TRUMBULL PUBLIC SCHOOLS
TRUMBULL, CONNECTICUT

Curriculum Committee of the
Trumbull Board of Education

Regular Meeting

Tuesday, November 29th, 2022, 8:30 a.m. Trumbull
High School Main Office Conference room

AGENDA

I. Call to Order/Introduction

II. Public Comment

III. Approval/Minutes – Regular Meeting October 10-20-2022

IV. New Business

a. Curriculum Guide Update- Grade 4 Science

b. Curriculum Guide Update- Grade 5 Science

c. New Course Proposal- Grades 9-12 American Sign Language- Level 1

d. New Course Proposal- Grades 11-12 UConn Early College Experience- If You Love It, Teach It

e. New Text Proposal- Grade 12 -African American Literature

1. Butler, Octavia E, *Parable of the Sower*. New York, Four Walls Eight Windows, 1993.

TRUMBULL PUBLIC SCHOOLS
TRUMBULL, CONNECTICUT

Curriculum Committee of the
Trumbull Board of Education

Regular Meeting

Thursday, October 20, 2022, 8:30 a.m.
Trumbull High School Main Office Conference Room

MINUTES

I. Call to Order/Introduction- Mrs. Petitti called the meeting to order at 8:30am.

Members Present	Members Absent
M. Petitti, BOE Curriculum Committee Chair	L.Nuland, BOE Member
J.McNamee BOE Member	
S. Iwanicki, Ed.D., administrative designee	

II. Public Comment- Trumbull parent Tara Figueroa shared that she attended to support the work being done to diversify our curriculum. No other public comment was received.

III. Approval/Minutes – A motion was received by Lucinda Timpanelli to approve the minutes of August 18th Curriculum Committee. Mrs. Petitti seconded. Ms. McNamee obstained. The motion passed. A second motion was made by Ms. McNammee to approve the minutes of the Regular Meeting 09/22/2022. Mrs. Petitti seconded. The motion passed.

IV. New Business

a. Grade 6– Reading

1. New Text Approval for Revised Course: Woodson, Jacqueline. *Harbor Me*, 2018- Grade 6 Reading teachers, Kristen Heffernan (Hillcrest) and Morgan Mancini Madison,) presented the text. They shared the setting and plot of the novel and the accessibility of the text for 6th graders. They highlighted that it also teaches standards around themes of struggle and narration. Ms. McNamee noted that it is "a modern classic" and the author has earned the National Book Award for another book she wrote *Brown Girl Dreaming*. Mrs. Petitti shared that the real-life experiences are good for students. Ms. McNamee made a motion to approve the book *Harbor Me* and bring it to the full Board. Mrs. Petitti seconded. The motion was approved.

2. New Text Approval for Revised Course: Lai, Thanhha. *Inside Out & Back Again*, 2011. It was shared that both *Harbor Me* and *Inside Out & Back Again* will be used in Book Clubs with students. *Inside Out & Back Again* highlights the personal experience of a child-refuge and helps students to experience another perspective.

The teachers highlighted that it helps students to understand how much change can happen in just one year in addition to touching on a theme of resilience and hope and teaching standards that involve inference and comprehension. Winder of the National Book Award as well as a Newbury Honor Book, this memoir features a strong protagonist that appeals to 6th grade students and allows them to reflect deeply on themes which they can relate to at their grade level. Mrs. Petitti commented that the book touches another culture and yet anyone can relate to the experience. Ms. McNamee noted that both books could be core books as well as supplemental. Ms. McNamee made a motion to approve the book *Inside Out & Back Again*, and bring it to the full Board. Mrs. Petitti seconded. The motion was approved.

b. Grade 7–English Language Arts
New Text Approval for Revised Course: Alifirenka, Caitlin, et al. *I Will Always Write Back*: *How One Letter Changed Two Lives*. 2015. Grade 7 Language Arts Teacher, Jeanne Malgioglio (Madison) presented the text joined by ELA Instructional Team Leaders Leigh Gabriel (Hillcrest) and Valentina Cenatiempo (Madison). It was shared that this book will be read right after a unit on Africa in the student Social Studies class and because it is narrated by the voice of teens, it really counteracts stereotypes and shows authentic perspectives about Zimbabwe. In addition to the cultural exposure, the different points of view in the book and the themes of kindness and generosity fit well with both the standards and the social emotional development of seventh grade students. Ms, McNamee highlighted that non-fiction is important and standards aligned. Mrs. Pettti stated it was relatable, and that we also need to maintain challenge. A short discussion regarding maintaining rigor and balancing new authors with classic authors, such as Mark Twain was held. It was agreed that there are formats within book clubs and ways to engage readers in reading higher level text that can ensure that rigor is in place. Ms. McNamee made a motion to approve the book *I Will Always Write Back*: *How One Letter Changed Two Lives*. and bring it to the full Board. Mrs. Petitti seconded. The motion was approved.

c. Grades 9-12– New Curriculum Guide Approval: Jazz Band
THS music teacher Josh Murphy presented the new Jazz Band Curriculum. He shared that the course outlines the study of Jazz which is anything that is not classical instrumental and band music; it could incorporate Latin Music, for example. He reviewed that the guide compliments the two concerts that students get to perform and that students learn basic Jazz Band and a host of concepts and skills around rhythms, the Blues, improvisation and more. Ms, NcNamee mentioned that she loved the assignment where students listen to the music and get to analyze it. Mr. Murphy responded that 90% of Jazz is just listening. Mrs. Petitti shared that "it looks like a fun course!" Ms. McNamee made a motion to approve the *Grades 9-12–Jazz Band Curriculum Guide* and bring it to the full Board. Mrs. Petitti seconded. The motion was approved.

d. Grades 10-12– New Curriculum Guide Approval: African American/ Black and Puerto Rican/Latino Course of Studies. Social Studies Department Chair Kathy Rubano shared that the course for this guide is required by the state and that Sean and she had been

attended modules offered by the state to develop its curriculum. The course ran two sections last year and is running two more this year. The students study African American/Black History the first semester and Puerto/Rican Latino the second semester. Mr. Cafferty shared that the reception has been very positive. Ms. McNamee asked the students ever use Spanish in the Latino semester as it is the native language of many of our students. It was shared that while many of our students are fluent in oral Spanish, they struggle with reading and writing academic Spanish. Nevertheless, Mr. Cafferty has incorporated elements into the course, such as magical realism poetry, that students read and translated. He was grateful for the Board's support in working with the state to synthesize all the resources provided to develop the curriculum guide within the History Department and its offerings. Ms. McNamee shared that offering an AP African American History course may be a good follow-up. Ms. McNamee made a motion to approve the curriculum guide for *Grades 10-12 African American/ Black and Puerto Rican/Latino Course of Studies*–and bring it to the full Board. Mrs. Petitti seconded. The motion was approved.

The meeting was adjourned at 9:15a.m.

TRUMBULL PUBLIC SCHOOLS
Trumbull, Connecticut

Science Curriculum
Grade 4
Next Generation
September 1, 2022

Curriculum Writing Team

Suzanne Spielman	Science Teacher, Jane Ryan Elementary
Amy Alfano	Science Teacher, Middlebrook Elementary
Amanda Schaefer	Science Teacher, Middlebrook Elementary
Matia Berti	Science Teacher, Frenchtown Elementary
Nicole Maresca	Science Teacher, Frenchtown Elementary
Alison Cotter	Science Teacher, Booth Hill Elementary
Stacy Weinstein	Science Teacher, Daniels Farm Elementary
Elizabeth Doherty	Elementary Science Program Leader Grades K-5
Dr. Susan Iwanicki	Assistant Superintendent

NEXT GENERATION SCIENCE
Grade 4

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NEXT GENERATION SCIENCE
Grade 4

APPENDICES

The Trumbull Board of Education will continue to take Affirmative Action to ensure that no persons are discriminated against in its employment.

CORE VALUES AND BELIEFS

The Trumbull School Community engages in an environment conducive to learning which believes that all students will **read** and **write effectively**, therefore communicating in an articulate and coherent manner. All students will participate in activities **that present problem-solving through critical thinking**. Students will use technology as a tool applying it to decision making. We believe that by fostering self-confidence, self-directed and student-centered activities, we will promote **independent thinkers and learners**. We believe **ethical conduct** to be paramount in sustaining the welcoming school climate that we presently enjoy. Approved 8/26/2011

INTRODUCTION & PHILOSOPHY

The Connecticut State Board of Education, in its 2008 Position Statement on Science Education, calls for a systematic approach to ensuring that every student in Connecticut receives a rich and coordinated PK-12 education in science. Science learning should focus simultaneously on developing an understanding of core concepts, as well as knowing how scientists work collaboratively to test ideas, analyze evidence and solve problems. The realization of this vision is critical for our students' futures, as well as for Connecticut's place in the globally competitive economy.

In 2015, the Connecticut State Board of Education adopted the Next Generation Science Standards which embodies the National Research Council's *Framework for K-12 Education: Practices, Crosscutting Concepts, and Core Ideas* (2011); and furthermore developed a 5-year Implementation Plan of the Next Generation Science Standards (NGSS) for transitioning curriculum, instruction, and assessment. The NGSS architecture was designed to provide information to teachers and curriculum and assessment developers beyond the traditional one line standard and uses Science and Engineering Practices along with various components of the Disciplinary Core Ideas and Crosscutting Concepts to make up the performance expectations for students.

The Board offers guidelines to support the establishment of collaborations among various stakeholders to build a coordinated science education system. (SDE, 2008).
As developed by the writers of the *Framework for K-12 Science Education* (Council, 2011), a core idea for K-12 science instruction should:

1. "Have broad importance across multiple sciences or engineering disciplines or be a key organizing principle of a single discipline."
2. "Provide a key tool for understanding or investigating more complex ideas and solving problems."
3. "Relate to the interests and life experiences of students or be connected to societal or personal concerns that require scientific or technological knowledge."
4. "Be teachable and learnable over multiple grades at increasing levels of depth and sophistication." (Council, 2011)

The Trumbull Public School's Grade 4 science curriculum addresses the Next Generation Science Standards as listed with each unit of study.

SAFETY FIRST

The Trumbull Public School System follows the recommended guidelines for student safety in the classroom as represented in the National Science Education Standards, State Science Frameworks and NGSS, the National Science Teachers Association, and OSHA and as outlined in subsections of Policy 6000 in regards to Instruction. We encourage and foster a hands-on, process and inquiry-based approach to science instruction with student safety always first and foremost in mind. The use of lab safety guidelines are supported throughout the district.

COURSE GOALS

The course goals derive from the 2013 Next-Generation Science Standards. Goals are listed specific to each unit in this curriculum guide, and developed through unit lessons using the 5E learning model (engage, explore, explain, elaborate, evaluate) in order to encourage student engagement and foster metacognitive learning strategies through a reflective process. An important role of science education is not to teach "all the facts" but rather to prepare students with sufficient core knowledge so that they can later acquire additional information on their own.

COURSE ENDURING UNDERSTANDINGS

Earth's Systems, History, and Human Impact
Students will understand…

- Earth's major systems interact in multiple ways to affect earth's surface materials and processes. Human activities affect Earth's systems and their interactions at its surface.
- Maps can help locate the different land and water features where people live and in other areas of Earth.
- Living things affect the physical characteristics of their regions. Many types of rocks and minerals are formed from the remains of organisms or are altered by their activities.
- All materials, energy, and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.
- A variety of hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.
- Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. However, humans are doing things to help protect Earth's resources and environments.

Energy, Waves and their Applications
Students will understand…

- Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
- When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced.
- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.
- When objects collide, the contact forces transfer energy so as to change the object's motion. The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.
- It is important to be able to concentrate energy so that it is available for use where and when it is needed. For example, batteries are physically transportable energy storage devices, whereas electricity generated by power plants is transferred from place to place through distribution systems.
- Waves, which are regular patterns of motion, can be made in water by disturbing the surface. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks.)
- Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa.

Molecules to Organisms

Students will understand…

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
- Organisms range in composition from a single cell to multicellular organisms. In multicellular organisms groups of cells work together to form systems of tissues and organs that are specialized for particular functions.
- Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions and support their survival.
- Eye structures have individual functions, and light waves and their frequencies affect our experience of vision. (Relationship between light and pupil size.)

Engineering Design

Students will …

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

COURSE ESSENTIAL QUESTIONS

- How do people reconstruct and date events in Earth's planetary history?
- How and why is Earth constantly changing?
- How do Earth's major systems interact?
- How do the properties and movements of water shape Earth's surface and affect its systems?
- How do living organisms alter Earth's processes and structures?
- How do human activities and Earth's surface processes (including natural disasters) affect each other?
- How do humans depend on Earth's resources?
- How can humans explain and predict interactions between objects and within systems of objects?
- How can one predict an object's continued motion, changes in motion, or stability?
- What is energy?
- How do food and fuel provide energy?
- How are waves used to transfer energy and information?
- What are the characteristic properties and behaviors of waves?
- How do organisms live, grow, respond to their environment, and reproduce?
- How do organisms detect, process, and use information about the environment?
- How do engineers solve problems?
- What are the criteria and constraints of a successful solution?
- How can the various proposed design solutions be compared and improved?

COURSE KNOWLEDGE AND SKILLS

Crosscutting scientific and engineering concepts as outlined in the Next Generation Science Standards for Grade 4 (NGSS):
Students will know…

- Patterns can be used as evidence to support an explanation. Science assumes consistent patterns in natural systems. Similarities and differences in patterns can be used to sort and classify natural phenomena.
- Cause and effect relationships are routinely identified, tested, and used to explain change.
- Energy and matter: Energy can be transferred in various ways and between objects. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
- Knowledge of relevant scientific concepts and research findings is important in engineering. Over time, people's needs and wants change, as do their demands for new and improved technologies.
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands.

Students will be able to …

- Ask questions (for science) and define problems (for engineering)
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Use mathematics and computational thinking
- Construct explanations (for science) and design solutions (for engineering)
- Engage in arguments from evidence
- Obtain, evaluate, and communicate information

SCIENCE YEAR AT A GLANCE

Lesson are based on Allotted Instructional Time per discipline for Grade 4: 225 minutes
(recommended 5 – forty-five minute classes per week or 4 - fifty-five minute classes per week)

September to December	Unit 1: **Changing Earth** Earth's Systems, History, and Human Impact STEM-embedded unit on Earth materials/systems/erosion
January to mid-April	Unit 2: **Energy Works** Waves and Their Applications in Technologies for Information Transfer (Energy - Natural Resources, Motion, Electricity)
Mid-April to June	Unit 3: **Plant and Animal Structures** From Molecules to Organisms: Structure and Function, Information Processing

UNIT 1- Changing Earth
Earth's Systems, History, and Human Impact

Unit Goals

Grade 4 students are expected to develop an understanding of the effects of weathering or the rate or erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of Earth's features, students will analyze and interpret data from maps. Different types of maps provide different information about the landforms and bodies of water on Earth. For example, Globes are three dimensional and use texture or elevated surfaces to show hills, mountains, or deserts.

NGSS.4-ESS1-1.	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
NGSS.4-ESS2-1.	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
NGSS.4-ESS2-2.	Analyze and interpret data from maps to describe patterns of Earth's features.
NGSS.4-ESS3-1.	Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.
NGSS.4-ESS3-2.	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
NGSS.3-5.ETS1.B	Designing Solutions to Engineering Problems. Testing a solution involves investigating how well it performs under a range of likely conditions.
NGSS.3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

NGSS.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The following course goals derive from the 2010 Connecticut Core Standards.

ELA/Literacy

CCS.ELA-Literacy.W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
CCS.ELA-Literacy.W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
CCS.ELA-Literacy.W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)
CCS.ELA-Literacy.SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Mathematics

CCS.MP.2	Reason abstractly and quantitatively.
CCS.MP.4	Model with mathematics.
CCS.MP.5	Use appropriate tools strategically.
CCS.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit

in terms of a smaller unit. Record measurement equivalents in a two-column table.

NGSS 3D Learning

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ● Identify the evidence that supports particular points in an explanation. (4-ESS1-1) ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ● Make observations and/or measurements to produce data to serve as the basis for	**ESS1.C: The History of Planet Earth** ● Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1) **ESS2.A**: Earth Materials and Systems ● Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ● The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or	**Patterns** ● Patterns can be used as evidence to support an explanation. (4-ESS1-1, 4-ESS2-2) **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ● Science assumes consistent patterns in natural systems. (4-ESS1-1) **Cause and Effect** ● Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1) **Influence of Science, Engineering and Technology on Society and the Natural World** ● Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1) ● Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

evidence for an explanation of a phenomenon. (4-ESS2-1) Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ● Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. ● Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)	near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2) **ESS2.E: Biogeology** ● Living things affect the physical characteristics of their regions. (4-ESS2-1) **ESS3.A: Natural Resources** ● Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1) **ESS3.B**: **Natural Hazards** ● A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). ● Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) (Note: This Disciplinary Core Idea can also be found in 3.WC.) **ETS1.B: Designing Solutions to Engineering Problems** ● Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)	

Unit Essential Questions:

- How do people reconstruct and date events in Earth's planetary history?
- How and why is Earth constantly changing?
- How do Earth's major systems interact?
- How do the properties and movements of water shape Earth's surface and affect its systems?
- How do living organisms alter Earth's processes and structures?
- How do human activities and Earth's surface processes (including natural disasters) affect each other?
- How do humans depend on Earth's resources?
- How do engineers solve problems?
- What are the criteria and constraints of a successful solution?
- How can the various proposed design solutions be compared and improved?

