DESIGNING FUTURE CITIES

THE IMPORTANCE OF SUSTAINABLE AND RENEWABLE ENERGY

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HOPE STATEMENT

Our goal for this lesson is to inspire students to learn more about creative sustainability practices. The lessons and assessments focus on student-centred research projects into sustainable resources and technologies aimed at addressing climate change in the cities of the future.

LEARNING OBJECTIVES

A 1.1

Apply a scientific research process and associated skills to conduct investigations, making connections between their research and the scientific concepts they are learning.

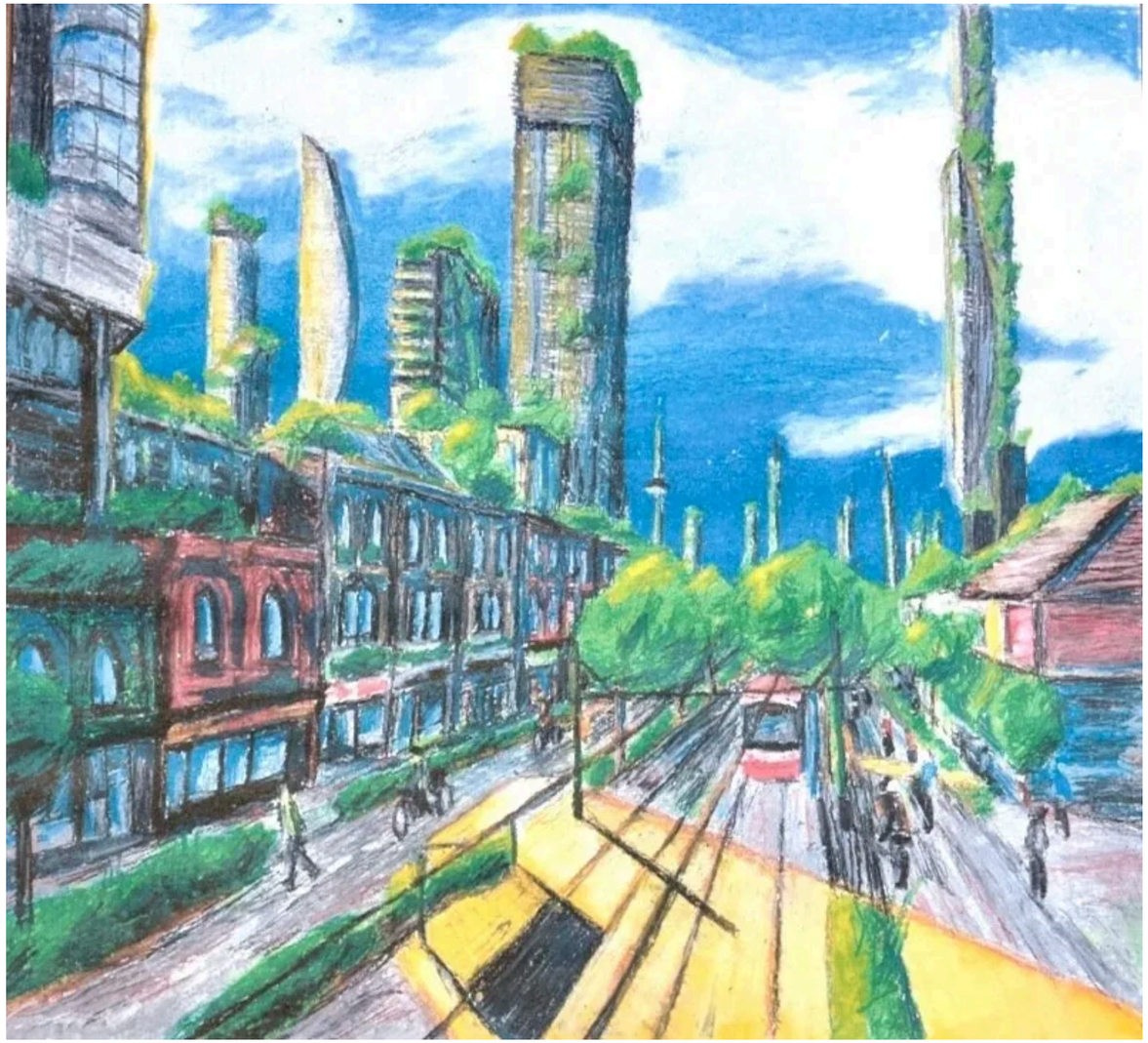
B 1.1

Assess impacts of climate change on the sustainability of local and global ecosystems, describe local or global initiatives for combating climate change, and identify solutions to address some of the impacts.

