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INTEGRATION OF SOCIAL STUDIES AND/OR SCIENCE WITHIN YOUR LITERACY
WORKSHOP MODEL: A PROFESSIONAL DEVELOPMENT PRESENTATION

By Karry Helgestad

A capstone project submitted in partial fulfillment of the
requirements for the degree of Master of Arts in Literacy Education

Hamline University

Saint Paul, Minnesota

August 2019

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Content Expert: Jenna Lund

PROJECT DESCRIPTION

This project was created to provide teachers with professional development on the value of integrating subjects within the literacy instruction time allocated during the day. The purpose of the project was to inform teachers of the methods and research involved in integration of content area standards with language art standards as to the positive impact it has on reading comprehension. My research question is: *How does the integration of science and/or social studies standards with language arts standards impact the reading comprehension of upper elementary students?* The project was focused on not only providing rationale for the integration of content and language arts standards, but also focused on adult principles of learning by guiding them through a modeled integration lesson of a fifth-grade science standard and informational text literacy standard.

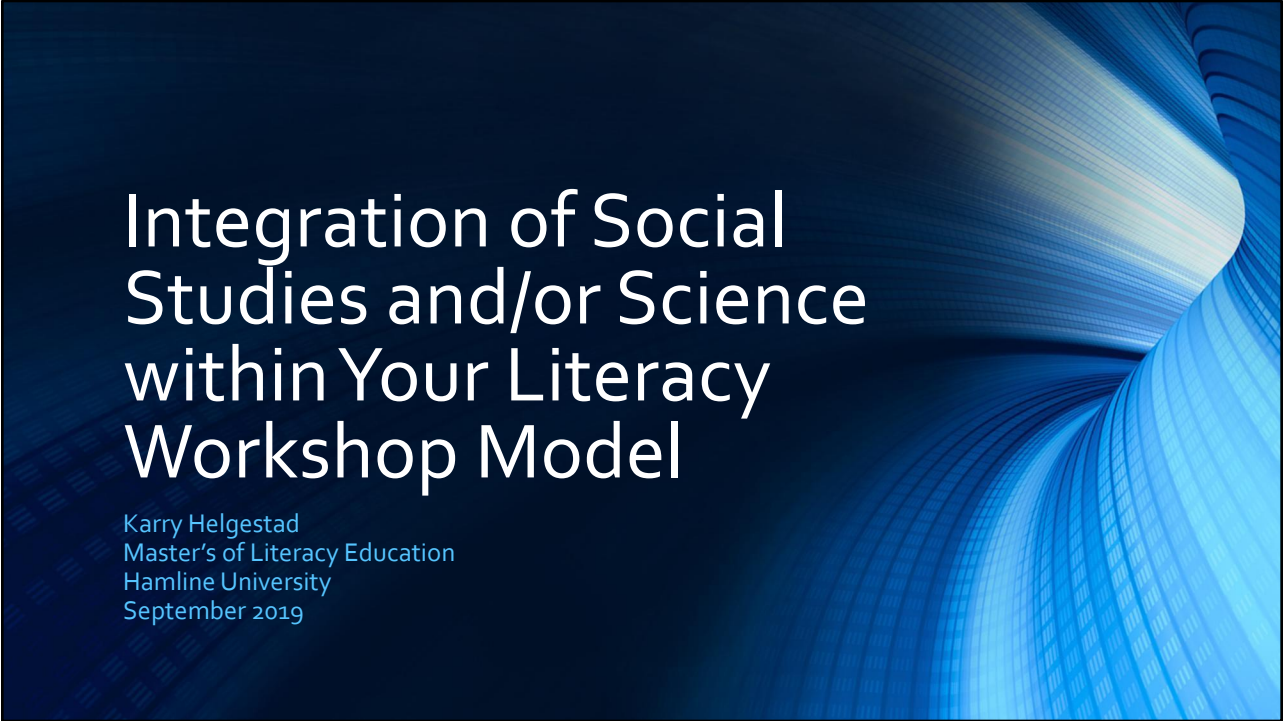
One of the intended audiences for this teacher professional development workshop was for upper elementary teachers who currently do not have a mandated curriculum for either science, social studies or language arts. The reason I explored this topic of integration for my capstone paper was because of my frustration of teaching reading skills in isolation using many different resources that were not cohesive or aligned to any of the science or social studies standards. I felt like the isolation of reading skills and the lack of cohesive texts were doing a disservice to our developing readers, particularly our English language learners and our special education students, because it didn't capitalize on the necessary components of building background knowledge and vocabulary necessary for reading comprehension. In the professional development workshop, I offered a suggestion on how to organize the school day to offer a 90 minute block of time that effectively integrated a content subject area and language

arts standards, while giving a thirty minute block of time in the day devoted solely to literature. I also modeled an integration lesson for teachers by showing them how easily the two set of standards could be integrated without compromising any reading instruction time. Between components of the lesson plan, I provided teachers with the research on the main reasons why integrated curriculum has a positive effect on reading comprehension: background knowledge and vocabulary building.

Another intended audience for this project was for administrators and reading teams who have been assigned to review and purchase a curriculum. At a time when school teachers and districts feel like every minute of the school day counts, I would use this project and the research involved to advocate that a curriculum that integrates both grade level science and social studies standards with the language arts standards would be the best investment in taxpayer's money. I would also use this project to advocate that a curriculum be reviewed and purchased that has aligned small group classroom resources to support our English language learners and our special education students.

The format of the project has two components: a Google Slide presentation and a Google Sites website. The Google Sites website is intended to be used as a resource to the presentation. For example, during the presentation I would ask teachers to go to the website to find examples of book clubs or a Google Form I created so teachers could commit to one integration goal for the year. The Google Slide presentation is intended as the primary vehicle for the professional development workshop. The presentation is broken into four different sections. The first section is an examination of authentic reading, how we teach reading and current Minnesota Comprehensive Assessment (MCA) data for the state and district. The second section shares my

research question and the different models and studies of integrated curriculum. The third section is the modeled integrated lesson plan coupled with research on background knowledge and vocabulary. In that section, I am asking teachers to act as students and learners as they go through the lesson by providing numerous hands-on activities and discussion prompts. This section ends with teachers thinking about one way to bring integration into their classroom with a follow-up Google Form. The final section is based on my own two precepts for teaching and learning along with a short video demonstrating the “why” behind my research question and project.



Integration of Social Studies and/or Science within Your Literacy Workshop Model

Karry Helgestad
Master's of Literacy Education
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September 2019

WORKSHOP AGENDA

Morning Session:

- Why do we read?
- Examine Minnesota Comprehensive Assessment data for state and district
- Integrated instruction models
- Mock schedules - School day and reading workshop

Afternoon Session:

- Model integrated lesson & research
- Literature - Where does that fit in?
- Precepts of teaching
- Teacher goals
- Final remarks



Why do we read?

In small groups, using the chart paper provided, list all of the reasons we read as adults.

1. Hang chart paper up in the room. Expect reasons to be: entertainment, learn new things, habits, become an expert,
2. Give each adult in the room sticker dots. Have them go around the room and put a sticker by any of the reasons why they think children read as well.
3. Discuss as a whole group.



How do we teach **reading** or how have we taught **reading** in the past?