Scope and Sequence Bundle 1:
Lesson 1: Earth's Layers and Plates
Lesson 2: Rock Formations and Patterns
Lesson 3: Weathering and Erosion
Lesson 3a: This lesson is from Building for Erosion Control: Pearson Project
STEM
Lesson 4: Mapping Earth
Lesson 5: Changing Earth
Lesson 6: Life on a Changing Earth

Earth's Systems Phenomena:
Throughout history, strong earthquakes occurred leading to volcanic eruptions. (e.g., The west coast of the United States experiences many earthquakes. In 1980, a major earthquake triggered the eruption of Mount St. Helens in Washington.)

Earth's Systems Focus Questions:

- What causes earthquakes?
- Why does the west coast experience earthquakes?
- Why did Mount St. Helens erupt after an earthquake?
- What causes the layers of sand, soil, or clay to form?
- Are there differences between soil, sand, and clay?
- What is the difference between a map and globe?
- Where are most fossils found?
- Why are fossils found in regions where water once existed?
- Why are water animals found deeper underground?

Erosion STEM-based Application Phenomena: Driving around the country, you may notice warning signs alerting people about rockslides, landslides, mudslides, or flooding. With heavy rainfall, it is crucial to exercise caution.

Erosion STEM-based Application Focus Questions:

- What causes landslides, rockslides, mudslides, or flooding?
- Why are these events more common during rainfall?
- Are there solutions to prevent landslides, rockslides, mudslides, or flooding?

Assured Assessments:

Formative:

- Student Investigation Sheets
- Science Notebook Entries
- Whole Group Check-In Discussions
- Monitoring during turn and talk
- Student responses during class discussions
- Students' questions about the investigative phenomenon at the end of the unit
- Tell Me More Responses- Extensions and Enrichment

Summative/Content:

- Lesson 1- Changing Earth Snapshot
- Journal Activity- Earth's Plates and Layers
- Erosion IAB- (CSDE Comprehensive Assessment Program)
- Lesson 4- Mapping the Earth
- Relative Age of Rocks IAB- (CSDE Comprehensive Assessment Program)

Resource:

Core

- *Building Blocks of Science® 3D: Changing Earth* . Carolina Biological Module & Teacher Edition, 2019
- *Building Blocks of Science® 3D: Changing Earth* . Carolina Biological Student Readers. 2019. Carolina Biological Supply Company. Burlington, NC.
- *Project STEM: Building for Erosion Control*. Pearson Module & Teacher Edition
- *Project STEM: Building for Erosion Control Science Reader.* Pearson Education Inc. Upper Saddle River, NJ. Print

Supplemental

- *Erosion.* Delta Science Reader. Nashua, NH, 2004. Print
- Classroom and Learning Commons content related libraries

Time Allotment

- Earth's Systems: Changing Earth- Trimester 1 (September-December)

UNIT 2- Energy Works
Waves and Their Applications in Technologies for Information Transfer
(Energy, Motion, Electricity)

Unit Overview

Energy is a central idea in science; however, it is a complex and somewhat abstract topic that students may struggle to grasp. *Energy Works* incorporates phenomena and provides opportunities for students to manipulate materials while exploring concepts related to energy. Throughout the series of six hands-on lessons, students study different kinds of energy, the transfers and transformations that occur between them, and how energy is used in the world around them. Inquiry-based investigations encourage students to make claims supported with evidence and reasoning, elaborate upon their observations, and design their own experiments.

Students begin by tracing the flow of energy that comes into their bodies and identifying other sources of energy around them. They learn about the two main types of energy—stored (potential) and motion (kinetic)—and participate in interactive demonstrations to draw comparisons between them. To understand the concept of energy transfers and transformations, students set up circuits. They also learn about waves as more than just a water-related topic by examining energy patterns and making connections to forms of communication, like Morse code. Nonrenewable and renewable energy sources are introduced and students explore the benefits and detriments of different types of alternative energy. Students create models of wind turbines and waterwheels and elaborate upon their functionalities. In the last lesson, students design an experiment to answer a question about energy and demonstrate their knowledge. As a culmination, students evaluate how much they have learned about energy by revisiting their pre-unit assessment activity.

Standards

NGSS.4-PS3-1.	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
NGSS.4-PS3-2.	Make observations to provide evidence that energy

	can be transferred from place to place by sound, light, heat, and electric currents.
NGSS.4-PS3-3.	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
NGSS.4-PS3-4.	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
NGSS.4-PS4-1.	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
NGSS.4-PS4-3.	Generate and compare multiple solutions that use patterns to transfer information.
NGSS.4-ESS3-1.	Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.
NGSS.3-5.ETS1.B	Designing Solutions to Engineering Problems. Testing a solution involves investigating how well it performs under a range of likely conditions.
NGSS.3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
NGSS.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The following course goals derive from the 2010 Connecticut Core Standards.

ELA/Literacy

CCS.ELA-Literacy.W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
CCS.ELA-Literacy.W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
CCS.ELA-Literacy.W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
CCS.ELA-Literacy.W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
CCS.ELA-Literacy.SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
CCS.ELA-Literacy.SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
CCS.ELA-Literacy.RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
CCS.ELA-Literacy.RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
CCS.ELA-Literacy.RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.

Mathematics

CCS.MP.2	Reason abstractly and quantitatively.

CCS.MP.4	Model with mathematics.
CCS.MP.5	Use appropriate tools strategically.
CCS.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
CCS.MD.4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
CCS.4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

NGSS 3D Learning

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. ● Ask questions that can be investigated and predict reasonable outcomes based on patterns such as	**PS3.A: Definitions of Energy** ● The faster a given object is moving, the more energy it possesses. (4-PS3-1) ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3) **PS3.B: Conservation of Energy and Energy Transfer**	**Energy and Matter** ● Energy can be transferred in various ways and between objects. (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4) **Patterns** ● Similarities and differences in patterns can be used to sort and

cause and effect relationships. (4-PS3-3) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ● Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ● Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1) ● Apply scientific ideas to solve design problems. (4-PS3-4)	● Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3) ● Light also transfers energy from place to place. (4-PS3-2) ● Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4) **PS3.C: Relationship Between Energy and Forces** ● When objects collide, the contact forces transfer energy so as to change the object's motions. (4-PS3-3) **PS3.D: Energy in Chemical Processes and Everyday Life** ● The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) **ETS1.A: Defining Engineering Problems**	classify natural phenomena. (4-PS4-1) ● Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3) **Connections to Nature of Science** ● Scientific Knowledge Assumes an Order and Consistency in Natural Systems ● Science assumes consistent patterns in natural systems. (4-ESS1-1) **Cause and Effect** ● Cause and effect relationships are routinely identified. (4-PS4-2) **Interdependence of Science, Engineering, and Technology** ● Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)

● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3) **Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ● Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1) ● Develop a model to describe phenomena. (4-PS4-2)	● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3-4) **PS4.A: Wave Properties** ● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1) Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **ESS3.A: Natural Resources** ● Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)	

	ETS1.C: Optimizing The Design Solution ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)	

Unit Essential Questions:

- How can one predict an object's continued motion, changes in motion, or stability?
- What is energy?
- How are waves used to transfer energy and information?
- What are the characteristic properties and behaviors of waves?
- How do humans depend on Earth's resources as energy?
- How do food and fuel provide energy?
- How do engineers solve problems?
- What are the criteria and constraints of a successful solution?
- How can the various proposed design solutions be compared and improved?

Scope and Sequence Bundle 2:

Lesson 1: Energy Sources Are Everywhere
Lesson 2: Stored Motion and Energy
Lesson 3: Energy Transfers and Transformations
Lesson 4: Energy Moves in Waves
Lesson 5: Recycling Energy
Lesson 6: My Energy Experiment

Phenomenon:
Before a race, coaches tell their runners to eat a healthy meal of pasta, fruits, or vegetables. In fact, coaches of all sports encourage their athletes to have a snack before a game. You might have had a teacher encourage you to eat a good breakfast the morning of a big test. Why is this? What does this make you wonder?

Focus Questions:
- What are some types of energy we use?
- What are stored energy and motion energy?
- How does energy transfer form?
- What happens when objects collide?
- How is the sun's energy transferred?

- How do you build an electric circuit?
- How does a battery harness energy?
- How can you use waves to send messages?
- How can you create waves?
- How does energy move in waves?
- What are types of alternative Energy?
- How does a wind turbine generate electricity?
- What can I build to demonstrate water energy?

Assured Assessments:

Formative:

- Student Investigation Sheets
- Science Notebook Entries
- Whole Group Check-In Discussions
- Monitoring during turn and talk
- Student responses during class discussions
- Students' questions about the investigative phenomenon at the end of the unit
- Tell Me More Responses- Extensions and Enrichment

Summative:

- Lesson 2: Stored and Motion Energy
- Lesson 3: Energy Transfers and Transformations Journal Activity
- Batteries and Circuits IAB (CDSE Smarter Balanced Website)
- Lesson 4A: Energy Moves in Waves Journal Activity
- Lesson 4 (End): Water waves IAB (CDSE Smarter Balanced Website)
- Lesson 5: Recycling Energy Snapshot
- Lesson 5: Wind Turbine IAB (CDSE Smarter Balanced Website)

Resources:

Core:

- *Building Blocks of Science® 3D: Energy Works* . Carolina Biological Module & Teacher Edition, 2019
- *Building Blocks of Science® 3D: Energy Works* . Carolina Biological Student Readers. 2019. Carolina Biological Supply Company. Burlington, NC.

Supplemental

- *Energy,* Harcourt School Publishers, Print
- Classroom and Learning Commons content related libraries

Time Allotment:

- Trimester II and beginning of Trimester III (January to mid-April)

UNIT 3 - Plant and Animal Studies

From Molecules to Organisms: Structures and Processes

Unit Goals

Fourth graders are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another. For example, energy radiated from the sun is transferred to Earth by light. When light is absorbed, it warms Earth's land, air, and water and the energy produced facilitates plant growth.

Standards

NGSS.4-PS3-4.	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
NGSS.4-LS1-1.	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
NGSS.4-LS1-2.	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

The following course goals derive from the 2010 Connecticut Core Standards.

ELA/Literacy

CCS.ELA-Literacy.W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

CCS.ELA-Literacy.SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Mathematics

CCS.4.G.A.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

NGSS 3D Learning

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ● Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ● Construct an argument with evidence, data, and/or a model. (4-LS1-1)	**LS1.A: Structure and Function** ● Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) **LS1.D: Information Processing** ● Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	**Systems and System Models** ● A system can be described in terms of its components and their interactions. (4-LS1-1),(4-LS1-2)

Unit Essential Questions

- How do organisms live, grow, respond to their environment, and reproduce?
- How do organisms detect, process, and use information about the environment?

Scope and Sequence Bundle 3
Lesson 1: Structures Used for Survival
Lesson 2: Animal Structures
Lesson 3: Plant Structures
Lesson 4: Using the Senses
Lesson 5: Exploring the Eye
Lesson 6: Structure and Function

Phenomena
In Alaska, temperatures can be extremely cold—as low as -60°C (-76°F). Few types of plants and animals can survive in such a climate, but the Alaskan wood frog is able to freeze its body, which stops its breathing and the beating of its heart. When the temperatures rise in spring, the frog thaws and returns to life. What does this make you wonder?

Essential/Focus questions

- Will a seed grow inside a plastic bag?
- How do external structures support survival?
- How do internal structures support survival?
- How does a seed grow into a plant?
- Do plants have structural adaptations?
- How do internal structures help support a plant's survival, growth , and reproduction?
- How do we sense the world around us?
- How is information processed?
- How are senses tested?
- How is information processed?
- How are senses tested?
- How does the eye work?
- How do we see images?
- How do human eyes compare to other animals eyes?
- How can the eye be improved?

Assured Assessments

<u>Formative:</u>

- Student Investigation Sheets
- Science Notebook Entries

- Whole Group Check-In Discussions
- Monitoring during turn and talk
- Student responses during class discussions
- Students' questions about the investigative phenomenon at the end of the unit
- Tell Me More Responses- Extensions and Enrichment

Summative:

- Lesson 1- Structures Used for Survival - Journal Activity
- Lesson 2- Structures Used for Survival Snapshot
- Lesson 2- Animal Structures Journal Activity
- Lesson 3- Plant Structures Activity
- Lesson 5- Exploring the Eye Snapshot

Resources:

Core:

- *Building Blocks of Science® 3D: Animal Studies* . Carolina Biological Module & Teacher Edition, 2019
- *Building Blocks of Science® 3D: Animal Studies* . Carolina Biological Student Readers. 2019. Carolina Biological Supply Company. Burlington, NC.

Supplemental:

- Classroom and Learning Commons content related libraries
- Online resources will be listed with lesson outlines.
- Interactive Word Walls: (Teacher Resource)

https://drive.google.com/open?id=1FihpyiT-toBe2IbSjAOlqOEaW1Sw_Kgm
https://drive.google.com/file/d/1Q3CvdFzZuE0FeYH7O3VC097vtwK9fk08/view?usp=sharing

Time Allotment

- Trimester III (from mid-April to end of school year)

Appendix A
Sample of Assured Lesson Outline
Changing Earth

+-Grade 4: Unit 1: Earth's Systems, History, and Human Impact

Plan Ahead	★ For Lesson 2, Session 3, students will need access to hot water. Teachers may wish to plan to bring in a hot water heater/plate, thermos, etc. ★ For Lesson 3, collect approximately six 16 ounce or 1 liter plastic bottles. Each bottle should have a cap. ★ Field trip suggestion: Connecticut Science Center (November) *This unit has connections to Social Studies:* **Social Studies States and Regions: Harcourt Brace **Social Studies: Chapter 1: ***Lesson 2: Rivers Change the Land***	
Grade*:* Grade 4	***Topic:*** Earth's Layers and Plates	***Lesson 1 of 6*** ***(approximately 7 class sessions)***

Performance Standard:

- **4-ESS1-1:** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- **4-ESS2-1:** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- **4-ESS2-2:** Analyze and interpret data from maps to describe patterns of Earth's features.
- **4-ESS3-2:** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Crosscutting Concepts: Patterns, Cause and Effect

Students will know...

- Earth is composed of three layers: crust, mantle, and core.
- The mantle is made of liquid rock (magma), which convects and results in movement of the crust. n Volcanic activity and earthquakes are common along the boundaries between tectonic plates.
- The movement of tectonic plates can cause magma to rise from Earth's mantle and flow from volcanoes as lava.
- Earth is constantly changing; however, it can occur quickly or at a very slow rate.
- Changes to landforms or evidence of erosion may not be noticeable in a year or even a lifetime, but we can find evidence of past changes to predict future changes.
- Evidence of quick changes are noticeable when catastrophic events occur such as earthquakes, volcanoes, and flooding.

Objectives ...

- Construct a model of three layers of Earth.
- Assemble a map of Earth's tectonic plates and make predictions about the effects of their movement.
- Recognize patterns within the Ring of Fire to draw conclusions about volcanic activity and earthquakes.

Phenomena: Our Earth is constantly changing; however, it occurs at a very slow rate. Changes to landforms or evidence of erosion may not be noticeable in a year or even a lifetime, but we can find evidence of past changes to predict future changes. The anchoring phenomenon for *Changing Earth* is identifying geological events and structures to explain the history of Earth.

Lesson Plan – 5 E Model:

Essential Question(s):

- How do people reconstruct and date events in Earth's planetary history?
- How and why is Earth constantly changing?
- How do Earth's major systems interact?

Teacher Prep and resources: **https://carolinascienceonline.com/#/teacher/product-lines/BBS**
The Building Blocks of Science® 3D: Changing Earth module "Earth's Layers and Plates", Teacher Guide, and Student Reader
**All digital resources, including simulations, for Building Blocks of Science can be found online, with teacher access code, at http://www.carolinascienceonline.com* or click on the link above.

Before beginning this Unit of Study - Watch Phenomena video and Teacher Preparation Video in Digital Resources Under Unit Overview and Lesson 1 links for Carolina Biological 3D (link above)

LESSON OVERVIEW:

- Earth is made up of mountain ranges, lakes, volcanoes, rivers, canyons, and many other landforms and waterways, all of which are continually changing. Most of these changes are not noticeable in a single lifetime; for example, it takes rivers thousands—even millions—of years to form canyons. Other changes are more drastic and immediate, such as those resulting from an earthquake or a volcanic eruption. This unit focuses on Earth and its changing surface due to erosion, weathering, plate tectonics, and human impact.

