You're Invited!

Language Arts

Background: The chairperson of the Global Nations International Climate Summit (GNISC) invites and challenges students to learn about climate change through a simulation involving different countries from around the world. Students will participate in a role-playing scenario as members of these different countries. Each country has been affected by climate change and students are challenged to investigate probable causes and determine the best mitigation options for their country.

Goal: Students are introduced to the scenario and are challenged to investigate the evidence of climate change along with the probable causes and mitigations for their assigned country.

Objectives: Students will ...

- Develop a basic understanding of some of the ways in which the climate of the world is changing
- Explore and consider evidence from countries from around the world

Materials (for a class of 30):

- Suit jacket costume or some other costume for the chairperson
- 10 – 8½" x 11" sheets of white paper for each group to design their flag
- Markers or crayons to decorate flags
- You're Invited! – Country Role Cards
- 30 You're Invited! – Global Climate Change Definitions Sheets
- You're Invited! – Chairperson Script
- 30 You're Invited! – Student Sheets
- You're Invited! – Teacher Transparency
- Materials for the box labeled with the country name on the item.
  Underalia Land – Sunscreen
  Unstattica – Bug spray
  Monromian – Seeds
  Entipian – Loaf of bread with high price tag
  Gamtulala – Umbrella
  Sarrasadi – Winter gloves
  Shafangistan – Sun hat
  Infirdiddy – Sunglasses
  Jahongo – Mini fan
  Gernadie – Ski season pass with only a 1-week season

Time Required: (2) 45-60 minute class periods

Standards Met: LA1, LA3, LA4, LA12, G1, G2, G6

Procedure:

PREP

- Recruit your principal or a parent to come in and introduce the scenario using the You're Invited! – Chairperson Script.
- Get a costume for the chairperson.
- Prepare box of items for each country for the chairperson.

PROCEDURE

- Explain to students that they will be learning about the Earth's climate.
- Hand out the You're Invited – Global Climate Change Definitions Sheets. Go over the definitions and allow students to share what they know or connect with about the vocabulary.
- While you are explaining this, have the chairperson come in and read the You're Invited! – Chairperson Script.
- Divide students into 10 groups and hand each group a country role card.
- Hand out the You're Invited! – Student Sheet to each student.
- Countries should take time to brainstorm a design of their country flag and a national anthem.
- It might be helpful to provide examples of flags from countries around the world or states and discuss the symbolism within the flag.
- Hand out one 8½" x 11" sheet of paper for each country to draw their flag.
- Once groups have completed their flag and created a national anthem, have each country stand up read their role card with the country information. You can record their data on an overhead transparency so the other countries can compare their country to the others. They also need to discuss the symbolism on their flag and have them sing their national anthem.
- Next have them discuss the climate concerns of their country.
- Hang up flags on the wall near where the members of that country are seated.
- After all countries have presented, discuss similarities and differences within the countries.
- Next have students brainstorm possible causes for these climate concerns and what next steps they should take regarding where they can get more information relating to other possible causes. Make a suggestion that perhaps they should invite people from around town to see what their opinion is as to why the climate is changing.

Assessment:

- Class participation in activity
- Completion of You're Invited! – Student Sheet

You're Invited! – Chairperson Script

Costume – Suit jacket or some other official outfit

Chairperson:
"Welcome Global Nations! I have recently received some materials from the citizens of your countries representing their concerns with some issues surrounding their climate."

*Bring out each item and discuss what it could represent to that country:

- Underalia Land – Sunscreen
- Unstattica – Bug spray
- Monromian – Seeds
- Entipian – Loaf of bread with high price tag
- Gamtulala – Umbrella
- Sarrasadi – Winter gloves
- Shafangistan – Sun hat
- Infirdiddy – Sunglasses
- Jahongo – Mini fan
- Gernadie – Ski Season pass with only a 1-week season

"As chairperson of the Global Nations International Climate Summit (GNICS), I want to personally invite you to the first meeting GNICS. Countries around the world are getting ready to gather together to learn from each other about our global climate. I appreciate your eagerness to participate in this GNICS examining the atmospheric, environmental and other effects taking place within your countries. You are going to be members of these countries, and it is your country's task during this Summit to investigate what is happening in your country related to climate change, then present the evidence from your country, investigate probable causes for these changes, and research your country's best options for mitigating these changes. It is your challenge to find potential solutions for your country, and I look forward to hearing your potential solutions at the GNICS.

Let's all work together to improve our lives together as Global Nations!"

You're Invited! – Student Sheet

Name_____ Date_____

I am a member of _____ (name of your country).

Use the space below to design ideas for your flag:

Our flag contains the following symbolism:

Climate concerns of my country:

You're Invited! – Global Climate Change Definitions Sheet

Acclimatize
To adjust to changes in environmental variables.