Directions:

1. In small groups of grade level, again list the way you've taught skills in the past.
2. Switch groups up to one from each grade (3-4-5) elementary to compare and contrast thoughts as it can be different.
3. Hang lists up
4. Expect reasons to be: skill by skill, essential question driven, literature vs. non-fiction.

Compare and Contrast

Why we read:

- ◆ **Enjoyment**
- ◆ **Learn something new**
- ◆ **Directions**
- ◆ **Become an expert**
- ◆ **(Your reasons)**

How we teach reading:

- ◆ **Skill by Skill**
- ◆ **Genres**
- ◆ **Informational vs. Literature**
- ◆ **Writing vs. Reading**
- ◆ **(Your reasons)**

In pairs, examine the reasons listed on both charts. Start to discuss the vast differences of why we read, how we teach reading and how that might impact comprehension of text. **BIG IDEA:** By taking reading and piecemealing into separate skills, such as main idea, text structure, text features, plot diagram, metaphors, then we've pretty much have not shown students how to be readers for authentic reasons. Let's look at the data now:

Minnesota Report Card: State Percentages (2019)

Subject	2016	2017	2018
Reading	60.2% (265, 111)	60.6% (270,024)	60.4% (270,226)
Science	55.5% (96,935)	54.7% (97,635)	52.5% (94,501)

[Minnesota Report Card: Minnesota State Percentages](#)

This is the data currently housed on the MDE Minnesota Report Card website. This is for the entire state. I want you to keep in mind that the same state website says the statewide goal is 90% of students demonstrating performance at grade level by 2025. That's in six years.

Reference:

Minnesota Department of Education. (2019, April 19). *Minnesota Report Card*.

Retrieved April 19, 2019, from Demographics: Who goes to this school?:

http://rc.education.state.mn.us/#demographics/orgId--10656070000__p--3

Minnesota Report Card: Your School Percentages (2019)

Subject	2016	2017	2018
Reading	71.9% (1532)	71.8% (1539)	71.3% (1533)
Science	73.2% (632)	71.4% (656)	68.3% (628)

Your School's MCA Percentages

Data from a small midwestern rural Minnesota school forty miles southwest of the Minneapolis-St. Paul metro area. (Option to customize this slide for district's or school's scores.)

Discussion: This school is keeping on trend with the state in the fact it's moving only a tenth percent in the positive/negative direction and science scores are declining as the years go on. Even though this school is ten percentage points above the state average, it's flatline scores indicate it is no more better off on meeting the statewide goal of 90% of students performing at grade level by 2025. At the time of this presentation, that is only six years away from today.

Reference:

Minnesota Department of Education. (2019, April 19). *Minnesota Report Card*.

Retrieved April 19, 2019, from Demographics: Who goes to this school?:

http://rc.education.state.mn.us/#demographics/orgId--10656070000__p--3



Integration of Content Classes with English Language Arts

- ◆ CORI integration concept
- ◆ IDEAs integration concept

The next section of the workshop will be to present to you my most important findings of my capstone research project which was based on the question *How does the integration of science and/or social studies standards with language arts standards impact the reading comprehension of upper elementary students?* This question and subsequent research will set up the rest of the workshop that will suggest realigning the school day to integrate language arts standards with social studies and science standards.

Concept Oriented Reading Instruction (CORI)

- 7 year collaboration project between University of Maryland and Frederick City Schools (2000-2007)
- Developed by John Guthrie & Allan Wigfield (2000)



Shared Integrated Skills

- Ask questions
- Synthesize
- Predicting
- Inferring
- Summarizing

Helgestad Capstone Paper: CORI section, pages 16-17

Stress that CORI hits so many standards of the ELA Common Core in all four parts: READING, WRITING, SPEAKING and LISTENING

Reference:

Pearson, P., Moje, E., & Greenleaf, E. (2010, April 23). Literacy and science: Each in the service of the other. *Science*, 328, 459-463.

University of Maryland. (2000-2019, March 29). *CORI Research Projects*. Retrieved from Concept-Orientated Reading Instruction: <http://www.cori.umd.edu/>

Concept Oriented Reading Instruction (CORI)

1. Starts with a inquiry-based hands-on activity where students ask questions.
2. Students then seek to answer questions with a wide-variety of texts.
3. Students then present findings to answer in a end project of their choosing.

- CORI
- CORI video - 4th GRADE

Helgestad Capstone Paper: CORI section, pages 16-17

Stress that CORI hits so many standards of the ELA Common Core in all four parts: READING, WRITING, SPEAKING and LISTENING

The last line of the video suggests that CORI improves motivation to read, which is a nice transition to the study results. Next slide.

Reference:

Cervetti, G., Barber, J., Pearson, P., & Goldschmidt, P. (2012). The impact of an integrated approach to science and literacy in elementary school classrooms.

Journal of Research in Science Teaching, 631-358. doi:10.1002/tea.21015

Guthrie, J. (2005-2019). CORI concept oriented reading instruction. Retrieved from

<http://www.cori.umd.edu/>

Guthrie, J. (2005-2019). Video of CORI in classroom. Retrieved from

<http://www.cori.umd.edu/what-is-cori/video.php>

Guthrie, J. T., Wigfield, A., & Vonsecker, C. (2000). Effects of integrated instruction on motivation and strategy use in reading. *Journal of Educational Psychology*, 331-341.

Concept Oriented Reading Instruction (CORI) Study by Guthrie, et. al

- Hypothesis: Students with CORI instruction would display higher levels of intrinsic motivation and have greater use of cognitive skills.
- Research study based on two groups of third and fifth-grade students: CORI education and traditional science education.
- Results: No difference in intrinsic motivation, but significant increase of the use of cognitive skills in the CORI students compared to the traditional science education students.



Reference:

Guthrie, J. T., Wigfield, A., & Vonsecker, C. (2000). Effects of integrated instruction on motivation and strategy use in reading. *Journal of Educational Psychology*, 331-341.



Integration of Content Classes with English Language Arts

◆ IDEAs integration concept

Another model of integration instruction researched for my capstone research project which was based on the question *How does the integration of science and/or social studies standards with language arts standards impact the reading comprehension of upper elementary students?* was the IDEAs integration model or concept.

In-Depth Expanded Application of Science (Science IDEAS)

- Michael Romance and Nancy Vitale(1992)
- 5 year study (2003-2008)
- Hypothesis: The Science IDEAS integration method of science and literacy would have a positive effect on student's reading comprehension achievement and improved student science achievement in grades 3, 4 and 5. The same group of students would be able to transfer that increase to grades 6 and 7.

[Science IDEAs website](#)

Helgestad Capstone Paper pages 14-15

This is another example of an integration instruction method developed by Romance and Vitale (1992).

Reference:

Romance, N., & Vitale, M. (2016). Implications of a cognitive science model integrating literacy in science on achievement in science and reading.

International Journal of Science and Math Education, 979-995.

Science IDEAS: Grade 3-5. (n.d.). Retrieved from

<http://www.scienceideas.org/Overview/index.html>

In-Depth Expanded Application of Science (Science IDEAS)

Control Group

- 2 hours every day of district-approved language arts/reading curriculum
- ½ hour several days per week on district approved science education curriculum

Experiment Group

- 2 hours every day of reading and writing instruction integrated with in-depth science instruction
- ½ hour of literature instruction every day

Helgestad Capstone Paper pages 14-15

Teachers: Let's make a hypothesis about which group fared better results when it comes to comprehension.

