Unit 3: Earth & Human Activity (Earth and Space Science)

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Belleville Public Schools

Curriculum Guide

EARTH SCIENCE, GRADE 7

EARTH & HUMAN ACTIVITY (MODULE G)

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Teacher of Earth Science, John Calabrese

Dr. Richard Tomko, Ph.D., M.J., Superintendent of Schools

Ms. LucyAnn Demikoff, Director of Curriculum and Instruction K-12

Ms. Nicole Shanklin, Director of Elementary Education

Mr. George Droste, Director of Secondary Education

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Unit Overview

Earth's Natural Hazards

- Natural Hazards
- Natural Hazard Prediction

Human Impacts on Earth Systems

- Human Impacts on the environment and Reducing Methods
- Climate change

Enduring Understanding

- Natural Hazards are different from natural disasters
- Types of natural hazards include floods, hurricanes, volcanic eruptions, earthquakes, tornadoes, tsunamis, sinkhole, hailstorm, drought, avalanche, blizzard, cold wave, lightning and wildfires.

- There are a variety of causes in order for natural hazards to occur.
- Causes of natural disasters might be weather or related to geologic processes within earth.
- Effects of natural disasters can be loss of property, habitat destruction, and even loss of life.
- Natural resources are unevenly distributed throughout the globe.
- Mineral resources form as a result of past and present geologic processes
- Humans use resources on a daily basis. Some of these resources include: fish, wood, wax, tin, iron, graphite, hydropower, marble, cotton, peanuts, etc.
- The biosphere, atmosphere, hydrosphere and lithosphere can be affected by the acquisition or consumption of resources.
- Humans make an impact on the environment. These impacts can be small or large, short or long term, and positive or negative.
- Such activities that affect the environment are deforestation, fossil fuel combustion, cement production, natural resource extraction, waste disposal, and agriculture activities.

Essential Questions

- What types of natural disasters are likely in certain areas?
- How, when and where do natural hazards happen?
- what is a natural disaster?
- what types of monitoring and communication networks alert you to possible natural hazards?
- What are natural resources and how are they used?
- What natural resources do you use everyday?
- Why are some natural resources more common in some places than others?
- How do organisms depend on natural resources from their environment?
- How has human population changed over time?
- How has changing human population changed the rate at which resources are used?
- How does the use of resources affect Earth's air, water, land, and living things?
- How are humans alter land and soil on earth?
- What is causing global temperature change?
- What are some ways humans pollute, and how do these actions affect the environment?
- How could climate change affect your life?
- How do we contribute to climate change?

Exit Skills

By the end of all units E, F, G and H, students should be able to

- Describe the types of natural disasters and where they are likely to occur.
- Explain how, when and where natural hazards happen.
- Compare and contrast natural disaster and natural hazard.
- Describe the types of monitoring and communication networks that alert to natural hazards.
- How can you stay safe during a dangerous natural event?
- Describe the use of resources and how it affects Earth's air, water, land, and living things.
- Predict how the use of resources affect the availability of resources for future generations.
- Describe the causes of global temperature change.
- Explain how do we contribute to climate change through pollution.

New Jersey Student Learning Standards (NJSLS-S)

NextGen Science Standards

6-8.MS-ESS3-2.1.1	Graphs, charts, and images can be used to identify patterns in data.
6-8.MS-ESS2-3.1.1	Patterns in rates of change and other numerical relationships can provide information about natural systems.
6-8.MS-ESS3-1.2.1	Cause and effect relationships may be used to predict phenomena in natural or designed systems.
6-8.MS-ESS3-3.2.1	students classify relationships as causal or correlational, and recognize that correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.
6-8.MS-ESS2-6.2.1	Develop and use a model to describe phenomena.
6-8.MS-ESS2-1.2.1	Develop and use a model to describe phenomena.
6-8.MS-ESS2-2.3.1	students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude

	of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations.
6-8.MS-ESS2-3.4.1	Analyze and interpret data to provide evidence for phenomena.
6-8.MS-ESS3-2.4.1	Analyze and interpret data to determine similarities and differences in findings.
6-8.MS-ESS2-6.4.1	Models can be used to represent systems and their interactions—such as inputs, processes and outputs— and energy, matter, and information flows within systems.
6-8.MS-ESS2-2.6.1	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future.
6-8.MS-ESS3-3.6.1	Apply scientific principles to design an object, tool, process or system.
6-8.MS-ESS3-1.6.1	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) 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.
6-8.MS-ESS2-1.7.1	Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.
6-8.MS-ESS2-3.ESS1.C.1	Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.
6-8.MS-ESS2-2.ESS2.A.1	The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.
6-8.MS-ESS2-1.ESS2.A.1	All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.
6-8.MS-ESS2-3.ESS2.B.1	Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.
6-8.MS-ESS2-2.ESS2.C.1	Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations.
6-8.MS-ESS2-6.ESS2.C.1	Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.
6-8.MS-ESS2-6.ESS2.D.2	The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.
6-8.MS-ESS3-1.ESS3.A.1	Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.
6-8.MS-ESS3-2.ESS3.B.1	Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.
6-8.MS-ESS3-3.ESS3.C.1	Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.
6-8.MS-ESS3-3.ESS3.C.2	Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.
SCI.MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of

	Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
SCI.MS-ESS3-3	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
SCI.MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
SCI.MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
SCI.MS-ESS3-2	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
SCI.MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
SCI.MS-ESS2-6	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Interdisciplinary Connections

LA.RL.7.1	Cite several pieces of textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
LA.RL.7.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.
MA.7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
LA.W.7.1	Write arguments to support claims with clear reasons and relevant evidence.
MA.7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
SOC.6.1.8.B	Geography, People, and the Environment

