Hands-On Humanities: Teaching Climate through Games, Role-Plays, and Simulations
Hello!

We are Laney and Natalie

a researcher-teacher partnership with a passion for climate education
1. Carbon Cycle Theater

Let’s start with the first set of slides
How can we get more carbon into the soil?
2. Molecule Models

Greenhouse gases that make you smile
How do greenhouse gases warm the earth?

When energy hits a greenhouse gas molecule, the flexible bonds between carbon and oxygen begin to jiggle. As it jiggles, it may bounce into other molecules, causing them to jiggle, as well, warming the atmosphere.
# How To Make Model Molecules

## Materials

- Seven tennis balls
- Two saw blades
- Four chopsticks
- Spray paint
- Electrical tape
- Utility knife

## Carbon Dioxide

Wrap the saw blades in electrical tape. Cut a one-inch slit in two of the tennis balls. Push the end of one blade through each slit. Cut two one-inch slits on opposite sides of a third tennis ball. Slide one blade into each slit.

## Oxygen and Nitrogen

Wrap one set of chopsticks in electrical tape. Take the second set of chopsticks and cut them shorter, then wrap with electrical tape. Cut small holes in each of four tennis balls. Poke one set of chopsticks into two balls; poke the other set into the last two balls. Spray paint balls and chopsticks.
3. **Thingamabob Game**

Complex economics wrapped in chocolate
Global Averages of Carbon Dioxide
<table>
<thead>
<tr>
<th>Company</th>
<th>Capital 1</th>
<th>Production 1</th>
<th>Capital 2</th>
<th>Production 2</th>
<th>Capital 3</th>
<th>Production 3</th>
<th>Capital 4</th>
<th>Production 4</th>
<th>Capital 5</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>$1000</td>
<td>1000</td>
<td>2000</td>
<td>1000</td>
<td>3000</td>
<td>3000</td>
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<tr>
<td>2</td>
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<td>2000</td>
<td>2000</td>
<td>4000</td>
<td>4000</td>
<td>8000</td>
<td>8000</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$1000</td>
<td>1000</td>
<td>2000</td>
<td>800</td>
<td>2800</td>
<td>2000</td>
<td>4800</td>
<td>4800</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$1000</td>
<td>250</td>
<td>1250</td>
<td>250</td>
<td>1500</td>
<td>250</td>
<td>1750</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$1000</td>
<td>250</td>
<td>1250</td>
<td>250</td>
<td>1500</td>
<td>500</td>
<td>2000</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$1000</td>
<td>1000</td>
<td>1100</td>
<td>900</td>
<td>2000</td>
<td>300</td>
<td>2300</td>
<td>0</td>
<td></td>
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<tr>
<td>Production total</td>
<td>3,600</td>
<td>5200</td>
<td>10,050</td>
<td>16100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CO2 ppm</td>
<td>7</td>
<td>10</td>
<td>20</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380 ppm</td>
<td>387</td>
<td>397</td>
<td>417</td>
<td>449</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
Discussion Questions

#1 Why did you destroy the Earth?

#2 Describe what went on in your group. What pressures did you feel?

#3 What prevented you from being more ecologically oriented?

#4 How does the game resemble real life? What was unrealistic about the game?

#5 Is the game “rigged”? Could the rules be changed in ways that would not lead to climate ruin?

#6 Invent a new set of rules for the “game” that would not lead to environmental destruction. What different behaviors could be rewarded?
Create a free account to access role plays and simulations like the Climate Change Mixer, Thingamabob Game, and Climate Trial
4. Climate Trial

Who’s to blame?
The Indictment

You are charged with the destruction of cultures, species, and putting at risk the lives of countless millions of people around the world. But your crime is also about the future. You are destroying the lives of people throughout the world who are alive today. And you are destroying the lives of people throughout the world who are yet to be born.
The Defendants

US Government
Until 2007, the United States was the leading emitter of greenhouse gases, and is still the largest emitter per capita in the world.

US Consumers
The United States has about 5% of the world’s population, but consumes more than 25% of its resources and creates more than 25% of its waste.

China, India, and Friends
China burns more coal every year than the United States, Japan, and the European Union combined.

Oil and Coal Companies
In 2013, the top five oil companies made $93 billion. That is $254 million every single day.