- Begin school year by introducing Science Word Wall with poster: *Say It Like A Scientist*
  - During each lesson that introduces new vocabulary, have students post terms on the wall space provided.

ENGAGE: *Opening activity – access prior learning / stimulate interest / generate questions:*

Scope and Sequence:

Lesson 1, Session 1:

Investigation "A": What Are Earth's Layers?

- Read "Unit Overview: *Changing Earth*" from the *Building Blocks of Science® 3D: Changing Earth* Teacher Guide (p. xxiv) and "Background Information" (p. 36). AND on digital resources at:: https://carolinascienceonline.com/#/teacher/product-lines/BBS/products/59e9c9204242530000000024?node=5ca568f57d7f805cce2a0c2e&tab=5ca568f57d7f805cce2a0c16
- Prepare SMARTBoard and computer.
- Introduce phenomenon by reading section titled, "Investigative Phenomenon for Lesson 1" to students followed by the corresponding video (p. 34).

Investigative Phenomenon for Lesson 1 (Beginning of Lesson):
Throughout history, the west coast of the United States has experienced many earthquakes. In 1980, a strong earthquake occurred and led to the volcanic eruption of Mount St. Helens in Washington. The earthquake also caused a massive avalanche. Ask students to respond to the following question: "What does this make you wonder?" Chart student questions to refer to throughout the sessions.

Anticipated Questions:

- What causes earthquakes?
- Why does the west coast experience earthquakes?
- Why did Mount St. Helens erupt after an earthquake?

In science notebooks, students will create a two-column chart titled, "Our Earth." The first column should be titled, "What I Know About Earth" and the second column should be titled "What I Want to Know About Earth." Allow students to fill this chart in with as much detail as they can. Students can Turn & Talk or share with the whole class.

EXPLORE: *Lesson Description – Materials needed / probing or clarifying questions / resources*	
Scope and Sequence	**Materials** listed with each lesson design in Teacher Guide

Session 1: Investigation "A": *Pre-Unit Assessment: What Are Earth's Layers?* Introduce Lesson 1: Investigation A: What are Earth's Layers? (pp. 37 -39). These steps are outlined in Teacher Guide: **1.** Ask students to create a two-column chart in their science notebooks titled "Our Earth." The first column should be titled "What I Know About Earth," and the second column should be titled "What I Want to Know About Earth." Tell students that they are beginning a unit about Earth and how it can change. Allow a few minutes for students to fill in the chart with as much detail as they can. (you can also use the Interactive Digital resource for the SMART Board) https://carolinascienceonline.com/#/teacher/product-lines/BBS/products/59e9c920424253000000002 4?node=5ca568f57d7f805cce2a0c2f&sort=TITLE_ASC&tab=5ca568f57d7f805cce2a0c2b&play **2.** Tell students that they will learn about Earth's layers by building a model. Guide students to think about Earth's materials. Use the following questions to guide a discussion: ● How can we describe Earth? *(Answers will vary. Students might suggest that Earth is round, that it has water and land, that there are mountains, that Earth revolves around the Sun, or that Earth is made of different layers.)* ● What makes Earth different from other planets? *(Earth has living things and a large amount of water.)* ● How can the Earth support living things? *(Earth has air, water, food, and shelter, which are needed to support life.)*	**Teacher Prep:** 10 minutes **Lesson : 45 minutes** **Digital Tip:** Rather than drawing, use the Earth's Layers simulation during your discussion. **MATERIALS:** Students ● 1 Science notebook* ● 1 Ball of craft dough- three colors- yellow, red, green ● 1 Marble ● 1 Plastic knife **Team of two students** ● 1 Paper plate of clay **Teacher** ● 15 Paper plates* ● Chart paper or whiteboard* ● Clay ● Markers* *Use marble for inner core; yellow dough for outer core; red dough for mantle; green dough for crust ***Do not use the soil (crust) for this activity.**

- What is the Earth made of? *(Answers will vary, but students are likely to say things like soil, rocks, or water.)*

3. Draw attention to the idea that Earth is made of different materials. Begin a discussion about the different layers of Earth by drawing or providing a model like the one in Figure 1.2. Discuss Earth's three layers and their characteristics.

- Guide students to construct a model of Earth's layers using a marble, plastic knife, craft dough (various colors)

Investigation A

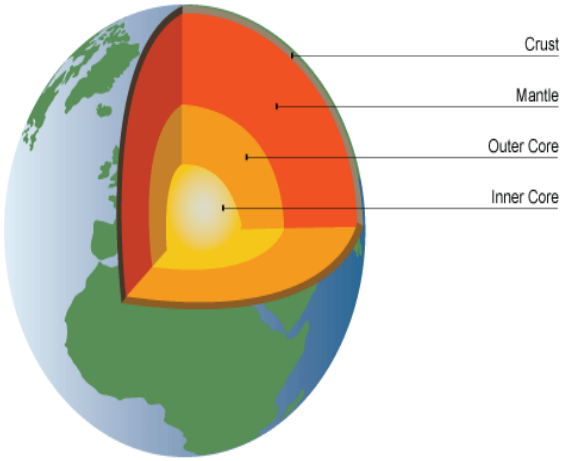
1. Each student will need about 2 tablespoons of each color of clay for their 3D Earth model. Place about one-quarter cup of clay on a paper plate for pairs of students to share.

2. Title a sheet of chart paper "Our Earth." Create a two-column chart with one column titled "What We Know About Earth" and the other column titled "What We Want to Know About Earth." Alternatively, use Interactive Whiteboard: Our Earth.

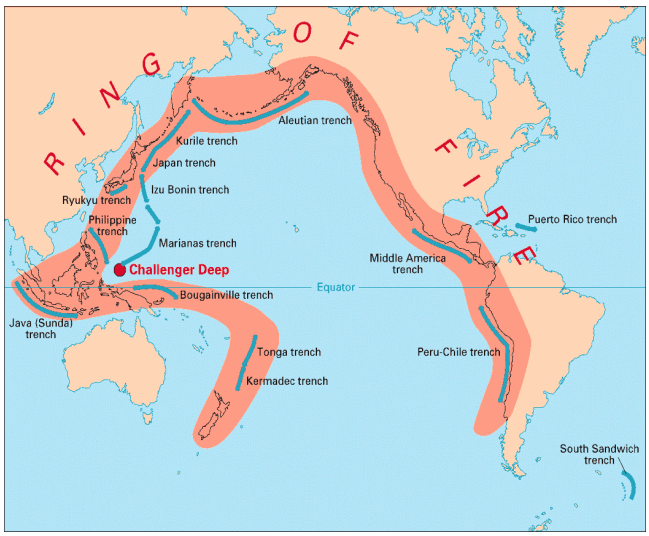
Turn & Talk: The mantle of Earth moves around, causing the crust to change shape. What landforms on Earth might have been formed by the movement of the mantle?

Vocabulary:

- **Crust:** The crust is the outermost layer of Earth and is solid. This is where life exists.
- **Mantle:** The mantle is the middle layer of Earth and is made of melted rocks. It is extremely hot and is constantly moving and flowing. This movement is what causes changes in Earth's crust.
- **Core:** The core is the deepest, innermost layer of Earth and is the hottest layer. It is made mostly of metals, which is what causes the Earth to be magnetic and have north and south poles.

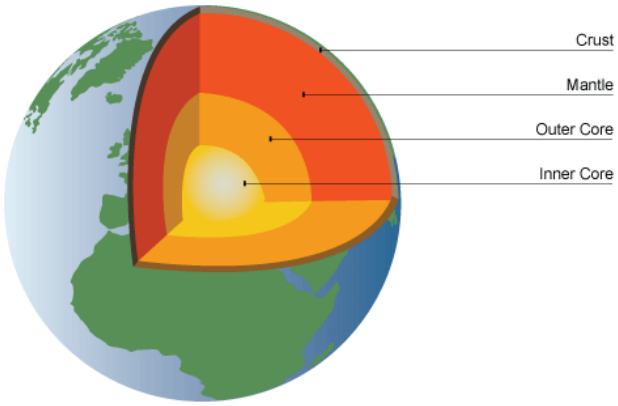


	Tell Me More Investigation A: page 39 (optional) The mantle of Earth moves around, causing the crust to change shape. What landforms on Earth might have been formed by the movement of the mantle?
Lesson 1, Session 2: (2 or 3 Days) ***TEACHER TIP:** **Prior to lesson - assign cutting of plates for homework - (suggest placing pieces in baggies)** **Watch prior to lesson:** **Brain Pop:** The Mysteries of Life: Plate Tectonics (6:49 min) **https://www.brainpop.com/science/earthsystem/platetectonics/** **You may want to explore the links to graphic organizer, related articles, worksheets, and vocabulary within the Brain Pop **Investigation "B":** *Why Does Earth Have Plates?* ● Introduce Investigation B: Why Does Earth Have Plates?" (pp. 40-41). **Use the discussion questions listed on pages 40 - 41 during investigation.** ● Students will construct a puzzle of a map as an introduction to studying about Earth's tectonic plates. ● In partnerships, facilitate discussion on observations from the map. Have students brainstorm the effects of the moving plates and record these in their Science Notebooks. **Turn & Talk:** Earthquakes and volcanic eruptions are common events along Earth's plates. What do you think causes an earthquake? Think about Earth's plates. **Watch after lesson:**	**Teacher Preparation:** 5 minutes **Lesson:** 45 minutes (each lesson) **For each student:** , Student Investigation Sheet 1B: *How is Earth Divided into Plates?* , Glue stick , Pair of scissors , Science notebooks , *Changing Earth* Literacy Reader, p. 5 , **Find the Continents and Oceans Make a copy for each student** **Teacher:** , Chart paper or whiteboard , Markers **Teaching Tip:** This investigation will introduce students to tectonic plates. Depending on the background knowledge of your students, it may be helpful to review the names of the continents. List them on the board, or provide a map for the class.  **Continents and Oceans**

Earth's Interior and Plate Tectonics:(5:43 min) https://easyscienceforkids.com/plate-tectonics-for-kids-video/	**Identify Phenomena:** Make connections to convections in the mantle and the convection of air, which rises as it heats, due to the sun, and falls as it cools. (p.41 TG) **Tell Me More Investigation B**: page 41 (optional) What do you think causes an earthquake? Think about Earth's plates.
EXPLAIN: *Concepts explained and vocabulary defined:*	
Lesson 1, Session 3: **Investigation "C"**: *What is the Ring of Fire?* ● Review vocabulary and concepts from Investigations A & B. ● Introduce Lesson 1: Investigation C: *What is the Ring of Fire?* (pp. 41-43). **Use the discussion questions listed on pages 41 - 43 during investigation.** ● Students will make observations using a map to recognize patterns related to the Ring of Fire and volcanic activity. ● Review students' questions about the investigative phenomenon from the beginning of the lesson.  	**Teacher Preparation:** 5 minutes **Lesson:** 45 minutes **For each student:** , Red marker , Science notebook , *Changing Earth* Literacy Reader, pp. 6-9 **Teacher:** , Chart paper or whiteboard , Markers **Teacher Tip:** Use the Magma Convection simulation to provide visual support for the idea that convection within the mantle causes magma to rise into a volcano. , Simulation: *Magma Convection* * **All digital resources for Building Blocks of Science can be found online, with teacher access code, at http://www.carolinascienceonline.com*
Concepts	**Vocabulary:**

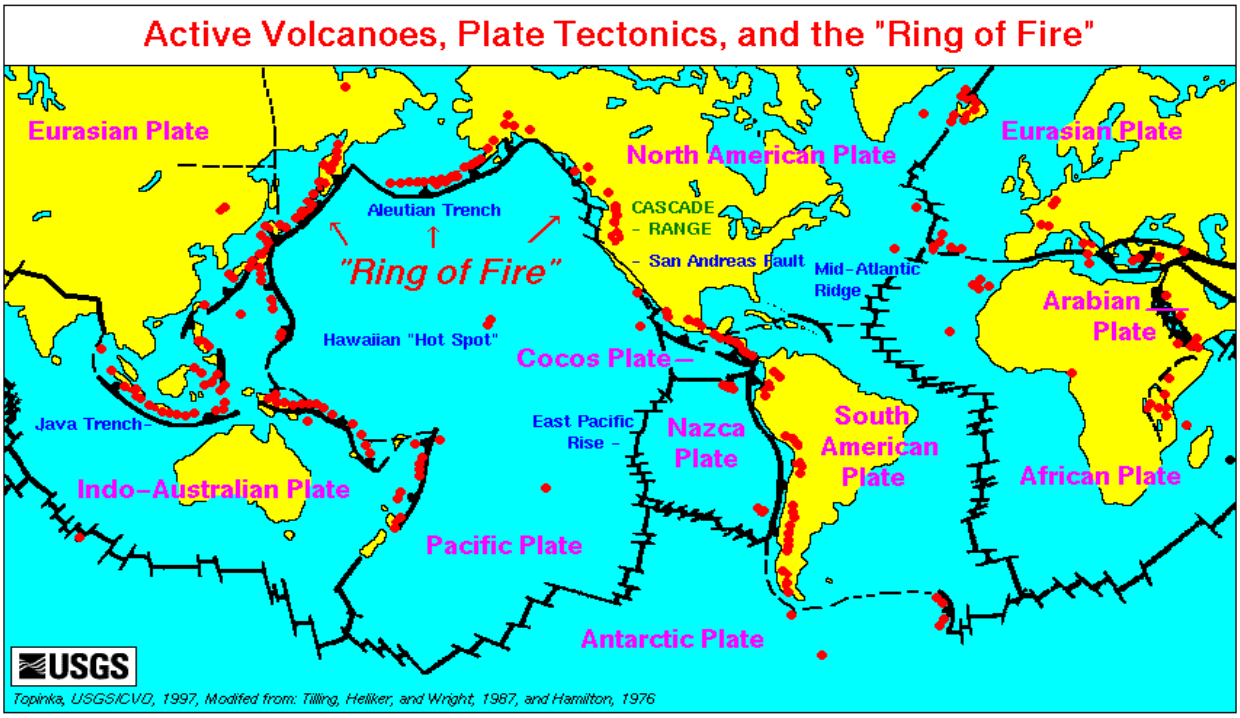
- Rocks, soil, and sand are present in most areas where plants and animals live.
- Maps show the shapes and types of land and water in any area. Maps can help locate the different land and water features where people live and other areas of Earth.
- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns.
- A variety of hazards result from natural processes such as earthquakes, volcanic eruptions, and coastal erosion.

Boundary - a dividing line or a line that marks the limits of an area
Convection current - An up and down movement in a liquid or a gas that is caused by differences in temperature.



Core - The innermost layer of the Earth.
Crust - The outermost, rocky layer of Earth.
Magma - molten rock beneath Earth's surface.
Mantle - The layer inside Earth between the crust and the outer core.
Plate tectonics - The widely accepted theory that today's continents were once part of a single landmass that broke apart about 200 million years ago, have moved into their present locations, and are still in motion.
Volcano - an opening in Earth's crust through which lava, ash, and cinders erupt, or the mountain formed from past eruptions.

Earth's Plate Boundaries



ELABORATE: *Applications and extensions*

	Materials
Lesson 1, Session 4: 1 or 2 Days: REVIEW **Phenomenon (End of Lesson):** Review students' questions about the investigative phenomenon from the beginning of this lesson. Guide students in applying the concepts explored in this lesson and connecting them to the anchoring phenomenon: identifying geological events and structures to explain the history of Earth. By the end of the lesson, students should be able to explain that: • Earthquakes occur when tectonic plates shift, causing the land to vibrate. • The West Coast of the U.S. experiences many earthquakes because it is located along a plate boundary. • Earthquakes can cause volcanic eruptions because volcanoes are also commonly located along plate boundaries. The vibrations of an earthquake may cause magma to erupt from a nearby volcano.	**Teacher Preparation:** 5 minutes **Lesson:** 40 minutes Science in the News Article Report (Teacher discretion for students to work individually or in pairs.) *Kilauea Newsela Article* *Nature's Fury Newsela Article* *Volcano Warning Signs Newsela Article* *Mount St. Helens Research Newsela Article* *WHOLE CLASS: SMART Board* Carolina Bio Digital Resource: Changing Earth - Scenario Based Digital Assessment https://carolinascienceonline.com/#/teacher/product-lines/BBS/products/59e9c92042425300000000024?

