

Climate Change Interdisciplinary Curriculum Unit: Math

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **3rd Trimester**
Length: **3 Weeks**
Status: **Not Published**

Summary of the Unit

In this fifth grade interdisciplinary unit, students will examine the effects of climate change through the mathematical and problem solving lens. Students will work through a series of activities that focus on different aspects of climate change such as global temperature increases and an increased need for renewable energy. The activities include the analyzing of graphs and data to help determine the effects of climate change. This unit emphasizes problem-solving and encourages students to brainstorm practical solutions that reduce negative effects on the environment. Through guided instruction, collaborative activities, and critical thinking tasks, students will develop foundational scientific and mathematical literacy necessary to create their own cross-curricular project on the effects of climate change.

Enduring Understandings

- Graphs help us understand information more clearly.
- Data is information or facts that can be collected and used to learn about a topic.
- Weather refers to day-to-day conditions outside whereas climate refers to long-term patterns of weather in a specific area.
- Climate change describes a change in the average conditions in a region over a period of time.
- Renewable energy is energy from a source that is not depleted when used.
- A line graph has an x-axis (horizontal) and y-axis (vertical).
- A carbon footprint is an estimate of how much carbon an individual, a family or a business produces.

Essential Questions

- What is the difference between weather and climate?
- How do graphs help me understand and make predictions about data?
- How can weather and climate data be represented?
- Why does the way we choose to organize data matter?
- How can data help us understand and protect our environment?
- How does climate change affect our community?
- How might climate change impact other communities?
- What are changes that we can make to have a positive impact on climate change?
- What is a carbon footprint and how can I reduce it?

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

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> • Graph (line, bar, picture) • Data • Trend • Climate • Weather • Place value • Registry | <ul style="list-style-type: none"> • Climate change • Activist • Conserve • Renewable energy • Nonrenewable energy • Anomaly • Circumference | <ul style="list-style-type: none"> • Equivalent • Represent • Data scientist • X-axis • Y-axis • Erosion • Crown |
|--|---|---|

- njclimateeducation.org
- <https://ourworldindata.org/climate-change>
- [Carbon Footprint Calculator Link](#)
- [Renewable Energy Around the World Link](#)
- More resources & worksheets included in Google Slides attached below
- Belouga
- BrainPop

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/ Assessments
Climate vs. Weather 1 day	<ul style="list-style-type: none"> *Represent, ask, and answer questions about data in a graph. *Explain the difference between climate and weather. *Make predictions about weather based on climate data. 	<ul style="list-style-type: none"> *Use this Google Slides activity for the lesson. *Match games with different types of graphs and weather vs. climate. *Watch weather vs. climate YouTube video. *Create 3 different graphs based on rainfall data. 	<ul style="list-style-type: none"> *Respond to the activity by answering questions on these documents: Weather v. Climate Assessment
Carbon Footprint Math Lesson 1 Week	<ul style="list-style-type: none"> *Calculate and explain carbon footprint and understand how to reduce it. *Explain how climate change affects their daily lives. 	<ul style="list-style-type: none"> *Use this Google Slides activity for this lesson. *Watch and discuss this video on Climate Change. *Fill out this worksheet with a partner and discuss how their daily activities may impact climate change. *Students will complete this carbon footprint journal throughout the week and determine their carbon footprint number at the end of the week. 	<ul style="list-style-type: none"> *Completion of the carbon footprint journal - students will fill this out throughout the week. *Optional activity - students can create a poster as explained on Slide 18.
Data & Graphing Lesson: Climate Art 1 day	<ul style="list-style-type: none"> *Read and interpret data from a chart. *Read decimals as tenths and write them as 	<ul style="list-style-type: none"> *Use this Google Slides activity for this lesson. *Discuss the graphs presented in the slides 	<ul style="list-style-type: none"> *Respond to the graphs by answering questions about the data presented. *Optional Activity -