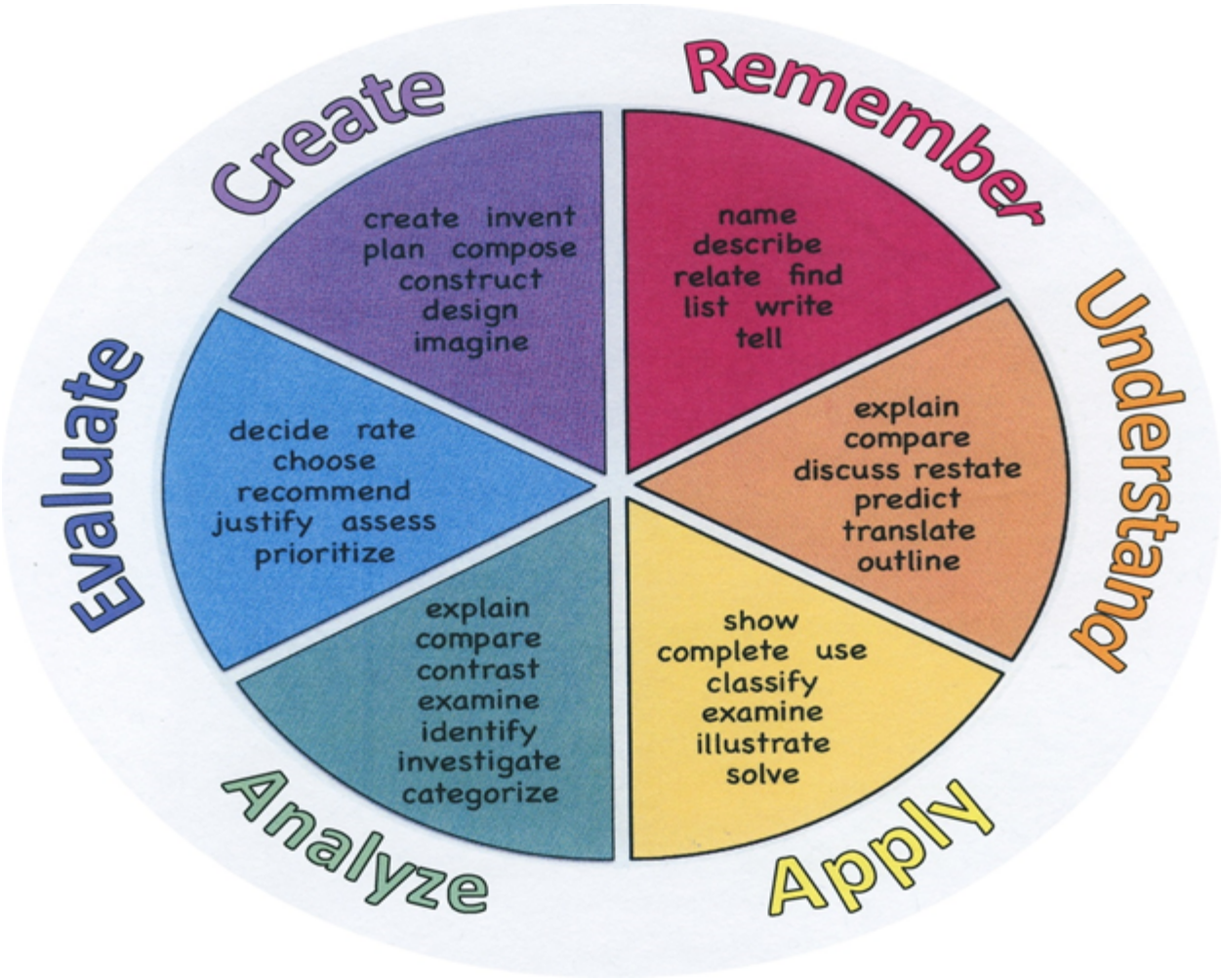
Learning Objectives

- Students will be able to analyze and interpret data to recognize patterns to determine the history of hazards in a particular locations
- Students will be able to explain when and where natural hazards are likely to occur.
- Students will be able to design methods to reduce the harmful effects of certain natural hazards.
- Students will be able to analyze past geological hazards to better understand how natural hazards can be predicted for the future.
- Students will be able to investigate the uses of natural resources and explore the difference between nonrenewable and renewable resources.
- Students will be able to analyze how humans impact the environment and how they control resource amounts consumed.
- Students will be able to determine the causes and effects of resource quantity on organisms and the

environment.

- Students will be able to justify how human activities and other factors influence changes in climate.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



Suggested Activities & Best Practices

Utilization of various DefinedStem.com projects which recognizes the different learning styles of the students. DefinedStem is both problem and project-based learning

problem and project-based learning. Content specific project:

- Volcanism: Mt. St. Helens
- Civil Engineering: Urban Heat Islands
- Tornado chloropleth mapping

Utilization of **NEWSELA.com** that can be used for different leveled readers.

- Assign weekly informational text articles directly related to the lesson
- Complete reading comprehension activities on the assigned articles: quiz, power words, write

Assessment Evidence - Checking for Understanding (CFU)

Summative Module G Chapter Tests given in Google Classroom (Summative)

Periodic Vocabulary Quizzes (Summative)

Lab activities and Accompanying worksheets (Summative)

Defined Stem project (Alternate)

Why It Matters charts (KWL) (Formative)

Graphic Organizer (Formative)

BrainPop quizzes on videos covering Module G (Summative)

Newsela Article/Quiz covering Module G (Summative)

HMH Workbook Highlights & Questions (Formative)

Notebook Entries & Diagrams (Alternate)

Oncourse Assessment Tools (Formative)

"Do Now/Exit Ticket" Activity (Formative)

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate

- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Google Forms
- Illustration
- Journals
- Kahoot
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Plickers
- Question Stems
- Quickwrite
- Quizlet
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