Reference:

Romance, N., & Vitale, M. (2016). Implications of a cognitive science model integrating literacy in science on achievement in science and reading.

International Journal of Science and Math Education, 979-995.

Reference:

Romance, N., & Vitale, M. (2016). Implications of a cognitive science model integrating literacy in science on achievement in science and reading.

International Journal of Science and Math Education, 979-995.

In-Depth Expanded Application of Science (Science IDEAS)

- Hypothesis: The Science IDEAS integration method of science and literacy would have a positive effect on student's reading comprehension achievement and improved student science achievement in grades 3, 4 and 5.
- **RESULTS: Experiment group increased their science knowledge 1.08 grade level equivalent and their reading comprehension increased .57 grade level equivalent compared to their peers.**

Helgestad Capstone Paper pages 14-15

Reference:

Romance, N., & Vitale, M. (2016). Implications of a cognitive science model

integrating literacy in science on achievement in science and reading.

International Journal of Science and Math Education, 979-995.

In-Depth Expanded Application of Science (Science IDEAS)

- Hypothesis: The same group of students would be able to transfer that increase to grades 6 and 7.
- **RESULTS: These same students were also able to maintain that increase in grades 6 and 7.**

Helgestad Capstone Paper pages 14-15

Reference:

Romance, N., & Vitale, M. (2016). Implications of a cognitive science model integrating literacy in science on achievement in science and reading.

International Journal of Science and Math Education, 979-995.



Why were these integration methods so successful?

<https://www.weareteachers.com/5-fun-alternatives-to-think-pair-share/>

Teachers: Using the "Write Around" activity from this website, provide chart paper for each table. Ask students to start writing any answers to why they think integration methods were so successful in CORI and Science IDEAs. Give five minutes to write, five minutes to discuss. Ask someone to share with the whole group why their thoughts.

References:

Mulvahill, E. (2015). Ten fun alternatives to think-pair-share. Retrieved from

<https://www.weareteachers.com/5-fun-alternatives-to-think-pair-share/>

“Studies of educationally top-performing countries across the globe indicate that one of the very few characteristics share is a high-quality, content-rich curriculum” (Steiner, 2017).

- Finland, Hong Kong, South Korea, Canada, Japan, New Zealand, Australia, the Netherlands and Switzerland

By starting with this quote, I’m going to make a bold suggestion that we look at the current way we teach reading. The fact that the most successful countries on the PISA (Programme for International Student) are very different countries with very different cultures, but they still keep it content rich. They all have that in common.

Reference:

Steiner, D. (2017). Curriculum research: What we know and where we need to go.

Standards Works, 1-13. Retrieved June 27, 2019:

<https://standardswork.org/wp-content/uploads/2017/03/sw-curriculum-research-report-fnl.pdf>

Integrated Schedule for the School Day

[Alternative Schedule Google Drive](#)

Before sharing the schedules, ask teachers "What is the first thing to go when there are interruptions in the schedule? Usually, it's science and social studies. Why? National Reading Panel Report: students need at least 90 minutes of uninterrupted reading instruction each day.

<https://www.readingrockets.org/article/example-go-minute-reading-block>

Karry: Possible analysis of how much kids will be reading in alternative schedule versus traditional schedule.

Reference:

An example of the 90 minute reading block. (n.d.). Retrieved from

<https://www.readingrockets.org/article/example-90-minute-reading-block>

An Integrated Reading Workshop Schedule

[Reading Workshop Model](#)

Review the proposed reading workshop schedule. I will stress that I will be showing them next how to integrate the informational text standards with the science and social studies standards to meet the goal of teaching both the reading comprehension skills and content knowledge. Workshop includes word work, vocabulary, building background knowledge, guided comprehension skill, close reading. I will also incorporate book club ideas.



Activity:

Using the “I can” statements for informational text” and your science or social studies curriculum, see where you can integrate learning targets from both domains.

Teachers should come with either a social studies or science curriculum. For those who don't have curriculum, copies of the state standards will be given.

I can statements were freebie from TPT. I added them to website for purpose of workshop.

The goal should be that teachers can see adding almost all of the informational text standards into one unit.

Karry: Model integration of learning targets for both content classes an language arts. Display on poster paper.



Learning Targets for Teachers

- ★ I can **be an active participant in a modeled integrated lesson.**
- ★ I can **ask questions.**
- ★ I can **listen and learn possibly new information about the research on background knowledge and vocabulary.**
- ★ I can **think about how I will bring something back to my classroom.**

These are the learning targets for the rest of the teacher professional development workshop. I will be teaching an integrated lesson, while adding the research to the appropriate parts of the lesson. Teachers need to be able to bring something back to their classroom, so addressing this in the learning target is critical to setting the purpose of going through the integrated lesson plan with teachers.



Minnesota State Standards

- Minnesota Science State Standard 5.4.2.1: Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms. Give examples of beneficial and harmful human interaction with natural systems.
- Minnesota ELA State Standard 5.2.5.5 Compare and contrast the overall structure of events, ideas, concepts, or information in two or more texts: chronological; cause and effect; problem and solution; description; compare and contrast;

This part of the presentation, I will be giving an example of an integrated lesson plan. Modeled lesson plan has been added to the website.

The first goal of an integrated lesson plan is to combine the content standard with the English language arts standards. How could we possibly combine these two?

Reference:

Minnesota Department of Education (2013, December 5). *Minnesota Academic*

Standards Science K-12 2009 Version[PDF]:

<https://education.mn.gov/MDE/dse/stds/sci/>



Learning Targets

- ★ I can **identify the cause and effect** of how **changes in the environment affect organisms.**
- ★ I can **identify a solution to the problem** created **from the effects of environmental change** created by human interaction with natural systems.

The first goal of an integrated lesson plan is to combine the content standard with the English language arts standards. We practiced doing that earlier.

I like to color code the learning targets into both the ELA, science and academic language (Tier 2 vocabulary) just to slightly differentiate the content from the ELA learning targets but to simultaneously reinforce the idea that we are integrating them in one sentence. The second learning target will be addressed in a following lesson (not modeled here for time purposes), but I think it's important for students to know where they are headed as the unit progresses.



Text Sets

- Scott Foresman, Science textbook p. 166-169
- Who Was Rachel Carson?
- Miss Rumphius
- Nonfiction books on animals
- [PBS Endangered Species Videos](#)
- NewsELA article “Dying polar bear”

Quad Text Set Framework:

- 1 Target text that is challenging above grade level
- 3 texts to build background knowledge and motivation (Lewis & Walpole, 2016)

Text sets are an important part of an integrated lesson plan. Text sets include nonfiction, fiction, poetry, videos, novels, textbooks, picture books, etc. Students will need access to various texts on subject to complete project at the end of the unit. (More to come on project).

Quad Text Set Framework: In this case, the textbook is above grade level; NewsELA article will be at student’s instructional level which can be challenging for students.

References:

Cooney, B. (1982). *Miss Rumphius*. New York: Viking Press

Dying polar bear has people discussing climate change. (2017). Retrieved from

<https://newsela.com/read/starving-polar-bear-climate/id/38851/>

Fabiny, S. (2014). *Who was Rachel Carson?* New York City: Penguin Random House.

Lewis, W. E., & Walpole, S. (2016). Designing your own text sets: A four text framework to build content knowledge in secondary classrooms. *Literacy Today*, 30-31.

