topics can be enhanced by including time to read with a partner about historical figures prominent in the lessons. Outside literature can be accessed to allow students to engage in a variety of texts. Science-based classes like health and physical education can use partner reading to help students understand English language vocabulary about body systems or rules to a team sport.

Extensive partner reading can be adapted to other grade levels. In preschool and kindergarten settings, students can be given reading mentors from higher grade levels. Partner reading can be done in shorter sessions to account for attention spans and to more quickly access new information. In middle and high school, partner reading can include larger group discussions about shared science texts. Science “book clubs” can be held regularly as students encourage each other to ask questions and elicit further understanding of scientific ideas. Challenging students to find news articles and journals to share with others can broaden the scope of partner reading to a collective practice.

Conclusion

The value of the extensive partner reading program is evident in the way it encourages mutual learning. Students working to overcome language barriers are more prepared to investigate and explore science-related concepts when provided with culturally-appropriate ways to do so. Removing limitations to the texts available, including limits on types of texts, genres, purpose and complexity give students a broader scope in which to see science and look for

answers to questions they have. Teachers can gain an appreciation for the unique perspectives of ELL students and their peers in the context of both their individual backgrounds and their language-bound histories. In the end, science instruction and literacy go hand-in-hand, so it follows that literacy instruction and science should do the same. This design enhances both by embracing the differences that make diverse student populations promising as candidates for future scientists.

REFERENCES CITED

- Ankrum, J. W. (2022). Complex texts or leveled readers for the primary grades? Yes and yes! *Early Childhood Education Journal*, 50(4) pp. 605-611.
<http://dx.doi.org/10.1007/s10643-021-01178-1>
- Augare, H. J., David-Chavez, D. M., Groenke, F. I., Little Plume-Weatherwax, M., Lone Fight, L., Meier, G., Quiver-Gaddie, H., Returns From Scout, E., Sachatello-Sawyer, B., St. Pierre, N., Valdez, S., & Wippert, R. (2017). A cross-case analysis of three Native Science Field Centers. *Cultural Studies of Science Education*, 12(2), 227-253.
<http://dx.doi.org/10.1007/s11422-015-9720-6>
- Browning Elementary School District. *GreatSchools*, National Center for Education Statistics, www.greatschools.org/montana/browning/browning-elementary-school-district/. Accessed 1 Mar. 2026.
- Carjuzza, J., & Ruff, W. G. (2016). American Indian English Language Learners: Misunderstood and under-served. *Cogent Education*, 3(1), 1229897.
<http://dx.doi.org/10.1080/2331186X.2016.1229897>
- Chubin, D. E., May, G. S., & Babco, E. L. (2005). Diversifying the engineering workforce. *Journal of Engineering Education (Washington, D.C.)*, 94(1), 74-86.
<http://dx.doi.org/10.1002/j.2168-9830.2005.tb00830.x>
- Falloon, G., Hatzigianni, M., Bower, M., Forbes, A., & Stevenson, M. (2020). Understanding K-12 STEM education: a framework for developing STEM literacy. *Journal of Science Education and Technology*, 29(3), 369-385. <http://dx.doi.org/10.1007/s10956-020-09823-x>
- Garcia, L. (2024). *Cultivating Honor: How Indigenous Students Harness Resilience and Cultural Wealth to Thrive at a Borderlands University* (Doctoral dissertation, The University of Texas at El Paso).
- Medicine Crow, J. (1939). *The effects of European culture contacts upon the economic, social, and religious life of the Crow Indians*. University of Southern California.
- Montana Office of Public Instruction (2010). *The Framework: A Practical Guide for Montana Administrators and Teachers Implementing Indian Education for All*.
- Namhee, S. (2017). The effects of extensive reading on reading comprehension, reading rate, and vocabulary acquisition. *Reading Research Quarterly*, 52(1). 73-79.
- Napi School in Montana-U.S. news education (n.d.).
<https://www.usnews.com/education/k12/montana/napi-school-276306>
- National Center for Education Statistics (2019).
<https://www.greatschools.org/montana/browning/browning-elementary-school-district/>

