

Seattle/Issaquah Summer Institute:

Teaching for Biliteracy:

Strengthening Bridges Between Languages



Issaquah, Washington

August 6-8, 2019

@T4Biliteracy



Teaching for Biliteracy



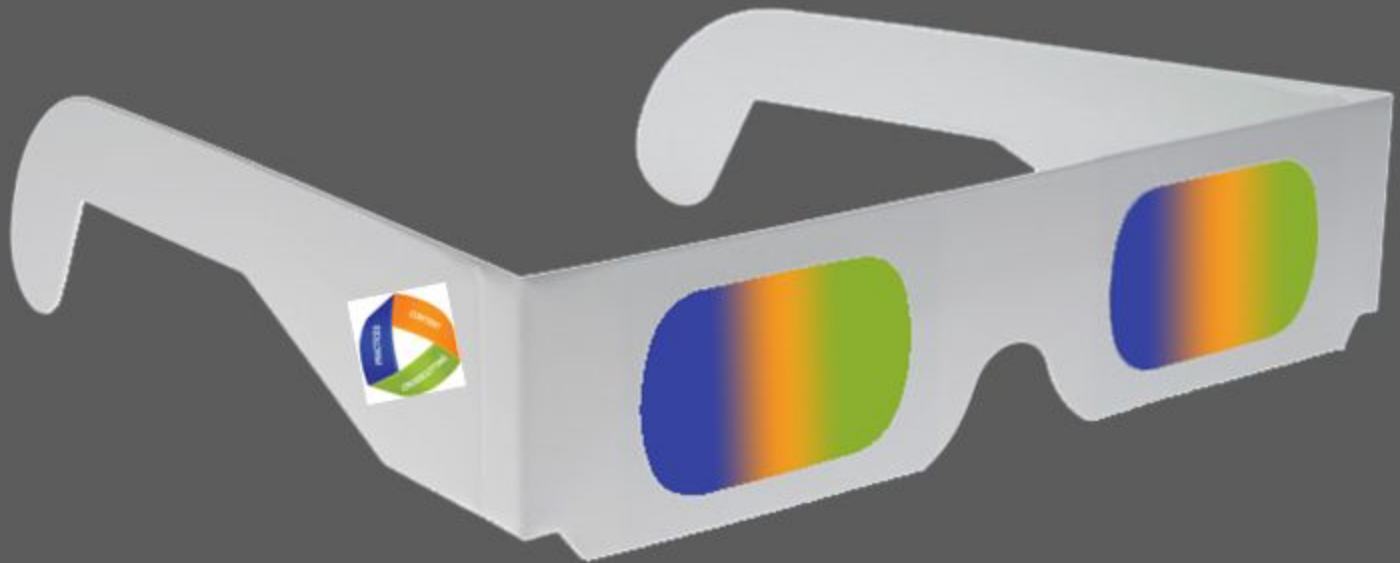
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Next Generation Science Standards



Paradigm Shift

Three Dimensional Instruction



Three Dimensional Learning

The National Research Council's (NRC) [Framework](#) describes a vision of what it means to be proficient in science; it rests on a view of science as both a body of knowledge and an evidence-based, model and theory building enterprise that continually extends, refines, and revises knowledge. It presents three dimensions that will be combined to form each standard:

Dimension 1: Practices

The practices describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems. The NRC uses the term practices instead of a term like "skills" to emphasize that engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice. Part of the NRC's intent is to better explain and extend what is meant by "inquiry" in science and the range of cognitive, social, and physical practices that it requires.

Although engineering design is similar to scientific inquiry, there are significant differences. For example, scientific inquiry involves the formulation of a question that can be answered through investigation, while engineering design involves the formulation of a problem that can be solved through design. Strengthening the engineering aspects of the Next Generation Science Standards will clarify for students the relevance of science, technology, engineering and mathematics (the four STEM fields) to everyday life.

Dimension 2: Crosscutting Concepts

Crosscutting concepts have application across all domains of science. As such, they are a way of linking the different domains of science. They include: Patterns, similarity, and diversity; Cause and effect; Scale, proportion and quantity; Systems and system models; Energy and matter; Structure and function; Stability and change. The Framework emphasizes that these concepts need to be made explicit for students because they provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world.

