Climate Discovery: Climate Future

Climate Lingo Bingo

Teacher's Guide *http://.eo.ucar.edu*

Subject Focus:

Earth Science
Environmental Science
Political Science and Social Studies

Materials & Preparations:

- Print definitions onto one large label and cut each out;
- Print enough bingo cards so that each student has one. You may have to use two different cards if there are more than 24 students;
- Attach one definition to each card using a paper clip;
- Ideally you will use one definition per student. Any extra definitions can be put into play by posting them on the class bulletin or white board.

Time:

30 minutes for a participant to complete one straight or diagonal row. It will take a minimum of 45 minutes for a class to play when the objective is to match all words on the card with their definitions.

Materials For Students:

- One bingo card per student
- One numbered climate definition to wear per student (There are 39 definitions in all.)
- Pencils or pens
- Answer sheet

National Science Content Standards Addressed:

Underlying Concepts and Processes Standard; Concept Standard D

Objective:

Students will learn terminology specific to climate and/or climate change.

Procedures:

1. Each student is given one definition label to wear.
2. Each person receives one Bingo Card.
3. Review the directions with the students. and check to see if there are any questions.
4. Ring a bell or noisemaker of some kind to signal the game has begun.
5. Students wander from classmate to classmate reading their definitions. If the student's definition matches with one of the bingo-card words, the student should record the following next to the specific word being defined:
    - person's name, and number of their definition located on its label
6. When a game participant has collected enough names and numbers to fill one row, column, or diagonal row, he or she shouts "Climate Lingo Bingo!"
7. Have the student check his/her answers using the answer sheet to confirm that all answers are correct (the word's number should match match the number assigned to it on the answer sheet.)

Discussion:

This activity can be used as an icebreaker among students prior to beginning a study on climate change. An understanding of the "lingo" used by climatologists and others from related fields can greatly enhance a student's understanding, retention, and enjoyment of the material.

Extension:

Since the activity provides climate terms and definitions, there is an endless amount of ways these words can be used meaningfully with students. Matching words to definitions is one activity that can improve one's knowledge of climate terms. The game can be played with the objective of matching all words with their definition. Also, the game can be easily converted into a traditional bingo game where the teacher reads a definition, and the students then cover the matching word with a penny or other object used as a marker. When a row or column, straight or diagonal, is full, they shout "Climate Lingo Bingo." (Note: A variety of bingo cards will need to be made and used.)

1. The fraction or percent of radiation striking a surface that is reflected by that surface. In terms of visible light, white surfaces tend to be highly reflective while darker surfaces tend to absorb more incoming radiation.	2. Tiny liquid or solid particles of various composition that occur suspended in the atmosphere.	3. Departure of temperature, precipitation, or other weather element from its long-term average.
4. The insulating effect of atmospheric greenhouse gases (water vapor, carbon dioxide, etc.) that keeps the Earth's temperature about F. warmer than it would be otherwise.	5. An episode of anomalously high sea-surface temperatures in the equatorial and tropical eastern Pacific; associated with large-scale swings in surface air pressure between the western and central tropical Pacific. It is also commonly referred to as El Niño, but this term only refers to the ocean warming component and fails to include the corresponding changes in the atmosphere.	6. Electromagnetic radiation at wavelengths shorter than microwaves and longer than visible red light; emitted by most objects on Earth.
7. A chemical (O_3) found naturally in the stratosphere that filters out potentially lethal intensities of ultraviolet radiation from the Sun. It also occurs unnaturally in the troposphere, where it is harmful to human health.	8. The tendency of a major temperature change to increase in magnitude with latitude.	9. A segment of the atmosphere situated between the troposphere and mesosphere and the primary site of ozone formation.

10. Short-wave, energetic electromagnetic radiation emitted by the Sun, much of which is absorbed in the stratosphere, where it is involved in the formation and destruction of ozone.	11. Lowest thermal subdivision of the atmosphere in which air temperature normally drops with altitude. This layer of the atmosphere is the site of nearly all weather.	12. This is a term used to describe an ecological community together with its environment, functioning as a unit.
13. An odorless, colorless, flammable gas, CH_4, the major constituent of natural gas, that is used as a fuel and as an important source of hydrogen and a wide variety of organic compounds. It is also a greenhouse gas.	14. One of two or more atoms having the same atomic number but different mass numbers.	15. This is a colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition; it is also a greenhouse gas in Earth's atmosphere.
16. Permanently frozen subsoil, occurring throughout the Polar regions and located in perennially frigid areas.	17. This term means lacking moisture, especially having insufficient rainfall to support trees or woody plants.	18. These are synthetic industrial gases composed of chlorine, fluorine, and carbon that serve as greenhouse gases that also contribute to ozone depletion. Their use is banned in many countries.

