To view this meeting, the livestream link is: https://vimeo.com/event/729428

To make a public comment, the call in number is (US) 1-754-900-1598

The PIN is 485 874 784#

Board of Education
May 2, 2023

BOE Conference Room
6:30 p.m.-Executive Session
Council Chambers
7:00 p.m.-Public Session

As citizens of our community, we will conduct ourselves in accordance with Newtown's Core Character Attributes as displayed in our character tree. We will be responsible for our actions and show respect for each other. We will interact peacefully, productively, and politely. We will be trustworthy and honest and show compassion toward others. Newtown's continued success is contingent upon our ability to persevere, to follow through with our commitments, and to stay focused on the greater good.

REVISED AGENDA

Item 1	EXECUTIVE SESSION • Personnel Matter
Item 2	PLEDGE OF ALLEGIANCE
Item 3	ACTION ON EXECUTIVE SESSION ITEM
Item 4	CONSENT AGENDA • Donation to Newtown High School • Correspondence Report
Item 5	**PUBLIC PARTICIPATION
Item 6	PRESENTATIONS • Discussion and Possible Action on the Imagine Learning EL Education Reading Program for Grade 5 for the 2023-2024 School Year • Presentation of Special Review Committee Report about Challenged Books and Superintendent Recommendation • Discussion on Citizen's Requests for Reconsideration of Library Media Materials
Item 7	OLD BUSINESS • Second Read and Possible Action on Integrated Physical and Earth Science Curriculum
Item 8	NEW BUSINESS • Action on Minutes of April 18, 2023 • Action on Minutes of April 24, 2023
Item 9	**PUBLIC PARTICIPATION
Item 10	ADJOURNMENT

***The Board encourages the public to share thoughts and concerns at two points during Regular Meetings. During the first Public Participation, the Board welcomes commentary regarding items on the agenda. During the second Public Participation, commentary may also include issues for the Board to consider in the future. After being recognized, please state your name and address for the record. We request that speakers be respectful and limit comments to two minutes. The Board of Education does not discuss personnel items or student matters in public nor does it engage in dialogue during either public comment period. If you desire more information or responses to specific questions, please email the Board.*

April 18, 2023

TO: Chris Melillo

FROM: Kimberly Longobucco

Please accept the donation of $500 from the Newtown Lions Club Foundation to our Best Buddies Program. This is a very generous donation that will be very useful to our students.

Thank you.

Newtown Lions Club Foundation LLC
PO Box 218
Newtown, CT 06470

Newtown Public Schools

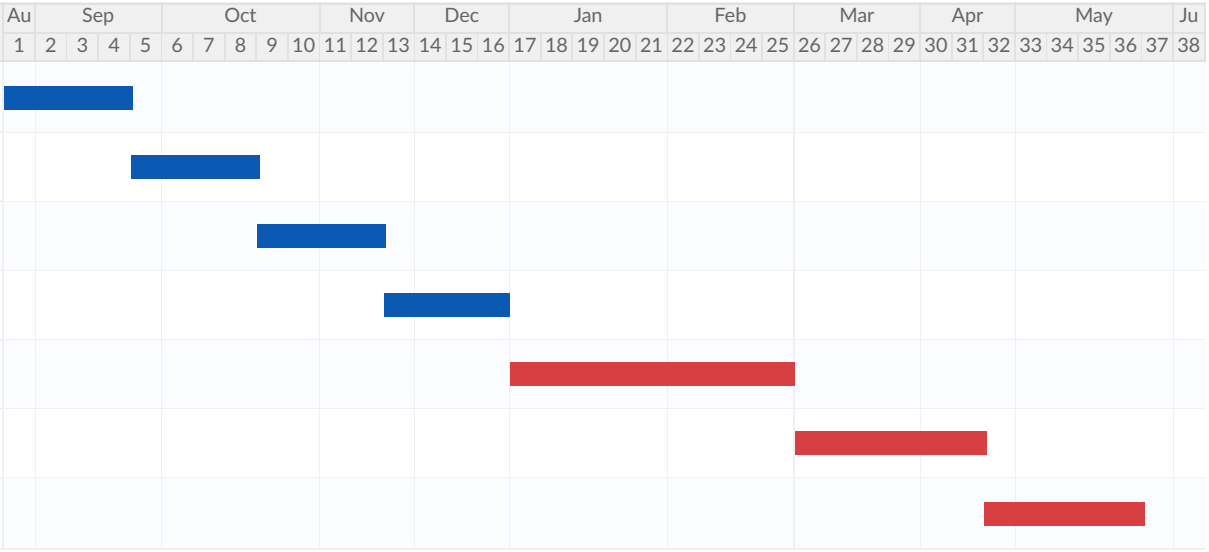
Atlas

Integrated Physical and Earth Science

8 Curriculum Developers | Last Updated: Thursday, Jan 5, 2023 by Georgina, Fawn

Unit Calendar by Year

Unit	Lessons
Lab skills and density	0
01a Big Bang and The...	0
01b Formation and Life cycle of...	0
02 Motion of the solar system	0
03 Formation and History of the...	0
04 Climate Change (Historical an...	0
05 Energy Resources	0



7 Units found

Previous Year

Lab skills and density

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template (Optional)]

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Gathering Information
Concepts: **scientific inquiry, evaluation, design**, **numeracy**, **calculation, analysis, data, evidence**, **measurement, observation**, **scientific ideas**, **experimentation, objectivity**

G

Generalizations / Enduring Understandings

1. Scientific inquiry inspires critical evaluation and communication of scientific ideas to generate further experimentation, product design, and solutions to problems.

2. Scientific numeracy provides the foundation for the ability to calculate, analyze, and interpret scientific data and ideas.

3. Reliable evidence that supports scientific ideas must be valid, replicable, and objective.

4. Precise measurement and close, accurate observations create the evidence scientists need.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. What is the scientific method? (F)
1b. What are the steps of the scientific method? (F)
1c. How does the scientific method attempt to remain totally objective? (C)
1d. What is the nature of science? (C)
1e. Is the scientific method important to modern society? (P)

2a.Which type of graph is appropriate for a particular set of data? (F)
2b. How are simple mathematical relationships applied to scientific problems? (C)
2c. How does one determine the type of graph based on the data? (C)
2d. How do scientists use data to show relationships between variables, draw conclusions and make inferences? (C)
2e. How can mathematical operations be used to analyze and interpret data and present relationships between variables in appropriate terms? (C)
2f. Is mathematics essential to the study of science? (P)

3a. What is data? (F)
3b. How do scientists assess the reliability of the data that was generated in the investigation? (C)
3c. Why is evidence a necessity for explaining scientific ideas? (C)
3d. Does all science need evidence? (P)
3e. Can the public trust scientific studies? (P)

4a.What is mass, volume, and density? (F)
4b. How does one measure in science? (F)
4c. How do scientists choose the appropriate equipment and techniques to make observations and gather data?(F)
4d. What is the relationship between mass, volume, and density? (C)
4e. Why do scientists use certain equipment and techniques to make observations and gather data? (C)
4f. Why is it important for scientists to use data and observations as evidence? (C)
4g. Should the United States switch to the metric system? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Ask questions that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.
- Evaluate a question to determine if it is testable and relevant.
- Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan and conduct an investigation or test a design solution in a safe and ethical manner including considerations of environmental, social, and personal impacts.
- Select appropriate tools to collect, record, analyze, and evaluate data.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

Connections to the Nature of Science: Most Closely Associated with Practices

Scientific Investigations Use a Variety of Methods

- Scientific investigations use a variety of methods, tools, and techniques to revise and produce new knowledge.

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based on empirical evidence.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must KNOW:

Physical Properties
Mass
Length
Volume
Density
D=M/V
Area
Meter
Liter
Gram
Metric system
Customary system
Scientific notation
Scientific method
Variables
Hypothesis
Experiment
Data
Results
Conclusion
Error analysis
Validity
Testable
Measurable
Objective
Observation
Claim
Evidence
Reasoning
Beaker
Graduated Cylinder
Meter Stick
Ruler
Balance
Pie chart
Line graph
Bar graph
Scatter plot
Trend
Precision vs. Accuracy
Percent Error
Qualitative vs. Quantitative data

Students will be able to DO:

Asking questions and defining problems
Ask questions that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.
Evaluate a question to determine if it is testable and relevant.
Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory.

Planning and carrying out investigations
Plan and conduct an investigation or test a design solution in a safe and ethical manner including considerations of environmental, social, and personal impacts.
Select appropriate tools to collect, record, analyze, and evaluate data.