Dimension 3: Disciplinary Core Ideas

Disciplinary core ideas have the power to focus K–12 science curriculum, instruction and assessments on the most important aspects of science. To be considered core, the ideas should meet at least two of the following criteria and ideally all four:

- Have **broad importance** across multiple sciences or engineering disciplines or be a **key organizing concept** of a single discipline;
- Provide a **key tool** for understanding or investigating more complex ideas and solving problems;
- Relate to the **interests and life experiences of students** or be connected to **societal or personal concerns** that require scientific or technological knowledge;
- Be **teachable** and **learnable** over multiple grades at increasing levels of depth and sophistication.

Disciplinary ideas are grouped in four domains: the [physical sciences](#); the [life sciences](#); the [earth and space sciences](#); and [engineering, technology and applications of science](#).



Inquiry



BOX 3-1

PRACTICES FOR K-12 SCIENCE CLASSROOMS

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Elementary School

Life Science

Earth & Space Science

Physical Science

Elementary School Introduction			
K	K-LS1 From Molecules to Organisms: Structures and Processes	K-ESS2 Earth's Systems	K-PS2 Motion and Stability: Forces and Interactions
		K-ESS3 Earth and Human Activity	K-PS3 Energy
1	1-LS1 From Molecules to Organisms: Structures and Processes	1-ESS1 Earth's Place in the Universe	1-PS4 Waves and Their Applications in Technologies for Information Transfer
	1-LS3 Heredity: Inheritance and Variation of Traits		
2	2-LS2 Ecosystems: Interactions, Energy, and Dynamics	2-ESS1 Earth's Place in the Universe	2-PS1 Matter and Its Interactions
	2-LS4 Biological Evolution: Unity and Diversity	2-ESS2 Earth's Systems	
Grades K-2 Engineering Design Introduction			
K-2-ETS1 Engineering Design			
3	3-LS1 From Molecules to Organisms: Structures and Processes	3-ESS2 Earth's Systems	3-PS2 Motion and Stability: Forces and Interactions
	3-LS2 Ecosystems: Interactions, Energy, and Dynamics	3-ESS3 Earth and Human Activity	
	3-LS3 Heredity: Inheritance and Variation of Traits		
	3-LS4 Biological Evolution: Unity and Diversity		
4	4-LS1 From Molecules to Organisms: Structures and Processes	4-ESS1 Earth's Place in the Universe	4-PS3 Energy
		4-ESS2 Earth's Systems	4-PS4 Waves and Their Applications in Technologies for Information Transfer
		4-ESS3 Earth and Human Activity	
5	5-LS1 From Molecules to Organisms: Structures and Processes	5-ESS1 Earth's Place in the Universe	5-PS1 Matter and Its Interactions
	5-LS2 Ecosystems: Interactions, Energy, and Dynamics	5-ESS2 Earth's Systems	5-PS2 Motion and Stability: Forces and Interactions
		5-ESS3 Earth and Human Activity	5-PS3 Energy

Next Generation Science Standards K-5

K-ESS2 Earth's Systems

K-ESS2 Earth's Systems

Students who demonstrate understanding can:

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. - Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s). - Construct an argument with evidence to support a claim. (K-ESS2-2) ----- Connections to Nature of Science Science Knowledge is Based on Empirical Evidence - Scientists look for patterns and order when making observations about the world. (K-ESS2-1)	ESS2.D: Weather and Climate - Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) ESS2.E: Biogeology - Plants and animals can change their environment. (K-ESS2-2) ESS3.C: Human Impacts on Earth Systems - Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (<i>secondary to K-ESS2-2</i>)	Patterns - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1) Systems and System Models - Systems in the natural and designed world have parts that work together. (K-ESS2-2)

Connections to other DCIs in kindergarten: N/A

Articulation of DCIs across grade-levels: **2.ESS2.A** (K-ESS2-1); **3.ESS2.D** (K-ESS2-1); **4.ESS2.A** (K-ESS2-1); **4.ESS2.E** (K-ESS2-2); **5.ESS2.A** (K-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)

W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)

W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (*K-ESS2-2*)

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)

Mathematics –

MP.2 Reason abstractly and quantitatively. (K-ESS2-1)

MP.4 Model with mathematics. (K-ESS2-1)

K.CC.A Know number names and the count sequence. (K-ESS2-1)

K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)

K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

Source: Next Generation Science Standards

www.TeachingForBiliteracy.com



Next Generation Science Standards K-5

K-ESS2 Earth's Systems

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K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

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Performance Expectations

- Assessable statements of what students should know and be able to do...*after* instruction.