PBS Science Trek. (2017, December 10). *Endangered Species Basics* [Video File].

Retrieved from <https://www.pbs.org/video/endangered-species-basics-zfpzwn/>

Scott Foresman Science. (2006). Glenview, Illinois: Pearson Education.



Vocabulary Group–Label–List

- In groups of three, I can use the vocabulary from the previous unit with the new vocabulary to cluster the vocabulary words based on what you think the words have in common.
- Previous Unit: ecosystems, food web, producer, consumer, herbivore, carnivore, omnivore, food chain, abiotic, biotic
- NEW: inherit, mutation, structural adaptation, pesticide, extinct, organisms, endangered, keystone species, conservation, predators, pack

Time: 10-15 minutes

The first part of this lesson is to both review key vocabulary from the previous unit, because this is not a new unit, while introducing the new key vocabulary.

The PDF of the vocabulary activity is on the website. It's entitled "List-Group-Label" in the book *Subjects Matter* by Daniels and Zemelman.

Revisiting vocabulary from the previous unit reinforces the idea that students need multiple activities and times to work on vocabulary to reinforce the connections.

Reference:

Daniels, H., & Zemelman, S. (2014). *Subjects matter: Exceeding standards through powerful content-area reading*. Portsmouth, NH: Heinemann.



Vocabulary Research

- Lack of background knowledge is strongly correlated to lack of vocabulary knowledge because if a student doesn't have enough background knowledge to understand the context around a word, then they will not be able to figure out the meaning of the word (Rupley and Nichols, 2005).

By starting with a sorting activity, such as "List-Group-Label" students are working to make new connections to words previously learned to new words. This activity is also giving students the necessary "before reading" time to digest these new words.

Reference:

Rupley, W., & Nichols, W. (2005). Vocabulary instruction for the struggling reader.

Reading and Writing Quarterly, 21(3), 239-260.



Vocabulary Research

- The Matthew Effect is a theory that says students with larger vocabularies have the necessary word knowledge to build even bigger vocabularies, while those students with limited vocabularies do not possess enough work knowledge and fall even further behind than their peers (Stanovich, 1986, as cited in Coyne et al., 2019, p. 164).

Teachers: How does the Matthew Effect relate to the lack of background knowledge? How do we keep this at the center of our instruction? Who is on our classrooms do we see most often with this Matthew Effect? Turn and talk to your table mates.

Reference:

Stanovich, K. (1986). Matthew effects in reading: Some consequences of individual

differences in the acquisition of literacy. *Reading Research Quarterly*, 21,

360-406. doi:10.1598/rrq.21.4.1



Activate Prior Knowledge

- Quick review of food webs and ecosystems.
- Minnesota Forest Food Web: Think-Pair-Share about what happens when you take one of the things out of the food chain.
- In your science journal, pick any plant or animal in the food chain and describe what would happen.
- Sentence Stems: “If the (animal or plant) was removed from the food web, then (this would happen). I know this because (your opinion or reason here).”

Time: 15-20 minutes

Quickly review food webs and ecosystems by asking students what they know and what more they want to learn.

Look at foodweb from Minnesota Zoo “Aquatic Food Web and Invasive Species” lesson plan (on website).

Think-Pair-Share with pairs about what happens when you take one of these things out of the food chain. What happens?

Write opinion in science journals. Writing is strongly related to reading. Writing is the production while reading is the reception of language. In this “Activate prior knowledge” exercise students are listening, speaking and writing. “Throughout our adult lives, we simultaneously learn about language and then use language to learn, especially when asked to unlock meaning from a difficult texts (Wells, 1986, as cited in Robb, 2003, p. 19)

Try not to skip the writing piece of this lesson because writing is the production piece to language. Through writing, students construct new knowledge to their existing schema. (Robb, 2003).

Reference:

Minnesota Zoo. (n.d.). *Aquatic food webs and invasive species* [PDF]. Retrieved from

<http://mnzoo.org/pdfs/3a-AquaticFoodWebsandInvasiveSpecies-LessonPlan.pdf>

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Robb, Laura. (2003). Teaching reading in social studies, science, and math. New York, NY: Scholastic.



Tortuga sacrificed a fly and
knocked a run in.

Activity: Read sentence out loud.

In small groups: gather information from teachers about what they think the sentence is about.

Talk about background knowledge of baseball that is needed to understand this sentence is about baseball.

Talk about background knowledge of words that is needed to understand this sentence is about baseball: Sacrificed: common sports analogy forgetting an out to get a point; Knocked - juicy verb instead of hit, but there is no knocking involved. Even being from Minnesota might help as Tortuga is the last name of one of the Minnesota Twins



Baseball Study on Background Knowledge



- Recht and Leslie (1998) conducted a study on the importance of background knowledge.
- Study involved 32 students who were screen for high and low ability readers, as well as high and low background knowledge.
- It also involved three semi-professional baseball players.
- Story was given to students on baseball with the purpose to assess the ability to reenact the story, verbal retell with details, summarize story and also rate the importance of sentences to the story.

“On all measures, children with greater knowledge about baseball recalled more than did children with less knowledge, and what they recalled was more similar to what the experts recalled” (Recht and Leslie, 1998, p. 19)

Helgestad capstone paper, page 31

Reference:

Recht, D., & Leslie, L. (1988). Effect of prior knowledge on good and poor readers'

memory of text. *Journal of Educational Psychology*, 80(1), 16-20.



Close Reading of Text:

→ Purpose of reading: You are going to read about changes in an ecosystem caused by living things, such as to understand how humans change ecosystems.

Time: 15-20 minutes

Teachers: This is an example of how to create a lesson integrating the research. It's a model lesson.

Using close reading strategies (PDF on website), read pages 166-169 in the Scott Foresman Science textbook.

The goal is always for students to read, rather than be given the information orally, because the more students read the better readers they become.

Possible other lessons for students: How to annotate informational text; main idea and details; Signposts Non-Fiction;

Reference:

Scott Foresman Science. (2006). Glenview, Illinois: Pearson Education.



Reading Comprehension Strategy mini-lesson

Time: 15-20
minutes

Cause	Effect
Beavers make dams.	Ponds make beavers safe from wolves and other predators
	A new pond floods homes of organisms.
	A new pond is a new home for some organisms.

Sentence Stem: When (cause happens), the results are (effects).
Example: When beavers make dams, ponds are created which makes beavers safe from wolves and other predators.

Following the gradual release lesson plan, continue with this lesson plan by doing the think aloud, guided practice and independent practice. The graphic organizer above is for the think aloud. In the workshop, I may use chart paper with the “students” for the whole group and partner work.

Use the text the students read during their close reading, so students are digging deeper into the text and also looking at author’s purpose and craft. This will be the third or fourth time they read the same text.

Also, use of graphic organizers is a quick and easy way for students to connect prior knowledge to new knowledge - Little and Box (2011).

Encourage summarizing the text in their words, Please note that students are writing the vocabulary words again achieving our goal of multiple exposures to text.

Reference:

Little, D. C., & Box, J. A. (2011). The use of a specific schema theory strategy -

semantic mapping - to facilitate vocabulary development and comprehension

for at-risk readers. *Reading Improvement, 1*, 24-31.



Background Knowledge: Research

- For students to infer, they need background knowledge. Students with rich life experiences and reading volumes have more background knowledge to infer. The more students read, the more they know (Lupo, Strong, Walpole, and McKenna, 2018).