19. Established in 1988 by the World Meteorological Organization and the UN Environment Program, this body is responsible for providing the scientific and technical foundation for the UN's Framework Convention on Climate Change through the publication of periodic assessment reports.	20. This is an international agreement aimed at curbing greenhouse gas emissions an average 5.2 percent below 1990 levels. The protocol went into effect in February 2005 in 141 countries.	21. Energy obtained from sources such as geothermal, wind, photo voltaic, solar, and biomass is known as...?
22. A three-dimensional pattern of ocean circulation driven by wind, heat and salinity that is an important component of the ocean -atmosphere climate system.	23. This term refers to the tendency for urban areas to have warmer air temperatures than the surrounding rural landscape, due cities' low albedo of streets, sidewalks, parking lots, and buildings.	24. This is a human disease caused by a virus spread by mosquitoes and characterized by fever, rash, muscle and joint pains. It can result in death but most people fully recover. It is expected to spread with climate change beyond the tropics where it is commonly found today.
25. This term refers to the introduction of malaria into places where malaria has been uncommon through mosquito vectors transported via aircraft.	26. This graph represents carbon dioxide atmospheric measurements from 1958 to the present.	27. This refers to the study of Earth's past climate using both direct and indirect measurement tools.

28. -- a cause of change in Earth's global energy balance that occurs naturally or anthropogenically (by humankind).	29. This refers to a situation whereby a stable climate system or stable component of the climate system suddenly begins to undergo rapid change.	30. This landmark international agreement was designed to protect the stratospheric ozone layer and was originally signed in 1987 but was also amended in 1990 and 1992.
31. -- a software tool that provides computer simulations of the Earth's past, present, and future climate states, the most sophisticated of which demand the use of supercomputers.	32. This term refers to Earth's snow, ice, sea ice, freshwater ice, frozen ground, ice shelves and icebergs.	33. This term refers to the responsible use of Earth's resources to ensure inter-generational equity and a higher quality of life for all people. Economic and social development and environmental protection are interdependent and mutually reinforcing components of this concept.
34. This term refers to the degradation of formerly productive land due to multiple causes. It may intensify a general climatic trend toward greater aridity, or it may initiate a change in local climate.	35. -- any particular matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles at the body of a water or other liquid.	36. This is the study of the annual cycle of plants and animals and how they respond to seasonal changes in their environment.

37. A formation, group of formations, or part of a formation of rock type that contains sufficient saturated permeable material to yield significant quantities of water wells and springs.	38. A term that refers to a long-lasting river of ice that is formed on land and moves in response to gravity.	39. Data collected that yields indirect evidence of past climate conditions in the local and/or global environment.
40.	41.	42.
43.	44.	45.

Climate Change Lingo Bingo Answer Key

Definition by Number

1. Albedo
2. Aerosol
3. Anomaly
4. Greenhouse Effect
5. ENSO or the El Niño Southern Oscillation
6. Infrared Radiation
7. Ozone
8 Polar Amplification
9. Stratosphere
10. Ultraviolet Radiation
11. Troposphere
12. Ecosystem
13. Methane
14. Isotope
15. Carbon Dioxide
16. Permafrost
17. Arid
18. Chlorofluorocarbons
19. IPCC or the Intergovernmental Panel on Climate Change
20. Kyoto Protocol
21. Renewable Energy
22. Thermohaline Circulation
23. Urban Heat Island Effect
24. Dengue Fever
25. Airport Malaria
26. Keeling Curve
27. Paleoclimatology
28. Climate Forcing
29. Climate Threshold
30. Montreal Protocol
31. Climate Model
32. Cryosphere
33. Sustainable Development
34. Desertification
35. Sediment
36. Phenology
37. Aquifer
38. Glacier
39. Proxy Record

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Albedo #_____	IPCC #_____	Greenhouse Effect #_____	Ecosystem #_____	Anomaly #_____
Thermohaline Circulation #_____	ENSO #_____	Ultraviolet Radiation #_____	Keeling Curve #_____	Paleoclimatology #_____
Desertification #_____	Glaciers #_____	FREE	Urban Heat Island Effect #_____	Renewable Energy #_____
Dengue Fever #_____	Kyoto Protocol #_____	Sediment #_____	Phenology #_____	Aquifer #_____
Troposphere #_____	Chlorofluorocarbons #_____	Aerosol #_____	Arid #_____	Carbon Dioxide #_____

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Albedo #_____	IPCC #_____	Greenhouse Effect #_____	Montreal Protocol #_____	Anomaly #_____
Thermohaline Circulation #_____	Climate Model #_____	Infrared Radiation #_____	Keeling Curve #_____	Cryosphere #_____
Polar Amplification #_____	Proxy Records #_____	FREE	Sustainable Development #_____	Renewable Energy #_____
Airport Malaria #_____	Kyoto Protocol #_____	Permafrost #_____	Climate Forcing #_____	Climate Threshold #_____
Stratosphere #_____	Ozone #_____	Methane #_____	Isotope #_____	Carbon Dioxide #_____