Next Generation Science Standards K-5

Three Foundation Boxes

Process

What students do

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)

Engaging in Argument from Evidence

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

- Construct an argument with evidence to support a claim. (K-ESS2-2)

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

Content

What students know

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

ESS2.E: Biogeology

- Plants and animals can change their environment. (K-ESS2-2)

ESS3.C: Human Impacts on Earth Systems

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary to K-ESS2-2)

Connections

How students think

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS2-2)

Source: Next Generation Science Standards

www.TeachingForBiliteracy.com



Next Generation Science Standards K-5

Three Foundation Boxes

Process

What students do

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Content

What students know

- Physical sciences
- Life sciences
- Earth sciences
- Engineering, technology and application of science

Connections

How students think

- Patterns
- Cause and effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Function
- Stability and Change



Next Generation Science Standards K-5 Resources

<https://www.nextgenscience.org/get-to-know>

<http://www.nextgenstorylines.org>

<http://www.nextgenscience.org/resources/bundling-ngss>

Example Bundles:

Read First: [Introduction and Guide](#)

The bundles will be released over the course of summer 2016. Six course models are currently available below.

Kindergarten

[Thematic Model](#)

[Topics Model](#)

1st Grade

Thematic Model

Topics Model

2nd Grade

Thematic Model

Topics Model

3rd Grade

Thematic Model

Topics Model

4th Grade

Thematic Model

Topics Model

5th Grade

Thematic Model

Topics Model

Middle School

[Course 1: Phenomenon Model](#)

[Course 1: Topics Model](#)

Course 2: Phenomenon Model

Course 2: Topics Model

Course 3: Phenomenon Model

Course 3: Topics Model

High School

[Course 1: Conceptual Progressions Model](#)

[Course 1: Domains Model: Chemistry](#)

Course 2: Conceptual Progressions Model

Course 2: Domains Model: Physics

Course 3: Conceptual Progressions Model

Course 3: Domains Model: Biology



Example Bundles:

Read First: [Introduction and Guide](#)

Kindergarten

[Thematic Model](#)

[Topics Model](#)

1st Grade

[Thematic Model](#)

[Topics Model](#)

2nd Grade

[Thematic Model](#)

[Topics Model](#)

3rd Grade

[Thematic Model](#)

[Topics Model](#)

4th Grade

[Thematic Model](#)

[Topics Model](#)

5th Grade

[Thematic Model](#)

[Topics Model](#)

Middle School

[Course 1: Phenomenon Model](#)

[Course 2: Phenomenon Model](#)

[Course 3: Phenomenon Model](#)

[Course 1: Topics Model](#)

[Course 2: Topics Model](#)

[Course 3: Topics Model](#)

High School

[Course 1: Conceptual Progressions Model](#)

[Course 2: Conceptual Progressions Model](#)

[Course 3: Conceptual Progressions Model](#)

[Course 1: Modified Domains Model: Chemistry w/Earth and Space Science](#)

[Course 2: Modified Domains Model: Physics w/Earth and Space Science](#)