YOUTH IMAGINE THE FUTURE

A festival of writing & art

- Encourages youth to research the climate crisis, finding solutions that aim to create a better ecological and social future.
- Amplifies the voices of youth regarding their concerns about the natural world and social equity issues.
- Builds community among those who share the same concerns for our environment.
- Helps address increasing climate anxiety among youth.
- Fosters individuality, creativity and climate literacy.



Pictured above is a futuristic depiction of Spadina Avenue in 2045. Created with pastels, this artwork incorporates environmentally sustainable technologies into local cities.

***Spadina Ave* by Matthew Hennessy**

What are your thoughts on this artwork?

How does it relate to climate change?

Pictured above is a portrait of individuals from different cultures and communities, sharing in a peaceful and inclusive society. In the background, different renewable and sustainable energy technologies are displayed, representing how clean technologies play a foundational role in future societies.

***HOPE LIES AHEAD* by Rhea Hollingsworth**

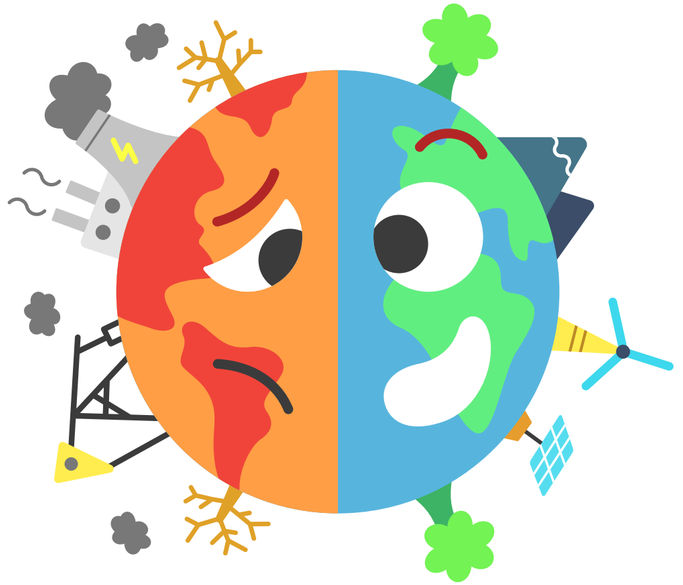
What are your thoughts on this artwork?

How does it relate to climate change?

CLIMATE CHANGE AND SUSTAINABILITY

Climate change refers to “long-term shifts in temperatures and weather patterns” (United Nations).

Human activities largely contribute to climate change, including burning fossil fuels such as coal, oil, and gas.



EFFECTS OF CLIMATE CHANGE

How have you noticed or experienced the effects of climate change?