Science in the News ● Choose articles that discuss earthquake or volcanic eruptions ● Allow for choice (3-4 articles max) If time, have students share reports in groups.	node=5ca568f57d7f805cce2a0c2e&tab=5ca568f57d7f805cce2a0c2d&sort=TITLE_ASC&play **Tell Me More Investigation C**: page 43 (optional) The mantle is made of melted rock. What could be formed when the melted rock cools?
EVALUATE: *Assured assessments*	
Formative Monitoring: questioning / discussion	*Summative Assessment*
Lesson 1, Session 5: ● Science Notebook Entry ● Whole group check-in discussions ● Monitoring during Turn and Talk ● Student responses during class discussions ● Review students' questions about the investigative phenomenon from the beginning of the lesson.	Journal Entry- "Earth's Layers and Plates" Snapshot- Lesson 1- Changing Earth
ELABORATE FURTHER: *Reflective / enrichment* (optional) See individual lesson plans. **Tell Me More: Investigation A**: The mantle of Earth moves around, causing the crust to change shape. What landforms on Earth might have been formed by the movement of the mantle? **Tell Me More: Investigation B:** What do you think causes an earthquake? Think about Earth's plates. **Tell Me More: Investigation C:** The mantle is made of melted rock. What could be formed when the melted rock cools?	

General Scoring Rubric

General Rubric

	Exploration	Vocabulary	Concept Building	Science Notebook
4	Student displays a high level of interest by asking questions, building on concepts, and testing ideas. Provides input and participates in group settings.	Student uses a rich and varied vocabulary that includes appropriate scientific vocabulary that is used in an accurate manner. Writing displays a deep level of understanding of a concept.	Student's responses indicate a higher level of thinking by drawing connections between unit concepts and phenomena. Claims are supported with strong evidence and reasoning.	Student's entries display informative, in-depth responses that demonstrate an understanding of the content. Diagrams are detailed and labeled when applicable. Student draws strong conclusions.
3	Student remains engaged by participating, building on concepts, and testing ideas. Rarely asks questions but is cooperative in group settings.	Student uses a varied vocabulary that includes appropriate scientific vocabulary. Writing accurately describes a concept or experience.	Student's responses during investigations, conversations, and class discussions reflect growth of knowledge. Student understands concepts but may not be able to make strong connections. Claims are supported with evidence and reasoning.	Student's entries provide accurate and descriptive responses. Visual aids, such as data tables and diagrams, are included when applicable. Student draws a conclusion.
2	Student participates in investigations but does not appear to be building on concepts, asking questions, or providing input in a group setting.	Student's vocabulary is limited. Appropriate scientific vocabulary is used occasionally but may not be in the correct context. Writing describes an experience but may not be accurate or detailed.	Student's responses indicate knowledge of the material but do not demonstrate growth. Connections are not readily made, and misconceptions may be noted. Claims are supported, but sometimes evidence and reasoning have inaccuracies.	Student's entries lack accuracy. Student misses key ideas and struggles to form in-depth responses and conclusions. Visual aids are missing detail.
1	Student may not participate in investigations and/or may struggle with building upon concepts. Student rarely asks questions or provides input.	Student struggles to describe experiences in writing. Appropriate scientific vocabulary is missing or used incorrectly.	Student's responses do not indicate knowledge of the material. Concepts are misunderstood, and connections are inaccurate or nonexistent. Claims are not supported by accurate evidence and reasoning.	Student's entries poorly or inaccurately address the concepts. Student does not provide support for his/her responses.

TRUMBULL PUBLIC SCHOOLS
Trumbull, Connecticut

Science Curriculum
Grade 5
Next Generation
September 1, 2022

Curriculum Writing Team

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SCIENCE - NEXT GENERATION
Grade 5

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NEXT GENERATION SCIENCE
Grade 5

APPENDICES

CORE VALUES AND BELIEFS

The Trumbull School Community engages in an environment conducive to learning which believes that all students will **read** and **write effectively**, therefore communicating in an articulate and coherent manner. All students will participate in activities **that present problem-solving through critical thinking**. Students will use technology as a tool applying it to decision making. We believe that by fostering self-confidence, self-directed and student-centered activities, we will promote **independent thinkers and learners**. We believe **ethical conduct** to be paramount in sustaining the welcoming school climate that we presently enjoy.

Approved 8/26/2011

INTRODUCTION & PHILOSOPHY

The Connecticut State Board of Education, in its 2008 Position Statement on Science Education, calls for a systematic approach to ensuring that every student in Connecticut receives a rich and coordinated PK-12 education in science. Science learning should focus simultaneously on developing an understanding of core concepts, as well as knowing how scientists work collaboratively to test ideas, analyze evidence and solve problems. The realization of this vision is critical for our students' futures, as well as for Connecticut's place in a globally competitive economy.

In 2015, the Connecticut State Board of Education adopted the Next Generation Science Standards which embodies the National Research Council's *Framework for K-12 Education: Practices, Crosscutting Concepts, and Core Ideas* (2011); and furthermore developed a 5-year Implementation Plan of the Next Generation Science Standards (NGSS) for transitioning curriculum, instruction, and assessment. (Appendix B). The NGSS architecture was designed to provide information to teachers and curriculum and assessment developers beyond the traditional one line standard and uses Science and Engineering Practices along with various components of the Disciplinary Core Ideas and Crosscutting Concepts to make up the performance expectations for students.

The Board offers guidelines to support the establishment of collaborations among various stakeholders to build a coordinated science education system. (SDE, 2008).
As developed by the writers of the *Framework for K-12 Science Education* (Council, 2011), a core idea for K-12 science instruction should:

1. "Have broad importance across multiple sciences or engineering disciplines or be a key organizing principle of a single discipline."
2. "Provide a key tool for understanding or investigating more complex ideas and solving problems."
3. "Relate to the interests and life experiences of students or be connected to societal or personal concerns that require scientific or technological knowledge."
4. "Be teachable and learnable over multiple grades at increasing levels of depth and sophistication." (Council, 2011)

The Trumbull Public School's Grade 5 science curriculum addresses the Next Generation Science Standards as listed with each unit of study.

SAFETY FIRST

The Trumbull Public School System follows the recommended guidelines for student safety in the classroom as represented in the National Science Education Standards, State Science Frameworks and NGSS, the National Science Teachers Association, and OSHA and as outlined in subsections of Policy 6000 in regards to Instruction. We encourage and foster a hands-on, process and inquiry-based approach to science instruction with student safety always first and foremost in mind. The use of lab safety guidelines are supported throughout the district.

COURSE GOALS

The course goals derive from the 2013 Next-Generation Science Standards. Goals are listed specific to each unit in this curriculum guide, and developed through unit lessons using the 5-E learning model (engage, explore, explain, elaborate, evaluate) in order to encourage student engagement and foster metacognitive learning strategies through a reflective process. An important role of science education is not to teach "all the facts" but rather to prepare students with sufficient core knowledge so that they can later acquire additional information on their own.

COURSE ENDURING UNDERSTANDINGS

Earth and Space Systems
Students will understand…

- The planet Earth is a tiny part of a vast universe that has developed over a huge expanse of time.
- The sun is a star that appears larger and brighter than the other stars because it is closer. Stars range greatly in their size and distance from Earth.
- The patterns of motion of objects in the solar system can be described and predicted on the basis of observations and an understanding of gravity. This Earth phenomena is used to explain day and night, seasons, tides, and phases of the moon.
- Earth's surface is a complex and dynamic set of interconnected system
- All of Earth's processes are the result of energy flow and matter cycling within and among the geosphere, hydrosphere, atmosphere, and biosphere interacting over a wide range of temporal and spatial scales.
- Earth's surface processes affect and are affected by human activities.
- Natural hazards and other geological events can significantly alter human populations and activities.
- Humans depend on all the planet's systems for a variety of resources, some of which are renewable or replaceable and some of which are not.

Structures and Properties of Matter
Students will understand…

- Matter can be understood in terms of the types of atoms present and the interactions both between and within them.
- Matter is anything that takes up space and has mass.
- There are three main states of matter - each have unique properties.

- Mass is a measurement of the amount of matter something contains; weight is the measure of the pull of gravity on an object.
- Energy can cause matter to change state however matter can neither be destroyed or created as it simply changes from one state to another.
- Chemical changes cause matter to change in identity, while physical changes may only change in shape, color, or state.

Matter and Energy in Ecosystems
Students will understand…

- All organisms are made of cells.
- Plants and animals have both internal and external structures that serve functions in growth, survival, behavior, and reproduction.
- Plants and animals have unique and diverse life cycles that include being born (sprouting plants), growing, developing into adults, reproducing, and eventually dying.
- Ecosystems are natural systems of living things. Biotic factors (living things) interact with each other and with Abiotic factors (non living things) in their environment.
- Energy and matter are essential for the survival of all living things.
- Organisms can survive only in environments in which their particular needs are met.
- The cycling of matter and the flow of energy within ecosystems occur through interactions among different organisms and between organisms and the physical environment.

COURSE ESSENTIAL QUESTIONS

- What is the universe, and what is Earth's place in it?
- How are stars formed, and why do they appear in different positions during the night?
- What are the predictable patterns caused by Earth's movement in the solar system?
- How do Earth's major systems interact?
- How do humans depend on Earth's resources?
- How do natural disasters affect individuals and societies?

- How do living organisms alter Earth's processes and structures?
- How can one explain the structure, properties, and interactions of matter?
- How do particles combine to form the variety of matter one observes?
- How do substances combine or change (react) to make new substances?
- How does one characterize and explain these reactions and make predictions about them?

- How do organisms obtain and use matter and energy they need to live and grow?
- How do organisms interact with the living (biotic) and nonliving (abiotic) environments to obtain matter and energy?
- How do matter and energy move through an ecosystem?
- How do food and fuel provide energy?
- If energy is conserved, why do people say it is produced or used?

COURSE KNOWLEDGE AND SKILLS

Crosscutting scientific and engineering concepts as outlined in the Next Generation Science Standards(NGSS):

Students will know…

- Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
- Cause and effect: Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
- Scale, proportion, and quantity. In considering phenomena, it is critical to recognize what is relevant at different measurements of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
- Systems and system models. Defining the system under study-specifying its boundaries and making explicit a model of that system provides tools for understanding and testing ideas that are applicable throughout science and engineering.
- Energy and matter: flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems possibilities and limitations.
- Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
- Stability and change. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Students will be able to …

- Ask questions (for science) and define problems (for engineering)
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Use mathematics and computational thinking
- Construct explanations (for science) and design solutions (for engineering)
- Engage in arguments from evidence
- Obtain, evaluate, and communicate information

Scope and Sequence

September to December	Bundle 1: Earth's Place in the Universe: Earth and Space Systems
January to mid-April	Bundle 2: Matter and Its Interactions: Structure and Properties of Matter
mid-April to June	Bundle 3: Molecules to Organisms: Matter and Energy in Ecosystems

BUNDLE 1:

Earth's Place in the Universe:
Earth and Space Systems

Unit Overview:

Systems of matter and energy are present around Earth and across space. Interactions within and between these systems produce observable and predictable patterns. Earth is composed of interconnected systems and is also part of a larger system in space. Students explore the interaction between Earth's systems and its role as part of larger systems. Students investigate the components that make up our solar system, and explore the apparent brightness of stars, including the Sun, as well as patterns in constellations in the sky. Students use models to observe the rotation and revolution of Earth and the Moon to explore patterns in day and night, shadows, seasons, and Moon phases. Students investigate the interconnected systems on Earth and describe how the systems depend on and affect one another. Students then model how water in the hydrosphere is distributed on Earth, and how humans benefit from and can influence Earth's systems.

Unit Goals

NGSS: 5-ESS1-1:	Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth**.**
NGSS: 5-ESS1-2:	Represent data in graphical displays to reveal patterns of daily changes in length and directions of shadows, day and night, and the seasonal appearance of some stars in the night sky.
NGSS: 5-ESS2-1:	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
NGSS: 5-ESS2-2:	Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
NGSS: 5-ESS3-1:	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
NGSS: 5-PS2-1:	Support an argument that the gravitational force exerted by Earth on objects is directed down.

The following course goals derive from the 2010 Connecticut Core Standards.

ELA-Literacy

CCS.ELA-Literacy.RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-ESS1-1)*
CCS.ELA-Litearcy.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-ESS1-1)*
CCS.ELA-Literacy.RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). *(5-ESS1-1)*
CCS.ELA-Literacy.RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1)
CCS.ELA-Literacy.W.5.1	Write opinion pieces on topics or texts supporting a point of view with reasons and information. (5-ESS1-1)
CCS.ELA-Literacy.SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. *(5-ESS1-2)*

Mathematics

CCS.Mathematics.MP.2	Reason abstractly and quantitatively. *(5-ESS1-1)*,(5-ESS1-2)
CCS.Mathematics.MP.4	Model with mathematics.

The following standards derive from the 2013 Next-Generation Science (NGSS) Middle School Engineering Design Standards.

NGSS.3-5-ETS1-2:	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

BUNDLE 1: Earth and Space Systems

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data When possible and feasible, digital tools should be used. ● Represent data in graphical displays (bar graphs, pictographs	ESS1.A: The Universe and its Stars ● The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)	Patterns ● Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates

and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2) Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on ● Support an argument with evidence, data, or a model. (5-ESS1-1) ● Support an argument with evidence, data, or a model. (5-PS2-1) Obtaining, Evaluating, and Communicating Information ● Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1) Constructing Explanations and Designing Solutions ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)	ESS1.B: Earth and the Solar System ● The orbits of Earth around the sun and the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2) ESS2.A: Earth Materials and Systems ● Wind and water can change the shape of the land. (2-ESS2-1) ESS2.B: Plate Tectonics and Large-Scale System Interactions ● Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2) ESS3.C: Human Impacts on Earth Systems ● Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1) PS2.B: Types of Interactions ● The gravitational force of Earth acting on an object near	of change for natural phenomena. (5-ESS1-2) ● Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3) Scale, Proportion, and Quantity ● Natural objects exist from the very small to the immensely large. (5-ESS1-1) Stability and Change ● Things may change slowly or rapidly. (2-ESS2-1) *Systems and System Models* ● *A system can be described in terms of its components and their interactions. (5-ESS3-1)* *Connections to Engineering,Technology and Applications of Science* Influence of Engineering, Technology, and Science on Society and the Natural World ● Developing and using technology has impacts on the natural world. (2-ESS2-1) ● People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) ● Engineers improve existing technologies or develop new ones to

	Earth's surface pulls that object toward the planet's center. (5-PS2-1) ETS1.B: Developing Possible Solutions ● Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) ● At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)	increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2) *Connections to Nature of Science* Science Addresses Questions About the Natural and Material World ● Scientists study the natural and material world. (2-ESS2-1) ● Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1) Cause and Effect ● Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)

Unit Essential Questions

- What is the universe, and what is Earth's place in it?
- How are stars formed, and why do they appear in different positions during the night?
- What are the predictable patterns caused by Earth's movement in the solar system?
- How do Earth's major systems interact?
- How do humans depend on Earth's resources?
- How do natural disasters affect individuals and societies?

Scope and Sequence of Bundle 1:

Lesson 1: Earth's Place in Space
Lesson 2: Stars
Lesson 3: Sun, Earth, and Moon
Lesson 4: Earth's Systems
Lesson 5: Protecting Earth's Systems

Phenomenon: Systems of matter and energy are present around Earth and across space. Interactions within and between these systems produce observable and predictable patterns—night and day, seasons, tides, weather and climate. Earth is composed of interconnected systems and is also part of a larger system in space.

Focus questions

- What is the universe, and what is Earth's place in it?
- What do we know about Earth and Space systems?
- How can we describe planets in our solar system?
- How do the Sun, Earth, Moon make a system?
- How are stars formed, and why do they appear in different positions during the night?
- What does the brightness of a STAR tell us?
- What is the role of gravity in our solar system?
- How does gravity play a role in the shapes of planets and their orbits?
- What are the predictable patterns caused by Earth's movement in the solar system?
- Can patterns in the Daytime Sky tell me more about Earth?
- How do Earth's major systems interact?
- What can we notice about the patterns of the Moon?
- How can the Moon affect patterns on Earth?
- How do humans depend on Earth's resources?
- How can communities use Science to protect Earth's resources and environments?
- How do natural disasters affect individuals and societies?

Assured Assessments

Formative/Skills:

- Student Investigation Sheets
- Science Notebook Entries
- Whole group check-in discussions
- Monitoring during Turn and Talk
- Student responses during class discussions
- Review students' questions about the investigative phenomenon from the beginning of the lesson.
- Tell Me More Extension - responses

Summative/Content:

- Lesson 1: Earth's Place in Space Snapshot Assessment
- Lesson 2: STARS Snapshot Assessment
- Lesson 3: Sun, Earth, and Moon Snapshot Assessment
- Lesson 4: IAB Watershed Activity

Resources

Core

- Building Blocks of Science® 3D: Earth and Space Systems (©2019) Carolina Biological Supply Company. Burlington, NC.
- Building Blocks of Science Literacy Series™: Earth and Space Systems. Carolina Biological Supply Company. Print.