Adding this information after the Reading Comprehension Strategy lesson to make point that students are reading the article again for the second time, therefore increasing background knowledge as they make connections through the new lesson.

Reference:

Lupo, S. M., Strong, J. Z., Lewis, W., Walpole, S., & McKenna, M. C. (2018,

January/February). Building background knowledge through reading:

Rethinking text sets. *Journal of Adolescent and Adult Literacy*, 61(4), 443-444.



Background Knowledge: Research

- A central component to an integrated curriculum is that reading volumes increase through the use of text sets (Daniels and Zemelman, 2014).

Not only should students read more, but they should read wide and varied texts on the matter. Make sure students use guided practice using familiar texts, but the goal should be to practice the reading comprehension skills with another article during group work or independent practice.

Reference:

Daniels, H., & Zemelman, S. (2014). *Subjects matter: Exceeding standards through powerful content-area reading*. Portsmouth, NH: Heinemann.



Background Knowledge: Research

- Another central component to integrated curriculum is discussion (speaking) and writing, which is the output of language or production part of language (Cervetti et al. 2012).

Adding a writing component to the reading comprehension strategy mini-lesson is central to learning new information.

Reference:

Cervetti, G., Barber, J., Pearson, P., & Goldschmidt, P. (2012). The impact of an integrated approach to science and literacy in elementary school classrooms. *Journal of Research in Science Teaching*, 631-358. doi:10.1002/tea.21015



Independent Work Assignment

1. Using a graphic organizer and your textbook, analyze the cause and effect of zebra mussels on the environment.
2. On the back of your graphic organizer, answer the following questions:
 - *What is the effect of people introducing a new species to an area?
 - *Explain how changes in an ecosystem can be sometimes be helpful or harmful. Use examples from your reading.
3. Turn it into the inbox.
4. Work on Reading Must-Dos.

Time: 10 minutes

The independent work will be used for teachers to assess if students have both learning targets for the content and reading comprehension strategy (ELA).



Must-Dos and Can-Dos

Student Must-Do	Student Can-Dos	Teacher Must-Do
Read small group article annotating on the side anything that's confusing. Answer questions while waiting.	Write in your journal or write a story about a person who is stuck in an environmental battle or weather element.	Small Group
Writing Response: Write a paragraph stating your opinion on human interaction with the environment. Also, what other questions do you have?	Independent Reading Reader's Theater Book Clubs	
Vocabulary Activity: Revisit the list-group-label activity at the beginning of the unit. Would you change any of them? Why or why not?		

The independent work will be used for teachers to assess if students have both learning targets for the content and reading comprehension strategy (ELA). The table looks a little small for a graphic organizer, so I might have an electronic version in Google Classroom or on chart paper. I might only have students do one or two of the student must-dos depending on time.



Small Groups

- ★ I can gather information on how human interaction (cause) with nature affects the polar bear and its environment (effect).
- ★ I will do this with the NewsELA article “Dying polar bear has people discussing climate change?”

NewsELA articles can be leveled so ALL students are reading.

*Articles in small group must be related to the content learning objective so students are constantly adding more background knowledge to their schema based on what they are learning. If articles are still too high for some readers, I'd prefer to scaffold the learning versus using another article. I believe all students need to have the same grade level content knowledge.

Reference:

Dying polar bear has people discussing climate change. (2017). Retrieved from

<https://newsela.com/read/starving-polar-bear-climate/id/38851/>

While I'm working on small groups, students will be working on reading must-dos and reading can-dos.



Response to Intervention Groups

- ★ I can **gather information** on how human interaction (**cause**) with nature affects the polar bear and its environment (**effect**).

At a time when struggling students are likely to be taken out of their science class to attend remedial reading classes, these findings suggest a better option may be to attend to the needs of struggling readers within science class, where they simultaneously acquire subject-matter knowledge and inquiry skills, and even perhaps even improve their literacy skills" (Pearson et al., 2010, p. 462).

Yes, I have this slide repeated because it's an important piece of the integrated curriculum that students who are pulled out of the classroom for services such as RTI as using the same content material as the classroom teacher. 1. This is important to build background knowledge. 2. If RTI teachers use the same content material or topic, then RTI teachers can tease out the difference between reading difficulties and background knowledge.

Reference:

Pearson, P., Moje, E., & Greenleaf, E. (2010, April 23). Literacy and science: Each in the service of the other. *Science*, 328, 459-463.



Background Knowledge: Models of Learning

- Rosenblatt, 1983, 1978 stated the model of learning is where “learners creates knowledge by linking new information to past experiences and knowledge” (as cited in Robb, 2003, p. 25)

Using the principles of adult learning, adding research slides after an activity to prevent students from being in their seats too long. I’m hoping to convey that for each part of the lesson template, there is research to back up the reason why it’s there.

Reference:

Robb, Laura. (2003). Teaching reading in social studies, science, and math. New York, NY: Scholastic.



Background Knowledge: Models of Learning

- Integrated curriculum is supported by the neuroscience of learning because according to Willis (2006) it offers opportunities to relate new material with previously learned material, experiential learning and best-remembered information through multiple exposures (as cited in Wiggins and McTighe, 2011).

Teachers: Integrated curriculum is supported by many models of learning. What other models of learning could integrated curriculum support.

Reference:

Wiggins, G., & McTighe, J. (2011). *The Understanding by Design Guide to Creating High-Quality Units*. Alexandria, VA: ASCD.

Willis, J. (2016). *Research-based strategies to ignite student learning*. Alexandria, VA: ASCD.



Weekly Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
Whole Group	Small Group	Small Group	Small Group	Assessment/ Project Work

Final parts of the modeled lesson plan: When I start a unit, whole group will often take the entire time. I put my small groups in then on Tuesday-Thursday, with Friday being an assessment day for vocabulary, reading comprehension strategy and content learning targets.



Closing Circle

What did you learn today?

Time: 5 MINUTES

Gather around the circle to review key concepts of what you learned today in regards to cause and effect and human interaction with the ecosystem. If students have been sitting for a long time, make this a quick review game that involves movement. Sometimes when I'm super short on time, I ask students to meet me at the door on the way to use the bathroom with one fact they learned.



Literature Time: Book Clubs

Book Club Suggestions

Learning Targets: I can **analyze** how the **main character changes in response to a nature conflict in the story and how that contributes to the theme.**

Minnesota State Standard 5.1.2.2 Determine the theme of a story, drama, or a poem from details in the text, including how characters in a story or drama responds to a challenge or how the speakers in a poem reflects upon a topic; summarize the text.

Time: 35 MINUTES

Integrated curriculum swaps social studies and science content time in the afternoon with literature. This idea was generated from the Science IDEAS model. Also, The English curriculum is more of a spiral than a pyramid; kids practice the same basic processes year after year, at (we hope) increasingly sophisticated levels” (Daniels & Zemelman, 2004, p. 47. This is the reason why it’s okay to swap content time with ELA/Reading Workshop block.

Website has several suggestions for book clubs for the modeled science-ELA integration lesson.

Reference:

Daniels, H., & Zemelman, S. (2014). *Subjects matter: Exceeding standards through powerful content-area reading*. Portsmouth, NH: Heinemann.