Mathematical and computational thinking
Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Constructing explanations and designing solutions
Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

Core Learning Activities

1. Density of Aluminum Lab Practical or Density Cube Lab: Students measure mass and volume of varied aluminum shapes then calculate the density of each shape within a small percent error to make conclusions about how shape/size affects density of objects made from the same material.

2. Density of Water: Students measure the mass of different volumes of water to determine basic properties of density.

3. Density of Fluids: Students measure the density of various fluids, then layer them in a graduated cylinder according to their density and suspend small solids in each layer to determine relative density.

4. Scientific Method Comic: Students create a comic strip that shows a character using the scientific method to solve an experimental problem to show their understanding of the steps of the scientific method.

5. Measuring activity: Students measure basic properties such as mass, volume, length, area, temperature, etc. using appropriate lab equipment to practice getting accurate measurements.

6. Questioning using Snapple bottle activity: Students see an engaging demonstration (Balloon in a Snapple Bottle) to generate scientific questions then evaluate them according to criteria for scientific questions (testable, measurable, objective).

7. The Obscertainer: Using little black containers, students predict, observe, and hypothesize about the unseen shapes contained within. This is an exercise in using different senses to make observations and collect data.

8. Converting metric units worksheets: Students engage in a math workshop to convert metric units into different scales or to convert between metric and standard units. Also known as "dimensional analysis".

- Density practical - aluminum - short version.doc
- density of water - graph m&V.doc
- Density Cube Lab.doc
- ob-scertainer activity.pdf
- questioning activity with snapple-water balloon.docx
- Conversions and dimensional analysis.docx
- lab safety worksheet.pdf

Assessments

Density of Aluminum Lab Practical
Summative: Lab Assignment
Uses aluminum rectangular prism, cylinder, can, foil to reinforce writing procedures, making data tables, and calculating density
Density practical - aluminum - short version.doc

Scientific Method Comic
Summative: Other Visual Assessments
Create comic illustrating the scientific method
comic sci method - K.doc

Density of Fluids
Summative: Lab Assignment
Measures and calculates the density of several fluids and small objects then predicts which fluids the objects would float in
density of fluids.doc

Measuring Activity
Formative: Lab Assignment
Practice measuring using various tools and then converting metric units
measuring activity.pdf

Measuring and Lab skills test
Summative: Written Test
HIES quest 1 - 2014.doc

Resources

Professional & Student

Glencoe Physical Science with Earth Science text, Unit 1, chapters 1 and 2 pages 4-36 Text book resources for relevant math skills are found on page 16. Also on multiple pages throughout the chapter in the form of practice problems.

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

- Problem Solving

Students will engage in lab scenarios to practice commonly used lab skills that will be carried through the year. Students will be required to design and conduct a procedure and will learn and practice the scientific method. This unit will lay the groundwork for all following units that require lab skills.

Interdisciplinary Connections

Math: This unit has a strong focus on Math integration. Using the metric system to measure in base 10's is a practiced skill and will be used in data collection and calculations. Math is also integrated through the use of graphs to interpret data which is a skill that will be used throughout the course and during lab experiences.

English: Creation of the comic strip requires clear use of language and communication to express understanding of the scientific method.

01a Big Bang and The electromagnetic Spectrum

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template (Optional)]

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: **Scale, Proportion, and Quantity**
Universe, models, observation, indirect and direct observation, limitations, ,measurement theory, technology, mathematical representations, wave, evidence, relationships ,matter, phenomenon

01A Earth in the Universe Unit plan

G

Generalizations / Enduring Understandings

1. Indirect observation allows for studying objects that are too distant at scale for the limits of direct observation.

2. Models use scale and proportion to communicate relationships between different parts of the model.

3. Observational evidence and measurements support theories about distant objects or past events, such as The Big Bang Theory.

4. Wave behaviors and their mathematical representations explain many phenomena such as the expansion of the Universe.

5. Technological devices use wave behavior and interactions with matter to transmit and capture information.

6. Technology produces, transmits, and captures signals for storing and interpreting information used as evidence to support theories.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. How is the universe 's size discovered? (F)
1b. How did stars and galaxies form? (F)
1c. How long would it take to get to the closest star? (F)
1d. How big is the Milky Way Galaxy? (F)
1e. How did the stars and galaxies form? (C)
1f. How does one gather evidence about objects incapable of being directly observe? (C)
1g. Did anything come (exist) before the Big Bang? (P)

2a. How old is the universe?(F)
2b. Where is Earth located within the Milky Way Galaxy? (F)
2c. How big is the universe? (C)
2d. How is the age of the Universe determined? (C)
2e. Why are there so many different models of the Universe? (C)
2f. Can anyone travel to the edge of the universe? (C)
2g. Is there one center to the Universe? (P)

3a. What is the Big Bang Theory? (F)
3b. How fast is the Universe expanding? (F)
3c.What do redshift and blueshift reveal about the expansion of the Universe? (F)
3d. What does the Cosmic Background Radiation reveal about the formation of the universe? (C)
3e. What is causing the Universe to expand at its current rate? (C)
3f. Why have scientists theorized about the existence of dark matter and energy even though they cannot be readily observed? (C)
3g. How do redshift/blue shift to describe motion in the Universe? (C)
3h. Does the multiverse exist? (P)
3i. What did the universe come from? (P)
3j.What is beyond the edge of the universe? (P)

4a. What is the light limit? (F)
4b. What travels fastest in the known Universe? (F)
4c. What does it sound like in space? (F)
4d.What is the speed of light? (F)
4e. Why does the frequency of a wave apparently change when it is moving towards/away from the observer? (C)
4 f. When one looks into space can one see objects in the present, past, or future? (C)
4g. How does change in velocity affect the flow of time? (C)
4h. Can humans travel at the speed of light? (C)

5a. What at the benefits and drawbacks of using electromagnetic waves in technology? (F)
5c. What kinds of technological devices use waves to collect or transmit information? (F)
5d. What practical applications do technological devices have to collect or store information? (F)
5e. How can the human body be affected by the use of devices that use waves? (C)
5f. Why is a lead apron necessary at the dentist's office? (C)

6a. Which technological devices collect the information scientists use as evidence for astronomical theories? (F)
6b. What types of evidence are collected with wave technology to support astronomical theories?
6c.How does information gathered by telescopes help determine the origin of the universe? (C)
6d. Is the telescope the most important invention contributing to scientific knowledge? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 2. Developing and using models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism or system in order to select or revise a model that best fits the evidence or design criteria.
- Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS1: Earth's Place in the Universe

ESS1.A: The Universe and Its Stars

- The Big Bang theory is supported by observations of distant galaxiesreceding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe.(HSESS1-2)

PS4: Waves and Their Applications in Technologies for Information Transfer

PS4.A: Wave Properties

- The wavelength and frequency of a wave are related to one another by thespeed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (HS-PS4-1)
- Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sentover long distances as a series of wave pulses. (HS-PS4-2),(HSPS4-5)

PS4.B: Electromagnetic Radiation

- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features.(HS-PS4-3)
- Atoms of each element emit and absorb characteristic frequencies of light.These characteristics allow identification of the presence of an element, even in microscopic quantities. (secondary to HS-ESS1-2)

PS4.C: Information Technologies and Instrumentation

- Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them.(HS-PS4-5)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must KNOW:

Universe
Observable Universe
Galaxy
Milky way galaxy
Star
Lightyear
Big Bang theory
Theory
Cosmic background radiation
Hubble's law
Matter
Expansion
Space
Time
Telescope
Detector
Hubble space telescope
Refraction
Reflection
Doppler effect
Red/Blueshift
EM radiation
Gamma, x-ray, ultraviolet, visible, infrared, micro, radio waves
Spectroscopy
Wave
Speed of light
Wavelength
Frequency
Speed = wavelength x frequency
Amplitude
Transverse waves
Longitudinal waves
Sound
Light
Medium
Vacuum

Students must be able to DO:

Constructing Explanations and Designing Solutions

Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
Apply scientific reasoning, theory, and/or models to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.

Using Mathematics and Computational Thinking

Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Obtaining, Evaluating, and Communicating Information

Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

Engaging in Argument from Evidence

Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.