Supplemental

- Online resources will be listed with lesson outlines on “Pacing Chart”.
- Delta Science Reader: EARTH, MOON, and SUN. Print. 2011
- Comprehensive Science Assessments, Book 5: Options Publishing: 2005. Merrimack, NH.
- Classroom and Learning Commons content related libraries

Time Allotment

- Bundle 1: Earth and Space Systems - Trimester 1

BUNDLE 2:

Matter and Its Interactions:
Structures and Properties of Matter

Unit Overview

Matter makes up everything around us, but students may struggle to understand this given that they cannot see certain types of matter, like gases, and that they may not recognize when matter is a mixture or a solution. Students study the states of matter and make connections to physical and chemical properties, including volume, mass, freezing point, melting point, boiling point, and the ability to form mixtures and solutions. Students will learn to describe matter and predict its interactions with other types of matter. As students are exposed to different materials, they use physical properties to draw distinctions between types and kinds of matter. They learn that physical properties are not solely descriptors of observable characteristics like color and size, but can be tested for, such as hardness, buoyancy, magnetism, and viscosity. Understanding the physical properties of matter is helpful to be able to predict the interactions that will occur when matter is mixed. Students compare mixtures and solutions and attempt to separate them into their individual components. The concept of chemical changes is explored; by attempting to separate mixtures that have undergone chemical changes, students realize that matter can transform. In a culminating activity, students act as engineers to apply what they have learned to design a water filtration procedure.

Unit Goals

NGSS: 5-PS1-1:	Develop a model to describe that matter is made of particles too small to be seen.
NGSS: 5-PS1-2:	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
NGSS: 5-PS1-3:	Make observations and measurements to identify materials based on their properties.
NGSS: 5-PS1-4:	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

The following course goals derive from the 2010 Connecticut Core Standards.

ELA-Literacy

CCS.ELA-Litearcy.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-PS1-1)*

CCS.ELA-Literacy.W.5.7	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. *(5-PS1-2),(5-PS1-3),*(5-PS1-4)
CCS.ELA-Literacy.W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. *(5-PS1-2),(5-PS1-3),*(5-PS1-4)
CCS.ELA-Literacy.W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. *(5-PS1-2),(5-PS1-3),(5-PS1-4)*

Mathematics

CCS.Mathematics.MP.2	Reason abstractly and quantitatively. *(5-ESS1-1)*,(5-ESS1-2)
CCS.Mathematics.MP.4	Model with mathematics.
CCS.Mathematics.MP.5	Use appropriate tools strategically.
CCS.MATH.C.5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

The following standards derive from the 2013 Next-Generation Science (NGSS) Middle School Engineering Design Standards.

NGSS.3-5-ETS1-2:	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

BUNDLE 2: Structures and Properties of Matter

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models ● Develop a model to describe phenomena. (5-PS1-1) Planning and Carrying Out Investigations ● Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables	PS1.A: Structure and Properties of Matter ● Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including	Cause and Effect ● Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4) Scale, Proportion, and Quantity ● Natural objects exist from the very small to the immensely large. (5-PS1-1)

are controlled and the number of trials considered. (5-PS1-4) ● Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3) Using Mathematics and Computational Thinking ● Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2	the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1) ● The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2) ● Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3) PS1.B: Chemical Reactions ● When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4) ● No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2) ETS1-2: ● Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem	● Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2),(5-PS1-3) *Connections to Nature of Science* Scientific Knowledge Assumes an Order and Consistency in Natural Systems ● Science assumes consistent patterns in natural systems. (5-PS1-2)

Unit Essential Questions:

- How can one explain the structure, properties, and interactions of matter?
- How do particles combine to form the variety of matter one observes?
- How do substances combine or change (react) to make new substances?
- How does one characterize and explain these reactions and make predictions about them?

Scope and Sequence of Bundle 2:

Lesson 1: Matter all Around Us
Lesson 2: Energy and States of Matter
Lesson 3: Physical Properties of Matter
Lesson 4: Making Mixtures and Solutions
Lesson 5: Physical and Chemical Changes
Lesson 6: Separating Matter

Phenomenon: There are many different types of bread. Most are made using different combinations of flour, water, salt, and yeast. When you mix the ingredients, they form a soft, sticky dough. An important step in making bread is allowing the dough to rise for a long period of time. After about an hour of rising, you should notice that the dough takes up more space in its bowl.

Essential/Focus questions

- Why does matter matter?
- How can you find an object's mass and calculate its volume?
- How can you prove that gases have mass and volume?
- How do particles of matter behave?
- Are evaporation and condensation observable?
- Is matter conserved when it changes states?
- How can I use physical properties to identify properties?
- How do the properties of liquids vary?
- What evidence indicates a chemical change?
- Is evidence of chemical change observable?
- How is contaminated water cleaned?
- How does a filtration system remove contaminants from water?

Assured Assessments

Formative/Skills:

- Student Investigation Sheets
- Science Notebook Entries
- Whole group check-in discussions
- Monitoring during Turn and Talk
- Student responses during class discussions
- Review students' questions about the investigative phenomenon from the beginning of the lesson.
- Tell Me More Extension - responses

Summative/Content:

- Lesson 1: Mass and Volume Snapshot
- Lesson 2: Particles of Matter Snapshot
- Lesson 3: Physical Properties of Matter Snapshot
- Lesson 4: Section C: Making Mixtures and Solutions Snapshot
- Lesson 5: Chemical and Physical Changes Snapshot

Resources

Core

- Building Blocks of Science® 3D: Structures and Properties of Matter (©2019) Carolina Biological Supply Company. Burlington, NC.
- Building Blocks of Science Literacy Series™: Structures and Properties of Matter. Carolina Biological Supply Company. Print.
- Sweet, Melissa. *Balloons Over Broadway*. Houghton/Mifflin/Harcourt (2011)

Supplemental

- Online resources will be listed with lesson outlines on “Pacing Chart”.
- Comprehensive Science Assessments, Book 5: Options Publishing: 2005. Merrimack, NH.
- Classroom and Learning Commons content related libraries

Time Allotment

- Bundle 2: Matter and Its Interactions: Structure and Properties of Matter - Trimester 2

BUNDLE 3:

Molecules and Organisms:
Matter and Energy in Ecosystems

Unit Goals

NGSS: 5-:LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water..
NGSS: 5-LS2.1:	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
NGSS: 5-PS3-1:	Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) once energy from the sun.
NGSS: 5-ESS2-1:	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
NGSS.5-ESS2-1:	Obtain and combine information about ways individual communities use science ideas to protect the earth's resources and environment

The following course goals derive from the 2010 Connecticut Core Standards.

ELA-Literacy

CCS.ELA-Literacy.RI.5.1.	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-LS1-1)*
CCS.ELA-Literacy.RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
CCS.ELA-Liteacy.RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
CCS.ELA-Literacy.RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.
CCS.ELA-Literacy.RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1)

CCS.ELA-Literacy.RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)
CCS.ELA-Literacy.W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)
CCS.ELA-Literacy.SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Mathematics

CCS.Mathematics.M.P-2	Reason abstractly and quantitatively. *(5-LS1-1)*
CCS.Mathematics.M.P-4	Model with mathematics *(5-LS1-1)*
CCS.Mathematics.M.P-5	Use appropriate tools strategically. *(5-LS1-1)*
CCS.MATH.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5-LS1-1)*

The following standards derive from the 2013 Next-Generation Science (NGSS) Middle School Engineering Design Standards.

NGSS.3-5-ETS1-2:	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

BUNDLE 3: Molecules and Organisms: Matter and Energy in Ecosystems

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence ● Support an argument with evidence, data, or a model. (5-LS1-1) Developing and Using Models	LS1.C: Organization for Matter and Energy Flow in Organisms ● Plants acquire their material for growth chiefly from air and water. (5-LS1-1) LS2.A: Interdependent Relationships in Ecosystems ● The food of almost any kind of animal can be traced back	Energy and Matter ● Matter is transported into, out of, and within systems. (5-LS1-1) Systems and System Models ● A system can be described in terms of its components and their

● Develop a model to describe phenomena. (5-LS2-1) *Connections to the Nature of Science* Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena ● Science explanations describe the mechanisms for natural events. (5-LS2-1) Developing and Using Models ● Use models to describe phenomena. (5-PS3-1)	to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1) LS2.B: Cycles of Matter and Energy Transfer in Ecosystems ● Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1) PS3.D: Energy in Chemical Processes and Everyday Life ● The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)	interactions. (5-LS2-1)(ESS2.1) Energy and Matter ● Energy can be transferred in various ways and between objects. (5-PS3-1) Connections to Nature of Science Science Addresses Questions About the Natural and Material World. ● Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

	ESS2.A: Earth Materials and Systems ● Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1) ESS3.C: Human Impacts on Earth Systems ● Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	

Unit Essential Questions

- How do organisms obtain and use matter and energy they need to live and grow?
- How do organisms interact with the living (biotic) and nonliving (abiotic) environments to obtain matter and energy?
- How do matter and energy move through an ecosystem?
- How do food and fuel provide energy?
- If energy is conserved, why do people say it is produced or used?

Scope and Sequence of Bundle 3:

Lesson 1: Biotic and Abiotic Factors
Lesson 2: Energy flow in an Ecosystem
Lesson 3: Interactions in an Ecosystem
Lesson 4: Human Impact
Lesson 5: Protecting the Ecosystem

Phenomenon: Energy is what drives activity, growth, repair, and reproduction for all living things. All living things require an energy source to survive.

Focus questions

- What are biotic and abiotic factors?
- Why are plants important in an ecosystem?
- What do plants need to grow?
- What is photosynthesis?
- How do animals depend on plants?
- What is a food chain?
- What is a food web?
- How does competition affect an ecosystem?
- What are the four spheres of the Earth and how do they interact?
- Why is the water cycle important?
- What is an ecocolumn?
- How does water pollution impact an ecosystem?
- How do humans impact ecosystems?
- How do humans disrupt natural cycles?
- Can we model the effects of human impact?
- Can we develop solutions to decrease human impact

Assured Assessments

Formative/Skills:

- Student Investigation Sheets
- Science Notebook Entries
- Whole group check-in discussions
- Monitoring during Turn and Talk
- Student responses during class discussions
- Review students' questions about the investigative phenomenon from the beginning of the lesson.
- Tell Me More Extension - responses

Summative/Content:

- Lesson 1: Biotic and Abiotic Factors Snapshot
- Lesson 2: Interdependence of Biotic Factors in an Ecosystem Snapshot

- Lesson 3: Ecosystems: Matter and Energy in the Ecosystem Snapshot
- Lesson 4: Interdependence Between Earth's Sphere
- Lesson 5: IAB - Ecosystems

Resources:

Core

- Building Blocks of Science® 3D: Matter and Energy in Ecosystems (©2019) Carolina Biological Supply Company. Burlington, NC.
- Building Blocks of Science Literacy Series™: Matter and Energy in Ecosystems. Carolina Biological Supply Company. Print.

Supplemental

- Online resources will be listed with lesson outlines on "Pacing Chart".
- Comprehensive Science Assessments, Book 5: Options Publishing: 2005. Merrimack, NH.
- Classroom and Learning Commons content related libraries

Time Allotment

- Bundle 3: Molecules to Organisms: Matter and Energy in Ecosystems

Appendix A

Assured Lesson Outline Sample

Earth's Place in the Universe (Lesson 1)

Bundle I: Earth and Space Systems

Plan Ahead	***Read these articles from NSTA:*** ***Claims, Evidence, Reasoning (CER):*** *https://v2.luminpdf.com/viewer/5d307a775cdf5e0019eb971a* ***Interactive Word Walls:*** https://v2.luminpdf.com/viewer/5d307b998d5f9a0019c29001 Earth & Space Science Resource: https://cptv.pbslearningmedia.org/subjects/science/earth-and-space-science/weather-and-climate/ Teacher Background, Bozeman Science http://www.viewpure.com/mxI7vRv8HT0?start=0&end=0 (7:30 mins)	
Grade: Grade 5	***Topic:*** *Earth's Place in Space*	***Lessons: Lesson 1 of 5*** ***-approximately 9 class periods***

Performance Standard:
5-PS2-1: Support an argument that the gravitational force exerted by Earth on objects is directed down.
Crosscutting Concepts: Cause and Effects; Scale, Proportion, and Quantity
CCS.Mathematics.MP.2: Reason abstractly and quantitatively. CCS.Mathematics.MP.4: Model with mathmatics.

Students will know…

- ❏ A "System" is a group of parts that work together.
- ❏ Earth is a part of large space systems.
- ❏ The shapes and orbits of planets and their satellites are caused by the constant pull of gravity.
- ❏ Models are used to describe the sizes and distances of planets in our solar system, due to their immense scale.

Objectives…

- ❏ Begin building an age-appropriate understanding about Earth's roles in space systems
- ❏ Compare the sizes of the planets in our system and the distances of the planets from the Sun and from each other
- ❏ Explain how the pull of gravity impacts Earth's shape and path around the Sun
- ❏ Construct an argument to support concepts related to gravity

Unit Anchoring Phenomena: Investigative Phenomenon for Lesson 1 (Beginning of Lesson):
The Sun shines through your window early in the morning, and it wakes you up. You step outside and see the Moon high in the sky. You go through your day, and then you watch the Sunset on the horizon. The night sky with the Moon and stars begins to emerge. The next morning, the pattern repeats. What does this make you wonder?

Anticipated Questions from students:

- What keeps the Sun and Moon in the sky?
- How far away are the Moon and Sun from Earth?
- How many stars are in the sky?

Lesson Plan – 5 E Model

Lesson 1: Investigative Phenomena: The Sun shines through your window early in the morning, and it wakes you up. You step outside and see the Moon high in the sky. You go through your day, and then you watch the Sunset on the horizon

Essential Question(s):

- What is the universe, and what is Earth's place in it?
- How are stars formed, and why do they appear in different positions during the night?
- What are the predictable patterns caused by Earth's movement in the solar system?
- How do Earth's major systems interact?

Teacher Prep and resources: **https://carolinascienceonline.com/#/teacher/product-lines/BBS**
The Building Blocks of Science® 3D: Carolina Building Blocks of Science: Earth and Space Systems, Teacher Guide
Before beginning Lesson 1: -

- Watch Teacher Prep Video (online resource) Under Lesson 1 - Overview Objectives - scroll down to video
- Read through Unit Overview: the beginning sections of the Teacher's Guide with format and background information: pages 32 to 35.
- Familiarize yourself with the Student Reader.

Teacher Guide: LESSON OVERVIEW

- This lesson focuses on examining the systems that make up our universe. Students research the planets in our solar system. Students learn about the pull of gravity and how it shapes the Sun, Earth and Moon system.

*Essential vocabulary for Lesson 1 is listed on page 32 in the Teacher Guide and online in the Teacher Background Tab.

ENGAGE: *Opening activity – access prior learning / stimulate interest / generate questions:*

Scope and Sequence:

Anchoring Phenomena **Instructional time:** 1 class period
Session 1:

Teachers need:

- Prepare SMARTBoard/Chart Paper, and computer.
- Read section on Anchoring Phenomenon (background for teacher). Page 32 in Teacher Guide.
- Phenomena Video: Show the corresponding online digital resource video - under Lesson 1, scroll down to video (3:19 min)
- At the end of the video, create a class chart of students' questions. Save to refer to at the end.

Investigating Phenomena:
Students need: Science Notebooks
Teacher needs:

- Read (page 32): "Investigating Phenomenon for Lesson 1"
- Encourage students to record questions in their science notebooks about what they see in the video.

Investigative Phenomenon for Lesson 1 (Beginning of Lesson):
The Sun shines through your window early in the morning, and it wakes you up. You step outside and see the Moon high in the sky. You go through your day, and then you watch the Sunset on the horizon.

The night sky with the Moon and stars begins to emerge. The next morning, the pattern repeats. What does this make you wonder?

EXPLORE: *Lesson Description – Materials needed / probing or clarifying questions / resources*

Scope and Sequence	**Materials** listed with each lesson design in Teacher Guide
Investigation A: ***What do we know about Earth and Space systems?***	**Instructional time:** 1 class period
Session 2 **Follow directions for lesson on pages 36 to top of 37.**	Materials listed on page 36: **For each student:** Science Notebook
#1. Digital Resource: The Interactive Whiteboard Activity is under Lesson 1 A: ***A-IWB:*** *Knowledge and Questions about Earth and Space Systems*	**Teacher:** 1 Pair scissors Chart Paper or SMART Board Markers
Turn & Talk: Ask: ● Do you think a pair of scissors is an example of a system? *(Answers will vary.)* ● What will happen to the scissors, if I take them apart? *(They won't work.)* ● What are other examples of systems? *(Examples will vary but may include bikes, cars, the human body, ecosystems, or game consoles.)*	**System:** A group of parts that work together.
● What are some space objects (celestial bodies) with which Earth works, interacts, or is grouped? *(Students may suggest the Sun, other planets, or the Moon.)* ● How many systems do you think Earth is a part of? What do you think those systems are called? *(Answers will vary.)*	**Celestial bodies:** A natural object which is located outside of Earth's atmosphere, such as the Moon, the Sun, an asteroid, planet, or star.
Students record responses: Online digital resource Tell Me More: (under Lesson 1: Procedure) *Earth and Space Systems: Lesson 1: Investigation A*	
Optional: Have students complete in Science Notebooks	

Investigation B: ***Can I describe features of planets in our solar system?***

Session 3

Follow the directions on pages 37 to top of 40.

