

Is Global Warming Happening?

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LTMS

Approximate Timeline: 2 weeks

School Level: Middle School

Area(s) of Core Content: Science, Mathematics, Writing

Organizer:

How might we measure the possibility of global warming and the effects it might have on the environment?

Academic Expectations and Demonstrators:

Academic Expectation 1--Apply Communication and Math Skills:

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

- *Use a variety of telecommunication resources to obtain information on a specific need or problem*

1.5 - 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.

- *Model problem solving situations using oral, written, concrete, pictorial, graphic, simple algebraic methods.*
- *Use deductive/inductive reasoning to synthesize information related to problems, making conjectures, exploring, validating, and convincing others.*

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

- *Express information and ideas creatively using technology.*
- *Analyze relationships/patterns to draw inferences using technology.*

Academic Expectation 2--Science:

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

- *Analyze collected data to discover patterns and predict outcomes.*
- *Investigate the existence of small- scale variations within a large-scale pattern.*

2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.

- *Evaluate the impact of a disruption on the evolution of a system.*

Academic Expectation 2--Mathematics:

2.8 Students understand various mathematical procedures and use them appropriately and accurately.

- Interpret and organize information for logical deductions.

2.11 Students understand mathematical change concepts and use them appropriately and accurately.

- Represent patterns in several ways (e.g., graphs, ordered pairs, verbal statements, algebraic rules).

2.13 Students understand and appropriately use statistics and probability.

- Collect, display, analyze and interpret the data from a selected population.
- Make predictions and evaluate conclusions based on statistical analysis.

Academic Expectation 5--Thinking and Problem Solving:

5.3 Students organize information to develop or change their understanding of a concept.

- Develop and test concepts based on new information and experience.

Middle School Core Content--Writing:

WR-M-1.4 Characteristics of transactive writing may include ideas which communicate the specific purpose for the intended audience

WR-M-1.4 Characteristics of transactive writing may include well-organized idea development and support (e.g., facts, examples, reasons, comparisons, anecdotes, descriptive detail, charts, diagrams, photos/pictures) to accomplish a specific purpose

Middle School Core Content--Mathematics:

MA-M-3.1.1 Meaning of central tendency (mean, median, mode)

MA-M-3.1.2 Meaning of dispersion (range, cluster, gaps, outliers)

MA-M-3.1.3 Characteristics and appropriateness of graphs (e.g., bar, line, circle), and plots (e.g., line, stem-and-leaf, box-and-whiskers, scatter)

MA-M-3.2.1 Organize, represent, analyze, and interpret sets of data

MA-M-3.2.2 Construct and interpret displays of data (e.g., table, circle graph, line plot, stem-and-leaf plot, box-and-whiskers plot)

MA-M-3.2.3 Find mean, median, mode, and range; recognize outliers, gaps, and clusters of data

MA-M-3.3.1 How different representations of data (e.g. tables, graphs, diagrams, plots) are related

Middle School Core Content--Science:

SC-M-2.1.7 Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.

---Students will use appropriate equipment, tools, techniques, technology, and mathematics to gather, analyze, and interpret scientific data.

Essential Questions:

1. What is global warming?
2. What data is important to global warming?
3. What graphic representation of the data is most appropriate?
4. What does the graph tell us about global warming?
5. What conclusions can you draw from the data about global warming and how might it change our environment?

Culminating Performance:

Project (2 parts):

- ✓ Students will do a presentation for other students which will include their research process including at least three applicable data sites, a summary of the four graphic representations (including the graphs themselves) with a justification for the one(s) they chose, and the conclusions they reached.
- ✓ Students will design a transactive writing piece using the data to support their conclusions about the effects of global warming on the environment, including appropriate graph(s).

Scoring Guide:

The culminating performance project will have two areas of assessment.

Data sources (websites), graphs, which they chose and why – presentation will be done verbally with display of graphs using digital projector and computer.

Final presentation (math class)

- ✓ 4 – Students’ presentation included at least three sources of data, and at least one of each of the four graph types. They will digitally present the graph(s) they chose, describe each, and a clear and appropriate justification for why they chose it. Student is completely prepared and has obviously rehearsed.
- ✓ 3 - Students found at least two sources of data, and selected and summarized one that might be applicable to global warming.
- ✓ 2 - Students found and summarized a source of data that might be applicable to global warming.
- ✓ 1 - Students did not find nor summarize an applicable source of data.

Construction of the graphs using technology - box and whisker (graphing calculator), line, histogram, bar (Excel) (1/6)

- ✓ 4 – Using selected data, students will accurately and completely construct each of the types of graph.
- ✓ 3 - Using selected data, students will construct each of the types of graph with minor errors, or constructed only three of the types of graph accurately.
- ✓ 2 – Using selected data, students will construct each of the types of graph with major errors, or constructed only two of the types of graph accurately.
- ✓ 1 – Students will fail to accurately construct more than one of the given graphs.