Developing and using models

Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism or system in order to select or revise a model that best fits the evidence or design criteria.
Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

Core Learning Activities

1. **Scale and Proportion:** Students explore their place in the Universe by gaining an understanding of the full scale of the Universe. Videos, models, and analogies are presented to students to give them a sense of how large or small they are in relation to other objects in the Universe.
-How big is the Universe? Scale of the Universe video
Crash Course Video - Distances
Students draw a model of the universe (pre-model takes place before students do any major new learning and a post-model summative assessment will happen after students have completed the content about the expansion of the Universe and the Big Bang Theory)

2. **Expansion of the Universe:** Students will take notes on the concepts and supporting evidence of the Big Bang Theory. Students will then engage in models and activities that simulate and help explain how scientists know the Universe is expanding.
The Beginning of Everything -Big Bang: video explaining the general concept of the Big Bang Theory and some further implications as well as the limitations of current scientific knowledge.
Balloon expansion activity: Students use a balloon as a model of the expanding Universe by measuring the changes in spacing between marks made on the balloon.
Visualizing expansion of space: Paper based activity that shows how the space between galaxy clusters changes over time.
Graph Hubble's constant
Questions from Hubble Graphing activity
Theory, law, hypothesis lesson: Students are presented with the scientific language of "theory, law, and hypothesis" and that each means something specific and different in the scientific community.

- TedEd video

3. **Wave properties.**
Cymatics-science vs. music video.: Music video to explore properties of waves such as frequency, movement, shape, etc. used as an introductory phenomenon.
Slinky lab: Hands on lab where students measure the wavelength and frequency of slinky waves.
Math workshop on speed = wavelength x frequency calculations

4. **Doppler effect.**
Doppler sound (car horn): Introductory video to the show real world experience of the Doppler Effect
Red shift/Blue shift activity (CSI galaxies): Students calculate how fast a galaxy is moving based on the change in wavelength of the galaxy's light.

5. **Telescopes and detectors.**
Pictures of celestial objects in different portions of the EM spectrum.
Building/Using telescopes
Telescope research project

6. **EM Radiation**
Demos of different types of technologies that utilize EM radiation such as radios, remote controllers, UV lights, toaster, etc.
Build a Scale model of the EM spectrum

Assessments

Slinky Lab
Formative: Lab Assignment
See attachments below for link to handout.

Big Bang Balloon Lab
Formative: Lab Assignment
See attachments below for link to handout.

Waves Test
Summative: Written Test
Waves, EM, and Doppler test.pdf

Model of Universe
Summative: Group Project
Model (drawing) of the universe.docx.pdf

Copy of Waves, EM, and Doppler test.pdf

Big Bang Balloon Lab.pdf

Slinky Lab.pdf

Resources

Professional & Student

Phet simulation that shows electromagnetic waves in relationship to electron movement. https://phet.colorado.edu/en/simulation/legacy/radio-waves

Crash Course Astronomy: Telescopes video used to introduce telescope technology and EM waves technology. https://www.youtube.com/watch?v=mYhy7eaazIk&list=PL8dPuuaLjXtPAJr1ysd5yGIyiSFuh0mIL&index=6

Resource website for EM spectrum and radiation basics.
https://science.hq.nasa.gov/kids/imagers/ems/waves3.html

Phet simulation of transverse waves. Very simple and basic introduction to wave properties. https://phet.colorado.edu/sims...

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Math: Mathematical models of scale and proportion are useful in conceptualizing the true vastness of the Universe. Wave forms, like those created by electromagnetic radiation, can be described by classical math formulae such as sine and cosine waves.

Technology: Technological advancements have aided our observations of the Universe.

01b Formation and Life cycle of Stars

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Energy and Matter
Concepts: **energy, matter, conservation, model, pattern, transformation, sequence, data, cycle, prediction, radiation, fusion, nuclear processes, structure, life cycle, transport, energy output, wave**

01B Earth in the Universe

G

Generalizations / Enduring Understandings

1. A wave model or a particle model describes electromagnetic radiation, and for some situations one model is more useful than the other.

2. The Sun, a typical main sequence star, has a structure and life cycle pattern representative of all stars in the galaxy.

3. Nuclear fusion in the Sun's core transforms and releases energy that transports to Earth through radiation.

4. The life cycle of a star produces all natural elements on the periodic table through nuclear fusion while conserving matter and transforming energy.

5. All stars follow a sequence of stages as they produce new elements through nuclear processes and will end their "life" depending on their starting mass.

6. Scientists study the historical data of sunspot activity and use these patterns to help predict the Sun's cycle and its energy output.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. Do all electromagnetic waves travel at the same speed? (F)
1b.Does energy move the medium it travels through?(F)
1c. Do all types of waves behave the same? (F)
1d. Can all types of waves travel through empty space? (F)
1e. How is wavelength related to energy and frequency? (C)
1f. Why do some electromagnetic waves have more energy? (C)
1g. Is there a cosmic speed limit? (P)

2a. How do scientists know details about the sun and stars? (F).
2b. Will the sun devour the Earth as it goes through its life cycle? (F)
2c. What is a star? (F)
2d. What type of star is most abundant in the Universe? (F)
2e. Are all stars the same? (F)
2f. Why does all life on Earth depend on the sun? (C)

3a. How does the sun generate energy? (F)
3b. Why do stars twinkle? (C)
3c. Why are there no green stars? (C)
3d. How are elements created inside a star? (C)

4a. Where do the elements that make up the Earth come from? (F)
4b.What element do all main sequence stars fuse together? (F)
4c.How can a star produce elements in its core through its life cycle? (C)
4d. How do elements reveal detailed information about astronomical bodies? (C)

5a. What is going to happen to the sun when it "dies"? (F)
5b. How long do stars live? (F)
5c. How are stars born? (F)
5d. How do stars die? (F)
5e. Why do some stars become black holes? (C)
5f. How big can stars get? (C)
5g. Will Earth be devoured by a black hole? (P)

6a. What are sunspots? (F)
6b. Are sunspots predictable? (F)
6c.How does energy output correlate to the number of sunspots present? (C)
6d. How do scientists know that the Sun goes through cycles? (C)
6e. What caused the Little Ice Age? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science Performance Expectations (2017)

NGSS: HS Physical Sciences

HS.Energy

Performance Expectations

- HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

HS.Waves and Electromagnetic Radiation

Performance Expectations

- HS-PS4-3. Evaluate the claims, evidence, and reasoning behind behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

NGSS: HS Earth & Space Science

HS.Space Systems

Performance Expectations

- HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.
- HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS1: Earth's Place in the Universe

ESS1.A: The Universe and Its Stars

- The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. (HS-ESS1-1)
- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (HS-ESS1-2),(HS-ESS1-3)
- Other than the hydrogen and helium formed at the time of the BigBang, nuclear fusion within stars produces all atomic nuclei lighterthan and including iron, and the process releases electromagneticenergy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (HS-ESS1- 2),(HS-ESS1-3)

PS3: Energy

PS3.D: Energy in Chemical Processes and Everyday Life

- Nuclear Fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. (secondary to HS-ESS1-1)

PS4: Waves and Their Applications in Technologies for Information Transfer

PS4.B: Electromagnetic Radiation

- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features.(HS-PS4-3)
- Atoms of each element emit and absorb characteristic frequencies of light.These characteristics allow identification of the presence of an element, even in microscopic quantities. (secondary to HS-ESS1-2)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must KNOW:

Star
Sun
First generation star
Second generation star
Energy
Light
Spectrum
Waves
Photon
Absorption
Radiation
Gravity
Nuclear fusion
H-R diagram
Main sequence
Giant
Supergiant
White dwarf
Neutron star
Black hole
Supernova
Nebula
Planetary nebula
Solar mass
Corona
Chromosphere
Photosphere
Radiative zone
Convection zone
Solar wind
Sunspot
Prominence
Solar flares
Element
Proton
Neutron
Electron
Electron energy level (orbital)
Hydrogen
Helium

Students must be able to DO:

Developing and Using Models

Develop a model based on evidence to illustrate the relationships between systems or between components of a system.
Use a model to provide mechanistic accounts of phenomena. (HS-ESS2-4)

Obtaining, Evaluating, and Communicating Information

Communicate scientific ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

Engaging in Argument from Evidence

Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.

Core Learning Activities

1. Spectroscopy lab (see attachments below) using spectroscopes and emission tubes and the solar/continuous spectrum

2. Layers of the Sun: Sun-ion; students research properties of each layer of the sun and construct a simple flipbook to keep as a resource.