Session 3
Day 1: ***#1 through #5***

#1: Review systems

#2: Introduce vocabulary:

- **Universe:** All of the contents of space including all matter, energy, and galaxies
- **Galaxy**: One of the very large groups of stars and other matter in the universe
- **Solar system:** A group of planets and other objects that move around a central star
- **Celestial Body-** a natural object outside earth's atmosphere. Examples include: sun, moon

#3: Talking questions for class discussion

- What objects did you list? *(Students may suggest planets, moons, asteroids, comets, or satellites.)*
- How far do you think the objects are from Earth? From the Sun? From each other? *(Answers will vary.)*
- How do the objects vary in size? *(Answers will vary.)*
- How do scientists gather evidence about objects in our solar system? *(Students may suggest using technology such as telescopes, space orbiters, or satellites to gather information.)*

#4: Sun and Earth:
Show students the scaled Sun and Earth cutouts you prepared from Teacher Sheet 1B.

- What do you notice about the Sun and Earth? *(The Sun is much bigger than Earth.)*
- How is the Sun different from Earth? *(Answers will vary. Students may suggest the Sun is a star, a ball of gas, very hot. They*

Instructional time: 3 class periods

MATERIALS List for 3 class sessions:
Student

- 1 Science notebook*
- 1 Student Investigation Sheet 1B.1: *What Can I Learn About a Planet in Our Solar System?*
- 1 Student Investigation Sheet 1B.2: *Can I Describe Features of the Planets in Our Solar System?*

Class

- Chart paper or poster board/paper*
- Colored pencils or markers*
- Research materials (including science books and magazines, dictionaries, and computers with Internet access as available)*

Teacher

- 1 Teacher Sheet 1B: *Scaled Images of Earth and the Sun*
- 1 Student Investigation Sheet 1B.2: *Can I Describe Features of the Planets in Our Solar System?* (Teacher's Version)
- 1 Inflatable globe
- Chart paper or whiteboard*
- Markers*

may describe Earth as solid, having water, having an atmosphere, or supporting life.) ● Why can this be called a model of the Sun and Earth? *(The cutouts are models because they are not the real objects and are not the same size as the real objects, but they can be used to describe the objects since we can't interact with them directly.)* ● If we were to make a model of our solar system, what else should we include? *(Students may suggest the Moon, other planets, their moons, asteroids, meteoroids, comets, or other small objects like satellites. Explain that in this scale model, the Moon would be about one-fourth the size of the Earth cutout.)* **#5: Turn & Talk:** ● What would you include in your model of the solar system? ● What would be the center of the solar system? ● Which planets would you include in your model? ● How would the size of the Sun compare to the other parts of the solar system? Ask students to imagine that they are designing a model of the solar system for the class. Instruct students to draw or describe in their science notebooks what their model would look like. **Session 3** **Day 2: *#6 through #8*** **#6: Use Sheet 1B.1** *What can I learn about a planet in our solar system?* **#7: Research** **https://solarsystem.nasa.gov/planets/overview/** ***EARTH, MOON, SUN* Delta Science Reader** **#8: Groups:** Students will pair to discuss what they learned and prepare a poster to share with class Part B of 1B.1 needs to be included on poster	**Model:** A representation of an object or idea. **Scale Model:** A physical representation of an object which is larger or smaller than the actual object but maintains the same proportions as the real object. **Planets:** A spherical body that moves around a star. NASA Kids Solar System Exploration NASA: **Our World: Pluto - Our First Dwarf Planet**

Session 3 **Day 3: *#9 through #11*** **#9: Sheet 1B.2** *Can I Describe the Features of the Planets in Our Solar System?* BrainPOP Planets: *https://www.brainpop.com/search/?keyword=planets* **#10:** Share posters and record on Part A of Investigation Sheet **#11 -** Individually students complete Part B & C of Sheet 1B.2.	
EXPLAIN: *Concepts explained and vocabulary defined:*	
Investigation C: ***How do the Sun, Earth, and Moon make a system?*** **Session 4** **Session 4** **Day 1: *#1 through 5*** Mini Lesson: Claims Evidence Reasoning (CER) Student Investigation Sheet 1C - Part E. #1: Review previous investigation and vocabulary. Teacher should preview sites before showing students. https://solarsystem.nasa.gov/solar-system/sun/overview/ https://staratlas.com/ http://www.spaceweather.com/ http://www.viewpure.com/1Eh5BpSnBBw?start=0&end=0 Mind Blowing: Proportional Sizes(3.33 min - video) **#2: Gravity brainstorm** **#3: Gravity Demonstration and Turn & Talk**:	**Instructional time: 2 class periods** **MATERIALS** **Student** ● 1 Science notebook* ● 1 Student Investigation Sheet 1C: *How Do the Sun, Earth, and Moon Make a System?* **Teacher** ● 1 Teacher Sheet 1C: *Sun-Earth-Moon System* ● 1 Student Investigation Sheet 1C: *How Do the Sun, Earth, and Moon Make a System?* (Teacher's Version) ● 1 Hardcover book* ● 1 Inflatable globe ● Projection system* **Gravity:** The force that attracts all objects toward each other.

• How does dropping the book demonstrate gravity? *(The book fell to the floor, which demonstrates the pull of gravity.)* • Define "gravity." *(If students do not correctly define "gravity," guide them to understand that gravity is a force that pulls all objects toward each other.)* • How can we use force to describe what happened in this demonstration? *(Answers may vary, but students should say that gravity pulled the book to the floor.)* • What experiences have you had with gravity? *(Answers will vary.)* **#4: Gravity:** force on Earth Brain Pop Video Gravity: https://www.brainpop.com/science/motionsforcesandtime/gravity/ Turn & Talk: • How do you think gravity affects objects in space? *(Answers will vary.)* **#5: Inflatable Globe:** Model of Earth • How can we describe Earth's shape? *(Round, spherical, like a ball)* • Think about the planets in the solar system. They have the same shape as Earth. How do you think gravity plays a role in shaping planets? *(Answers will vary. Guide students to understand that the pull of gravity on each planet results in its spherical shape.)* • Why else might gravity be important in space? *(Answers will vary. Guide students to understand that in space, every object has a gravitational pull on every other object in space. Gravity influences the orbits of planets, moons, and satellites, and it holds together galaxies.)* **Session 4** **Day 2:** *#6 through 11* #6: Sheet 1C: *How Do the Sun, Earth, and Moon Make a System?* Part A.	**Spherical shape:** A three dimensional version of the two-dimensional circle. The ball image is a good one since the word sphere comes from very similar-sounding Greek and Latin words, both of which mean "ball." Page xi in Front Matter of Teacher Guide:

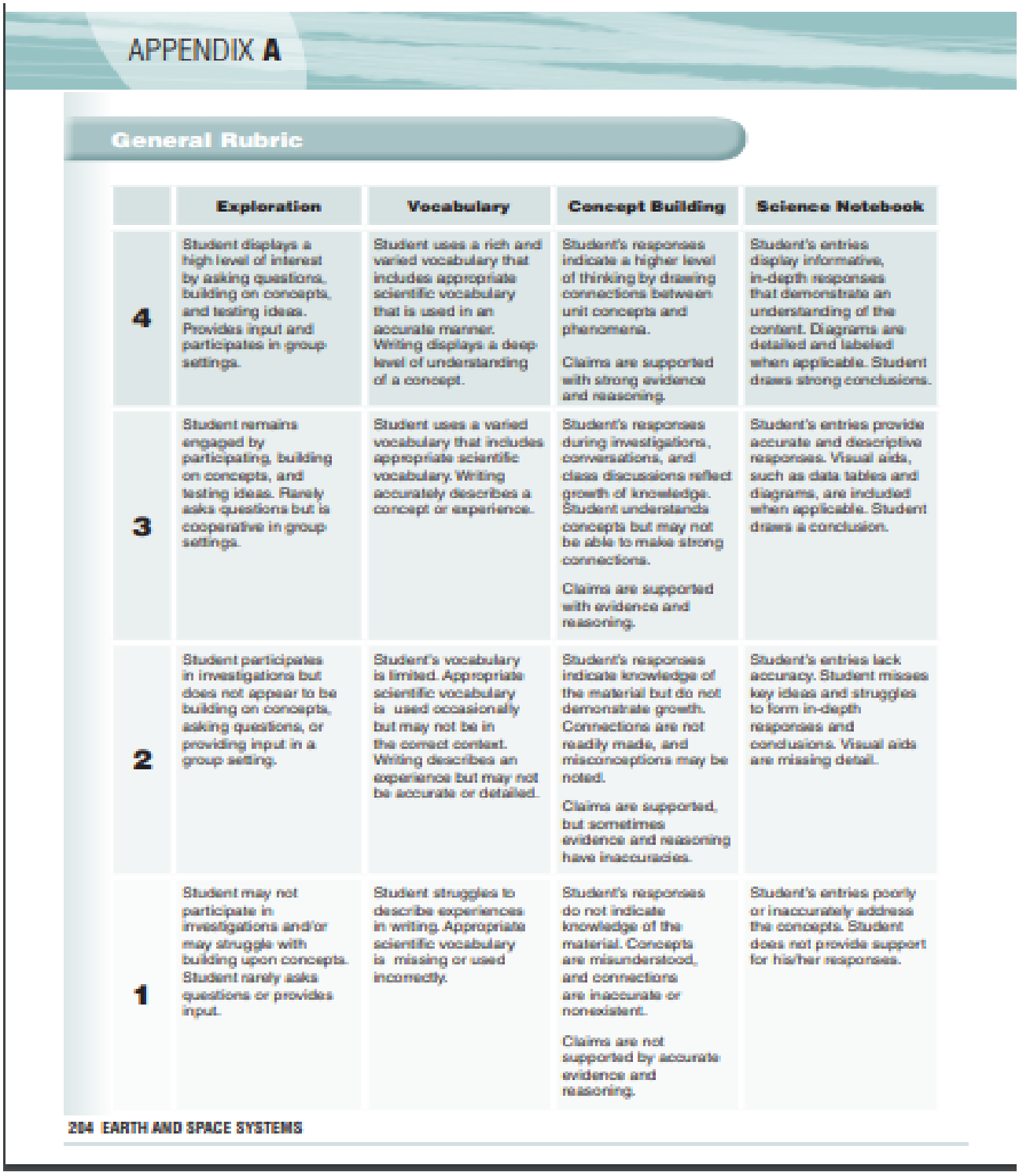
#7: Sheet 1C: Part B - Show: *Digital Tip: Sun, Earth, Moon Simulation* #8: Teacher Sheet 1C: Sun-Earth-Moon System #9: Sheet 1C: Part C #10: Claims, Evidence, Reasoning (CER) Sheet 1C: Part E. #11: Ask a few volunteers to share CER responses.	**Sensemaking: Developing Claims Supported with Evidence and Reasoning** Scientific argumentation, or evidence-based argumentation, is defined as making scientific explanations (claims) using empirical data (evidence) to justify an argument (reasoning). Scientists use this type of argumentation to make sense of phenomena and refine their ideas, explanations, and experimental designs. In the classroom, students should be introduced to scientific argumentation to guide them in sensemaking, or building an understanding of phenomena based on evidence gained through observations, investigations, and data analysis. Through sensemaking, students refine and revise their understanding as new evidence is acquired and information is shared through class discussions. Building Blocks of Science units offer multiple opportunities for students to make sense of scientific concepts by developing claims and supporting their claims with evidence and reasoning. At the start of an investigation, students are presented with a question related to a scientific concept. To make sense of a phenomenon or concept, students must draw upon their previous knowledge and experiences to develop a statement or conclusion that answers the question. To support that claim, students must provide relevant and specific data as evidence. This data may come from previous investigations, inference clues, texts, or class discussions. Students may even reference personal experience. Reasoning provides justification for why the selected evidence supports the claim. Relevant scientific principles should be incorporated into this reasoning. After the investigation, students should revisit their initial claims and determine if they are supported by newly gathered evidence. If the available evidence does not support students' initial claims, students should identify misunderstandings and present a claim that is supported. To support students who struggle with scientific argumentation, ask them to use sentence frames such as "I think ____ because ____" to help with sensemaking. Explain that the first blank is the claim and the second blank is the evidence and reasoning.
Concepts	**Essential Vocabulary:**
• A System is a group of parts that work together. • Earth is a part of large space systems. • The shapes and orbits of planets and their satellites are caused by the constant pull of gravity. • Models are used to describe the sizes and distances of planets in our solar system due to their immense scale.	• Celestial bodies • Galaxy • Gravity • Model • Planet • Revolution • Rotation • Scale model • Solar system • Star • Sun • System • Universe Essential vocabulary with definitions: https://docs.google.com/document/d/13IDorAW9vxYtYIi4oljHWrfqtYbVH_LeIXZV1FlLcuE/edit?usp=sharing
ELABORATE: *Applications and extensions*	
	Materials
Review Day **Session 5** Anchoring Phenomenon (End of Lesson):	**Instructional time: 1 class period** *Optional Extensions to Lesson 1: Page 44*

Review students' questions about the investigative phenomenon from the beginning of this lesson. Guide students in applying the concepts explored in this lesson and connecting them to the anchoring phenomenon: recognizing patterns that can explain the interconnectedness of the systems on Earth and in space. By the end of the lesson, students should be able to explain that: ● Earth is part of many larger systems in space. ● Models are used to describe the sizes and distances of planets in our solar system due to their immense scale. ● The shape and orbit of Earth around the Sun and the shape and orbit of the Moon around Earth are the results of the constant pull of gravity.	
EVALUATE: *Assured assessments*	
Formative Monitoring: questioning / discussion	*Summative Assessment*
● Student Investigation Sheets ● Science Notebook Entries ● Whole group check-in discussions ● Monitoring during Turn and Talk ● Student responses during class discussions ● Review students' questions about the investigative phenomenon from the beginning of the lesson. ● (Tell Me More - responses)	**1 Class Period** Lesson 1: Earth's Place in Space Assessment General Rubric: https://carolinascienceonline.com/bbs-journey/ess/ess_GeneralRubric.pdf
ELABORATE FURTHER: *Reflective / enrichment* (optional)	
*Tell Me More (Page 37)Define "system" in your own words, and give an example. Draw the system and label its parts. *Tell Me More (Page 40)The Sun, Earth, and Moon make up a system. Do you think these objects are the same size? Explain why or why not? *Tell Me More (Page 42) The Sun, Earth, and Moon work as system. Explain how Earth's distance from the Sun affects life on Earth. Describe how it would be different if Earth were closer to or farther from the Sun. See brainPOP for video explanation https://www.brainpop.com/science/space/sun/ ** "Tell Me More" questions are found under digital resources	

Appendix B

General Scoring Rubric

General Scoring Rubric



APPENDIX A

General Rubric

	Exploration	Vocabulary	Concept Building	Science Notebook
4	Student displays a high level of interest by asking questions, building on concepts, and testing ideas. Provides input and participates in group settings.	Student uses a rich and varied vocabulary that includes appropriate scientific vocabulary that is used in an accurate manner. Writing displays a deep level of understanding of a concept.	Student's responses indicate a higher level of thinking by drawing connections between unit concepts and phenomena. Claims are supported with strong evidence and reasoning.	Student's entries display informative, in-depth responses that demonstrate an understanding of the content. Diagrams are detailed and labeled when applicable. Student draws strong conclusions.
3	Student remains engaged by participating, building on concepts, and testing ideas. Rarely asks questions but is cooperative in group settings.	Student uses a varied vocabulary that includes appropriate scientific vocabulary. Writing accurately describes a concept or experience.	Student's responses during investigations, conversations, and class discussions reflect growth of knowledge. Student understands concepts but may not be able to make strong connections. Claims are supported with evidence and reasoning.	Student's entries provide accurate and descriptive responses. Visual aids, such as data tables and diagrams, are included when applicable. Student draws a conclusion.
2	Student participates in investigations but does not appear to be building on concepts, asking questions, or providing input in a group setting.	Student's vocabulary is limited. Appropriate scientific vocabulary is used occasionally but may not be in the correct context. Writing describes an experience but may not be accurate or detailed.	Student's responses indicate knowledge of the material but do not demonstrate growth. Connections are not readily made, and misconceptions may be noted. Claims are supported, but sometimes evidence and reasoning have inaccuracies.	Student's entries lack accuracy. Student misses key ideas and struggles to form in-depth responses and conclusions. Visual aids are missing detail.
1	Student may not participate in investigations and/or may struggle with building upon concepts. Student rarely asks questions or provides input.	Student struggles to describe experiences in writing. Appropriate scientific vocabulary is missing or used incorrectly.	Student's responses do not indicate knowledge of the material. Concepts are misunderstood, and connections are inaccurate or nonexistent. Claims are not supported by accurate evidence and reasoning.	Student's entries poorly or inaccurately address the concepts. Student does not provide support for his/her responses.

