Climate Change Interdisciplinary Curriculum Unit: Science

Content Area: **Science**
Course(s): **Science**
Time Period: **3rd Trimester**
Length: **4-5 Weeks**
Status: **Not Published**

Summary of the Unit

In this interdisciplinary fifth grade unit, students will investigate the impact of human activities on Earth's systems through scientific inquiry and data analysis. They will collect and interpret information from various sources, including observation of their environment, climate data, and reports, to identify communities. Students will explore the relationship between human actions and natural activities building their understanding of environmental change. The unit emphasizes problem-solving and encourages students to brainstorm practical solutions that reduce negative effects on the environment, such as adopting sustainable habits, conserving energy, and promoting eco-friendly choices within their school or neighborhood. Through guided instruction, collaborative projects, and critical thinking tasks, students will develop foundational scientific literacy and a sense of responsibility as environmental stewards. This unit supports cross-curricular connections with social studies, literacy, and math, while empowering students to take informed action in their communities.

Enduring Understandings

- Climate is the average weather patterns and temperature in a place over a long period of time.
- Earth's climate is changing, and scientists are able to measure that.
- While natural processes (volcanos, solar cycles etc.) can affect climate, human processes (burning of fossil fuels, cutting down trees, production of waste etc.) are the more recent and major cause of climate change.
- Climate change can affect weather patterns, sea levels, animal habitats, and human communities. Some plants and animals are also endangered because they can't adapt quickly to climate changes.
- People can help reduce climate change by using less energy, recycling, conserving water, and protecting nature. People can change their energy sources to renewable energy sources (solar, wind) to continue to help reduce climate change.

Essential Questions

- What is the difference between climate and weather?
- What is climate change and how do we know it is occurring?
- How do human activities affect the Earth, its climate, and its systems?
- What natural systems (water cycle) impact climate?
- What evidence do scientists use to study climate and its changes?
- How do changes in climate affect people, plants, and animals?
- Is there anything that can be done to reverse the effects we have caused on our earth?

Summative Assessment and/or Summative Criteria

- Cumulative Cross Curricular Project Climate Change Cross Curricular Project

Climate Change In Our Backyard

My Name: _____

My Group Members: _____

In this project, you and a partner will become Climate Change experts! You will choose a local issue that contributes to climate change, something that happens in our area.

Key Questions:

- What is the issue?
- What is causing it?
- How is it affecting people, nature, and animals?
- What are some possible solutions?

After gathering your facts, pictures, and graphs, work together to create a presentation (tri-fold, powerpoint, poster) to teach others about your topic. You will include the following sections in your presentation:

- The Problem
- The Causes
- Effects on the environment and community
- Solutions and how we can help

Topics to choose from

1. Pollution
2. Flooding
3. Temperature changes
4. Deforestation
5. Landfills
6. Agriculture
7. Carbon Footprint
8. Forest Fires
9. Greenhouse Effect

Local Climate Change

Name: _____

Issue: _____

Criteria for Poster on a Local Climate Issue	Advanced (4 pts)	Proficient (3pts)	Developing (2pts)	Beginning (1pt)
Understanding the Issue	Clearly explains the local climate issue with lots of details and shows deep understanding.	Explains the local climate issue with some details and shows good understanding.	Gives a basic explanation of the issue but needs more details or clarity.	Has trouble explaining the issue or gives very little information.
Causes and Effects	Thoroughly describes the causes and clearly explains how the issue affects people, nature, and animals, using specific examples.	Describes the causes and explains effects on people, nature, and animals.	Mentions some causes or effects but needs more explanation or examples.	Does not clearly describe causes or effects.
Solutions and Actions	Gives multiple creative and realistic solutions, and clearly explains how we can help.	Gives some solutions and explains how we can help.	Mentions a solution but does not explain how we can help.	Does not suggest any solutions or actions.
Organization and Clarity	All poster sections are included, clearly labeled, and information is well-organized and easy to understand.	Most sections are included and labeled, and information is organized.	Some sections are missing or not labeled, or information is hard to follow.	Poster is missing several sections or is very hard to understand.
Visual Presentation	Poster is neat, colorful, and creative, with drawings or images that help explain the issue.	Poster is neat and has some color or images.	Poster has little color or images, or is a bit messy.	Poster is very messy or hard to read, with no images or color.

Total: _____ / 20pts

ES MS AS NS

Resources

Vocabulary:

• Climate • Weather • Atmosphere • Temperature	• Greenhouse Gas • Fossil Fuel • Pollution • Conservation • Sustainability	• Ecosystem • Endangered • Habitat • Recycle

Websites:

- Achieve 3000 Articles
  - Western Wildfires Show Climate Change is Here
  - Warming Earth, Changing Rivers
  - Floating Cities: The Wave of the Future?
  - Taking Action
  - Are Fossil Fuels Running Out of Gas?
  - As Earth Warms, Birds Move North
- Brain Pop
- Belouga
- Discovery Education
- Mystery Science
- Introduction to Global Warming: https://www.youtube.com/watch?v=C78KE5iGtg4

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Human Impact 1 Week	*Identify ways in which people have affected Earth's Systems *Explain how Humans depend on the Environment	*Discuss human impact on Earth by Using NJCTL slides 1-21 *Discovery Education Video: “Human Activity & Climate Change” *Brain Pop: “Climate Change” and “Human & the Environment”	*Quiz on Human Impact *Brain Pop with Pause Points *Brain Pop Quiz