Adaptation
The responsive adjustment of a sense organ (as the eye) to varying conditions; the process of adapting to something (such as environmental conditions).

Anthropogenic
Having to do with man, or caused by humans.

Atmosphere
The area in which all air exists; this sphere contains all of the gases that surround the earth.

Biodiversity
A property of ecosystems related to the number of different plant and animal species they contain.

Biome
Major division of the ecological communities on Earth characterized by the plant and animal life of that region.

Biosphere
The area in which all living things exist; this sphere includes all of the microorganisms, plants and animals of Earth, even humans.

Carbon Dioxide (CO_2)
A colorless, odorless, incombustible gas. CO_2 is formed during respiration, combustion and organic decomposition, and used in food refrigeration, carbonated beverages, inert atmospheres, fire extinguishers and aerosols.

Carbon sink
A place where carbon accumulates and is stored. For example, plants and trees are carbon sinks; they accumulate carbon dioxide during the process of photosynthesis and store it in their tissues as carbohydrates and other organic compounds.

Carbon source
A place where carbon is produced or released. For example, plants release carbon in the form of carbon dioxide when their tissues are broken down during combustion. In addition, cars release carbon dioxide as they burn gasoline, and power plants release carbon dioxide when they burn fossil fuels to generate electricity.

Chlorofluorocarbon (CFC)
Anthropogenic aerosol compound containing chlorine, fluorine and carbon that is used in propellants, refrigerants and solvents; freon.

Climate
Long-term pattern of weather that characterizes a region.

CO_2 Sequestration
The process of removing carbon dioxide from the atmosphere and making it unavailable for release back to the air.

Cryosphere
The sum total of earth's fresh water supply that is locked up in frozen forms including polar ice, mountain glaciers, permafrost and snow.

Cyclone
An area of low-pressure often associated with stormy weather.

Deforestation
The removal of trees from a previously pristine area, generally by logging to obtain lumber products.

Ecosystems
Communities of plants, animals and bacteria, generally composed of producers, consumers and decomposers that share a common physical and chemical environment.

Evaporation
The movement of gaseous water (water vapor) from the Earth's surface to the atmosphere; evaporate (verb).

Emission
Substance that is released or discharged, usually into the air; emit (verb).

Eustatic Sea Level Change
Changes in sea level caused by changes in the water volume of the world's oceans, such as those brought about by the formation or melting of mountain glaciers and polar ice caps.

Fixation of carbon
Another name for the photosynthetic process, whereby carbon is removed from the air and "fixed" or incorporated into plant tissues.

Fixed
A shorthand term for the "fixation of carbon," which is the process by which plants remove CO_2 from the air and incorporate it into their tissues.

Food chain
A sequence of organisms in an ecosystem in which each member feeds on the member below it.

Fossil fuels
Deposits of organic matter that have been altered over geologic time (since the Earth's formation) and can be burned for energy; for example, coal, crude oil and natural gas.

Global carbon cycle
The cyclical movement of carbon within the biosphere. Carbon is primarily removed from the air by plants during photosynthesis and by dissolving in bodies of water. Carbon is generally returned to the air via biological respiration, decomposition of organic matter, volcanic activity and society's industrial activities, including the combustion of fossil fuels.

Global climate change
A change in the long-term weather patterns that is characteristic of regions of the world.

Greenhouse gases
Gases such as water vapor, carbon dioxide and methane that are relatively transparent to the short wavelength solar radiation that emanates from the sun but that are fairly opaque to the longer wavelength thermal radiation that emanates from the surface of a planet. Other greenhouse gases include Nitrous Oxide, HFC's, SF6 and CFC's but will not be covered in depth in this unit.

GDP (Gross Domestic Product)
This is one way to measure the size of an economy. It is the market value of all final goods and services within a country in a given period of time.

Hurricane
A tropical cyclone with winds in excess of 64 knots (74 mph).

Hydrocarbon
An organic chemical compound consisting only of carbon and hydrogen atoms in the gaseous, liquid or solid phase. (Greek hydor, water + Latin carbo, charcoal).

Hydrosphere
The area in which water exists; for the purpose of this module, this sphere includes all liquid water on Earth, such as rivers, lakes and oceans, all frozen waters such as glaciers, icebergs, and polar icecaps, and all water vapor.

Hypothesis
A supposition or idea about something. In the scientific realm, it generally relates to physical or chemical interactions among various entities of nature.

Ice age
A period of extensive glaciations over large portions of earth's continents accompanied by reduced global temperature and changes in atmospheric circulation.

Interest
An immediate underlying concern applied to a specific situation or issue that usually reflects a person's personal interest or motivation. Competing interests result from a difference in perspective and motivation.