204 EARTH AND SPACE SYSTEMS

Carolina Biological: Building Blocks of Science 3D Scoring Rubric (2019)

Teacher Created Rubric

TRUMBULL PUBLIC SCHOOLS
NEW COURSE PROPOSAL

Date Submitted: September 8, 2022

Title of Course: American Sign Language Level 1
Grade Level: 9-12

Department: World Language

Length and Credit: Full Year - 1 Credit Class

Prerequisites: NONE

General Description:
This world language will provide an introduction to American Sign Language {ASL}, the primary language of the Deaf/Hearing Impaired in the United States and some parts of Canada. . This course is designed for students with little or no previous knowledge of American Sign Language. The course will also afford students insight into the culture of the Deaf community. An emphasis will be placed on ASL vocabulary development, and an introduction to the sentence structure, and the cultural foundations of ASL. However, the focus of the curriculum will be on communication in sign language.

Students will learn the manual alphabet (i.e., fingerspelling), numbers, and ASL vocabulary connected to each unit (i.e. family, home, school). Students will also work on both receptive skills (being able read fingerspelling and signed phrases) and expressive skills that will be incorporated into communication practices (Lentz, Mikos & Smith, Signing Naturally,2014).

The students will finish their studies with culminating project which will display their acquisition of the above skill sets

Rationale:
According to the Standards for Foreign Language Learning provided by the the American Council on Teaching Forgein Languages ``knowing how, when, and why to say what to whom" is an essential component for human communication. ACTFL further notes "while grammar and vocabulary are essential tools for communication, it is the ability to communicate in a meaningful and appropriate way with users of other languages that is the ultimate goal of today's foreign language classroom," (Lentz, Mikos & Smith, Signing Naturally, Introduction, 2014).

American Sign Language (ASL) is one of the most widely used languages in the United States, and the fourth-most studied second language at American universities. At least 35 states have recognized ASL as a modern language for public schools, and hundreds of colleges and universities in the United States are offering ASL classes (ACTFL.org, *Lead with Languages*, online, 4/28/22).
ASL is primarily used by American and Canadians who are either deaf or hard of hearing. There are approximately 250,000 – 500,000 ASL users in the United States and Canada, most of whom use ASL as their primary language (ACTFL.org, *Lead with Languages*, online, 4/28/22). Additionally, ASL is

utilized by hearing parents of deaf/hearing impaired children; hearing siblings of deaf/hearing impaired siblings; hearing children of deaf adults and those considering a career as an interpreter(ACTFL.org, *Lead with Languages*, online, 4/28/22) .

Finally, the Trumbull Public Schools System currently has 25-30 students who have some level of hearing loss that either utilize hearing aids or cochlear implants. Many of these students are on either IEPs or 504 and most, if not all, have hearing parents. The 2021-2022 academic year has provided an unusual year of students coming to the district with hearing losses, discovering a hearing loss while in district and/or learning his/her hearing loss has substantially decreased unexpectedly. Offering an ASL course would allow students in the district an opportunity to learn a language and culture that may well be a necessary part of their future education.

Resources Needed:

- Curriculum writing time throughout year or Summer 2023

Submitted by: Todd Manuel, House Principal, Trumbull High School
Jennifer Wolyniec, Coordinator of Special Education, Trumbull High School
Susanna Lavorgna Lye , Department Chair of World Language, Trumbull High School
Dr. Jill Angotta, Teacher of the Hearing Impaired

Reviewed by:

_____ Principal/Designee	_____ Date
_____ Assistant Superintendent	_____ Date
_____ Board of Education Curriculum Committee Member	_____ Date
_____ Board of Education Curriculum Committee Member	_____ Date
_____ Board of Education Curriculum Committee Member	_____ Date

TRUMBULL PUBLIC SCHOOLS
NEW COURSE PROPOSAL

Date Submitted: December 14, 2021
Resubmitted: September 9, 2022

Title of Course: If You Love it – Teach It
Grade Level: 11-12, Honors Course, UConn ECE Program

Department: Humanities – Family and Consumer Sciences

Length and Credit: Full Year. 3 UConn credits. 1 HS credit.

Prerequisites: 3 years of English

General Description:
This course is an honors level course offered through UConn's ECE Program. It is part of the education department at UConn and serves as an introduction to historical, philosophical and social foundations of education as well as how those foundations relate to teaching as a profession, school organization, educational reform, and reimaging of education futures.

This course focuses on eight themes as influential components of the teaching profession.

- Articulating how passions can shape what we teach and how we learn.
- Identifying significant events in American history that shaped our educational practices
- Organizational and sociopolitical structures of schooling and teaching in the U.S>
- Awareness of diversity in education as it relates to the structural nature of opportunity, inequality and human rights.
- Current issues involved in schooling and teaching as a profession.
- Addressing current education issues.
- National and state standards for teachers
- Understanding of multiple purposes, philosophies, and practices of education.

Rationale:
Offering this course as part of the UConn ECE program was initiated in 2020 in light of the national teacher shortage that continues to grow and how it dangerously impacts student learning. Furthermore, there is a greater need to increase diversity in the education workforce to better reflect the demographics of students in our schools. By offering this course to high school students, the objective is to attract students to the field of education by exploring and expanding their understanding of teaching and learning and the dynamics of the U.S. education system.

Resources Needed:

- Curriculum writing Summer 2022
- Textbook: Paris, D. & Alim, S. (Eds.) (2017) Culturally Sustaining Pedagogies: Teaching and Learning for Educational Justice in a Changing World. New York: Teachers College Press. 978-0807758335

Submitted by: Todd Manuel, C-House Principal, Trumbull High School
Diane Richards, CTE Teacher, Trumbull High School
Christina Rusate, CTE Department Chair, Trumbull High School

Reviewed by: _____ _____

Principal/Designee — Date

_____ _____

Assistant Superintendent — Date

_____ _____

Board of Education Curriculum Committee Member — Date

_____ _____

Board of Education Curriculum Committee Member — Date

_____ _____

Board of Education Curriculum Committee Member — Date

Trumbull High School & University of Connecticut
Early College Experience Program
Course Syllabus
EDCI 1100: If You Love It, Teach It

Instructor: Mrs. Diane Richards
Email: drichard@trumbullps.org
Room C-23:

Course Description
This is an educational foundations survey course for those who are interested in learning more about the landscape of K-12 education and how to connect their passions to it. *If You Love it, Teach It* engages students interested in working in K 12 settings in studies about teaching, learning, and schooling in the United States. It explores teaching and learning as processes that can relate to personal passions as well as how those passions are shaped, cultivated, or denied in different educational contexts. Course topics will include introductions to historical, philosophical, and social foundations of education, as well as how those foundations and personal passions relate to teaching as a profession, school organization, educational reform, and the reimagining of educational futures.

Course Format: This course will use a wide variety of writing, speaking, reading, and arts-based practices to explore course themes. Interactive discussions, in-class and online activities, a field experience, and readings are designed to engage students in articulating their processes, values, and experiences of knowing, learning, and teaching. Activities and assignments such as portfolios, thinking journals, K-12 setting observations, project- based learning, whole-class and small-group inquiry, a midterm exam, and cooperative teaching and learning experiences will combine to help the students consider theoretical knowledge in relation to the realities of educational practices in the classroom and beyond. In addition, students will be given the opportunity to focus on specific areas of current and future educational thinking through the production of written assignments on selected topics.

Course Themes
Primary Themes

- Passionate Teaching and Learning
- Histories of Education
- Philosophical and Social Foundations of Education

Considerations and Applications of Primary Themes

- Teaching as an Art and as a Profession
- Standards-Based Education
- School Governance and Organization
- Alternative Conceptions to Schooling and Teaching (e.g., Culturally Sustaining Pedagogy, Social Justice Education, Human Rights Education)

Student Learning Outcomes
Students are expected to demonstrate familiarity with each of the eight themes as influential components of the teaching profession by…

- Articulating how the "calling" to teaching can shape what we teach and how we learn, as well as the future success of our students..
- Identifying significant events in American history and analyzing their impact on each of us as well as current educational practices.
- Articulating a critical understanding of some of the organizational and social and political structures of schooling and teaching in the U.S.
- Articulating an awareness of diversity in education as it relates to the approach to schooling, teaching, and learning.
- Analyzing current issues involved in schooling and teaching as a profession.

- Developing relevant questions and discussing ways of addressing current questions as they relate to education issues.
- Demonstrating awareness of National and State standards for teachers.
- Demonstrating an understanding of multiple purposes, philosophies, and practices of education.

Course Texts

Paris, D. & Alim, S. (Eds.) (2017). *Culturally Sustaining Pedagogies: Teaching and Learning for Educational Justice in a Changing World*. New York: Teachers College Press. 978-0807758335

Additional or alternative readings could include selections from:

Canestrari, A.S., & Marlowe, B.A. (2021). *Educational Foundations: An Anthology of Critical Readings* (4th Edition). Sage Publications. 978-1544388168

Ornstein, A., Devine, D.U., & Gutek, G.L. (2017). *Foundations of education*. (13th ed.). Belmont, CA: Wadsworth.

Spring, J. (2021). *American Education*. (20th ed.) New York, NY: McGraw-Hill. (Released July 1, 2021).

Authors such as Sonia Nieto, Gloria Ladson-Billings, Lisa Delpit, Maxine Greene, John Dewey, James Banks, Wayne Au, Alfie Kohn, Diane Ravitch, Deb Meier, Vivian Paley, Richard Milner, Valerie Kinloch, Angela Valenzuela, Pedro Noguera, Christopher Emdin, Bettina Love, Gholdy Muhammed, and Jeff Duncan-Andrade.

Course Assessment -- % of Total Grade Participation -- 10%
Thinking Journals -- 20%
Midterm Exam -- 20%
Co-Teaching Activity -- 10%
Field Experience Project (*submitted with Final Portfolio*) -- 20%
Final Portfolio -- 20%

Assessment Descriptions

Participation is expected as professionalism and accountability are important factors in the livelihood of all educators. You are expected to be in class and actively participate. Absences and late work should be discussed with me so arrangements can be made to keep you on track.

Thinking Journal: 10 entries questioning readings and course activities will be assigned. Each response paper should demonstrate an understanding of the assigned topics and themes as well as an analysis of an aspect of that material that is particularly interesting, troubling, or challenging to you. Draw connections to your own experiences with schooling when possible.

A *Midterm Exam* will be given on the primary themes of the course as they relate to schooling and teaching.

Field Experience Project: This course requires 10 hours of field experience with prek-12 students, teachers, or schools. This can include after school activities. Please note that students cannot receive a passing grade for this course without proper documentation of the 10-hour field experience project, which includes both double-entry ethnographic notes (i.e., consisting of a non-judgmental description section and subjective response section) from each observation, as well as a summative reflection included in the portfolio.

Play Activity: This co-teaching or co-facilitation project should address educational opportunities in whatever it aims to teach. Each group will be responsible for creating a unique game or play activity related to course themes. A rubric will be created and/or adopted by students to evaluate the game/play/simulation project.

Final Portfolio: In lieu of a final exam, a final multigenre composition will be due where you present all of your writing

and thinking on course topics and themes in a physical or virtual portfolio. Keep all course materials throughout the semester for this final project. The portfolio will also include what you consider your teaching philosophy, as well as an introduction, reading journal entries/discussions, and a plan for further pursuing a career in education. Guidelines and rubric for the portfolio will be posted on Blackboard.

Grade Criteria

A = 100-93	B- = 82-80	D+ = 69-67
A- = 92-90	C+ = 79-77	D = 66-63
B+ = 89-87	C = 76-73	D- = 62-60
B = 86-83	C- = 72-70	F = 59-0

Class Policies

- *Late policies and reminders*: If an assignment is due on a day that you miss, it must be posted to Classroom with an email to me the same day as the class you missed unless you have made prior arrangements. If you have made prior arrangements with me, then your assignment will be due within three days back at school unless otherwise discussed with me. Finally, it is your responsibility to make sure you complete any work and/or notes covered during your absence. Be sure to check Google Classroom for current assignments.

- *Academic Integrity Policies*: This course expects all students to act in accordance with the Guidelines for Academic Integrity at the University of Connecticut as well as the Student Behavior | Community Standards. Because questions of intellectual property are important to the field of this course, we can discuss academic honesty as a topic and not just a policy. If you have questions about academic integrity or intellectual property, you should consult with your instructor. Additionally, consult UConn's Academic Misconduct | Community Standards.

- *Mobile Phone Policy*: Absolutely no cell phone use in class unless specified for an assignment. Please make sure that ringers are turned off when in the classroom. If you are text-messaging during class, you can be asked to leave and will receive a zero for participation. If there is a pressing reason why you need to have your cell phone available during a particular class period, then please notify me **before** class begins.

- *APA Citation Guidelines*: You should be using the APA format for citing texts in this course. APA guidelines and sample papers can be found at the library or bookstore in the complete APA manual and style guide. A quick reference is available at General Format // Purdue Writing Lab.

General Education Content Areas and Competencies

This course will propose satisfying general education requirements for Area One – Arts and Humanities (CA1), Area Two – Social Sciences (CA2), and Area Three – Diversity and Multiculturalism as defined by the General Education Oversight Committee General Education Oversight Committee.

Connecticut State Department of Education Standards and Resources

This course will offer students the opportunity to familiarize themselves with Connecticut State standards and resources via Connecticut State Standards

Course Outline

Week	Themes	Possible Readings and Lessons
1	Course overview Introductions: Who am I? Who am I as a learner?	Circles of My Multicultural Self - Culturally Responsive Teaching Why Cultural Diversity and Awareness in the Classroom Is Important | Walden University Pratt-Johnson - Communicating Cross-Culturally: What Teachers Should Know (TESL/TEFL) In today's multicultural schools and classrooms, resolving conflict means being culturally aware. Reflection: What's Your FRAME? | Learning for Justice This activity encourages students to reflect on their individual cultures and histories, their backgrounds, the things they grew up with (some that may have been in their control and others that they had no choice about), and their values. In the end, students will begin to enlarge their perspective and recognize diversity of belief and background.
2	What are we passionate about? What excites/interests me now and/or in the past? What possible lives do I dream about?	Educational Foundations: Part I (Why Teach?) What Teachers Make - Taylor Mali Pearl Arredondo: My story, from gangland daughter to star teacher
3	What do we mean by schooling, teaching and learning? Introducing and exploring the terms 'teaching", "learning", schooling", and "education". Unpack assumptions, experiences and perspectives on terms	The difference between schooling, learning, and education | by Rohan Roberts | Medium Authentic Learning Experiences. Originally published at… | by JackieGerstein Ed.D. | Medium School vs. Education: The Difference Matters

4	How do our passions relate to teaching and learning?	Educational Foundations, Part III: What Makes a Good Teacher? Christopher Emdin: Teaching Teachers How to Create Magic 3 rules to spark learning | Ramsey Musallam Bucholtz et al., "Language and Culture as Sustenance" (Course text chapter 3 in the Paris & Alim book). Can be used with the SKILLS website.
5	What's the difference between teaching and instruction? Conceptions of teaching (teaching as an art) Conceptions of instruction Status and development of the teaching profession.	Felipe Fernandez Armesto Teaching vs. Instruction, Inquiry vs Direct Instruction - The Great Debate and How it Went Wrong — The Learner's Way PBS Online: Only A Teacher: Teaching Timeline Irizarry, "For Us, By Us" A vision for culturally sustaining pedagogies forwarded by Latinx youth (Course text - chapter 5 of Paris & Alim book).
6	What do different histories/herstories of education tell us? Historical foundations of education Whose histories are being taught? Whose aren't? Why?	A Brief History of Education in the United States PBS Online: Only A Teacher: Schoolhouse Pioneers A History of American Indian Education https://www.pbs.org/show/latino-americans/ Timeline of Desegregation and Civil Rights Activities for Teaching Tolerance in the Classroom | Resilient Educator Teaching Tolerance offers activities and resources about the winding road toward, and away from, integrated schooling in the U.S.

