Climate Change Lotería: Facilitators guide

HISTORY

Lotería is an intergenerational game commonly used in Mexico. The first Lotería was played in Italy in the 15th century and was a popular game for the elite. In 1769, it made its way to Mexico, where it became a tradition at fairs. The most famous version of the game was first published in 1887 and has become iconic in Mexican culture.

The Pacific Northwest Agricultural and Safety Health (PNASH) Center, a research center at the University of Washington, created a Climate Change Loteria for engaging rural communities in learning. Considering PNASH's focus on health and rural communities, the messages in this game include health outcomes and impacts across farming, fishing and forestry. The inspiration for our rendition came from "La Lotería de Los Pesticidias," an educational game for workers on the Pesticide Worker Protection Standard, developed by the University of California Integrated Pest Management Program in 1992. The Climate Change Lotería has been developed and evaluated through several iterations by UW PNASH-affiliated students. Thank you to: Jose Carmona, John Yang, Dennise Drury, Jannah Amaly, Olivia Scott, and Idanis Cruz

INSTRUCTIONS

What You Need:

1 facilitator

3+ players

Lotería boards (multiply by number of players)

Lotería term cards

*16 small objects/player (multiply by number of players)

*Item not included in the game

Setting up the Game

Let player choose their Lotería game boards. Begin the game by introducing the students to climate change using the *Pre-Game Discussion* questions *below (optional)*. If no pre-game discussion skip to page 3 for "How to Play"

Pre-Game Discussion

What is climate change? Why are we concerned about climate change?

Information to guide the discussion:

- Global warming, but the problem is far more concerning and complicated than rising global temperatures.
- Humans are causing "significant changes in global temperature, precipitation, wind patterns and other measures of climate that occur over several decades or longer" (UC DAVIS).
- Examples: snow and ice are melting at rapid rates, sea levels are rising and extreme weather events such as wildfires and hurricanes are increasingly common.
- Our everyday actions and choices cause climate change. Mitigating climate change requires changes and additions to policy, and changes to our lifestyles and habits.

What is public health? How is climate change related to public health?

Information to guide the discussion:

- "The science and art of preventing disease, prolonging life, and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals." — CEA Winslow
- Example: hot, dry weather is leading to an increase in wildfires, not only putting lives at risk but also causing air pollution that negatively affects the health and wellbeing of millions.
- Example: warmer weather also means less snow pack. We rely on snow pack to fill our fresh water reservoirs, so that we have water for drinking and daily needs, such as bathing. A decline in water availability would directly affect human health.

What is a vulnerable population? What makes them a vulnerable population? How are they vulnerable to climate change?

Information to guide the discussion:

- "Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters" (WHO).
- A disaster can be natural or personal. Often a natural disaster results in personal disaster.
    - I.e. A hurricane destroying homes and displacing people.
- Children, pregnant women, elderly people, ill people, immigrant and minority people, and low-income people are some of these populations.
- Vulnerable populations are at higher risk of health concerns associated with climate change, as well as the financial costs of climate change.

- This is because they have fewer resources, whether that be health, mobility, income, etc.

How to Play

Shuffle the Lotería term cards and stack them face down. The first player selects the top card from the deck and reads only the definition on the card. Player 1 does not show the term card to other players. The card displays a key climate change term with the respective definition and an associated image. Other players try to identify the respective term based on the definition provided*. Once players have identified the term, all players who have the term on their board will mark the appropriate space with a small object (such as a bean or coin). If players do not guess the term after three attempts, the reader will reveal the term. At this point, all players who have the term on their board will mark the appropriate space with a small object**. The facilitator can then choose to ask a true or false question for more engagement (recommended) or…**

Player 2 then selects a card and repeats the process.

*Alternatively, remove guessing from the game to play at a quicker speed. The card drawer reads the term and definition, and then all players mark the term on their board. The facilitator then shares additional information and asks a true or false question.

How to Win!

Be the first player to mark four spaces in a horizontal, vertical, diagonal, or squared pattern and shout "Lotería!" Similar to Bingo, you can also choose to do a blackout. If you are giving away prizes, the winner should claim their prize.

Once a player wins, all players should rotate their boards or get a new board. Shuffle the cards and have a new player draw from the top of the deck.

Post-game Discussion

Ask the players to write down three facts that they learned. Then have them share at least one of those facts, either with the class or in small groups.

Optional: provide students with a small prize once they have shared a fact(s). Low cost and low waste prize ideas:

- Extra credit
- Pencil
- Zero to minimally packaged snacks/treats

Terms and Definitions plus True and False Questions

FOUNDATIONAL TERMS
[These concepts are directly related to climate change. They help create context for explaining and understanding climate change.]