3.Modeling Nuclear Fusion in Stars: Students construct a diagram of nuclear fusion by combining atomic particles to make new elements and show the release of energy.
Nuclear fusion activity template

4. Life cycle of a star card sort instructions: Students explore and reinforce the life cycle of a star by matching images with descriptions.
Life cycle of a star card sort cards

5. Graphing sunspot cycles : Students graph the amount of sun spots over several years to show a clear pattern that scientists call the "solar cycle"

6. HR-Diagram Graphing Activity: Students plot many stars on the HR-Diagram based on their temperature. They will then group the stars based on the scatter plot into their commonly named star categories (red giants, white dwarves, main sequence, etc.) This is a critical activity because the content has been known to show up on the NGSS state-level test.

- Sun-onion instructions.pdf
- Modeling Nuclear Fusion in stars.pdf
- nuclear fusion activity template.pdf
- Life cycle of a star card sort instructions.pdf
- Life Cycle of Stars Card Sort cardspdf.pdf
- Graphing Sunspot Cycles.pdf
- HR Diagram Graphing Activity (1).docx.pdf

Assessments

Spectroscopy Lab
Formative: Lab Assignment
spectroscopy lab.docx

Modeling Nuclear Fusion
Formative: Lab Assignment
See attachments under Core Learning activities.

Star Stations
Summative: Group Project
Multiple day assessment activity
Folder containing Star Station material

Resources

Professional & Student

Phet simulation: Models of a hydrogen atom. Can be used to introduce atomic structure as it relates to fusion in stars. https://phet.colorado.edu/en/simulation/legacy/hydrogen-atom
Lesson-Level Phenomenon: video of a star being eaten by a black hole
Crash Course Astronomy - Stars
Crash Course Astronomy- Sun
Crash Course Astronomy- Black Holes
Video about elements used during nuclear fusion activity.
https://cptv.pbslearningmedia....

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Math: Scale and proportions can aid in the understanding of immense sizes, distances, and lengths of time associated with the scale of the Universe.' Complex understanding of astronomy would not be possible without mathematical relationships that explain patterns and sizes observed in space. Astronomy would be reduced to the types of simple observations made by ancient humans.

02 Motion of the solar system

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Patterns
Concepts: **motion**, **scale**, **systems, patterns**, **astronomical events**, **predictability**, **laws**, **observation**, **gravity**, **distance**, **mass**, **models**, **properties**, **cause and effect**, **evidence**, **scientific principles**, **change, space**

02 Earth in the Solar System

G

Generalizations / Enduring Understandings

1. Patterns in star systems observed at different scales provide evidence for cause and effect explanations of observed astronomical events.

2. Laws of orbital motion describe the patterns of movement of objects in the Solar System and can predict astronomical events with accuracy.

3. Gravity from the objects in motion in space changes based on the mass of the objects and distance between objects.

4. Scientific models capture important aspects of scientific principles, but they cannot accurately depict all properties simultaneously.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a.How have humans used astronomical observations throughout history? (F)
1b.What is a meteor shower? (F)
1c. Do all comets return like Halley's comet? (F)
1d.Why do planets orbit a star? (C)
1e. How have humans perceived/interpreted astronomical observations throughout history? (C)
1f. Why do meteor showers happen at the same time every year? (C)
1g.Do astronomical events have meaning? (P)

2a.How do the planets travel around the sun? (F)
2b.What factors affect an object's orbit? (F)
2c.What does eccentricity measure? (F)
2d. How does the acceleration of an object change throughout its orbit around an ellipse? (F)
2e What are Kepler's Laws of Planetary Motion? (F)
2f. What is Newton's Law of Universal gravitation? (F)
2g. How does high eccentricity affect a comet's orbit? (C)
2h. How do scientists predict future comet appearances and solar eclipses? (C)
2i.Are far-future predictions of astronomical events accurate? (P)

3a. What is gravity? (F)
3b.What is the shape of the asteroid belt? (F)
3c. What is the effect of gravity on different masses? (C)
3d. Does the effect of gravity extend out from a mass forever? (C)
3e. How does Jupiter affect the shape and orbit of the asteroid belt? (C)
3f. How are Kepler's and Newton's Laws related? (C)
3g. How can laws of planetary motion help with understanding motion in the Universe? (C)

4a. How is scale used to make models more accurate? (F)
4b. How big would an accurate model of the solar system have to be? (F)
4c. Why do scientific models have limits? (C)
4d. What does an accurate model of the Solar System look like? (C)
4e. Why is it difficult to produce a model of the solar system that shows both accurate sizes and distances? (C)
4f. Are all posters of the Solar System wrong? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science Performance Expectations (2017)

NGSS: HS Physical Sciences

HS.Forces and Interactions

Performance Expectations

- HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
- HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
- HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

NGSS: HS Earth & Space Science

HS.Space Systems

Performance Expectations

- HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS1: Earth's Place in the Universe

ESS1.B: Earth and theSolar System

- Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (HS-ESS1-4)

PS2: Motion and Stability: Forces and Interactions

PS2.A: Forces and Motion

- Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1)
- If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objectsoutside the system. (HS-PS2-2),(HS-PS2-3)

PS2.B: Types of Interactions

- Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.(HS-PS2-4)
- Forces at a distance are explained by fields (gravitational,electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (HS-PS2-4),(HS-PS2-5)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Student must KNOW:

Solar system
Dwarf planet
Moon
Kuiper belt
Oort cloud
Comet
Asteroid/meteor/meteorite
Kepler
Kepler's Laws
Ellipse
Foci (focus point)
Eccentricity
Orbit/Revolution
Rotation
Perihelion
Aphelion
Orbital period
Newton
Gravity
Mass
Acceleration
Force
F=ma
Newton's law of universal gravitation
Distance
Gravitational field
Center of mass
Centripetal
Collision

Students must be able to DO:

Using Mathematical and Computational Thinking

Use mathematical or computational representations of phenomena to describe explanations.

Analyzing and Interpreting Data

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Constructing Explanations and Designing Solutions

Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects.

Core Learning Activities

1. See-Think-Wonder Protocol: The class discusses a variety of astronomical phenomena such as planetary transits, eclipses, meteor showers, and comet sightings to explore the idea that astronomical phenomena are highly predictable due to laws of motion.

2. Drawing of a model of the solar system: Used as a pre-model to assess students' learning about scale and proportion and motion in the solar system.

3. Kepler's 1st law; Drawing elliptical orbits and identifying the effect of changing aspects of the ellipse.

4. Kepler's 2nd law; Computer simulation activity exploring the orbits of inner solar system objects and the effect on speed of objects through the course of their orbit to achieve equal area over equal time.

5. Kepler's 3rd law; Rubber stopper lab Students swing rubber stoppers around on a string to measure how distance affects orbital period.

6. Gravity Well (Lycra-balls): a simple demonstration that can show orbital motion as described by Kepler's Laws as well as integrate topics about gravity and space-time.

7. Gravity and Motion worksheet: Reading and Math workshop practicing and exploring the effects of the law of universal gravitation in different scenarios.

Copy of Kepler's 1st law activity
Copy of Kepler's 2nd Law activity
Copy of keplers 3rd law activity
Gravity - (lycra-balls) Investigation_Guide.pdf
Copy of Model Rubric.pdf
Gravity and Motion Worksheet.pdf
see_think_wonder_template.pdf

Assessments

Gravity Well Activity
Formative: Lab Assignment
See attachments under Core Learning Activities.

Kepler's 3rd Law Activity
Formative: Lab Assignment
See attachments under Core Learning Activities.

Kepler's 2nd Law Simulation
Formative: Lab Assignment
See attachments under Core Learning Activities.

Kepler's 1st Law Activity (Ellipses)
Formative: Lab Assignment
See attachments under Core Learning Activities.

Kepler's Laws Quiz
Summative: Written Test
Kepler Quiz 2019.pdf

Solar System Model
Summative: Group Project
See attachments under Core Learning Activities for rubric.

Resources

Professional & Student

Text book: Glencoe Physical Science with Earth Science. 2006. (Chapters 3,4,7,8)
PhET orbital simulations can be used as introduction or exploration of orbital motion and Kepler's laws.
https://phet.colorado.edu/sims/html/gravity-and-orbits/latest/gravity-and-orbits_en.html
https://phet.colorado.edu/en/simulation/legacy/my-solar-system
https://phet.colorado.edu/en/simulation/gravity-force-lab
Video
Crash Course Astronomy: Gravity
https://www.youtube.com/watch?...