Isostatic Sea Level Change
Changes in sea level caused by the rising or falling of various portions of the earth's crust.

Methane
An odorless, colorless, flammable gas, CH_4, the major constituent of natural gas, that is used as a fuel and is an important source of hydrogen and a wide variety of organic compounds.

Mitigation
To act in such a way as to cause an offense to seem less serious. Related to climate change, mitigation refers to actions that reduce greenhouse gas emissions at their source or actions that remove greenhouse gases from the atmosphere.

Particulate matter
Small particles of matter such as dust and soot that are suspended in the air.

Per Capita
Per unit of population (per person).

Permafrost
Ground that is permanently frozen.

Parts per million (ppm)
Unit of measure most often used to describe the amount of a particular gas or compound in the air or water; it is the proportion of the number of molecules of the gas or compound out of a million (1,000,000,000) molecules of air or water.

Photosynthesis
The process by which plants use sunlight, water and carbon dioxide to produce their food.

Plate Tectonics
A theory explaining the present and past locations of continents due to massive movement of the Earth's crust.

Preferred Action
What the stakeholder thinks should be done about the specific issue; what action, if any, the stakeholder says should be taken.

Precipitation
The movement of liquid or solid water (rain, sleet, snow, etc.) from the atmosphere to the Earth's surface; precipitate (verb).

Precipitation Efficiency
The efficiency with which atmospheric moisture is converted to precipitation, often described as the ratio of precipitation to total available moisture.

Proxy data
Data obtained from objects that are sensitive to climatic phenomena. Some examples are tree ring widths, ice cores, pollen deposits, glacier lengths and deep sea sediments. Analyses of such data can be used to provide estimates of past climate conditions, such as temperature, precipitation or wind speed.

Shade-intolerant species
Plants that typically grow in places that receive lots of direct sunlight. They generally have high relative growth rates, highly-regulated stomata and thin leaves.

Shade-tolerant species
Plants that typically grow in places that receive less than full sunlight, such as the lower levels of a forest. They generally have low relative growth rates, open stomata and thick densely-packed leaves.

Stakeholder
Those individuals, groups, organizations and/or institutions that have a role in the problem and/or its solution and a stake in the outcome.

Topography
Having to do with elevation or "lay of the land," i.e., surface features.

Urban heat island
A region of warmer air temperature (relative to the surrounding countryside) in a metropolitan area. Urban heat islands have been documented to exist in cities with as few as a thousand inhabitants.

Vulcanism
Those processes collectively that result in the formation of volcanoes and their products.

Weather
Short-term (daily) changes in temperature, wind and/or precipitation in a region.

Definitions modified from http://www.co2science.org/dictionary/define.htm and http://davem2.cotf.edu/ete/modules/climate/GCglossary.html

You're Invited! – Country Role Cards

UNSTATTICA

Population: 288 million

Land Area: 9+ million km², 32 people per km²

GDP Per Capita: $43,866.65

Geography: A wide variety of landscapes including mountains, flatlands, lakes, deserts, and forests and a variety of temperatures. There is 7.09 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 99.0
CO_2 Emissions in million metric tons: 5,762

Number 1 in Energy consumption *(out of 214 countries)*
Number 1 in CO_2 Emissions

Climate Concerns: Permafrost thawing has caused the ground to subside 16-33 ft. since the 1960's in one of your states which limits the range for animals and increases insects, storms are becoming more intense.

SHAFANGISTAN

Population: 30 million
Land Area: 647 thousand km², 50 people per km²

GDP Per Capita: $275.95

Geography: Shafangistan has a variety of elevations and temperatures range widely based on elevation. The entire country overall is classified as desert but does experience limited snowfall in the winter. There is 0.07 thousand cubic meters of freshwater per person.

Energy Consumption in quads: 0.023
CO_2 Emissions in million metric tons: 0.915

Number 158 in Energy consumption *(out of 214 countries)*
Number 144 in CO_2 Emissions

Climate Concerns: The winters are becoming colder and the summers are getting hotter. Shafangistan is experiencing more severe storms than ever.

UNDERALIA LAND

Population: 20 million
Land Area: 7 + million km^2, 3 people per km^2

GDP Per Capita: $31.550.09

Geography: Underalia Land is an extremely flat country with sparse population. About 1/3 of the land is desert, while the other 2/3 has adequate rainfall for lush vegetation and forests. It has approximately 27.81 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 4.87
CO_2 Emissions in million metric tons: 332

Number 17 in Energy consumption *(out of 214 countries)*
Number 15 in CO_2 Emissions

Climate Concerns: Underalia Land is experiencing warmer than normal temperatures with extreme sun. Many of the lakes that once had water are drying up and are now called "Salt Lakes."