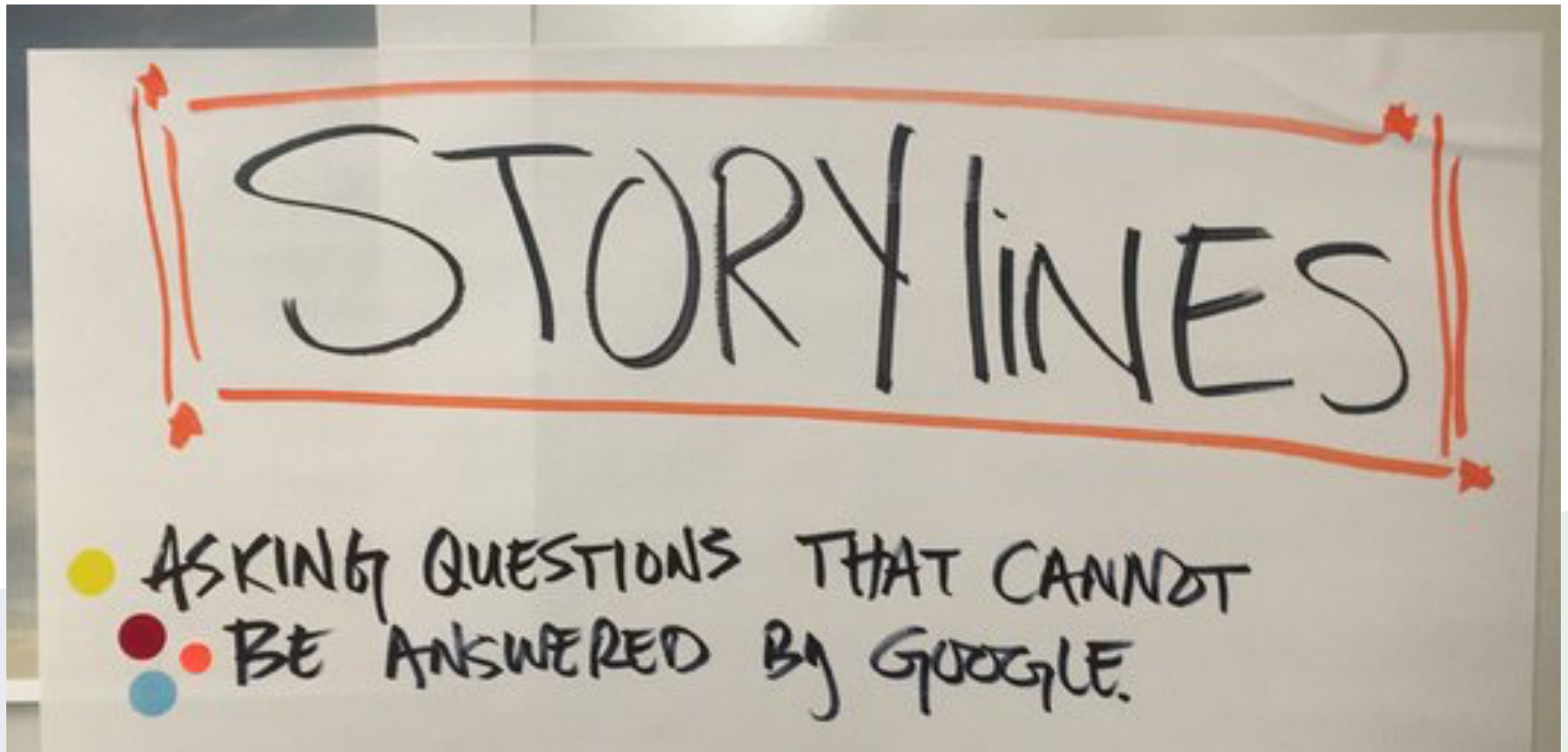
[Course 3: Modified Domains Model: Biology w/Earth and Space Science](#)

NGSS Example Bundles

<http://www.nextgenscience.org/resources/bundling-ngss>



Next Generation Science Standards K-5



Source: <https://pbs.twimg.com/media/CiwpnzdUkAAsdVR.jpg>



Fifth Grade

Year-Long Storyline written by NGSS
as part of the bundling options

The performance expectations in fifth grade help students formulate answers to questions such as: "When matter changes, does its weight change? How much water can be found in different places on Earth? Can new substances be created by combining other substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?" Fifth grade performance expectations include PS1, PS2, PS3, LS1, LS2, ESS1, ESS2, and ESS3 Disciplinary Core Ideas from the *NRC Framework*. Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun. Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.



Unit Storyline: Science/ Language Arts

Unit 1 Storyline:

Essential Question: What do plants need to meet their needs and survive within environments?

Essential Understanding: We want students to understand that plants need to meet their needs in order to survive in their environment.