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Math: Mathematical/computational skills will be used when analyzing data related to elliptical orbits. Mathematical/computational models will be used to predict motion of orbiting objects in the solar system. Without Mathematical connections astronomy would not have the complex modern understanding of space. Humans would be confined to the simple observations of heavenly bodies that ancient humans were.

Social Studies: Historical references to scientists and navigators who used similar techniques to initially gather information about heavenly bodies and their impact on the progress of science. Many of the famous scientists in this chapter made their contributions to science in the 1400-1600's which is known as a period of scientific renaissance.

03 Formation and History of the Earth

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template (Optional)]

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Stability and Change
Concepts: **evidence, processes, quantifications, models, change, formation, properties, materials, tectonics, geologic event, geologic history, record, time, scale, preservation, synthesis, cause, human comprehension**

03 Formation and History of Earth

G

Generalizations / Enduring Understandings

1. Different scales of time require quantifying and modeling change and rates of change to facilitate human comprehension.

2. Rocks preserve evidence of geologic events that occurred in the past and processes that are happening today.

3. Because active geologic processes have destroyed most of the very early rock record on Earth, other objects in the solar system that have changed little over billions of years provide critical information about Earth's formation and geologic history.

4. Properties of Earth materials drive internal processes which cause immense changes on the surface.

5. Surface processes and Earth materials provide evidence of how plate tectonics works and that it is still happening today.

6. Because the rock record preserves geologic events, absolute dating can be synthesized with relative dating to make a more complete record of Earth's history.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. What is the geologic time scale?(F)
1b. What is the evidence scientists use to construct Earth's history? (F)
1c. What types of phenomena are considered major geologic events? (F)
1d. How do scientists construct a timeline of Earth's 4.6 billion year old history?(C)
1e. How do humans fit into Earth's history?(P)

2a. What are the major events in Earth's history?(F)
2b. What information do rocks provide? (F)
2c. What is the evidence for continental drift?(F)
2d. How old are rocks? (C)
2e. How does the rock record give evidence for plate tectonics?(C)
2f. How do scientists support the idea that Pangea existed? (C)
2g. What is the evidence for the formation of Earth?(C)

3a. What does Earth have in common with the other terrestrial planets in the solar system?(F)
3b. How do scientists know about conditions of early Earth?(F)
3c. How can evidence from space be used to support theories about early Earth?(C)
3d. How was the Earth formed?(C)

4a. Why is Earth organized in distinct layers?(F)
4b. What is the magnetosphere? (F)
4c. What causes plate tectonics? (F)
4d. What is convection?(F)
4e. What causes the Earth's magnetosphere?(F)
4f. How can movement of interior layers affect surface processes?(C)
4g. What is the significance of Earth having layers?(C)
4h. Why was the magnetosphere so important for the development of life on Earth? (C)
4i. How is the surface of the crust affected by the movement of the plates?(C)
4j. What would Earth be like if it did not have layers?(P)

5a. What is the theory of plate tectonics?(F)
5b. What geologic surface processes are a result of tectonic movements? (F)
5c. How fast do tectonic plates separate? (F)
5d. How can rock hand samples be evidence of large plates moving?(C)
5e. How can fossils tell scientists what latitudes continents used to be in? (C)
5f. How do we know plate tectonics are happening today if it's too slow to see? (C)
5g. Is understanding plate tectonics an essential part of telling Earth's whole history? (P)

6a. What is relative dating of rocks?(F)
6b. What techniques are used to estimate a relative age on a rock layer or geologic event?
6c. How are dating techniques used to estimate a relative age on a rock layer or geologic event?(F)
6d. How does absolute dating of rocks work?(F)
6e. What is stratigraphy? (F)
6f. How do scientists know the age of rocks?(C)
6g. Can scientists rely on the estimated ages of rocks?(P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS1: Earth's Place in the Universe

ESS1.C: The History of Planet Earth

- Although active geologic processes, such as plate tectonics anderosion, have destroyed or altered most of the very early rock recordon Earth, other objects in the solar system, such as lunar rocks,asteroids, and meteorites, have changed little over billions of years.Studying these objects can provide information about Earth'sformation and early history. (HS-ESS1-6)

ESS2: Earth's Systems

ESS2.A: Earth Materials and Systems

- Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (HSESS2-1),(HS-ESS2-2)
- Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (HSESS2-3)

ESS2.B: Plate Tectonics and Large-Scale SystemInteractions

- The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can beviewed as the surface expression of mantle convection. (HS-ESS2-3)
- Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. (ESS2.B Grade 8 GBE) (HS-ESS2-1) (secondary to HS-ESS1-5)

PS1: Matter and Its Interactions

PS1.C: Nuclear Processes

- Spontaneous radioactive decays follow a characteristicexponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials. (secondary to HS-ESS1-5),(secondary to HS-ESS1-6)

PS4: Waves and Their Applications in Technologies for Information Transfer

PS4.A: Wave Properties

- Geologists use seismic waves and their reflection at interfaces betweenlayers to probe structures deep in the planet. (secondary to HS-ESS2-3)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must KNOW:

Late Heavy Bombardment
Accretion
Meteorites
Craters
Volcanoes
Crust
Mantle
Outer Core
Inner Core
Felsic
Mafic
Continental Crust
Oceanic Crust
Direct Evidence
Indirect Evidence
Convection Currents
Thermal Expansion
Radioactive Decay
Rocks
Igneous
Metamorphic
Sedimentary
Minerals
Continental Drift
Plate Tectonics
Convergent Boundary
Divergent Boundary
Transform Boundary
Subduction
Deep Ocean Trench
Mid-Ocean Ridge
Mountain Building
Relative Dating
Law of Superposition
Law of Original Horizontality
Law of Cross-Cutting Relationships
Extrusion
Intrusion
Fault
Unconformity
Erosion
Fossils
Trace Fossils
Index Fossils
Fossil Correlation
Absolute Dating
Half Life Decay
Parent Isotope
Daughter Isotope
Radioactivity
Radiometric Dating

Students will be able to DO:

Engaging in Argument from Evidence
Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments.

Constructing Explanations and Designing Solutions
Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.

Developing and Using Models
Develop a model based on evidence to illustrate the relationships between systems or between components of a system.

Planning and Carrying Out Investigations
Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Core Learning Activities

1. Head-line Prompt (Unit Phenomenon): Strange teacher talks to rocks, rocks talk back! Students respond to the opening headline then engage in a stations activity. Investigation stations of local CT rocks of various types that tell stories about CT's geologic history including plate tectonics and fossil organisms.

2. Evidence of Earth's Formation Stations: Students will engage in "evidence stations" of interplanetary rock evidence that suggests that similar processes found on the terrestrial planets can help to explain the origin of our own planet.
Density of Earth materials lab: Students measure the density of rock and mineral samples then categorize them into groups based on their density and physical properties like crystal size, color, luster, etc.

3. Continental vs. Oceanic Crust lab: Students observe rocks and minerals to determine the component parts of the rocks based on visible properties.

4. Plate Tectonics (Slip, slide, collide) WebQuest: Students use computers to use an interactive website to gain general knowledge about plate boundaries and plate tectonics in place of traditional lecture-style notes based on their previous background knowledge of this topic from middle school.

5. Geologic History Project: Students create a piece of media such as a brochure or a website pretending they are taking a vacation to a geologic time period. This is a research project to introduce students to Geologic history.

5. Fossil Correlation Lab: Students construct a fictional fossil timeline based on the appearance and disappearance of fossil species in samples and make conclusions about extinction and relative dating.

6. Fossil Exploration Lab: Students observe and identify different fossils by using a field guide and the fossil's morphology.

- density of earth materials activity (densities given - KB version).docx
- Coninental vs. Oceanic crust lab
- Plate Tectonics webquest.pdf
- Copy of 06 Fossil Correlation Activity
- Do Now_ Headline Prompt.pdf
- fossil exploration lab.pdf

Assessments

Density of Earth Materials Lab
Formative: Lab Assignment
See attachments in Core Learning Activities.

Plate tectonics test/quiz
Summative: Written Test
Copy of Inside earth and plate tectonics quiz.pdf

Geologic time website project
Formative: Personal Project
https://sites.google.com/newtown.k12.ct.us/ipes-earth-history-project/home
geologic time project packet.pdf

Relative dating Quiz
Summative: Written Test
relative dating quiz.pdf

Resources

Professional & Student

Dynamic Earth Interactive website can be used with the webquest assignments and as a general learning and studying tool. https://www.learner.org/series...