DROUGHTS

Increase in Droughts, or lack of water and rainfall in certain areas

WATER SCARCITY

A lack of water supply in regards to the demand for water

FIRES

Increase in the frequency and severity of wild fires

RISING SEA LEVELS

Increase in the frequency and severity of flooding, especially along coastlines

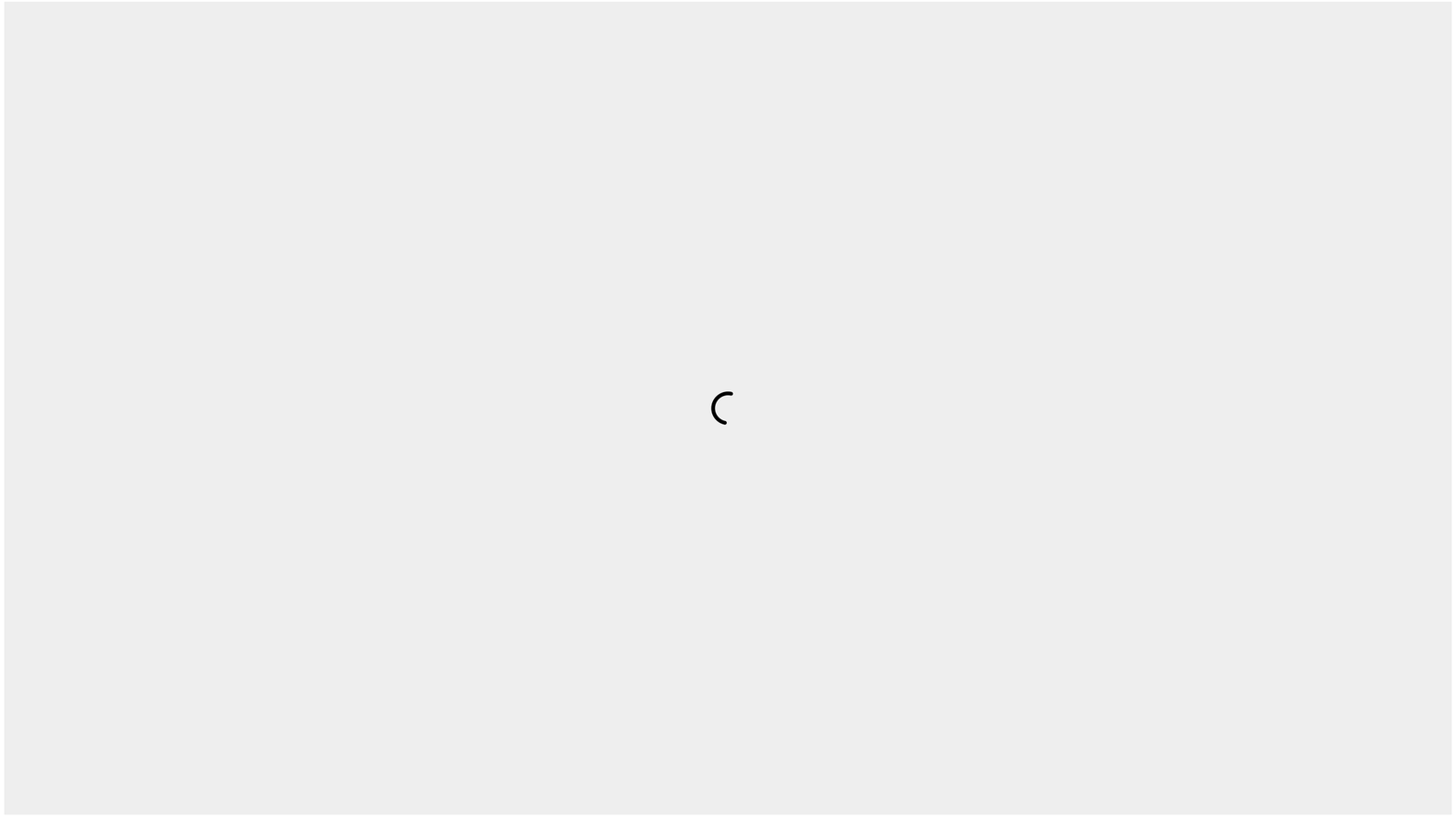
MELTING ICE CAPS

Loss of Arctic ice caps, leading to rising sea levels

SEVERE STROMS

Increase in the frequency and severity of natural disasters such as hurricanes

YOUTUBE VIDEO ON CLIMATE CHANGE

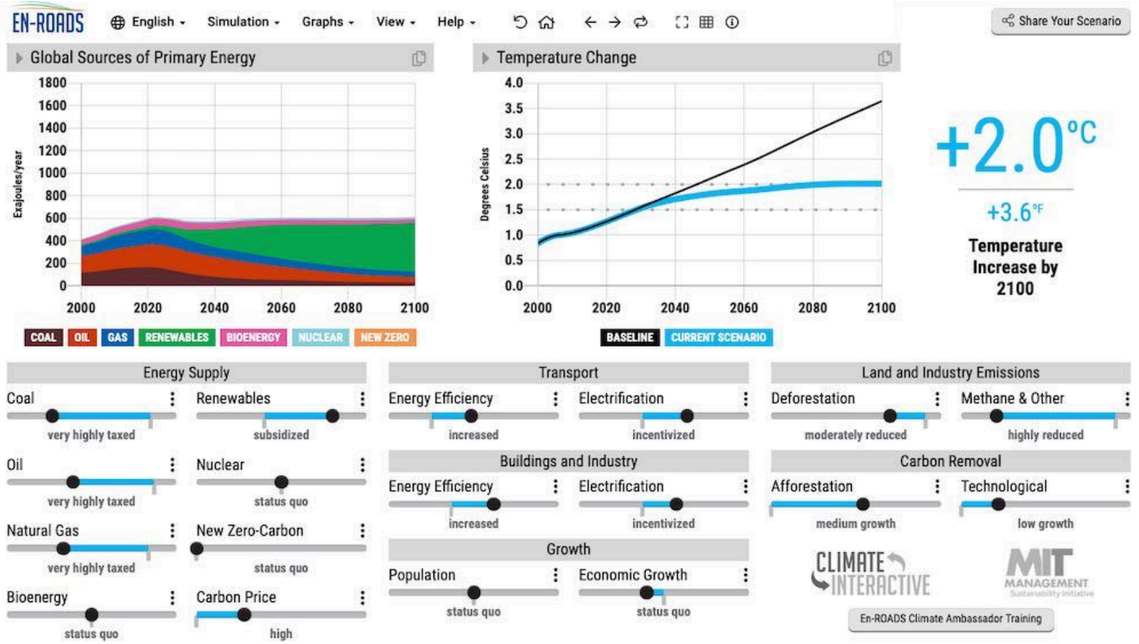


En-ROADS

Link to En-Roads

How these technologies effect net GHG emissions:

- Using the sliders available in En-ROADS, take a look at which factors may raise or lower GHG emissions.
- What happens to GHG emissions if we greatly increase our energy efficiency?
- What happens when we pair this with greatly reducing deforestation? Why?



TYPES OF RENEWABLE ENERGY SOLUTIONS

Renewable energy is important because it emits minimal greenhouse gases that contribute to climate change and global warming.

Renewable energy comes from clean energy sources, including the sun, water, and wind.

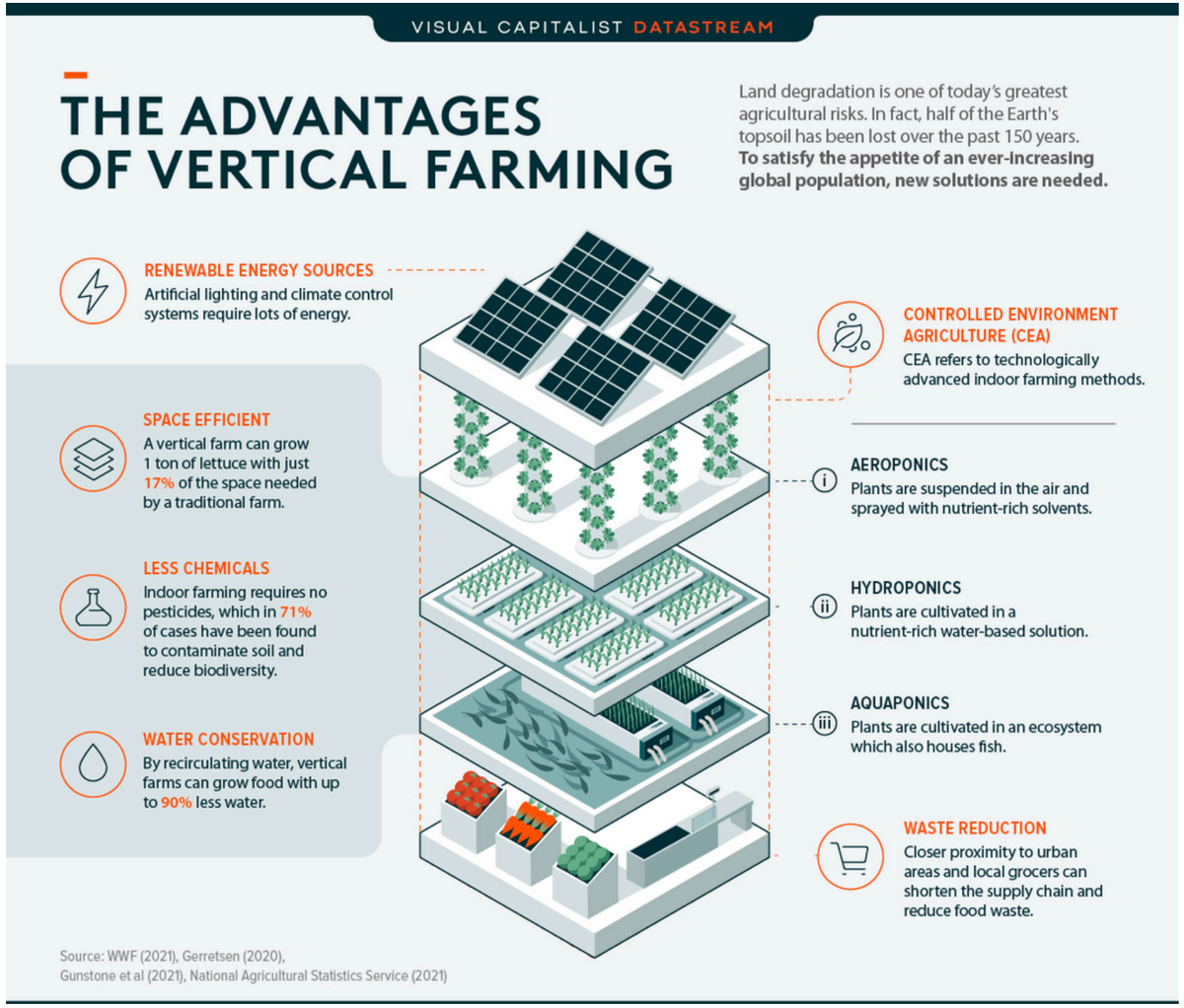
- SOLAR POWER SYSTEMS
- WIND TURBINES
- HYDROPOWER SOLUTIONS
- BATTERY STORAGE SYSTEMS