- Pringle, R. M., & Martin, S. (2005). The potential impacts of upcoming high-stakes testing on the teaching of science in elementary classrooms. *Research in Science Education (Australasian Science Education Research Association)*, 35(2), <http://dx.doi.org/10.1007/s11165-004-5599-z>
- Suchey, N. (2009). Oral passage reading fluency as an indicator of reading comprehension. *ProQuest Dissertations & Theses*.
- Unruh, S. & McKellar, N. A. (2017). *Assessment and Intervention for English Language Learners: Translating Research into Practice*. Springer, Cham, Switzerland, 2017.
- Weadman, T., Serry, T., & Snow, P. C. (2023). Oral language and emergent literacy strategies used by Australian early childhood teachers during shared book reading. *Early Childhood Education Journal*, 51(8), 1335-1348. <http://dx.doi.org/10.1007/s10643-022-01381-8>
- Youngju, L., Young, H. C., Taejung, P., & Jaeho, C. (2023). Situational interest during individual reading and peer reading activities using PALS: its relationship to students' reading skills and reading motivations. *Educational Studies*, 49(5) pp. 842-860. <http://dx.doi.org/10.1080/03055698.2021.1898341>
- Zollman, A. (2012). Learning for STEM literacy: STEM literacy for learning. *School Science and Mathematics*, 112(1), 12-19. <http://dx.doi.org/10.1111/j.1949-8594.2012.00101.x>

APPENDICES

APPENDIX A: EXTENSIVE READING ROUTINE GUIDE

Extensive Reading Routine Guide

The purpose of the reading routine is to familiarize students with the grouping structure, student expectations, and the role of the teacher in extensive reading.

Grouping Structure

Independent Group (students reading at or near grade level)

Teacher-Led Group (students reading below grade level)

*Consider restructuring reading groups to achieve balance. For example, for a class with more than half of students reading below grade level, place the students at the higher range of below grade level readers in the Independent Group.

Student Expectations

Independent Group

1. Text is student selected according to individual student Lexile reading scores.
2. Reading is done independently.
3. Only one text may be read per session.
4. Exit tickets are completed in the form of vocabulary activities. Vocabulary words are defined, used with correct context in a complete sentence, and examples are provided.

Supported Group

1. Text is teacher-selected and represents the average Lexile reading score of the Supported Group.
2. Reading is done chorally.
3. Multiple texts may be read per session.
4. Comprehension questions are frequently presented during instruction to check for engagement and understanding.

Role of the Teacher

Independent Group

1. Assist in selecting appropriate texts.
2. Monitor intermittently to check for student engagement.
3. Provide additional help as needed.
4. Assess vocabulary activity exit tickets and adjust future instruction accordingly.

Supported Group

1. Select appropriate texts.
2. Guide choral reading and model appropriate partner reading routines.
3. Frequently present questions for discussion. Allow for think time so students can craft thoughtful responses. This allows the teacher time for engagement/comprehension checks with the Independent Group.
4. Assess comprehension and engagement, and adjust future instruction accordingly.

APPENDIX B: PARTNER READING PROTOCOL

Partner Reading Protocol

The purpose of the Partner Reading Protocol is to outline routines and roles for students, provide sentence stems for discussions, and describe student outcomes in a checklist for teacher monitoring.

Partner Routine

Reader Directions and Expectations

1. The Reader reads one page of text aloud to the Listener.
2. Reading aloud is done at a natural pace and volume.
3. Pause at the end of each page and begin discussion (see Sentence Stems for Discussion).

Listener Directions and Expectations

1. The Listener reads silently while tracking text with their index finger (students needing additional assistance may use adaptive technology like line readers).
2. The Listener may ask the Reader to reread sections of text for clarification.
3. Pause at the end of each page and respond to discussion prompts posed by the Reader. *At the end of each page, the Reader and Listener change roles and continue reading.*

Sentence Stems for Discussion

“What did you think about ... (a vocabulary word or concept from the text)?”

“What was your favorite thing about ... (restate the topic or main idea of the selection)?”

“What questions do you have about ... (a vocabulary word or concept from the text)?”

Teacher Monitoring Checklist

Desired Outcome	Present	Missing
Student uses active listening (posture, tracking text, partner engagement, etc.)		
Student reads aloud at a natural pace (not rushed, not halting)		
Student engages in discussions by posing questions		
Student engages in discussions by responding to questions		

APPENDIX C: LITERACY STRATEGIES FOR THE 5E MODEL

	ENGAGE	EXPLORE	EXPLAIN	ELABORATE	EVALUATE
Strategy	Describe observations of the phenomenon using complete sentences.	Make an organized list based on findings from exploring the phenomenon.	Summarize steps in the investigation from start to finish.	Ask more questions about the phenomenon.	Make a visual display to summarize student findings.
Teacher Moves	Provide probing questions about the engaging phenomenon.	Provide templates (T-charts, Venn diagrams, etc.) to display relationships.	Provide discussion time in each step of the investigation.	Provide additional resources and literature related to the topic.	Provide materials to create a visual display (poster paper, pencils, rulers, markers, etc.).
Student Actions	Respond to questions orally.	Arrange items or information according to investigation outline.	Describe the steps and details of findings.	Construct a scientific question about the topic or related details.	Arrange previous Student Actions in a meaningful and easy to understand poster.
Added Support	Use sentence stems (example: “I noticed [fill in the blank]).”	Use a science vocabulary wall or poster.	Use data and observations collected from the investigation.	Use sentence stems (example: “I wonder why [fill in the blank])?”	Use extended time to allow for creativity in presentation techniques, styles, etc.

