VR EcoHack 2017

Educating Climate Change thru Immersive Media: Lesson Objectives

Your Mission: *Demonstrate the impact of climate change using VR, AR, or 360 video in a compelling, factual and immersive way. Focus on reaching young people ages 8-22. Use hands-on activities, games and/or stories to make a strong narrative as to why climate change is a critical issue to address and how it impacts our world.*

You can do so through a game, an experience, an app, a news story, building scenarios with feedback, a narrative, or documentary piece- or anything else you can think of inside of VR, AR, and 360 video! Be sure to add in the ***media literacy component*** *to get extra points and qualify for a special media literacy award!*

Lesson One: Local Impact & Resiliency

Theme: ***Too Much or Too Little***

The Problem: Boston is going to be faced with sea level rise and drought. What happens in the future if there's too much or too little water? Demonstrate the consequences of sea level rise and/or drought. (Other specific locations would be allowed, for example South Florida, New Orleans, your home town/country, etc.?)

Questions to Consider while Formulating your Project

- How can we demonstrate the impact of climate change on local communities in Boston? How could resiliency help these communities?
- What are the physical, social and environmental impacts of climate change on low-income and underserved communities?
- How does the filling in of wetlands impact urban areas?
- How does sea level rise impact the economy, culture, environment and neighborhood resiliency in Boston?
- What unexpected effects could drought have on the city of Boston?
    - Many buildings in Boston were built upon wooden pilings that were sunk deep into the ground, and these remain stable as long as they remain immersed in water. When significant droughts occur, the groundwater beneath the city

decreases and these wooden pilings can become exposed to air and begin to rot. This became a concern last August during the severe drought that affected Boston, much of Massachusetts, and communities throughout the Northeast.
    - Resources:
        - http://beaconhilltimes.com/2016/08/22/drought-lowers-ground-water-table-causing-concern-for-underground-wood-pilings/
        - http://www.nbcboston.com/news/local/Drought-Exposes-Risk-Under-Boston-391208001.html
        - http://www.wbur.org/morningedition/2016/10/31/drought-back-bay
- How does the *urban heat island effect* influence Boston? What could be done to help mitigate it's effects?
    - https://www.epa.gov/heat-islands

Lesson Plan for Background Information or To Build Upon:
http://serc.carleton.edu/earthlabs/drought/index.html

Define an example: Describe the impact of climate change in the community of Chelsea.

Web sites for data and resources:
NOAA story on Chelsea's climate change plan
MAPC Regional Climate Change Strategy
NASA Climate Change Evidence
MAPC Map of State Projects
Mass Audubon
EPA report: What Climate Change Means for Massachusetts
Massachusetts Climate Change Adaptation Report

Lesson Two: Humans & Carbon

The Problem:

- Human actions contribute CO2 and greenhouse gases to the atmosphere, but it's incredibly hard to track that impact or to change human behaviors to limit emissions. How can humans understand how to mitigate their behavior to reduce our overall carbon footprint?

Questions to Consider while Formulating your Project

- How does carbon dioxide impact climate change and how can we demonstrate these negative impacts of carbon dioxide in the environment?
- How do we measure and take action about reducing our carbon footprint?
- What are the causes and how can humans make personal changes that will reduce carbon emissions?
- How does the production, recycling and charging of electronics or creation of plastics, for example, impact carbon emissions?
- Can items like plastic be made from alternative products and if so, how could this slow climate change?

Lesson Plan for Background Information or To Build Upon:
http://cleanet.org/clean/literacy/esi/index.html

Lesson Three: Biodiversity

How does the change in weather patterns, temperature rise and ice sheets/sea ice melting affect coral reefs, penguins, polar bears, infectious diseases, and ultimately, humans etc.?

Examples: Polar bear and penguin extinction, increase in mosquitoes leads to spread of infectious diseases like Zika and malaria, acidification and bleaching of coral reefs, etc.

Web sites for data and resources:

NOAA: http://www.noaa.gov/climate

IPCC: http://www.ipcc.ch/

Lesson Four: Hard Nuts to Crack in Understanding Climate Change
Theme: Feedback loops

The Problem: Feedback loops are processes that build upon themselves similar to a snowball rolling down a hill. Understanding feedbacks is key to understanding climate change, but feedbacks are hard to conceptualize or visualize because they can happen over extended periods of time or at large scales.
Examples:

The **albedo effect** is an example of a feedback loop whereby dark surfaces absorb more heat than light colored surfaces (think of wearing a white vs. black t-shirt when out in the summer sun). This is part of the reason why scientists are so worried about polar ice caps melting - as there is less ice to reflect the sun's heat and more open, dark blue water to absorb heat - the temperature of the water will rise.

You might consider "**going green**" as another example of a feedback loop - as activities like recycling, buying local, and not drinking bottled water become social norms, there is more social pressure to make personal decisions that are environmentally friendly.

Questions to consider:

- What might a feedback loop look like if I could see it happening in time lapse animation?
- How might watching a feedback loop play out help people to understand how their actions may help or hurt the environment?

Lesson Plan for Background Information or To Build Upon:

- Understanding Albedo - from Climate Literacy and Energy Awareness Network (CLEAN)
- Interactions and Feedback - Ice Albedo Feedback from the EarthLabs
- Bill Nye explains a number of the complexities of climate change including the albedo effect (around 3:50)
- Examples of feedback loops that contribute to climate change:
    - 19 ways climate change is now feeding itself
    - Climate Change Feedback on Wikipedia

Bonus: Media Literacy Award

One important piece of climate change and teaching the next generation is training students how to think critically about all media sources and data.

How could a media literacy component be added into your immersive curriculum to challenge students to think more critically about the news, stories, facts, science and media messages they see about climate change?

Ideas for Critical Media Literacy Questions to Add to your Project
(pick at least three to qualify for the Media Literacy Award)

Construction & Deconstruction

What happens in the narrative to engage the audience?
How does this narrative make the work "matter" to the public? To teachers? To youth?
What tools of persuasion/evidence are used to encourage us to believe the truth of this text?
Do you see people like you in the content?
Who is invited to be concerned about the future of this planet?

Audience

How do we evaluate this data?
What tools of persuasion are un/convincing to us, encouraging us to dis/believe the data?
How is the work presented to the public?

Industry & Context

Who is in charge of producing and distributing this work?
What are their goals and motivations?
Who funded the work? Why?

Production & Distribution

If we were invited to produce work like this, what tools and techniques could we use to do it thoughtfully, drawing on evidence?

Resources & Links

- Turbosquid
- Unity Asset Store
- Sketchup