Selection of the graph (1/6)

- ✓ 4 - The selected graph fits the data well and makes it easy to interpret.
- ✓ 3 - Graph is adequate and does not distort the data, but interpretation of the data is somewhat difficult.
- ✓ 2 - Graph distorts the data somewhat and interpretation of the data is somewhat difficult.
- ✓ 1 - Graph seriously distorts the data making interpretation almost impossible.

Write-up (1/2)

(rubric to be prepared by language arts teacher)

Knowledge:

- ✓ Students must be able to find, identify, and obtain data using the Internet.
- ✓ Students must be able to construct line, bar, histogram, box and whisker plot graphs using technology (Excel, graphing calculators).
- ✓ Students must be able to understand and use measures of central tendency and dispersion.
- ✓ Students must be able to determine which graph best displays the data for the purpose of showing trends over time.
- ✓ Students must understand the meaning of global warming, the various forces and trends that affect it, and make conjectures about the impact it may have using the data representations.
- ✓ Students must be able to communicate their findings, using their graphs, in a written format using the transactive writing process.

Skills/Abilities:

- ✓ Excel
- ✓ Graphing calculator
- ✓ Computing measures of central tendencies
- ✓ Internet research, including downloading and importing data.

Critical Resources:

- ✓ Access to computer lab
- ✓ Access to graphing calculators
- ✓ Web page with lists of links to data sources (Richard Forston)
- ✓ Access to word processing

Instructional/Assessment Activities:

Specific lesson plans and timeline

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
Math	Intro	Data search		Constructing graphs using technology			Discuss graph appropriateness, select graph(s)	Creating final graph(s) and presentation	
Science	Intro, core content, pre-write			Continue core content, rough draft			Peer editing		Final draft due

Math

Day One – Introduction to Global Warming Project (Lecture)

- ✓ Usage of the Internet for research.
- ✓ Check on students' AUP status.
- ✓ Supply web page for list of global warming sites.
- ✓ Explain mathematical portion of unit.
- ✓ Assignment: - students will access the websites at home or after school for familiarity
- ✓ Assessment - NA

Day Two & Three - Data Search (Computer lab)

- ✓ Visit list of global warming sites.
 - ✓ View and select the appropriate sites.
 - ✓ Document the sites selected with summary of content.
 - ✓ Transfer data into Excel from appropriate sites.
- Assignment: - Final draft of documentation and summary.
 Assessment: - The summary will contain at least three sources of data which are appropriate to global warming.

Day Four, Five & Six – Construction of Graphs (Computer lab)

- ✓ Students must consider time periods of data as pertains to measures of central tendency.
- ✓ Construct line, bar and histogram graphs on Excel
- ✓ Construct box and whisker graph on graphing calculator.
- ✓ Print copies of graphs.

- ✓ Assignment: - In class, students will produce graphs reflecting each of the four graph types, for each of the three data sources.
- ✓ Assessment – the construction of the graphs

Day Seven – Appropriateness of Graphs (Lecture/Discussion)

- ✓ Discuss interpretation of graphs.
- ✓ Discuss appropriate graphs.
- ✓ In class/homework select appropriate graph(s) for transactive writing piece.
- ✓ Assignment: - selection of graphs.

Day Eight – Create Final Graph (Computer lab)

- ✓ Format selected graph(s) for titles, scales, etc.
- ✓ Print the final graph.
- ✓ Assignment: - finished graphs, prepare presentation
- ✓ Assessment –

Science

Day One, Two & Three – Introduction to Global Warming (Lecture/Discussion)

- ✓ What is global warming? What effects are observable from global warming?
- ✓ How does global warming affect our environment?
- ✓ Discuss transactive writing (feature article, persuasive writing, or editorial) including the writing process and support for ideas.

Assignment: - Pre-write for transactive piece.

Assessment: - the pre-write

Day Four, Five & Six – Further Study of Global Warming & Rough Draft (Lecture/Individual writing)

- ✓ Work on rough draft.
- ✓ Further study of global warming.

Assignment: - Work on rough draft.

Assessment: - NA

Day Seven & Eight – Peer Edit/Revision (Individual/Group work)

- ✓ Students will exchange and peer edit drafts (twice).
- ✓ Students will make revisions based on peer edits.

Assignment: - Make revisions from day's peer edit.

Assessment: - NA

Day Nine – Final Draft

- ✓ Draft will include pre-write, rough drafts, peer edit sheets, and final draft.

Assignment: -

Assessment: - Final draft will be assessed using scoring rubric

Scoring Guide

Unit Title: Is Global Warming Happening?

Culminating Performance:

**Is Global Warming Happening?
Culminating Project + Scoring Rubric**

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