APPENDIX D: SAMPLE 5E LESSON WITH EMBEDDED
LITERACY SUPPORTS FOR ELL STUDENTS

Lesson Focus: Students investigate how sound travels through different materials (air, water, and solids) while developing scientific vocabulary and oral language skills.

Phase of 5E Lesson	Teacher Moves	Student Actions	Literacy Supports
Engage	Introduce a phenomenon related to sound traveling through water. Prompt students to recall prior experiences with sound underwater. Facilitate discussion using guiding questions.	Share prior experiences. Participate in discussions. Begin forming initial impressions and expectations.	Develop oral language ability through structured discussion. Use complete sentences supported by teacher prompts. Repeat key vocabulary (e.g., sound, energy, travel).
Explore	Sets the purpose for the investigation (how sound travels through different materials). Make sounds using various methods (e.g., talking, clapping, tapping). Prompt students to record the source, the listener, and the material each sound travels through.	Record each sound's source, listener, and the material each sound travels through in the investigation notebook. Work with a partner to select other materials to send sounds through. Share the sounds made, including the source, listener, and material each sound traveled through.	Oral language development is supported through structured partner discussion. Anchor charts support reading and writing fluency (e.g., sentence stems, vocabulary walls, handwriting templates).
Explain	Discuss visualizing as a reading strategy. Guide the class in reading a text about how sound travels. Generate discussion by posing questions (e.g., "What is the source of the sound?")	Read the beginning of the text chorally. Read the remainder of the text aloud with a partner. Discuss the text with a partner.	Use leveled readers for emerging English Language Learners. Use adaptive technology (e.g., magnifiers, line readers, privacy barriers).

	Who is the listener? What is the sound traveling through?"		
Elaborate	Introduce partner reading tasks. Circulate to monitor for engagement and to provide support. Prompt students to share what they visualize as they read. Introduce and define new vocabulary.	Take turns reading text aloud with a partner. Visualize the source of each sound vibrating and the sound traveling from the source to the listener. Share what you visualized. Make sense of new vocabulary with simple synonyms and succinct definitions.	Emerging ELL readers are partnered with students reading at or near grade level. Use discussion starters (e.g., "What did you think about ...? I didn't know that ...").
Evaluate	Assign exit ticket questions (e.g., "Describe how a sound gets from a bird's mouth to your ears.").	Refer to notes in the investigation notebook. Write a short response to the exit ticket question.	Use sentence stems (e.g., "Sound travels from the bird to my ears because ..."). Work with a partner to discuss the question. Refer to visual aids like vocabulary charts. Refer to text evidence.