The concept that all plants have developed ways of surviving in their environment connects to the idea that living things need water, air, and resources from the land they live in (K-LS1-1). Plants can adjust to their environment to meet their needs (K-ESS2-2). Students will observe and ask questions about how plants meet their needs under different weather conditions. Through this unit, students will communicate how their (human) use of natural resources impact the environment (K-ESS3-3). Students will create a model to represent the different needs of plants and compare it to another plant or themselves (K-ESS3-1). After introducing the topic through dynamic experiences and after students build oracy and background knowledge the students will further their knowledge with the use of informational text. During reading time, with prompting and support, students will be working on identifying main idea, retelling key details, describing connections between texts and relationships between illustrations and the text (RI.K.1*, RI.K.2, RI.K.3, RI.K.7, RI.K.10*). With guidance and support, students will use a combination of drawing, dictation, and writing to compose an informative text (W.K.2). Because the writing genre students will produce as part of the summative assessment is writing a how-to-book, students will write how-to-books about routines in the classroom (for example, how to wash our hands; how to pack up at the end of the day to go home; how to share responsibilities, etc.). The how-to-books that are written as a whole group and practiced will become mentor texts for students as they write their own how-to-book about how to care for a living plant. Using the writing process, students will create a how-to-book of their choice (using examples of the mentor texts they have written as a group) and they will include information they recalled from experiences or from provided sources (ETS.K.1.1) (W.K.4*, W.K.5, W.K.8, W.K.10*).



Share:

- What I like about the science standards is _____.
- To meet the instructional shifts in the standards, we should _____.
- In my practice, science_____.