Minnesota Department of Education. (2018, August 15). *Minnesota Academic*

Standards English Language Arts K-12 2010 Version [PDF]:

<https://education.mn.gov/MDE/dse/stds/ela/>

“



Precept: Students need to read more

Traditional Classroom

- Reading Workshop: Students are reading the majority of the time.
- Science or Social Studies: Students may or may not read. Lectures may be substituted as easy way to convey content knowledge.
- Students read non-fiction or fiction, but usually not both.

Integrated Classroom

- Students are reading content knowledge every day!
- Students are reading literature every day!
- “Eyes on print” have been increased every day!

Turning the workshop from the modeled integrated lesson plan to some possible reasons why teachers should consider elements of the integrated classroom.



Volume of Reading Research

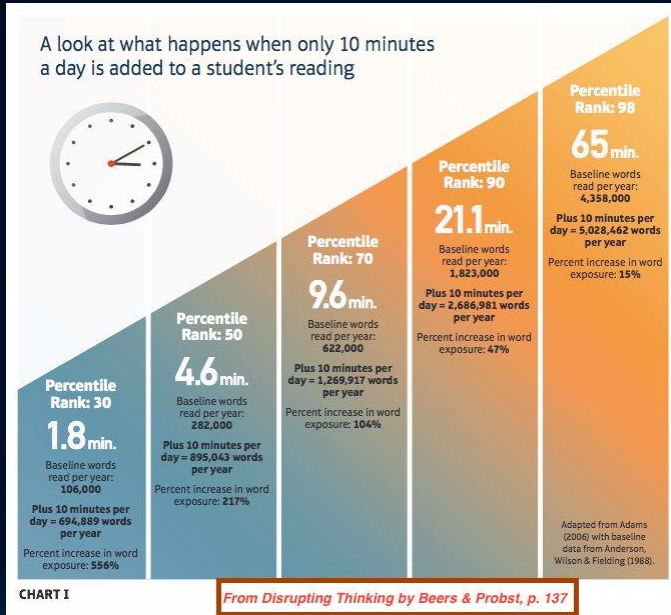
"John Guthrie and Anderson (1999) found that higher reading volume related to better reading comprehension in eighth- and tenth-grade students" (as cited in Daniels and Zemelman, 2014, p. 297)

"...poor readers had stronger gains in comprehension when they read for forty minutes compared with similar students who read for only fifteen minutes" (Samuels and Wu, 2004, as cited in Daniels and Zemelman).

Quotes are to validate the concept, "The more you read, the more you know."

Reference:

Daniels, H., & Zemelman, S. (2014). Subjects matter: Exceeding standards through powerful content-area reading. Portsmouth, NH: Heinemann.



Reference:

Beers, K., & Probst R. (2017). *Disrupted thinking: Why how we read matters*. New York, NY: Scholastic.



More research on reasons to read more that could be correlated to an integrated curriculum.

Reference:

Beers, K., & Probst R. (2017). *Disrupted thinking: Why how we read matters*. New York, NY: Scholastic.



Precept: Equity Matters

SPED or ELL student schedule:

9am: Meet with SPED teacher
10am: Science or Social studies in class
1045-1130: RDG with SPED teacher
1130-1215: Recess/Lunch
1215-100: Intervention
100-145: Math in class
145-215: Math with SPED teacher
215-245: Speech
245: Reading Interventionist
330: Home

General ED student:

9am: Hang out with friends
10-1130: Science or Social Studies
1130-1215: Recess/Lunch
1215-100: Enrichment
100-215: Math
215-300: Literature
300: Independent Reading
330: Home

Who is reading more? Who is being allowed to go deeper into subjects? Who is NOT building background knowledge?

Activity: In your groups, tally how many times your SPED or ELL student leaves your classroom.

Look at my example of my students.

I'm not saying that students who are developing readers or learning English don't need those services, but imagine how much more effective those services would be if the skills they were working on integrated closely with the skills that students are working on in class. Collaboration among RTI, Special Education students and general education students is key to making sure all students are learning the same content.

Studies done for PBL: Halvorsen et al., 2012 found students from low-SES performed statistically comparable to high-SES when those students were instructed in project-based model.

Reference:

Flippatou, D., & Kaldi, S. (2010). The effectiveness of project-based learning on

pupils with learning difficulties regarding academic performance, group work and motivation. *International Journal of Special Education*, 25(1), 17-26.

Retrieved March 19, 2019, from <https://eric.ed.gov/?id=EJ890562>

Halvorsen, A., Duke, N., Brugar, K., Block, M., Strachan, S., Berka, M., & Brown, J.

(2012, August 29). Narrowing the achievement gap in second grade social studies and content area literacy: The promise of a project-based approach.

Theory and Research in Social Education, 40(3), 198-229.

doi:10.1080/00933104.2012.705954

Flippatou & Kaldi (2010): Students with learning difficulties who were instructed in project-based model of instruction reported higher motivation and engagement.

Teacher Goals

- ❑ Four Corners
- ❑ Integrated Curriculum Goal Sheet

Activity Four Corners:

Stand in one corner if you are totally on board and want to change everything tomorrow or for the fall.

Stand in one corner if you want to take ONE thing from this workshop and implement it.

Stand in one corner if you want to take TWO things from this workshop and implement it.

Stand in one corner if you like the idea, but don't want to change the way you are teaching science, social studies or reading.

Talk with people at your corner.

Finally, think about your one, two or whole goals for teaching reading. Please fill out the Google Form. (Google Form will allow me to stay in contact with teachers, provide ongoing coaching or resources and touch base with them in six months to see how it's going. I will touch base initially the first two weeks and then plan on bimonthly afterwards.)

Our Why?

Last Remarks



I strongly believe through months researching my capstone question, "*How does the integration of science and/or social studies standards with language arts standards impact the reading comprehension of upper elementary students?*" that if we continue to teach reading in isolation of content knowledge that we are only teaching to the middle and above-average. I also believe that we are taking the fun out of reading because we are reading for the purpose of a skill and not for the purpose of learning something new, becoming passionate about something and making those connections that make us life long learners.

Reference:

Michael Jr.. [michaeljrcomedy]. (2017, January 8). *Know Your Why* [Video file].

Retrieved from <https://www.youtube.com/watch?v=1ytFB8TrkTo>

References:

[Capstone Project References](#)

APPENDIX A

Link to Professional Development Workshop:

<https://docs.google.com/presentation/d/1rffejxrh1FK4vmA2jrifqDehWNjFLMEqoJDTlqXhUwY/edit?usp=sharing>

Link to Professional Development Workshop Website:

[Professional Development Website for Resources](#)

Current Schedule:

Time	Subject
910-920	Morning Meeting
920-1000	Specialist
1010-1145	Reading Workshop
1145-1225	Recess/Lunch
1230-100	WIN (Intervention Time)
100-215	Math
215-300	Science/Social Studies
300-330	Independent Reading/Reading Conferences/Small Groups

Alternative Schedule:

Time	Subject
910-920	Morning Meeting
920-1000	Specialist
1010-1145	Science/SS/ELA Integration Workshop
1145-1225	Recess/Lunch
1230-100	WIN (Intervention Time)
100-215	Math
215-300	Literature & Spelling
300-330	Independent Reading/Reading Conferences/Small Groups

Integrated Reading Workshop Schedule

90 minute schedule for Integrated Social Studies or Science with Informational Text

Whole Group - Building Background Knowledge, Content Delivery, Reading Strategies and Skills explicit instruction	25 minutes
Vocabulary	10 Minutes
Small Groups While you work with small guided or strategy groups, students are doing one or more of the following: <ul style="list-style-type: none"> - Practicing reading strategy with science or social studies text - Work on vocabulary - Writing Responses - Work on end project for unit - Practice previous reading skills and strategies - Independent Reading 	10 minutes x 5 groups
Closing Circle	5 minutes
	Total: 90 MINUTES

45 minute schedule Literature/Writing Time (Alternate between these two):

Literature/Book Clubs <ul style="list-style-type: none"> - Book Clubs can be related to the topic - Shared stories to practice literature comprehension skills and strategies * - Alternative: Reader's Theater/Poetry 	35 minutes
OR Writing - Whole Group/15 minutes 20 minutes writing	35 minutes
Word Work - Words Their Way or Greek/Latin Roots	10 minutes
	Total: 45 minutes

*Many of the reading standards are recursive as the years progress, especially in literature standards, so I don't feel it's necessary to treat these skills as brand new skills students have never seen before.