The Market Economy
The benefits from a carbon-based economy are accrued privately, but the costs are borne by (mostly poor) people around the world.
Discussion Questions

What were the most effective arguments?
Were there any “innocent” groups?
Were there any groups whose guilt was directly connected to other groups?
Are there any groups that were not indicted that should have been included?
How much responsibility does the Global Capitalist system hold for the climate crisis?
What would restorative justice look like for these “convicts”?
5. **Outdoor Games and Garden Activities**

Engage the Body,
Engage the Mind!
Outdoor Garden Activities

- Greenhouse effect lab
- Compost pile activity
- Soil sampling (for Carbon and water holding capacity)
- Greenhouse gas “Freeze Tag”
- Temperature measurement lab
- Plant-based diet cooking demo
- Climate resilience assessment
Teaching Standards: Using Climate Education To Boost Student Achievement
More than 80% of parents in the U.S. support teaching climate change.

More than 86% of teachers agree.
Dear Parent,

I am writing with an update about your child’s [math/science/humanities/general] curriculum at XXX School for this coming academic year. This year, we will be covering the topic of climate change in more depth, and in an interdisciplinary, standards-based fashion in both math and social studies [or other subject(s)]. Our goal is to prepare students as well as possible to understand and engage with the most important challenges facing our society, and climate change is certainly one of them. [Other topics we will be covering include…..]

We will present students with the most current, scientifically accurate information available, and will involve local scientists/citizens in our curriculum to provide local context and relevance to the issue. The focus will be on both the problem itself, causes and effects of climate change, as well as monitoring efforts and solutions. We aim to make this a positive and empowering learning experience involving field trips, guest speakers, and hands-on, experiential learning projects, culminating in a [school or grade-wide] community action and service learning project. This will provide an excellent opportunity for authentic learning and assessment. The standards we will cover include [LIST].
### Summary of Americans’ Views on Global Warming

<table>
<thead>
<tr>
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<th>2001-2014 (average)</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td>Say most scientists believe</td>
<td>60%</td>
<td>62%</td>
<td>65%</td>
<td>71%</td>
</tr>
<tr>
<td>global warming is occurring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Believe global warming is caused</td>
<td>57%</td>
<td>55%</td>
<td>65%</td>
<td>68%</td>
</tr>
<tr>
<td>by human activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Believe effects of global warming</td>
<td>54%</td>
<td>55%</td>
<td>59%</td>
<td>62%</td>
</tr>
<tr>
<td>have already begun</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worry a great deal about</td>
<td>32%</td>
<td>32%</td>
<td>37%</td>
<td>45%</td>
</tr>
<tr>
<td>global warming</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Think global warming will pose a</td>
<td>35%</td>
<td>37%</td>
<td>41%</td>
<td>42%</td>
</tr>
<tr>
<td>serious threat in their lifetime</td>
<td></td>
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</tbody>
</table>

All polls conducted in March

**GALLUP**
Yale Climate Opinion Map
## Integrating Climate into your Standards

### Science
- Earth Systems
- Human impacts on Earth’s systems
- Weather and climate
- Cause and effect
- Developing and using models

### Social Studies
- Inquiry
- Geography
- History
- Economics
- Civics
- Taking Action

### Language Arts
- Reading fiction
- Reading nonfiction
- Informational writing
- Persuasive writing
Next Generation
Science Standards
Climate change included in US science teaching guidelines for the first time

Final draft of nonbinding education standards ‘buries’ human role but gives cohesion in introducing students to climate science

ESS3D: Global Climate Change

- MS-ESS3-5 Evidence Statements
- HS-ESS3-6 Evidence Statements
- HS-ESS3-5 Evidence Statements
- HS ESS3 Evidence Statements

*The final standards are much more vague about the causes of climate change. Photograph: Kevin Schmidt/CORBIS*
C3 Framework
For Social Studies State Standards
Now more than ever, students need the intellectual power to recognize societal problems; ask good questions and develop robust investigations into them; consider possible solutions and consequences; separate evidence-based claims from parochial opinions; and communicate and act upon what they learned. And most importantly, they must possess the capability and commitment to repeat the process as long as is necessary. (National Council of Social Studies 2017)
### Civics
- Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governmental and nongovernmental contexts
- Assess specific rules and laws (both actual and proposed) as means of addressing public problems

### Economics
- Explain how economic decisions affect the well-being of individuals, businesses, and society
- Evaluate alternative approaches or solutions to current economic issues in terms of benefits and costs for different groups and society as a whole

### Geography
- Explain how cultural patterns and economic decisions influence environments and the daily lives of people in both nearby and distant places
- Evaluate the influences of long-term human-induced environmental change on spatial patterns of conflict and cooperation
Common Core

Your climate education friend in disguise!
Teachers must instruct students in three genres

- Persuasive writing
- Informational writing
- Narrative writing

Why not make climate change the topic for any of these tasks?
Teachers must instruct students in
- Informational articles
- Novels
- Poetry
- Drama/screenplays

Why not make climate change the topic for any of these tasks?