Video to be used with Continental vs. Oceanic Crust lab:
https://www.youtube.com/watch?v=DHWavJf4SLE

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Math: Using exponential decay curves when calculating half-lives. The half-life decay rate of radioactive isotopes follows the mathematically predictable exponential decay curve so reliably that scientists are able to form an accurate story of Earth's history around absolute dates of specific rocks samples.

Social Studies: There are connections to students' understanding of historical context to the Carboniferous Era in geologic history as this is when all the coal deposits were formed that were later discovered and utilized starting during the industrial revolution. Human history is also put into context with geologic history. Students will be presented with the fact that Earth's history spans 4.6 billion years and recorded human history is such a small fraction of that.

04 Climate Change (Historical and Modern)

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Cause and Effect
Concepts: **geologic time, cause and effect, extinction, climate change, empirical evidence, models, feedback loops, changes, ratios, correlation, claims, systems, pattern, climate, relationships**

04 Climate Change

G

Generalizations / Enduring Understandings

1. Geologic time periods and their mass extinctions show correlation with global climate change and provide models that suggest current repetition of this pattern.

2. Positive feedback loops in Earth systems cause global climate change.

3. Models of the Earth's changing climate throughout geologic time suggest another mass extinction is in progress.

4. Drastic changes in the ratios of carbon within earth systems can cause an increase in global temperature.

5. Empirical evidence permits differentiation between cause and correlation and allows scientists to make claims about specific cause and effect relationships.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. What does the fossil record say about past climate changes? (F)
1b. What has caused the climate to cool and warm in the past? (F)
1c. What caused the mass extinctions in Earth's past? (C)
1d. Should society care about climate change? (P)

2a. What is an atmospheric feedback loop? (F)
2b. What is the difference between weather and climate? (F)
2c. How do scientists use models to predict changing climate? (C)
2d. How are feedback loops making the climate crisis worse? (C)
2e. What can citizens of all ages do to mitigate the effects of climate change? (C)
2f. Who is responsible for "fixing" climate change? (P)

3a. What do current climate models say about the extinction rate of current species? (F)
3b. What are the effects climate change has on the future of the Earth? (C)
3c. How can climate change cause mass extinctions? (C)
3d. Is the Earth currently experiencing the sixth mass extinction? (P)
3e. Is the sixth mass extinction unavoidable? (P)

4a. What are the gasses that have the biggest impact on global temperature? (F)
4b. What are the ways that matter flows through the carbon cycle? (F)
4c. How do greenhouse gasses warm the atmosphere? (C)
4d. How can human activities cause imbalance in the carbon cycle? (C)
4e. How are humans increasing global temperature? (C)
4f. Is global warming irreversible? (P)

5a. What is the Sun's effect on the Earth's climate system? (F)
5b. What effect do solar cycles have on climate and climate change? (C)
5c. What is the current evidence for global climate change? (C)
5d. How do increases of average global temperatures, rising sea levels, reduced glaciation, and the accelerated extinction of species serve as evidence for climate change? (C)
5e. Are human activities causing climate change? (P)
5f. Is published climate data trustworthy/reliable? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science Performance Expectations (2017)

NGSS: HS Earth & Space Science

HS.Earth's Systems

Performance Expectations

- HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
- HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

HS.Weather and Climate

Performance Expectations

- HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
- HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

HS.Human Sustainability

Performance Expectations

- HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS2: Earth's Systems

ESS2.A: Earth Materials and Systems

- Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (HSESS2-1),(HS-ESS2-2)
- The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation,volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g.,volcanic ash clouds) to intermediate (ice ages) to very long-termtectonic cycles. (HS-ESS2-4)

ESS2.C: The Roles of Water in Earth's SurfaceProcesses

- The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy,transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (HSESS2-5)

ESS2.D: Weather and Climate

- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection,absorption, storage, and redistribution among the atmosphere,ocean, and land systems, and this energy's re-radiation into space.(HS-ESS2-4)
- Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (HSESS2-6),(HS-ESS2-7)
- Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-6),(HS-ESS2-4)
- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhousegases added to the atmosphere each year and by the ways in whichthese gases are absorbed by the ocean and biosphere. (secondary to HSESS3-6)

ESS3: Earth and Human Activity

ESS3.D: Global Climate Change

- Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5)
- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in responseto human activities. (HS-ESS3-6)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Terms students need to KNOW:

Solar Radiation
Absorption
Reflection
Albedo
Climate
Weather
Earth System
Climate System
Carbon
Carbon Cycle
Carbon sink
Carbon source
Fossil fuels
Emissions
Carbon Dioxide
Atmosphere
Hydrosphere
Lithosphere
Biosphere
Feedback loops
Positive/Negative feedback
Greenhouse Effect
Greenhouse gases
Global warming
Glaciation
Ice age
Mass Extinction
Solar Cycles
Seasons
Precession
Carboniferous Era
The Great Dying

Skills students need to DO:

Using Mathematics and Computational Thinking
Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations.

Developing and Using Models
Develop a model based on evidence to illustrate the relationships between systems or between components of a system.
Use a model to provide mechanistic accounts of phenomena.

Planning and Carrying Out Investigations
Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Analyzing and Interpreting Data
Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.
Analyze data using computational models in order to make valid and reliable scientific claims.

Core Learning Activities

1. Albedo Lab: Students perform an experiment to test variables around reflection and absorption of light/heat to make conclusions about the effect of sunlight on different surfaces on Earth.

2. Melting glaciers “gallery walk”: Students view a series of pictures that show well known glaciers and bodies of water and the striking differences in conditions decades ago and modern day. Students are asked to think critically, evaluate the validity of the pictures, and make inferences.

3. Energy and resource efficiency check list: Students reflect on how their daily practices has an overall environmental impact.

4. Carbon Cycle Game: Students engage in a life-size board game style simulation that has them travel through carbon sinks.

5. Human Impact and Climate Change Test (link to test available below under "Assessments")

Albedo lab.pdf
Energy_Resource Efficiency Survey.pdf
Melting glacier gallery walk of climate change.pdf
Carbon Cycle Game Handout.pdf

Assessments

Carbon Cycle Game
Formative: Group Project
See attachments under Core Learning Activities.

Albedo Lab
Formative: Lab Assignment
See attachments under Core Learning Activities.

Human Impact on Earth Quiz
Summative: Written Test
Human Impact on Earth Quiz.pdf

Resources

Professional & Student

Climate Change Notes Presentation
Albedo article(s)
Greenhouse Effect (Notes)
Carbon cycle (Notes)
Sun's effect on climate (NASA website that provides data and evidence for melting ice caps)

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Data Analysis of climate data such as rising sea levels, carbon dioxide concentrations in the oceans, and extinctions of species per year can link to math application. All climate data is typically displayed in graphical form such as on scatter plots and show a trend which is usually accompanied with a best fit line or rolling average line which are concepts covered in math.

Historically, climate change events have happened on a minor or more regional scale within the limits of human history. These historic examples can be used to analyze the effects that climate change can have on the course of history and their social, political, and economical impacts. (Examples; the year without a summer and the little ice age)

05 Energy Resources

8 Curriculum Developers

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Influence of Science, Engineering, and Technology on Society and the Natural World
Concepts: energy, systems, resources, renewability, development, constraints, evaluation, impact, solutions, sustainability, transformation, technology, demand, electricity, magnetism

05 Electromagnetism, Energy transformations, and Energy Resources

G

Generalizations / Enduring Understandings

1. Technological solutions to energy demand often reduce impacts of human activities on natural systems and resources.

2. Renewable energy resources enjoy sustainability because they transform energy from the Sun into usable technological solutions.