SARRASADI

Population: 26 million
Land Area: 2 million km^2, 13 people per km^2

GDP Per Capita: $10,032.23

Geography: Mostly made of up of desert sand, there is a mountain range with an elevation of around 10,000 feet. Sarrasadi also has approximately 0.22 thousand liters of freshwater available per person.

Energy Consumption in quads: 4.85
CO_2 Emissions in million metric tons: 266

Number 18 in Energy consumption *(out of 214 countries)*
Number 21 in CO_2 Emissions

Climate Concerns: Winters are typically mild (around 75 degrees Fahrenheit) but are increasingly becoming colder. In many parts of Sarrasadi there is no rain, while others are experiencing flooding.

GERNADIE

Population: 82 million
Land Area: 357 thousand km^2, 230 people per km^2

GDP Per Capita: $35,853.95

Geography: Gernadie has a wide variety of landscapes from tall mountains to plains and forests. It has approximately1.35 thousand cubic meters freshwater available per person.

Energy Consumption in quads: 14.3
CO_2 Emissions in million metric tons: 838

Number 5 in Energy consumption *(out of 214 countries)*
Number 6 in CO_2 Emissions

Climate Concerns: Although the climate is usually temperate, Alpine glaciers are receding at a fast rate due to warmer than normal temperatures.

GAMTULALA

Population: 15 million
Land Area: 109 thousand km^2, 138 people per km^2

GDP Per Capita: $2,769.46

Geography: Made up of a volcanic landscape, Gamtulala has many rivers and streams throughout the country. Gamtulala has approximately14.03 thousand cubic meters of freshwater per person.

Energy Consumption in quads: 0.155
CO_2 Emissions in million metric tons: 10.1

Number 99 in Energy consumption *(out of 214 countries)*
Number 91 in CO_2 Emissions

Climate Concerns: Gamtulala is being plagued by mudslides that are brought on by excessive rain. Other parts of the country are becoming almost desert-like. Extremely severe storms are not uncommon and are becoming stronger every year.

ENTIPIAN

Population: 73 million
Land Area: 1 + million km^2, 73 people per km^2

GDP Per Capita: $174.09

Geography: Entipian has a combination of highlands and lowlands as well as some volcanic areas. It has approximately 2.17 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 0.065
CO_2 Emissions in million metric tons: 3.65

Number 124 in Energy consumption *(out of 214 countries)*
Number 116 in CO_2 Emissions

Climate Concerns: Rivers are overflowing due to the increased intensity of rainfall. Poor harvests are causing extreme hunger.

JAHONGO

Population: 127 million
Land Area: 378+ thousand km^2, 336 people per km^2

GDP Per Capita: $38,318.03

Geography: 4/5's of Jahongo's surface is mountainous including volcanoes and many agricultural areas. Jahongo has approximately 2.6 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 22.3
CO_2 Emissions in million metric tons: 1,225

Number 4 in Energy consumption *(out of 214 countries)*
Number 4 in CO_2 Emissions

Climate Concerns: Rainfall is abundant and temperatures are generally mild, but Jahongo is experiencing a higher than average amount of typhoons and rainfall as well as increased temperatures.

MONROMIAN

Population: 22 million
Land Area: 238 thousand km^2, 92 people per km^2

GDP Per Capita: $3,596.24

Geography: Dominated primarily by mountains, Monromian does have regions of valleys and plains which include salt lakes. Monromian has approximately 1.45 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 1.58
CO_2 Emissions in million metric tons: 90.7

Number 38 in Energy consumption *(out of 214 countries)*
Number 37 in CO_2 Emissions

Climate Concerns: Harsh temperatures are causing Monromian to experience a shift in agricultural regions to the changing regional temperatures along with extreme flooding.

INFIRDIDDY

Population: 1065 million
Land Area: 3 + million km^2, 355 people per km^2

GDP Per Capita: $711.59

Geography: Infirdiddy has a wide variety of plains and mountains. Infirdiddy has approximately 1.56 thousand cubic meters of freshwater available per person.

Energy Consumption in quads: 13.5
CO_2 Emissions in million metric tons: 1,008

Number 6 in Energy consumption *(out of 214 countries)*
Number 5 in CO_2 Emissions

Climate Concerns: Typically mild in temperature, Infirdiddy is experiencing a decline in rainfall and experiencing more intense weather conditions such as cyclones.

You're Invited! – Teacher Transparency

Country Name	Population	GDP Per Capita	Rank-CO2 Emissions	Rank-Energy Consumption	Climate Concerns
Entipian					
Gamtulala					
Gernadie					
Infirdiddy					
Jahongo					
Monromian					
Sarrasadi					
Shafangistan					
Underalia Land					
Unstattica					