Teacher: Mrs. Helgestad
Dates: May 2010
Grade: 5th Grade
Unit: Changes in Ecosystems,
Day: Day ONE

Common Core State Standards:

Minnesota State Science Standards:

5.4 Life Science, Interdependence Among Living Systems

Standard: Natural systems have many components that interact to maintain the living system.

Benchmark 2: Explain what would happen to a system such as a wetland, prairie or garden if one of its parts were changed. For example: Investigate how road salt runoff affects plants, insects and other parts of an ecosystem. Another example: Investigate how an invasive species changes an ecosystem.

5.4 Life Science, Interdependence Among Living Systems

Standard: Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.

Benchmark 1: Give examples of beneficial and harmful human interaction with natural systems. For example: Recreation, pollution, wildlife management.

Minnesota State English Language Arts Standards:

Informational Text 5.2.5.5 Compare and contrast the overall structure of events, ideas, concepts, or information in two or more texts: chronological, cause and effect, problem and solution, description and compare and contrast.

Learning Targets:

I can identify the cause and effect of how changes in the environment affect organisms.

I can identify a solution to the problem created from the effects of environmental change created by human interaction with natural systems.

Materials:

Text sets, notebook, cause and effect graphic organizer, problem and solution graphic organizer,

Text Sets:

- Scott Foresman, Science textbook p. 166-169
- I Survived Series: The Eruption of Mount St. Helen, 1980; The Destruction of Pompeii, AD 79
- Who Was Rachel Carson?

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Dates: May 2010
Grade: 5th Grade
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Day: Day ONE

- Miss Rumphius
- [How do woodpeckers chose their nests?](#)
- [The wolf hunt is on](#)
- Informational Texts from library on animals

Key Vocabulary (15-20 minutes):

NEW: Inherit, mutation, structural adaptation, pesticide, extinct, organisms, endangered, keystone species, conservation, predators, pack,
PREVIOUS: ecosystems, food web, producer, consumer, herbivore, carnivore, omnivore, food chain, biotic, abiotic

Using the List-Group-Label activity in the book Subjects Matter (Daniels and Zemelman) p. 153, ask students to look at the new and previous key vocabulary for this unit. Students will arrange the words in clusters based on something the words have in common.

Prepare to Read (Activate background knowledge, inquiry): (15-20 minutes)

Activate prior knowledge unit of food webs and ecosystems by quick review of what students learned/know.

Using food web from Minnesota Zoo "Aquatic Food Web and Invasive Species lesson plan, page 19 review the forest food web. Now, start a discussion (think-pair-share) with peers about what happens when you take one of these things out of the food chain. What happens?

In your science journal, pick any of the parts of the food chain and describe what you would think specifically happens to the food web at this time. What is your opinion of this scenario?

Sentence stems: "If the (animal or plant) was removed from the food web, then (this would happen). I think this is (your opinion here).

Close Reading of Text: (15-20 minutes)

Set purpose: Tell students they are going to read about changes in an ecosystem caused by living things, such as to understand how humans change ecosystems.

Working through close reading strategies, have students read in partners pages 166-169 of Scott Foresman textbook.

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Dates: May 2010
Grade: 5th Grade
Unit: Changes in Ecosystems,
Day: Day ONE

Skill building of Reading Comprehension Skill/Strategy: Cause and Effect (15-20 minutes)

Model:

T: "Okay, students, now we are going to practice using what we read to analyze the cause and effect text structure. A cause is why something happens, and effect is what happens as a result. We are going to use our cause/effect graphic organizer with the article we just read. First, let's do a quick chart of the ideas you think are cause/effect. (Examples: C: beavers E: ponds; C: swarms of locust E: food shortage; C: garbage in landfills E: pollution in water)

Guided Practice:

Think Aloud ("I"):

T: Now, we are going back into the text and find the exact sentences the author wrote that illustrate cause and effect. I'll start and your job is to watch and listen to my brain. I'm going to do the beaver example because it's first. Follow along with me on page 167. "By damming streams, beavers make new pond ecosystems where they are safe from wolves and other predators." Okay, I found my cause so I'm going to write that in my cause box on my graphic organizer. I'm kind of excited about this one because there are a few effects to one cause. I think one effect is definitely that a new pond is a safe place from predators. I also think it's interesting that it has both creation and destruction of other organism's homes, so I think they each get their own box.

Example of Cause and Effect Graphic Organizer:

Cause	Effect
Beavers make dams.	Pond makes beavers safe from wolves and other predators.
	A new pond floods homes of organisms.
	A new pond is a new home for some organisms.

Whole Group (We):

T: Now, let's do one together as a group. Let's analyze the cause and effect of earthworms. Remember, we want to lift information from the text by summarizing but using details.

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Day: Day ONE

(Fill out chart together, but students should also be filling out on their own graphic chart.)

Partner Work (US):

T: Now, let's do one in partners. Analyze the cause and effect of garlic mustard on page 168. Work first with one partner and then check with one more group.

Independent Practice (Me):

T: Now, I want you to do one yourself. Analyze the cause and effect of zebra mussels.

Formative Assessment:

Have students hand in cause-and-effect graphic organizer as a formative assessment. Also, have them write out the answers to the following content questions:

1. What is the effect of people introducing new species to an area?
2. Explain how changes in an ecosystem can sometimes be helpful and sometimes harmful.

Small Groups:

Work in guided reading groups or strategy groups with NewsEla article "Dying polar bear has people discussing climate change". Learning targets should be to gather information on how **human interaction with nature affects the polar bear and its environment, as well as looking for the causes and many effects in the text.**

Independent Work:

Must-Dos:	Can-Dos:
Read small group article while waiting annotating on the side anything that's confusing.	Write in your journal.
Writing Response: Look back at your writing response from the first part of the lesson. Write a paragraph stating your opinion on the human interaction with the environment. Is it always positive? Is it always negative? What other questions do you have?	Write a story about a person who stuck in an environmental battle or weather element.

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<p>Vocabulary Activity: Revisit the list-group-label activity at the beginning of the unit. Would you change any of them based on your current reading. Why?</p>	<p>Independent Reading</p>
<p>Work on end-of-unit project</p>	<p>Reader's Theater</p>
	<p>Book Clubs</p>

Reteach or Enrich:

***Use this space to identify students for a strategy group of either content or language arts skill or strategy.**

Closing Circle (5 minutes):

Gather around the circle to review the key concepts what you learned today in regards to cause and effect and human interaction with the ecosystem. A quick game of TrashketBall where students get to shoot a piece of scratch paper into a hoop after their table answers the question correctly is a student favorite.