3. Evaluating energy solutions demands accounting for a range of natural and human constraints.

4. Electricity and magnetism interact to transform energy used for the development of society and technology, such as those used for generating power for human demand.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1a. What are the current technological advances in renewable energy? (F)
1b. What is the role of energy in the modern world? (C)
1c. How do resource usage and availability affect the environment? (C)
1d. Is it critical to develop and utilize low impact energy sources? (P)
1e. Should non-renewable energy sources be outlawed? (P)

2a. What is the difference between renewable and non renewable resources? (F)
2b. How does heat energy generate electricity? (F)
2c. What is sustainability? (C)
2d. How does all the energy on Earth originate from the Sun? (C)
2e. Is sustainable energy better than non-renewable energy? (P)

3a. What factors affect human demand on energy/power? (F)
3b. What are the advantages and disadvantages of the different energy resources? (C)
3c. How do people choose the best energy resource for a particular location? (C)
3d. Can all renewable and nonrenewable resources be utilized in locations all over the world? (P)
3e. Are all renewable and nonrenewable resources available to the whole world's population? (P)
3f. Which method of generating electricity is the best? (P)
3g. Should the amount of usable energy influence human decisions and behaviors? (P)

4a. What is energy (F)
4b. What does it mean for energy to be conserved? (F)
4c. How can energy be conserved in a system? (C)
4d. What energy transformations are used to generate electricity? (C)
4e. How are electricity and magnetism related? (C)
4f. How do the properties of magnets allow them to be useful to society? (C)
4g. Is energy technology essential for the development of a global society? (P)

Standard(s)

Connecticut Core Standards / Content Standards

NGSS: Science Performance Expectations (2017)

NGSS: HS Physical Sciences

HS.Forces and Interactions

Performance Expectations

- HS-PS2-5. Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

HS.Energy

Performance Expectations

- HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
- HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*
- HS-PS3-5. Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

NGSS: HS Earth & Space Science

HS.Human Sustainability

Performance Expectations

- HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*
- HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*

NGSS: Disciplinary Core Ideas

NGSS: 9-12

ESS3: Earth and Human Activity

ESS3.A: Natural Resources

- Resource availability has guided the development of human society.(HS-ESS3-1)
- All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulationscan change the balance of these factors. (HS-ESS3-2)

ESS3.B: Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (HS-ESS3-1)

ESS3.C: Human Impacts on Earth Systems

- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (HS-ESS3-4)

PS2: Motion and Stability: Forces and Interactions

PS2.B: Types of Interactions

- Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.(HS-PS2-4)
- Forces at a distance are explained by fields (gravitational,electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (HS-PS2-4),(HS-PS2-5)

PS3: Energy

PS3.A: Definitions of Energy

- Energy is a quantitative property of a system that depends on the motionand interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (HSPS3-1),(HS-PS3-2)
- At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (HSPS3-2) (HS-PS3-3)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1)
- Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-1),(HSPS3-4)
- Mathematical expressions, which quantify how the stored energy in asystem depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (HS-PS3-1)
- The availability of energy limits what can occur in any system. (HS-PS3-1)

PS3.C: Relationship Between Energy and Forces

- When two objects interacting through a field change relative position, theenergy stored in the field is changed. (HS-PS3-5)

PS3.D: Energy in Chemical Processes and Everyday Life

- Although energy cannot be destroyed, it can be converted to less usefulforms—for example, to thermal energy in the surrounding environment.(HS-PS3-3),(HS-PS3-4)

ETS1: Engineering Design

ETS1.A: Defining and Delimiting an Engineering Problem

- Criteria and constraints also include satisfying any requirements setby society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such away that one can tell if a given design meets them. (HS-ETS1-1)(secondary to HS-PS2-3) (secondary to HS-PS3-3)

ETS1.B: Developing Possible Solutions

- When evaluating solutions it is important to take into account arange of constraints including cost, safety, reliability and aestheticsand to consider social, cultural and environmental impacts.(secondary to HS-LS2-7) (secondary to HS-LS4-6) (secondary to HSESS3-2),(secondaryHS-ESS3-4) (HS-ETS1-3)

Critical Content & Skills

*What students must **KNOW and be able to DO***

Terms Students must KNOW:

Renewable
Non-Renewable
Photovoltaic
Solar Energy
Wind Energy
Hydroelectric Energy
Biomass
Nuclear Power
Geothermal Energy
Turbine
Generator
Power Plant
Transformer
Conservation of Energy
Energy Transformation
Potential Energy
Kinetic Energy
Mechanical Energy
Chemical Energy
Radiant Energy
Nuclear Energy
Thermal Energy
Electron
Electromagnetism
Electrical Field
Magnetic Field
Magnet
Electricity
Current
Amps
Volts
V=IR
Resistance
Battery

Students must be able to DO:

Developing and Using Models
Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.
Constructing Explanations and Designing Solutions
Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations.
Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
Using Mathematics and Computational Thinking
Create a computational model or simulation of a phenomenon, designed device, process, or system.
Planning and Carrying Out Investigations
Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.
Engaging in Argument from Evidence
Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations).

Core Learning Activities

1. Modern Marvels: Renewable Energy movie to offer background knowledge about renewable energy resource to aid in poster project.

2. Energy Resource Research and Presentation: Students create a poster detailing pros and cons of a renewable resource and how it works to generate electricity.

3. Wind Turbine: Students design and build a wind turbine that produces small amounts of voltage.

4. Testing PV Cells: Students use small photovoltaic cells (Solar Cells) to test the effects of different variables such as angle and light intensity on voltage production.

5. Energy Transformation Stations: Students engage in hands-on activities to explore simple energy transformations.

6. Using Electromagnetism Presentation: Basic notes and discussion on how various forms of energy are converted to electricity.

7. Build an Electromagnet: Students construct a simple electromagnet and determine which variables can affect the strength of the magnet.

- design a wind turbine.docx
- Testing PV Cells.doc
- Modern Marvels: Renewable Energy
- UsingElectroMagnetism.ppt.pdf
- Energy Transformation Stations.pdf
- Energy Sources Research and Presentations Rubric.pdf
- build an electromagnet.pdf

Assessments

Build an Electromagnet
Formative: Lab Assignment
See attachments under Core Learning Activities.

Energy Sources Research and Presentation
Formative: Group Project
See attachments under Core Learning Activities.

Wind Turbine Build
Summative: Personal Project
See attachments under Core Learning Activities.

Resources

Professional & Student

Text Book; Glencoe *Physical Science with Earth Science.* 2006. Unit 4. Chapter 16, pages 484-409.

Videos:
Introductory video to electromagnets and their use, effects, and how to build one. https://www.youtube.com/watch?...

Crash Course Physics: Magnetism, a more detailed look at magnetism
https://www.youtube.com/watch?...

Sick Science: basic instructions on how to make a simple electromagnet. Use this video as in-class instructions for electromagnet activity. https://www.youtube.com/watch?...

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

- Information Literacy
- Problem Solving

Interdisciplinary Connections

Social Studies integration; In studying energy resources and how society generates power/electricity students will have to consider constraints such as population density, economics, and cost efficiency to determine the energy resources that would be best suited for certain regions. These social aspects of constraints on the power grid will help students synthesize a more complex solution to the energy crisis question and to more deeply weigh the pros and cons of each available resource. Further study of the effect of electric technology on society and modern first world life will be connected to the electromagnet investigations. Electromagnets are at the core of all electronic technology that makes life in the first world possible and could be part of the solution for lifting poorer nations out of poverty.

Please Note: these minutes are pending Board approval.

Board of Education
Newtown, Connecticut

Minutes of the Board of Education meeting held on April 18, 2023, at 6:30 p.m. in the Council Chambers, 3 Primrose Street.

D. Zukowski, Chair
J. Vouros, Vice Chair
D. Ramsey, Secretary
D. Cruson
J. Kuzma
J. Larkin
A. Plante
K. Kunzweiler (excused)
D. Godino (excused)
C. Melillo
A. Uberti
T. Vadas
4 Staff
14 Public
1 Press

Ms. Zukowski called the meeting to order at 7:37 p.m.

Item 1 – Executive Session

MOTION: Mrs. Larkin moved that the Board of Education go into executive session to discuss confidential attorney/client privileged material in regards to Board policy and invite Mr. Melillo and Attorney Dori Antonetti. Mrs. Kuzma seconded. Motion passes unanimously.

Item 2 – Pledge of Allegiance

Item 3 – Consent Agenda

MOTION: Mrs. Larkin moved that the Board of Education approve the consent agenda which includes the donation to Newtown High School and the correspondence report. Mrs. Kuzma seconded. Motion passes unanimously.

Item 4 – Public Participation

Item 5 – Reports

Chair Report: Ms. Zukowski reported that the book challenge process outlined in Policy 8-302 will be discussed by the Special Review Committee this Thursday, April 20 at 10:30 a.m. The committee is presenting their report to the Board at the May 2 meeting to be considered by the members.

Superintendent's Report: Mr. Melillo stated he would participate in the Lacrosse golf tournament this Sunday. We had our final meeting with the Legislative Council regarding our budget adjustments and expressed pride in his team for developing this budget. It was reduced by $450,000 and we will work to allocate a budget that is in the best interest of our students. He looks forward to the community support.