- HMH workbook series: E, F, H and G and supplementary materials (lab kits)
- Internet resources
- 1:1 Google classroom platform: Docs, Sheet, Forms, Slides, Sites
- Video streaming: YouTube, BrainPOP

Ancillary Resources

- Outdoor area of school
- Chromebook/ 1:1 Google classroom platform

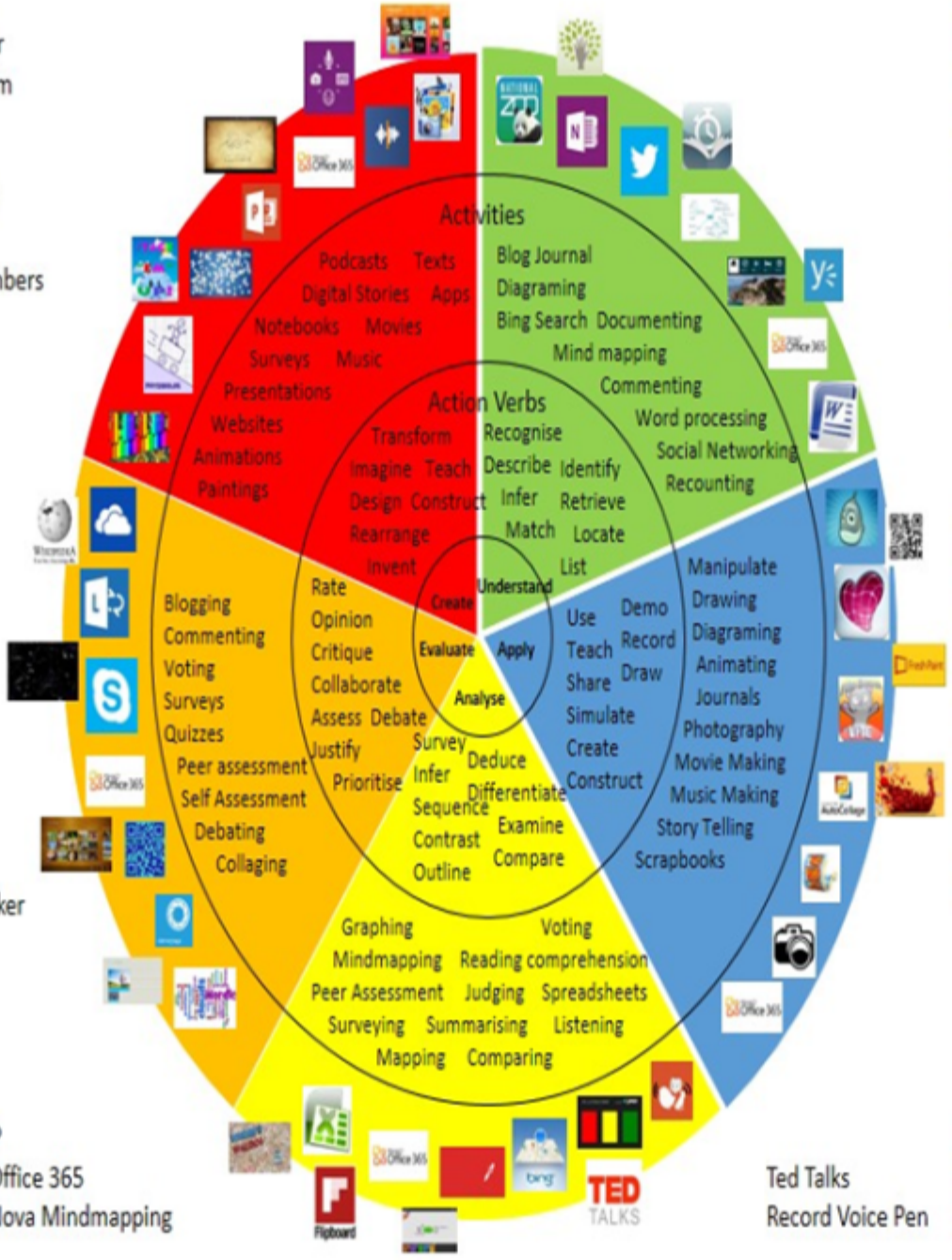
Technology Infusion

- Smart TV
- DefinedStem.com
- Document Camera
- Pod-casts video streams
- Discovery Education video streams
- YouTube video streams
- BrainPOP video streams
- Chromebooks
- Khan Academy
- Power Point presentation
- Flipgrid
- MS Word
- Google Applications: Classroom, Docs, Sheets, Slides, Forms, Sites

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel Office 365
Flipboard Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
CAEP.9.2.8.B.4	Evaluate how traditional and nontraditional careers have evolved regionally, nationally, and globally.
CAEP.9.2.8.B.6	Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.
CAEP.9.2.8.B.7	Evaluate the impact of online activities and social media on employer decisions.
TECH.8.1.8.A.2	Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.
TECH.8.1.8.B.1	Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
TECH.8.1.8.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.

21st Century Skills/Interdisciplinary Themes

21st Century/Interdisciplinary Themes that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

21st Century Skills that will be incorporated into this unit.

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

- Have students work in groups to design a device or tool that could aid people after a natural disaster
- Have students create an interactive map of the natural disasters of a chosen area.
- Have students create venn diagrams comparing hurricanes, earthquakes, and tornadoes.
- Have students create venn diagram to discuss and compare the meaning of disaster and hazard.
- Have students create an animated flipbook of a human event on the environment such as mineral mining or railroad building. i.e. start with untouched land, then initial human impact, and ending with the overall effect of the event on the land.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe

- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Special Education Learning (IEP's & 504's)

Special Education Learning adaptations that will be employed in the unit, using the ones identified below.

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

English Language Learning adaptations that will be employed in the unit, using the ones identified below.