Possible questions (Taken from the reading of today):

Name one effect of the beaver making a new pond.

Name one effect on the earth that humans cause by producing garbage.

What is one possible effect of a swarm of locusts.

Possible Social Studies or Science Connection:

America's wolf population was nearly eradicated by humans due to fear of wolves. What was it about history, economics, geography, and/or culture to make that happen.

Minnesota Literature Standards:

5.1.2.2 Determine the theme of a story, drama, or a poem from details in the text, including how characters in a story or drama responds to a challenge or how the speakers in a poem reflects upon a topic; summarize the text.

Analyze how the main character changes when they respond to a challenge

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(conflict) in the story.

Book Clubs: I'm going to recommend Carl Hiassen's books Hoot, Scat, Chomp, and/or Flush. Hiassen's books are centered around the ecosystem of Florida.

Another book club would be based on Gary Paulsen's books Hatchet, Tracker, Brian's Winter, Brian's Return, Woodsong and/or Woods Runner. These books center around internal conflict because of challenges in the environment.

Either book club could have the teacher using one of the books as a mentor text for mini-lessons.

Teacher:

Dates:

Unit:

Day:

Common Core State Standards:

Learning Targets:

Key Vocabulary:

Materials:

Text Sets:

Prepare to Read (Activate background knowledge, inquiry):

Close Reading of Text:

Skill building of Reading Comprehension Skill/Strategy:

Model:

Guided Practice:

Teacher:

Dates:

Unit:

Day:

Independent Practice:

Small Groups:

Formative Assessment:

Reteach or Enrich:

Closing Circle:

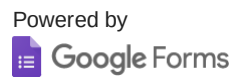
Integrated Curriculum Teacher Goal(s)

* Required

1. Name and Email Address *

2. Write one or two goals that you want to take away from this workshop. *

3. Do you have anymore questions about this workshop or integrated curriculum? Would you like to be contacted to go over these questions? *



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TEACHER'S EDITION



Scott Foresman

Science

See learning in a whole new light



You Are There!

The day is sunny, and the yellow wheat moves softly in the field beneath a blue sky. A strange black cloud seems to be moving toward you. Soon you see that it is not a rain cloud but a swarm of millions of locusts. As you run for your home, you feel locusts crunch under your feet. The desperately hungry insects are everywhere, nipping and chewing in search of food. What will be the effect of such a huge swarm?

Lesson 1

How do ecosystems change?

Ecosystems are always changing—sometimes quickly, sometimes slowly. People and animals may bring on these changes.

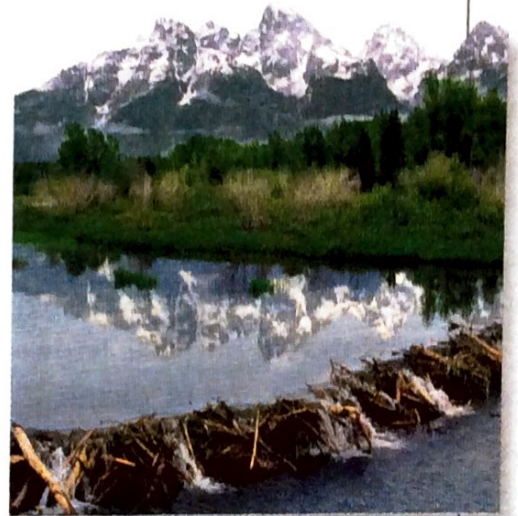
Animals Change Ecosystems

What kinds of changes could a huge swarm of locusts cause? In some parts of the world, locusts bring a great deal of trouble. As they move, they might feed on all the plants in the farm fields, causing food shortages for animals and people. Locusts have made paths 100 kilometers wide and 1,000 kilometers long.

Ecosystems are always being changed by organisms, wind, water, or other parts of the environment. By damming streams, beavers make new pond ecosystems where they are safe from wolves and other predators. For a few organisms, a new pond that floods their homes is bad news. But for many other organisms, a pond is a new home and is helpful.

Most changes in an ecosystem are not so dramatic, and not all changes are harmful. For example, earthworms slowly and quietly dig new holes through the soil, bringing oxygen to the plant roots. These worms improve the soil with digested materials they leave behind.

1. **✓ Checkpoint** Explain how changes in an ecosystem can sometimes be helpful and sometimes harmful.
2. **Math in Science** A locust swarm in 1875 was about 177 kilometers wide. Its length was about 16 times its width. How long was the swarm?



Beaver dams change the environment.

People Change Ecosystems

People change ecosystems when they build houses, clear forests, or throw out garbage. People also change ecosystems by introducing new plants and animals. Plants and animals have been carried over deserts, mountains, and even oceans. When a species is introduced into an ecosystem, it causes changes. These changes often affect the survival of entire species.

Zebra mussels are animals that people accidentally moved from one ecosystem to another. It seems that the zebra mussels stuck to ships that travelled from the other side of the world to the United States. Zebra mussels do not have predators in their new habitat, so their population has grown quickly. This species has changed the ecosystems of many rivers and lakes in many ways. For example, huge numbers of zebra mussels can take the food and space needed by other species. Those species may no longer be able to survive in the area.

The garlic mustard plant was carried to the United States on purpose. Early settlers used garlic mustard for food and medicine. Unfortunately, animals do not eat the plant, so it spread quickly. The plant can dominate forest floors, keeping other plants from getting water and sunlight. How do you think this affects plants and animals?

Zebra mussels stick to hard surfaces like these shells.



Garlic mustard seeds can grow even after being on the ground for five years. This means that removing the species from a place is a long, hard job.

Zebra mussels can block water pipes.





A landfill may cover a few acres or a few thousand acres.

Each American produces about 1.8 kilograms of garbage each day—that adds up to about 200 million tons a year! Most garbage is put into a landfill. A landfill is a pile of garbage that is eventually covered with soil and grass. The local ecosystem is greatly changed while the landfill is being used. After the landfill is covered by grass, the ecosystem might return to being very similar to what it was like before the landfill. In the past, landfills unexpectedly leaked pollution into nearby bodies of water. Today, liners seal off the garbage to keep harmful chemicals from getting into the ground.

Acid rain is rain that has absorbed certain kinds of pollutants. Acid rain changes ecosystems because it pollutes soils and lakes. Plants and animals can die from this pollution. People can treat polluted lakes by dumping helpful chemicals into the water.

✓ Lesson Checkpoint

1. Why can populations of zebra mussels and garlic mustard grow so quickly in their new ecosystems?
2. How do beaver ponds help the beaver? How do they affect other organisms?
3. 🎯 **Cause and Effect** What is the effect of people introducing new species to an area?



Fighting Acid Rain

Acid rain can hurt plants, animals, and other organisms in lakes. People can add material to a lake to control some of the effects of acid rain.



A Forest Damaged by Acid Rain

The pollutants in acid rain have damaged some of the trees and other plants in this forest.

Integration of Social Studies and/or Science within Your Literacy Workshop Model
Karry Helgestad
Masters of Literacy Education
Capstone Project
August 2019

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