Committee reports:

Mrs. Larkin reported on the CFF Committee meeting last night. The Director of Facilities interview phase is complete and expects to move to an offer this week. Our new Hawley project manager also provided an update. Regarding transportation we are looking good with drivers and will have spare drivers starting also. The Transportation Committee is still talking about contingency plans if needed.

Student Reports:

Dr. Longobucco read the students' report which noted that AP testing begins in two weeks and spring sports are in full spring with baseball, lacrosse, softball and tennis seeing great success in early competition. The annual "Senior Assassins" game is underway with students scheming

to win the cash prize. This past week was filled with college commitments as seniors finalize their decisions.

Financial Report:
MOTION: Mrs. Larkin Moved that the Board of Education approve the financial report and transfers for the month ending March 31, 2023. Mrs. Plante seconded.
Mrs. Vadas presented the financial report.
Motion passes unanimously.

Grants and Funding Updates:
Judy DeStefano joined Mrs. Vadas and gave an overview on grants.

Mr. Ramsey asked how many grants from the level of a teacher or staff member are used for innovative programs.
Mrs. DeStefano reported that she has received calls from the teachers and makes a note of what they are looking for to meet their needs.

Mr. Ramsey referred to the Perkins Grant and asked if that was for staff for innovative programs and equipment.
Mrs. DeStefano said teachers need to have certain certifications to be eligible for the classroom grants and part of it has to pay for professional development and travel if necessary.

Ms. Zukowski asked which competitive grants imply funding from the budget. She also asked about the art request from the borough and the amount.

Mrs. DeStefano said her initial request changed to $40,000. She was hoping to get funding from Novo up to $80,000 but was not sure how it will work out. There are no other positions being created from grants. Some grants are just for new positions. The Teen Talk counselor we are hoping to move to a grant for next year and possibly the fourth year. The counselor is more of a crisis interventionist counselor. They also work in the classroom with teachers and students struggling to attend school.

<u>Item 6 – Presentations</u>
Integrated Physical and Earth Science Presentation:
Fawn Georgina, the course teacher, and Chris Canfield, Department Chair, spoke about this curriculum.

Mrs. Plante inquired what grade level this course was offered to and was told it was for grade nine students but we also get a few sophomores.
Mrs. Plante also asked the number of students taking this course and was told there were ten sections with between 240 and 250 students.

Ms. Zukowski asked if all ninth graders took this course.
Ms. Georgina said that some advanced students skip to biology.

Mr. Ramsey asked if they got involved in food sustainability and supply chains to which Ms. Georgina stated that they got into waste management and food sustainability.
Mr. Ramsey also asked if they ever work with the culinary department.
Ms. Georgina stated they did and have tapped trees on campus for maple syrup and also planted fruit trees.

Item 7 – Old Business
Strategic Plan Update:
Dr. Richard Lemons presented an overview of what the committee has accomplished so far and spoke about the various focus groups. He also spoke about the survey participants and questions. The four strategic priorities that emerged include #1 to ensure stimulating, engaging and challenging learning opportunities tailored to the individual needs of students, #2 prepare students life beyond graduation, #3 retain, develop and diversify faculty and staff, and #4 ensure organizational excellence.

Mr. Ramsey referred to Priority #2 as sees it as the real purpose we have schools. He asked that such things as what we do in life, curiosity, and self-actualization be made more tangible in the plan.
Dr. Lemons said those sentiments don't come up that much in the survey but have come up in the planning committee multiple times. This could also emerge in working on the profile of a graduate.

Mr. Cruson noted that in Priority #3 he didn't see anything about the diversification of learning materials.
Dr. Lemons said those who mentioned it wanted students to see other things besides the teachers.

Mrs. Plante asked that regarding the survey how would we improve on these things and felt it was exciting to see what comes next.
Dr. Lemons said this creates where the district is going. We want a clear articulation of how the schools use this during different parts of the year.

Mrs. Larkin didn't see all of the data fitting in here but saw things we should explore and things that were concerning, but had opportunities. When the time is right, we might put some of that on the back burner but revisit and consider the stakeholder input.

Mr. Melillo noted that we want to make sure we create something we can actually leverage. As a committee we are going to try to find the buckets we were talking about and use the data to be better. There's information around special education and how we run our schools and how we communicate.

Ms. Zukowski asked for clarification on the six different focus groups for middle and high school students.
Dr. Lemons said there were 8 to 12 in the student focus group, 5 to 8 educators in their group, and there were three parent focus groups with a few dozen participants. We had six meetings with designated schools.

Ms. Zukowski asked the makeup of the committee.
Mr. Melillo stated there were two Board members, six administrators, five teachers and a couple of paras and clerks, and there were no parents other than those who were staff members.

Mr. Lemons stated that by the end of June we will provide a strategic plan with priorities and the work needed, portrait of a graduate, core values, and what continuous improvement would be for the district. He also spoke about their discussions regarding the portrait of the graduate which many school districts are discussing. They have also have had conversations around the Newtown core values.

Policy 5114 Suspension and Expulsion/Due Process:
MOTION: Mrs. Larkin moved that the Board of Education approve the Policy 5114 Suspensionand Expulsion/Due Process. Mrs. Plante seconded. Motion passes unanimously.

Chemistry (CPA Honors) Curriculum:
MOTION: Mrs. Larkin moved that the Board of Education approve the Chemistry (CPA Honors) Curriculum. Mrs. Plante seconded. Motion passes unanimously.

Multivariable Calculus Curriculum:
MOTION: Mrs. Larkin moved that the Board of Education approve the Multivariable Calculus Curriculum. Mrs. Plante seconded. Motion passes unanimously.

Item 8 – New Business
MOTION: Mrs. Larkin moved that the Board of Education approve the minutes of April 4, 2023. Mrs. Plante seconded.
Ms. Zukowski moved to amend the minutes of March 21, 2023 to replace the words “banning the book” and “banning books” with “the book challenges.” Mrs. Larkin seconded. Motion passes unanimously.
Vote on amended minutes: Passes unanimously.

Ms. Zukowski spoke about the updated structure of the minutes. Discussions related to the Board are recorded exceptionally well but the issue at hand is how to best represent public comments. Since every meeting is recorded, we will be providing a link to access the recording along with names and addresses of the speakers and an overall topic. This is an attempt to ensure the accuracy of the comments.

Item 9 – Public Participation
Please click here to view the public participation.

Joseph Crosby, 5 Blanches Walk, spoke about book challenges.
Jennifer Nicoletti, 68 Totem Trail, spoke about book challenges.
Sayward Parsons, 10 Checkerberry Lane, spoke about book challenges.
Jacqui Kaplan, 34 Osborne Hill Road, Newtown High School English teacher spoke about student learning and book challenges.
Jack Tanner, 13 Dodgingtown Road, thanked the Board for their service and addressed book challenges.
Connie Hoover, 13 Todds Road, addressed book challenges.
Kristin English, 28 Gisella Road, Trumbull, Newtown High School English teacher, spoke about student learning and book challenges.

MOTION: Mr. Vouros moved to adjourn. Mr. Cruson seconded. Motion passes unanimously.

Item 10 – Adjournment
The meeting adjourned at 9:49 p.m.

Respectfully submitted:

_____
Donald Ramsey
Secretary

Board of Education
Newtown, Connecticut

Minutes of the special Board of Education meeting held on April 24, 2023, at 12:30 p.m. in the Board of Education conference room, 3 Primrose Street.

D. Zukowski, Chair
D. Cruson
J. Kuzma
J. Larkin
A. Plante
T. Vadas

Item 1 – Call to Order
Ms. Zukowski called the meeting to order at 12:32 p.m.

MOTION: Mr. Cruson moved that the Board of Education go into executive session for a discussion and possible action on the appointment of the Director of Facilities and invite Mrs. Vadas. Mrs. Larkin seconded. Motion passes unanimously.

Item 2 – Executive Session
The Board had a discussion regarding the candidate for Director of Facilities.

Item 3 – Public Session for Action on the Appointment of the Director of Facilities
MOTION: Mr. Cruson moved that the Board of Education appoint John Barlow as Director of Facilities with the start date to be determined. Mrs. Kuzma seconded. Motion passes unanimously.

Ms. Zukowski stated that she felt we have a new Director of Facilities that will serve this district well and looks forward to working with him.

MOTION: Mr. Cruson moved to adjourn. Mrs. Plante seconded. Motion passes unanimously.

Item 4 – Adjournment
The meeting adjourned at 12:45 p.m.

Respectfully submitted:

_____
Deborra Zukowski
Chair