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing

- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

Intervention Strategies that will be employed in the unit, using the ones identified below.

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

Talented and Gifted adaptations that will be employed in the unit, using the ones identified below.

- Above grade level placement option for qualified students

- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge

Sample Lesson

Unit Name: Earth's Natural Hazards

NJSLS: See Link

Interdisciplinary Connection: See Link

Statement of Objective: SWBAT create a presentation on a natural hazard topic (tornadoes, hurricanes, blizzards, el nino/la nina, or thunderstorms), specifically what causes them and what the effects are.

Anticipatory Set/ Do Now: What do tornadoes and hurricanes have in common? ANS: B

a. They both form over the ocean

b. They both involve strong winds

c. They are both types of tropical storms

d. They both include funnel-shaped clouds

Learning Activity:
1 - 5-7 minutes will be alloted 'Do Now'. CFU: students will call on their own knowledge to guess the correct answer. Will raise hands when their answer choice is called upon.
2 - Students will view brief video on natural disaster- https://www.brainpop.com/science/earthsystem/naturaldisasters/ And complete the interactive quiz afterwards.
3 - Review directions for completing presentation and poster assignment.
4 - Students will be heterogeneously grouped. **Severe weather occurence rubric.docx** *
5 - Students will be able to utilize laptops(Chromebooks) in class.

Student Assessment/CFU's: See Link (CFU: students will call on their own knowledge to guess the correct answer. Will raise hands when their answer choice is called upon.)

Materials: 1. Smart TV- https://www.brainpop.com/science/earthsystem/naturaldisasters/
2. Workbook
3. Notebook
4. Brainpop
5. Rubric

21st Century Themes and Skills: See Link

Differentiation: See Link (video provided for visual learners, Students can chose their method of presenting, i.e poster, powerpoint, prezii, oral presentation.)

Integration of Technology: laptops (chromebooks) , brainpop

SCI.MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
SCI.MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
SCI.MS-ESS3-3	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
SCI.MS-ESS3-4	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
SCI.MS-ESS3-2	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.