1. **Ozone** – The layer of the atmosphere that protects us from harmful UV rays.

True or **false**: The hole in the ozone is the same size as the continental United States.

- The hole is three times larger than the United States.

2. **Biodiversity –** The amount of living things within an ecosystem.

True or **false**: The loss of a few species from climate change will not significantly alter ecosystems.

- The loss of one species can disrupt an entire ecosystem. Example: Without phytoplankton, larger marine animals would cease to exist. This is because phytoplankton are at the bottom of the marine food web.

3. **Carbon Dioxide (CO_2)** – The most abundant greenhouse gas.

True or false: One hundred companies are the source of 70% of greenhouse gas emissions.

- These are primarily companies in the fossil fuel industry.

4. **Climate** - The average temperature, precipitation, humidity, and wind patterns of a place.

True or **false**: Climate and weather are the same thing.

- Weather describes day-to-day measurements of temperature, precipitation, humidity and wind patterns. Think of climate as all the clothes you own. Weather is the outfit you choose to wear on a specific day.

5. **Climate Change –** Negative changes in climate due to human activity.

True or false: You have the power to help mitigate climate change on a daily basis.

- Everything you do, from the lights you use to the clothes you wear to the food you eat, contributes to climate change. Every day, you can choose to make decisions and purchases that contribute to climate change or help to mitigate it.

6. **Ecosystems** – A particular area or region where living and non-living things interact and affect one another.

True or false: The Great Barrier Reef can be seen from the moon.

- This ecosystem is so large and complex that it can be seen from 238,900 miles away.

7. **Environment** – The circumstances, objects, or conditions by which one is surrounded.

True or false: Climate change can affect our physical and social environments.

- Our social circles, including our values, norms, culture and languages are deeply influenced by the physical environment.

8. **Methane (CH_4)** – A greenhouse gas at least 25 times more dangerous than CO2.

True or false: A primary producer of methane is food waste.

- If food waste were its own country, it would be the third largest greenhouse gas emitting country in the world (behind the US and China).

9. **Nonrenewable resources** – Ancient resources produced by the earth that are available in limited amounts and not readily replaced.

True or false: Fossil fuels come from once living plants and animals.

- Over the course of millions of years once living plants and animals decomposed into their chemical parts, primarily carbon. With time, the carbon was buried by new soils. Eventually the pressure and heat created from being buried so deep in the Earth's surface transformed the carbon into a fossil fuel

10. **Oceans** – Climate change significantly affects the depths, temperatures, and levels of acidity of this ecosystem.

True or false: When ocean waters warm, the entire planet warms, even decades after the heat energy was absorbed.

- Energy in the form of heat becomes trapped in the ocean and warms the water.

11. **Solid Waste –** Any discarded or abandoned materials.

True or **false**: If an item is recyclable or compostable it is not considered waste.

- All discarded and abandoned materials are waste. Recycling and composting are methods of transforming waste into other useful materials. In addition, just because a material is recyclable or compostable does not guarantee that it is recycled or composted.

CAUSE TERMS

[These factors are direct causes of climate change.]

12. **Agriculture** – This industry is associated with pesticide application and run off, soil erosion, and livestock operations

True or false: Globally, agriculture, forestry and land use produces more greenhouse gas emissions than transportation.

- According to the Intergovernmental Panel on Climate Change, agriculture and other land use practices account for 24% of global greenhouse gases. Transportation accounts for 14%.

13. **Deforestation –** The process of removing trees, often for agricultural purposes.

True or **false**: Tree plantations are the primary driver of tropical deforestation.

- Beef is the #1 driver and soy production is #2, followed by cash crop timber.

14. **Emissions** – The by-product of burning fossil fuels.
True or false: High exposure to carbon emissions can harm human health, not just the environment.
    - High exposure to CO_2 can cause headaches, sleepiness, poor concentration, loss of attention and increased heart rate.

15. **Energy generation –** Non-renewable resources are the primary input to this process.
True or **false**: We do not need to be overly concerned about energy in Washington because we have a lot of hydroelectric power.
    - Dams have significant and detrimental impacts to water and land as resources and habitats.

16. **Greenhouse Effect -** When gases in the atmosphere trap heat, then reflect it back to the Earth's surface.
True or **false**: The greenhouse effect is always bad.
    - Without the greenhouse effect earth would be frozen.

17. **Industry –** The sector responsible for converting natural resources into material items.
True or **false**: Industries that produce materials made from renewable inputs, such as bioplastics, do not contribute to climate change.
    - Industries still use other inputs, directly linked to climate change like water and energy. Materials also have to be transported multiple times and disposed of at end of life; both processes release greenhouse gas emissions.