Natural Resources 1 week	*Define and identify renewable and nonrenewable resources *Determine how natural resources are distributed throughout the country *Determine how renewable and nonrenewable resources impact the environments	*National Geographic Renewable Energy 101 Video: https://youtu.be/1kUE0BZtTRc?si=Hraf9XX8dGMqliiC *Renewable Energy Slides: https://docs.google.com/presentation/d/1UlAUSVP4BxXx5qkHpsnM8i7kbq5kjKuaPmbhGRqnAzE/edit?usp=sharing	*Renewable energy slide sort
Climate Change 1 week	*Define greenhouse gasses and determine the effect it has on our planet *Determine how climate change occurs through human processes, and earth's process *Calculate Carbon Footprint	*What Causes Sea Levels to Rise Video: https://youtu.be/QH-KYmRAzOA?si=f_D8smTpuceXRKXo Climate Change Introduction: https://www.wwf.org.uk/sites/default/files/2019-12/WWF_KS2_Lesson1_Presentation.pdf Carbon Footprint Resources: https://www.energystar.gov/ia/products/globalwarming/downloads/GoGreen_Activities%20508_compliant_small.pdf https://gokid.mobi/carbon-footprint-for-kids-some-facts-a-quiz-and-also-a-worksheet/	*Carbon Footprint Quiz

Local Concerns 1-2 weeks	*Students will synthesize their research of nonfiction articles and climate change data into a culminating presentation highlighting a local or regional issue along with possible solutions to advocate for change.	*Work with a partner or small group to research and create a Multidisciplinary Presentation highlighting a local or regional issue and a possible solution to the problem. *Use data gathered from research to create and identify visuals to support cross curricular project topic.	*Students will create and present a poster on an issue in Climate Change within a group of 2-3 students on the topic of their choosing.

Standards

SCI.5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment, and address climate change issues. Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
SCI.5.ESS3.C	Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. Systems and System Models A system can be described in terms of its components and their interactions.

Suggested Modifications for Students with Disabilities, MLs Academically At Risk, and Gifted Students

Special Education/At Risk/504-consistent with individual plans, when appropriate.

- Modifications for any students' IEP/504 plan must be met.
- Allow additional time in whole-class instruction for processing and discussion.
- Alter assignment lengths when necessary.
- Provide students with graphic organizers during annotations and discussions.
- Repeat and clarify oral directions.
- Read assessments orally.
- Preferential seating permitted within groups/whole class.

- Check for understanding when conferring with the teacher.
- Modify vocabulary words used

Multilingual Learners

- Pair with an English-speaking peer to aid with sharing ideas.
- Allow additional time in whole-class instruction for processing and discussion.
- Provide students with picture flash cards when necessary.
- Alter assignment lengths when necessary.
- Limit the length of vocabulary words used.
- Provide pre-written prompts

GIFTED

- Provide text at reading levels
- Advances activities choice board: https://docs.google.com/document/d/119FsuBik3ejXNcG9x_CftoeD6S98zF71UFhxYkMLgjM/edit?usp=sharing

Suggested Technological Innovations/Use

- Students will use technology to produce written work in Google Docs and Slides
- Students can use Google Sheets to create graphs based on research
- Teachers can use:
    - Online databases
    - Videos
    - Google Maps
    - Map Tools
    - Educational games (ex. Kahoot, Blooket)

UDL Framework

In this 5th grade climate change unit, the UDL framework ensures that all students can access, engage with, and demonstrate an understanding of key scientific concepts. To support multiple means of engagements, students will explore climate change through real world, relatable issues such as local weather changes or deforestation with opportunity to explore personal interests such as recycling or animals. Lessons incorporate multiple means of representation using videos, hands on learning, simulations and texts with visual supports. Students will demonstrate their understandings through various formats such as posters and slide shows allowing for choice. Planning tools, sentence starters, and peer collaboration are used to scaffold learning. This approach ensures that all students regardless of learning style or ability, can meaningfully participate in science inquiry and contribute to discussions about climate change solutions.

Cross Curricular/Career Readiness, Life Literacies and Key Skill Practices

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.5	Use appropriate tools strategically.
MA.5.NBT.A.3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
MA.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.

MA.5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
MA.5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
ELA.L.WF.5.2	Demonstrate command of the conventions of writing, including those listed under grade four foundational skills.
ELA.L.RF.5.4.A	Read grade-level text with purpose and understanding.
ELA.L.KL.5.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
ELA.RI.IT.5.3	Analyze the impact of two or more individuals and events throughout the course of a text, explaining the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific evidence in the text.
ELA.RI.PP.5.5	Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent and how that may influence the reader's interpretation.
ELA.RI.MF.5.6	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.
ELA.RI.AA.5.7	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
ELA.W.AW.5.1.A	Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose.
ELA.W.IW.5.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
ELA.W.WR.5.5	Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.
ELA.W.SE.5.6	Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.
ELA.SL.PE.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
ELA.SL.II.5.2	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
ELA.SL.ES.5.3	Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
ELA.SL.PI.5.4	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
ELA.SL.UM.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

ELA.SL.AS.5.6	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.
SOC.6.1.5.GeoPP.2	Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.
SOC.6.1.5.GeoSV.3	Demonstrate how to use digital geographic tools, maps and globes to measure distances and determine time zones, and locations using latitude and longitude.
SOC.6.1.5.GeoHE.2	Cite examples of how technological advances have changed the environment in New Jersey and the United States (e.g., energy, transportation, communications).
SOC.6.1.5.EconEM.4	Compare different regions of New Jersey to determine the role that geography, natural resources, climate, transportation, technology, and/or the labor force play in economic opportunities.
SOC.6.3.5.CivicsPD.1	Develop an action plan that addresses issues related to climate change and share with school and/or community members.
SOC.6.3.5.GeoHE.1	Plan and participate in an advocacy project to inform others about the impact of climate change at the local or state level and propose possible solutions.
SOC.6.3.5.GeoGI.1	Use technology to collaborate with others who have different perspectives to examine global issues, including climate change and propose possible solutions.
TECH.9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
TECH.9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
TECH.9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).