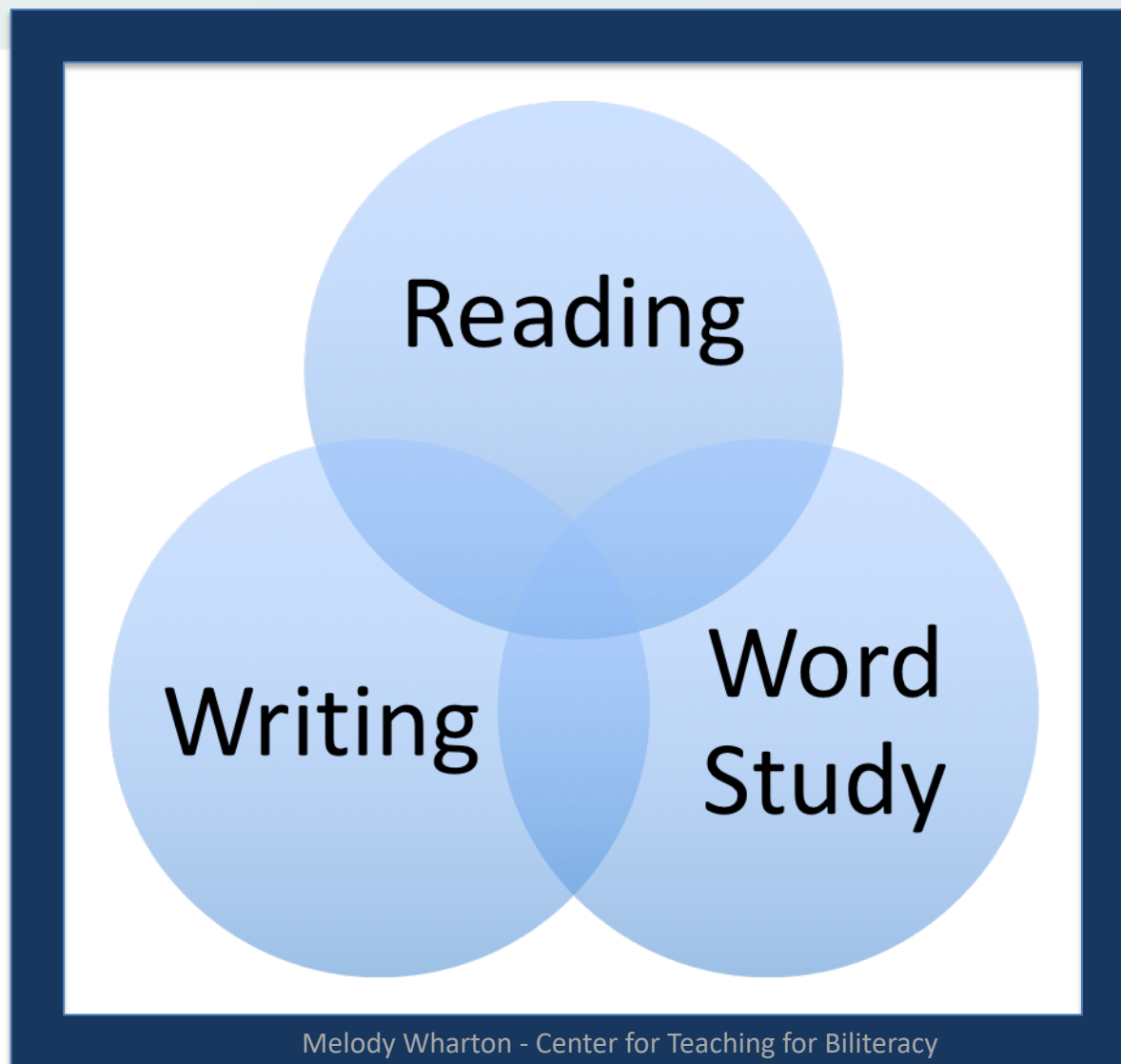


[illegible]

Universal Themes



Literacy Pedagogy



Context
for
Meaning:
SS,
Science
Or
**Universal
theme**



6th GRADE SLA 2017-2018 YEAR-AT-A- GLANCE

Quarter 1-first 9 weeks 6 weeks Spanish 3 weeks English	Quarter 2- second 9 weeks 6 weeks Spanish 3 weeks English	Quarter 3- third 9 weeks 6 weeks Spanish 3 weeks English	Quarter 4- fourth 9 weeks 6 weeks Spanish 3 weeks English
Overarching question: How does one preserve culture?			
READING	READING	READING	READING
Title: Individuals as Part of our Whole Community A way to make an impact in your community is <u>activism</u> Making social changes → have a voice Essential Question: How do individuals impact their communities? What is the benefit of contributing to the greater good? Essential Understanding: - A community is... -The point of view used to tell the story has a great impact (THEME) Genre: Realistic Fiction, Biographies, and Poetry	Title: Connecting the Past, Present, and Future Essential Question: What does the past have to do with me? How can I use it to shape the future? (current immigration, colonization etc.) <u>¿Qué tiene que ver el pasado conmigo? ¿Cómo puedo usarlo para dar forma al futuro?</u> Essential Understanding: -Fictional texts follow a specific plot structure. - There are various types of characters (static, dynamic, flat, round). - Dynamic characters change throughout a text and move towards a resolution. (CHARACTERIZATION AND POV) Genre: Historical Fiction, <u>NewsELA</u> articles on immigration or primary documents from explorers, Poetry	Title: The Individual in Nature Essential Question: What is our relationship with nature? • How is nature at war with each of us and how does it prove our vulnerability? • What is our responsibility in preserving our planet for future generations? • Where do you fit into nature? You are vulnerable to it. You have a responsibility to it. You are an essential part of it. Essential Understandings: - We as humans can often be held at nature's mercy, and because of this, it's everyone's job to care for the environment to maintain <u>their</u> safety and security of future generations. -Authors use descriptive language to add to the tone of the text. -Figurative language adds meaning Mood and tone: Mood-- estado de animo	Title: TBD Essential Question: • How does life in the fantasy world help us learn about the real world? • What kinds of conflicts typically occur in fantasy narratives? • What is believable about the story? ◦ What elements of culture can be found in the story???? Title: Preserving Culture Essential Question: • Does culture impact the delineations between good and evil? ◦ How is culture defined? • How do different groups advocate to preserve their culture?