7	Focus on school integration How do our passions relate to historical foundations of education? What does that mean for how we approach schooling, teaching, and learning?	The Little Rock Battle for School Integration | Learning for Justice In 1957, Little Rock African Americans made their city the most significant test case for the United States Supreme Court's 1954 and 1955 Brown v. Board of Education rulings. The Little Rock Nine and the Children's Movement | Learning for Justice This series of lessons commemorates the integration of Little Rock Central High School in 1957. One lesson features the biography of Daisy Bates, a leader of the desegregation crisis. Another focuses on the nine African-American youths who risked their lives for equality. The final two lessons examine how school integration affected the Little Rock community.This lesson focuses on questions of justice and the role youth have played in social and political movements.

		By reading a combination of primary and secondary sources, students will learn how the Little Rock Nine came to play their important role. These teenagers' participation in school integration stemmed not from the prodding of the parents or activists, but from within themselves. The pursuit of passion with Neil deGrasse Tyson – The Statesman
8	Why Do Socio Political Contexts for Education Matter? Question and Identify Sociopolitical Contexts of Education Social Foundations	Sonia Nieto, Sociopolitical Context of Multicultural Education (PPT in Google Drive folder) Chapter 2 of *American Education*: The Social Goals of Schooling Educational Foundations part VI: How does one develop a critical voice? Rita Pierson: Every kid needs a champion | TED Talk

9 & 10	What are frameworks for schooling and teaching to address social inequities? Exploring alternative frameworks for schooling and teaching (i.e., Culturally Responsive Pedagogy, Social Justice, and Human Rights Education) Rights and Roles of Students and Teachers	Culturally Sustaining Pedagogies: Alim & Paris, "What is Culturally Sustaining Pedagogy and Why Does it Matter?" Nieto PowerPoint on Social Justice Education (in Google Drive folder) Teen Rights In this lesson, students will explore what teen rights actually are. They will also read about some recent cases where teens felt their rights were violated. Students will debate the nature of rights and will discuss what they believe are appropriate rights for teens. Lee & Walsh, "Socially just, culturally sustaining pedagogy for diverse immigrant youth: Possibilities, challenges, and directions" (Chapter 11 of Paris & Alim book).
11 & 12	**What Areas Are We/I Interested in Exploring Further?** Selected topics/readings/activities in educational foundations (some suggestions at right) **Check: How Are the Foundations relating to My Field Experience?**	Girls' attitudes about STEM careers This lesson presents excerpts from a recent Girl Scouts Research Institute study showing girls may be more interested in science, technology, engineering and math (STEM) careers than previously thought. Students compare and contrast white, African-American and Hispanic girls' perceptions of STEM fields. Supporting Linguistically and Culturally Diverse Learners in English Education - NCTE The uniqueness of all cultures, languages and communities.

13 & 14	**What's the Relationship between Theories and Philosophies of Education?** Theories of Education and their philosophical roots **Where am I in these Philosophies and Theories?** Begin exploring schooling experiences, values, and actions related to different philosophies and theories	Philosophies and Theories in Education – Education 2010 Educational Philosophies Definitions and Comparison Chart This lesson will guide students through their human right to education and help them evaluate how well the world is doing when it comes to providing a free, equal, quality education to our youth.

15 & 16	**How are Schools Organized and Financed?** School Governance and Financing **What does school organization mean for my passions and those of others?** Locating different values and identities in how schools are organized and funded	Educational Foundations Part IV: What do Schools Look Like? The dilemma of public school funding | Lizeth Ramirez | TEDxChallengeEarlyCollegeHS Analyzing the School Holiday Calendar | Learning for Justice This lesson explores the debate about whether public schools, which typically close on major Christian and Jewish holidays, should also shutter for important celebrations in other faiths. Do schools kill creativity? | Sir Ken Robinson
17	**How do Standards & Assessment relate to educational theory?** Standards & Assessment	Educational Foundations Part V: How Should We Assess Student Learning?
18 & 19	**How can you best share your passions with others?** Introduction to Co-teaching Passionate Play activity construction by co-teaching teams	6 Co-Teaching Models | Understood
20-21	Co-taught Play activities	**(Presentations)**
22-23	**What did we notice about the relationship between our play activity and teaching and learning?** Reflections on co-teaching activities **What does the future hold (i.e., both for you and for U.S. public education)?** Dialogue on Possible Futures of Education	Educational Foundations part VII: How do we Move Forward? Course Text: Culturally Sustaining Pedagogies: Lee, "An Ecological Framework for Enacting Culturally Sustaining Pedagogy"
24	**Finals Week** *Portfolios due by ____.*	

Name:

EDCI 1100 Webquest

What was *Plessy v. Ferguson*?

What was *Brown v. Board*?

What else was happening in America during 1954?

Go to this website. Click on Overview in the top menu, then Profile and Performance Reports in the drop-down menu. Look up at least five school districts, including your own. Use the demographic data from the "Overview" section of the report to fill in the data below. Use the percentages rather than counts. Then go to this website and look up the District Reference Group (DRG) for each school district. Put this letter in the first column under the district name. (For more information on District Reference Groups, read this bulletin).

CT School District and DRG	**Black, non Hispanic**	**White, non Hispanic**	**Hispanic, any race**	**Asian, Pacific Islander, Native American, or two or more races**	**English language learners**	**Eligible for free/ reduced price meals**

Is there a correlation between the race of a school's population and its DRG?

What is de jure segregation?

What is de facto segregation?

If someone stopped you on the street and asked if Connecticut schools are segregated, what would you tell her/him/them?

Is Brown v. Board being upheld/executed today? Why or why not?

How would you create and/or advocate for diverse learning environments in schools and classrooms? What could that look like (i.e., how are diverse perspectives affirmed and engaged for teaching and learning)? Think in terms of the student, differing social and cultural perspectives, and society.

As part of this course, you are required to complete a field experience of at least 10 hours that includes K-12 classroom and/or participant engagement. You will complete a portfolio assignment that relates your insights from class readings and discussions to the notes and observations you make in your practicum hours.

Specifically, your field experience portfolio assignment is meant to be an academic exercise in which you make links between theory (i.e., ideas about how to best educate) and what you observe and discover (the practice or implementation of those ideas). You will not only write about what happened in the setting, but also consider how the activities in the classroom relate to the topics we read about and discuss in class.

Please make sure that you take great care when interacting and writing about people, especially children, in this field experience opportunity. Below are ethical guidelines you should be aware of and adhere to:

- Consent – You need to gain permission from a K-12 educator or counselor **before** beginning your field experience. Please check with the main office regarding sign-in and sign-out procedures, and make sure to get the "Field Experience Verification Form" signed each time you visit.

- Confidentiality – **Do not** use a child's name when making notes, and **do not** mention the name of the educational setting nor anyone who works there in your written work. Use only pseudonyms or code names in any notes, written submissions and online discussions. You can provide descriptions of the learner and the educational setting. Please make sure that no one involved can be identified.

- Competence – Remember that you are a guest of the classroom and school in which you are observing, serving, and assisting. If asked about your role, explain that the main purpose of the project is for your teacher education, and not for conducting evaluations of students or teachers.

- Professionalism – As a guest of the classroom and school in which you will be observing you are expected to **represent yourself and the university in a professional manner**. This means conducting yourself in a manner appropriate for the K-12 educational setting. Included, but not limited to, professional representation are: appropriate dress (no ripped or revealing clothing, no tank tops, belly shirts, or shirts with profanity, writing, or pictures on them), undergarments should be covered at all times, arrive on time and stay for the duration of your scheduled observation, use appropriate language, be helpful and respectful to all faculty, staff and students at the school in which you are observing.

The assessment of this field experience project includes your double-entry ethnographic notes (i.e., a non judgmental "objective" description section and a subjective response section that focus on your questions and connections with context and participants), verified completion of at least 10 hours of field experience, and a portfolio summary on the experience. If you have any questions about any of the requirements, ask your me before you begin this process.

Field Experience Verification Form

Student:
Field Experience
Setting:
Class/Community
Observed:
Cooperating Teacher/Supervisor's Name:
Teacher/Supervisor Contact Information (phone # / email):

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

Date: Hours: _Teacher Signature:

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Date: Hours: _Teacher Signature:

Portfolio Options

The portfolio is the place where you develop the most meaningful reading, writing, and thinking you've done in

this course. It gives you the opportunity to provide both an overview and selected snapshots of what you've questioned, learned and been inspired by during the year. It also provides you with a resource to use for future studies and teaching.

Portfolio Elements (may renamed, reorganized, and attended to through multiple genres):

I. Table of Contents

II. Introduction (should be at least one page, single spaced)

It should describe what you have accomplished in this course this year. It should also give the reader a sense of where you've been and where you are going as a future educator. As you write your introduction, consider the following:

- What have you been challenged with the most and why? Explain.
- What assignments or activities in class were the most memorable. Explain.
- What activities or lessons did you learn the most from? Why? What was it about the activity or lesson that helped you learn?
- Which activities or lessons challenged you the least? Why?
- What are your greatest strengths and concerns for going into education?

III. Teaching Philosophy

Explore and deepen your philosophy of teaching and learning. Review your thinking journal, web resources on developing a teaching philosophy, and original definitions of teaching and learning and review them based on your experiences with this course. Consider including a quote on education that represents your views on teaching and/or learning. Be sure to explain why you chose it.

IV. Field Experience Project (beginning with a multiple-page reflection)

This should include an overall reflection on your experience and what specifically you learned about students, schooling, learning, teaching and the kind of teacher you would like to be, along with your double entry observation notes, and your field experience verification and ethical consideration forms.Connect to educational theory and philosophy where appropriate.

V. Thinking Journal Entries

Include your entries and reflect on them or any changes you've made since they were submitted.

VI. Artistic Creations/Meditations on Teaching, Learning and Schooling

This should include other writing that is reflective of your thinning and learning in thai course such as art-based responses to course activities or texts, a reflection on your play activity, documenting outside research, a midterm reflection, a letter of thanks or a poem of inspiration to someone or something from your field experience, a discussion of metaphors or quotes on learning, and/or a plan for future learning based on your needs and interests as a future educator.

Portfolio Rubric

Category	Weak (4)	Satisfactory (6)	Exemplary (8)	Score
Writing mechanics And organization (8 points)	There are multiple grammatical, organizational, or typing errors to the point that it detracts from understanding.	The writing is clear with minimal errors and fits the tone of the activities being described. There is also adherence to required portfolio sections.	There are almost no writing errors and there is excellent adherence to portfolio sections. The descriptive and reflective elements make it clear to the reader how the writer's thinking about course topics has evolved during the semester.	
Description of Activities (8 points)	Insufficient information is provided to fully understand the what happened in course activities and/or the full context is not provided.	The reader clearly understands what, when and how the activities occurred. The author includes information about the professional setting, his or her role in activities, and the Social and educational dynamics important to the activities.	The author provides clear information about the activities, including a thorough explanation of memorable activities and their connections to key terms or ideas in the course.	
Reflection and Response (8 points)	The author's response to course activities is absent, not clear, or not supported with much evidence.	The author provides information about his or her reflections and responses to course activities, however the use of explanation and evidence are inconsistently applied.	The author's reflections and responses are clearly described and understandable in the analysis. They reflect sustained student thinking about his/her own experiences and passions, and how they shape the connections they make with learning, teaching, and schooling.	
Consideration of Questions and Issues (8 points)	Questions or issues are not raised or do not appear to be clearly linked/related to course concepts. No second point of view for looking at the activities is shown.	Questions and issues shows evidence of stepping out of the author's normal stance to try on a new point of view.	The author provides evidence of using multiple points from which they are viewing the activities, and use questions and issues as a starting point for developing new knowledge and understanding.	
Other Creations (8 points)	The author provides little depth or attention to developing stance or plan to guide the challenges they will face as teachers.	The author reveals an emerging stance or plan to guide them in future actions/interactions in classrooms, schools, and in other	The author clearly reveals how s/he has come to think differently about schooling and its impact on	

		educational endeavors	her/him/them for future teaching.	
*Note that 2 is only used if something shows no attention to section requirements			**Total**	

Attending to Thinking Journal Entries & Posts

<u>Style & Form</u>:

- Type and save Google Docs/Classroom,
- Type your name, the course title, and due date in the upper left of your paper.

- Create a title for your response and center it.
- Cite the text you are responding to in APA format.
- Single spaced, one page only (dropping font to 11 and minimizing margins will give you extra wiggle room)
- Always write in multiple paragraphs - minimum of 3 but no more than 6. Write in complete sentences (unless or except if you incorporate poetry).
- Beware of non specific pronouns (e.g., if it is unclear who "it" or "they" are)
- Do not start sentences with "So" and do not address your readers specifically (as I am doing in this document). In other words, don't use "you" in your responses.

Content:

- Focus on these questions (as well as your own): *What? So What? Now What?*
- Pose questions/problems and attempt to answer/solve them where appropriate.
- Synthesize – avoid summary (i.e., don't spend much time detailing what the material is, but rather show how you're thinking about it.) Make connections between the reading(s) and yourself (i.e. personalize your learning).
- Make your thinking explicit (i.e., show your readers why you believe what you believe or how
- you are arriving at a current belief or possible explanation).
- Use logic and reasoning (e.g. "Because this happens, it could suggest or suggest).
- Your audience is the many and varied stakeholders in education *(e.g., parents, administrators, teachers, students, the Public, etc.)* so write accordingly.
- Use evidence to support your assertions, claims, or plausible explanations (e.g., it should come from multiple trustworthy sources).
- Use specific examples or quotes from the reading or activity to make your points and/or illustrate the connections you are making.

Scoring Rubric	0	.5	1.0
Form	Missing / Not attempted (0-2 bullets attended to)	Some application (3-7 bullets attended to)	Full application (8-9 bullets attended to)
Content	Missing / Not attempted (0-2 bullets attended to)	Some application (3-7 bullets attended to)	Full application (8-9 bullets attended to)

TOTAL:

The Trumbull High School Community, which engages in an environment conducive to learning, believes that all students will **read and write effectively,** therefore communicating in an articulate and coherent manner. AH students will participate in activities that will address **problem solving through critical thinking.** Students will use **technology as a tool in decision making.** We believe by fostering self-confidence, self-directed and student-centered activities, we will encourage **independent thinking and learning.** We believe **ethical conduct** to be paramount in sustaining our welcome school environment.

TRUMBULL PUBLIC SCHOOLS
NEW TEXT REVIEW/APPROVAL PROCESS

Date Submitted: 8/19/2022

Title of Text: *The Parable of the Sower*

Author: Octavia Butler

Publisher: Grand Central Publishing

Year Published: 2019

ISBN Number: 978-1-5387-3218-2

Core or Supplemental: Core

Course: African American Literature

Grade Level: 12

(If applicable) Replaces text:

Rationale for adopting new text: This text would fill a couple gaps in the current curriculum: it's science fiction, a genre often overlooked in Black literature; it has a strong female protagonist; and it has a contemporary setting dealing with contemporary issues.

Text Description: ***Parable of the Sower*** is a 1993 science fiction novel by American writer Octavia E. Butler. It is a post-apocalyptic science fiction novel that provides commentary on climate change, race relations, political upheaval, and social inequality. The novel follows Lauren Olamina, a young woman who can feel the pain of others and becomes displaced from her home. Several characters from various walks of life join her on her journey north and learn of a religion she has crafted titled Earthseed. In this religion, the destiny for believers is to inhabit other planets. *Parable of the Sower* was the winner of multiple awards, including the 1994 *New York Times* Notable Book of the Year, and has been adapted into a concert and a graphic novel. *Parable of the Sower* has influenced music and essays on social justice. (Taken from Wikipedia).

Strengths: It's an easily accessible, high interest novel that is wildly prescient in predicting much of the major issues facing our society today. It has also been attributed with starting the "Afrofuturism" genre which looks at the intersection of history and the future from a uniquely Black perspective and would be an ideal text to introduce that concept. It has a strong female protagonist who is heroic in the way she takes charge of her community when it falls into crisis. It discusses the importance of building community with diverse backgrounds as well as explores the dangers of ignoring the problems that are dominant in society today. And, as a bonus, it's part of a series of novels for the student who reads it and is interested in reading more.

Weaknesses: It provides an unflinching look at a brutal world where civilization is falling apart. As such, there are scenes of violence described in the novel. Discussions about these moments will be properly and compassionately contextualized in the class where there has already been built a community of trust and mutual respect.

Submitted by: Adeline Marzialo, English Department Chair, Trumbull High School; Matthew Bracksieck, English teacher, Trumbull High School

Reviewed by: _____ _____

Principal/Designee Date

_____

Assistant Superintendent of Curriculum, Instruction, & Assessments Date

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Board of Education Curriculum Committee Member Date

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Board of Education Curriculum Committee Member Date

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Board of Education Curriculum Committee Member Date