APPENDIX E: STUDENT ENGAGEMENT WITH EMBEDDED
LITERACY IN A 5E LESSON PLAN FORMAT

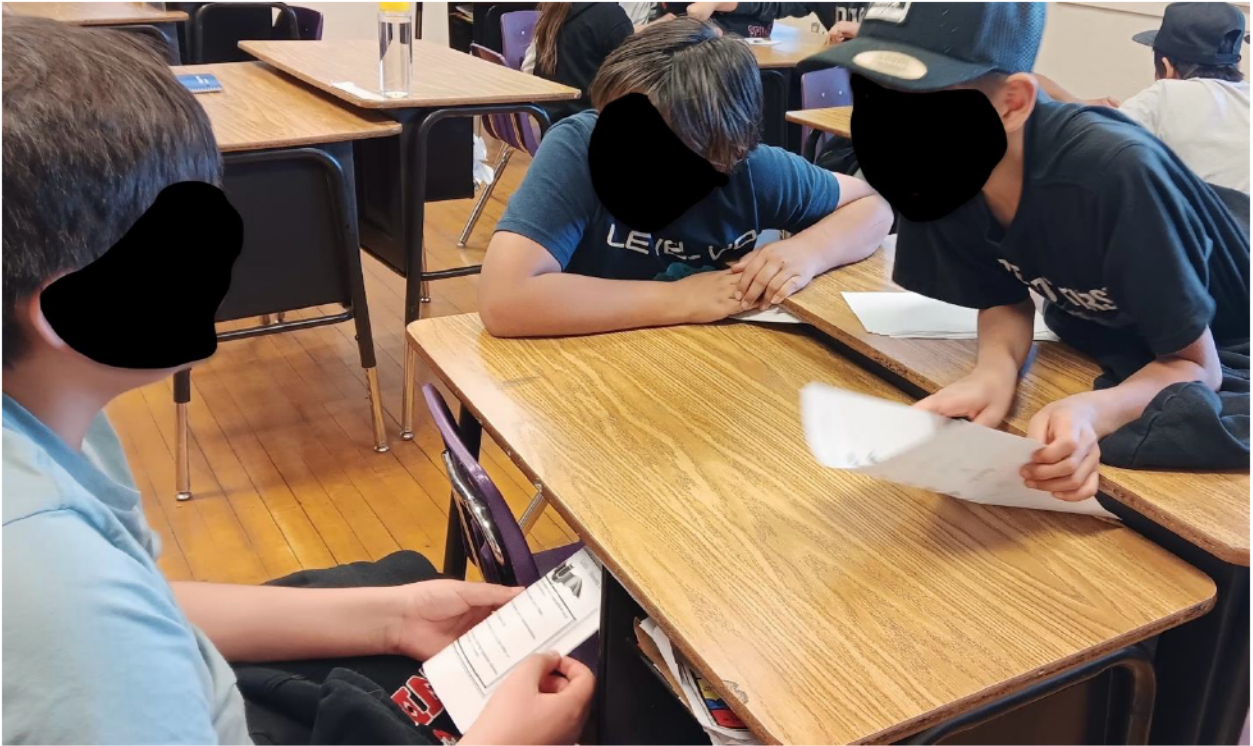


Figure E4. Students classify mammals based on taxonomic characteristics. *Note.* Partner reading creates a shared sense of responsibility and engages English Language Learners in a meaningful way with their reading mentors.

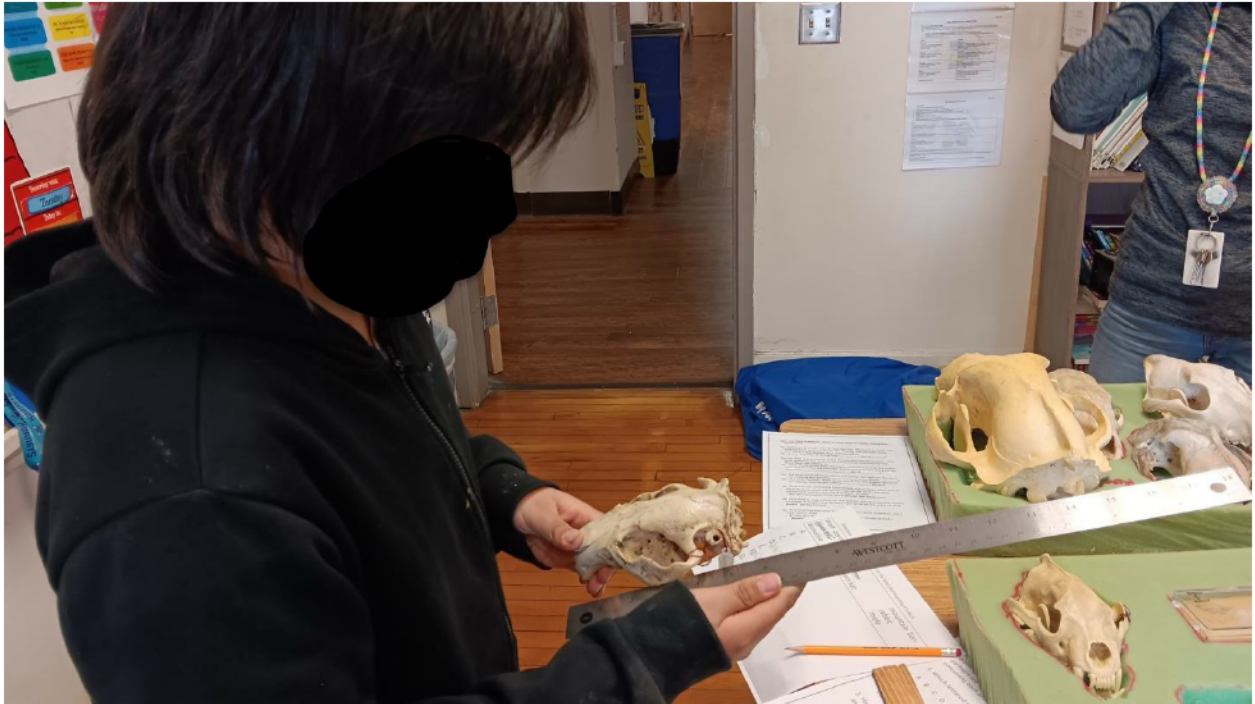


Figure E5. A student measures a mammal skull and refers to a lesson outline to identify what mammal it is. *Note.* Having literacy supports like sentence stems, word walls, and directions read aloud helps English Language Learners gain confidence in their ability to investigate real-world problems and communicate their findings.