	<p>fractions.</p> <p>*Create a line graph using data from a chart.</p>	<p>displaying global temperature anomalies.</p> <p>*Use these worksheets to discuss what students notice and wonder about the data.</p> <p>*Convert decimals on graphs to fractions.</p> <p>* Extension Activity - Students can visit this site and discuss what they notice about the graphs presented here related to climate change.</p>	<p>Students can create climate art such as the examples depicted in the Google Slides.</p>
<p>Renewable Energy Lesson: Global Energy</p> <p>1 day</p>	<p>*Collect data using a map.</p> <p>*Compare trends in data using line plots.</p>	<p>*Use this Google Slides activity for this lesson.</p> <p>*Use the Google Map in the slides to observe the different types of renewable energy resources that are used in the United States compared to the rest of the world.</p> <p>*Discuss the different forms of renewable resources used on the east coast of the United States.</p> <p>*Watch this video and discuss the benefits of using the energy resources discussed.</p>	<p>*Using these worksheets, students will compare and contrast two countries and their use of electricity using the maps provided.</p>
<p>Local Concerns</p> <p>1-2 weeks</p>	<p>*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.</p>	<p>*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.</p> <p>*Use data gathered from research to create and</p>	<p>*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.</p>

		identify visuals to support cross curricular project topic.	
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Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.5	Use appropriate tools strategically.
MATH.5.NBT.A.3.a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
MATH.5.DL.A.2	Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g., chart, storyboard, video presentation).
MATH.5.DL.A.4	Using appropriate visualizations (i.e., double line plot, double bar graph), analyze data across samples.
MATH.5.DL.B.5	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots.
MATH.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).
MATH.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.

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

Special Education*/Academically At Risk

- Chunked information - break lessons down into more manageable segments
- Visual supports - Use diagrams, videos, infographics to explain concepts
- Provide graphic organizers
- Pre-teach vocabulary and highlight vocabulary words in lessons
- Provide alternative assessments - draw diagrams, create models, or explain answers verbally if necessary
- Reduce complexity - simplify language on assessments, limit number of questions
- Allow extra time and breaks
- Create visual checklists for assignments
- Resources: Belouga, Achieve 3000, BrainPop

*Consistent with individual plans when appropriate.

ML:

- Use of simplified language in instruction free of idioms and complex sentence structures

- Visual supports - use pictures to describe vocabulary words, label images with bilingual vocabulary when possible
- Use of graphic organizers
- Use of native language - allow use of translation tools and dictionaries, encourage peer pairing with bilingual students
- Modify assessments - accept oral responses, labeled diagrams, or drawings when applicable, allow more time for work completion
- Use interactive activities such as sorting and matching cards for vocabulary comprehension

Gifted Students:

- Advanced content depth - assign scholarly articles or climate science research
- Independent research projects - students choose a climate-related topic and conduct in-depth, inquiry-based research
- Debate & critical thinking - organize debates on climate change
- Creative expression - write climate fiction short stories, create a visual art piece
- Leadership & mentorship - lead peer groups in projects or classroom climate simulations
- Resource: [Choice Board](#)

Suggested Technological Innovations/Use

- Use of videos and audio recordings when applicable
- Use of Excel/Google Sheets to organize climate change data and create graphs
- Use of interactive maps and graphs that demonstrate climate change data

UDL Framework

The Universal Design for Learning (UDL) principals guide instruction by providing multiple means of engagement, representation and action/expression. To engage learners, students investigate real-world climate data-such as temperate changes, sea level rise, or carbon emissions by analyzing trends and creating graphs, offering relevance and choice in the data sets they explore. Representation is enhanced through visual aids like interactive graphs, maps, and digital simulations. To support action and expression, students demonstrate understanding through diverse formats: creating data displays, art influenced by climate change, and developing their own word problems using climate data. These approaches ensure all students, including those with varied learning needs and strengths, can access content, build math skills, and apply them meaningfully in the context of climate change.

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

ELA.L.RF.5.4.A	Read grade-level text with purpose and understanding.
ELA.L.WF.5.2	Demonstrate command of the conventions of writing, including those listed under grade four foundational skills.
ELA.L.KL.5.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
ELA.RI.CR.5.1	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
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.
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 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.
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).