6th GRADE SLA 2017-2018 YEAR-AT-A- GLANCE

Quarter 1-first 9 weeks 6 weeks Spanish 3 weeks English	Quarter 2- second 9 weeks 6 weeks Spanish 3 weeks English	Quarter 3- third 9 weeks 6 weeks Spanish 3 weeks English	Quarter 4- fourth 9 weeks 6 weeks Spanish 3 weeks English
Overarching question: How does one preserve culture?			
READING	READING	READING	READING
Title: Individuals as Part of our Whole Community A way to make an impact in your community Making a difference with your voice Essential Understanding: individual... What is the benefit of contributing to the greater good? Essential Understanding: - A community is... -The point of view used to tell the story has a great impact (THEME) Genre: Realistic Fiction, Biographies, and Poetry	Title: Connecting the Past, Present, and Future para <u>dar</u> forma al <u>futuro</u>? Essential Understanding: -Fictional texts follow a specific plot structure. - There are various types of characters (static, dynamic, flat, round). - Dynamic characters change throughout a text and move towards a resolution. (CHARACTERIZATION AND POV) Genre: Historical Fiction, <u>NewsELA</u> articles on immigration or primary documents from explorers, Poetry	Title: The Individual in Nature You are vulnerable to it. You have a responsibility to it. You are an essential part of it. Essential Understandings: - We as humans can often be held at nature's mercy, and because of this, it's everyone's job to care for the environment to maintain <u>their</u> safety and security of future generations. -Authors use descriptive language to add to the tone of the text. -Figurative language adds meaning Mood and tone: Mood-- <u>estado de animo</u>	Title: TBD story? - What elements of culture can be found in the story???? Title: Preserving Culture Essential Question: - Does culture impact the delineations between good and evil? - How is culture defined? - How do different groups advocate to preserve their culture?

At the secondary level, stand alone Spanish Language Arts classes will need a universal theme to provide the meaningful context for reading and writing.

80% First Grade Rules + Regular System

Content

SC / SS

Living, Learning
+ Working
Together

(Math is mapped
elsewhere)

Writing

Reading

20% English
Universal Themes (Not Content)

Are there rules everywhere? How do observations describe patterns?

Universal themes provide meaningful context – themes that engage students and that connect the reading and writing.

Literature

Informational

Informations

School

Friendship

→ Wea

Universal Theme in English in an 80/20 program.

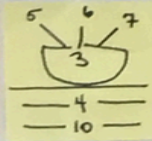
What factors help people
get along? (Author's Study-
Relationships)

Universal Theme in
Literature

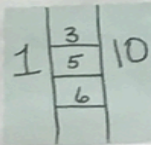
Narrative

3

Fiction



Literature

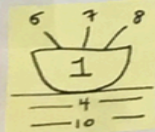


How can I be my best?
RESPONSIBILITY
Universal Theme

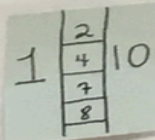
1

Opinion

Persuasive
Letter



Informational



Universal themes
in a 50/50 map.

Examples of Universal Themes:

- Family
- Celebrations
- Responsibility
- Right and Wrong
- Justice / Fairness



Share:

- What I like about universal themes is _____.
- To meet the instructional shifts in the standards, we should _____.
- In my practice, universal themes _____.



Biliteracy Units are Integrated: Content, Literacy and Language. Content and reading and writing standards are selected as part of the mapping process.

The collage features several educational documents and student work:

- Student Project:** A large sheet of paper with the title "Rules & Resp." in green. Below it, the question "Are there rules everywhere?" is written in red. To the right, the word "Sold" is written in green, followed by "How do..." in red. The project includes a table of "Illinois Learning Standards for Social Science-1st Grade" and a section titled "Inquiry Skills" with sub-sections: "Constructing Essential Questions", "Determining Helpful Sources", "Evaluating Sources and Using Evidence", "Developing Claims and Using Evidence", "Communicating Conclusions and Taking Informed Action", and "Taking Informed Action".
- Standards:** A section titled "Illinois Learning Standards for Social Science-1st Grade" is visible, listing various standards such as "SS.1.1.1: Explain how all people, not just official leaders, play important roles in a community" and "SS.1.1.2: Identify and explain how rules function in various settings, inside and outside of the school".
- Literacy and Content Standards:** Several smaller documents are visible, including "Literature", "Informational", and "Writing Standards".

Content: Science, Social Science Standards or a Universal Theme.

Writing Standards

Reading Standards