18. **Transportation –** The movement of people and goods, and one of the primary contributors to climate change.
True or false: Over half of all US transportation emissions come from passenger vehicles.
    - 60% of transportation related emissions in the US are related to passenger vehicles. The next largest contribution is from medium and heavy weight trucks (semis not pick-ups), at 23%.

CONSEQUENTIAL TERMS
[These concepts are the result of climate change and they are happening because of human activity.]

19. **Drought -** An extended period where there is little to no rainfall or snow.
True or **false**: This is not a concern for Washington because we have a wet climate.
    - Decreases in snow and increases in the temperature of streams are projected to cause summer water shortages.

20. **Extinction** – The result of species' inability to adapt to habitat disruptions and changing environments.

True or false: We are experiencing extinction rates only second to that of the dinosaurs.

- 30-50% of species are expected to be at risk for extinction in the next 30 years.

21. **Flooding –** When heavy rains cause a region to be partially covered or submerged in water.

True or false: Flooding can cause respiratory infections and perpetuate existing illnesses.

- Water intrusion into buildings can result in damp living spaces that susceptible to mold, which increases rates of asthma, pneumonia and other respiratory infections.

22. **Food Insecurity –** A household's inability to provide enough food for every person to live an active, healthy life.

True and false: Changes in climate in other regions of the world affect US food security.

- Climate events in other regions of the world, specifically tropical regions that supply products like coffee and bananas can cause sharp "reductions in [food] production and increases in price"(National Climate Assessment).

23. **Heat Waves –** This consequence is the deadliest weather related event.

True or false: In recent years, the number of heat waves has nearly tripled the yearly average.

- Currently, 30% of the world's population is exposed to potentially deadly heat for 20 or more days per year. These numbers will only continue to rise.

24. **Mental Health –** A person's emotional, psychological and social well-being.

True or **false**: Only people who experience extreme weather events related to climate change are at risk for mental illnesses.

- Incremental changes such as rising temperatures or droughts can negatively affect the day-to-day lives of many, having minor to severe mental health impacts. Example, crop yield may be significantly lower during a drought, causing financial stress, anxiety and even depression for farmers and farmworkers who rely on healthy crop yields for wages.

25. **Ocean Acidification –** This consequence interferes with marine animals' ability to build hard, protective shells.

True or **false**: Ocean acidification is only a minor problem because people can survive without eating shellfish.

- Over one billion people rely on oceans as their main source of nutrients. Shellfish are at the bottom of the food chain, so a decline in shellfish would affect the rest of the marine food web.

26. **Rising Sea Levels –** This consequence affects coastal communities and threatens the lives of over 1 in 7 people globally.

True or **false**: If ice and glaciers were not melting, sea levels would not be rising.

- Rising sea levels are caused by melting ice and glaciers but ALSO the expanding of the ocean as higher temperatures cause molecules to expand, and thus oceans to expand.

REDUCTION TERMS
[These are strategies for reducing human contribution to climate change and minimizing the associated negative impacts.]

27. **Alternative Transportation –** Any method of travel that reduces greenhouse gas emissions.
True or false: A two-person household can save, on average, almost $10,000 a year by owning one car vs. two and committing to alternative transportation.
    - Not only are you removing one car from the road, you support transportation methods that remove hundreds to thousands of cars from the road.

28. **Energy Conservation** – The act of saving energy to reduce associated greenhouse gas emissions.
True or false: Unplugging cords that are not in use, like phone chargers or toasters, makes a difference in energy consumption.
    - When a cord is plugged into an outlet, it draws energy. Unplugging may not result in significant cost savings for you, but when the majority of people unplug the change can be significant.

29. **Planting –** The act of putting seeds or plants into the ground with the knowledge that they will become carbon sinks.
True or **false**: Windowsill herb gardens are so small that they do not make a difference when it comes to reducing our carbon footprint.
    - By not purchasing herbs at the store, you cut transportation emissions, both from farm to store and your home to the store. You also reduce greenhouse gases associated with pesticides and fertilizers used to grow the herbs.

30. **Renewable Energy –** Energy that can be replaced at rate similar to consumption.
True or false**:** Renewable energy growth surpassed fossil fuel growth.
    - This is primarily due to growth in solar in China, but also cost reductions and policy changes.

31. **Refuse, Reuse, Reduce, Recycle -** Four ways to decrease the amount of waste you produce, otherwise known as "The 4 R's."
True or **false:** Recycling is the best thing you can do to decrease your waste.
    - There is a reason that recycling is the last of the 4 R's. All material items have a long list of associated waste. Example: When you buy a soda, or any other drink, there are emissions associated with the production of the bottle, emissions from growing the

ingredients used to make the soda and emissions from shipping. The best thing you can do with waste is not create it to begin with.

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