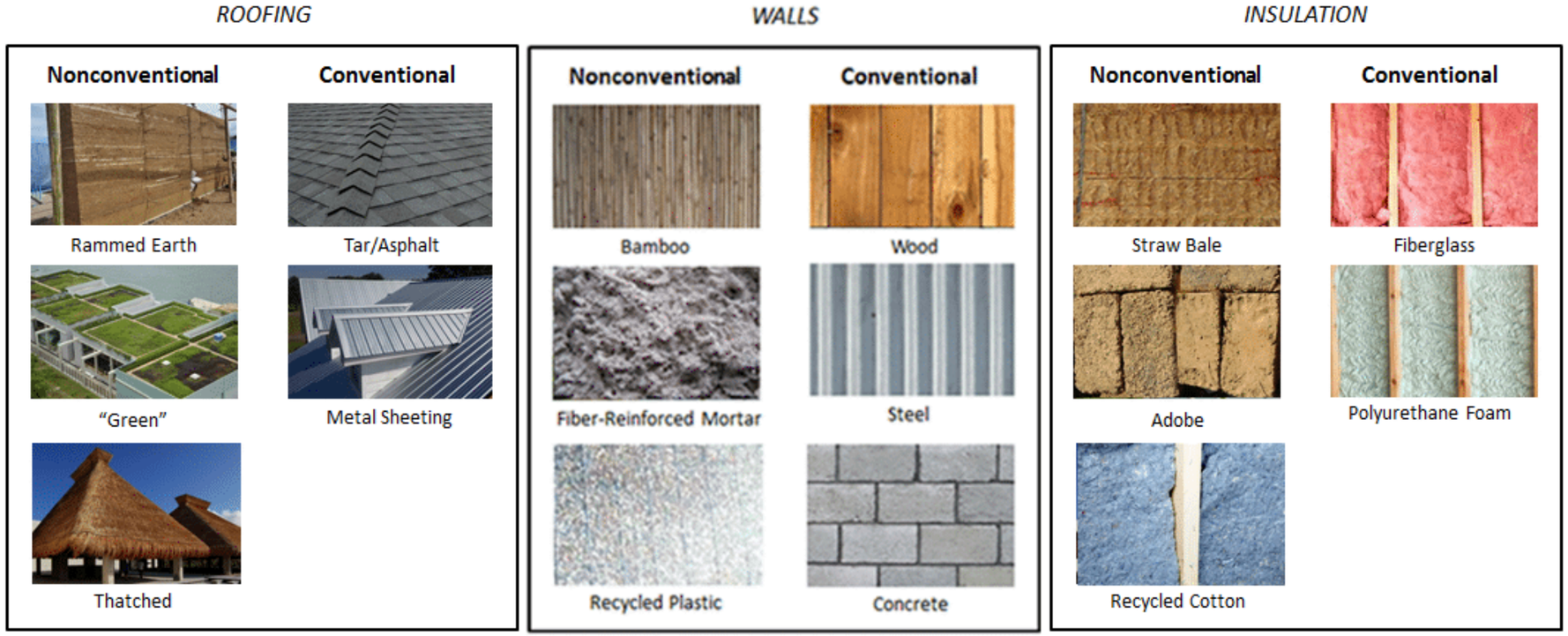
Global Initiatives

- Globally, different organizations and countries have begun implementing renewable energy sources into their communities.
- These global initiatives to incorporate renewable energy are important because they raise awareness of the impacts of climate change and create positive change in local and global communities.

VERTICAL FARMING

- Space efficient
- Uses fewer chemicals
- Uses less water
- Reduces land degradation and pesticides that contaminate soil and limit biodiversity



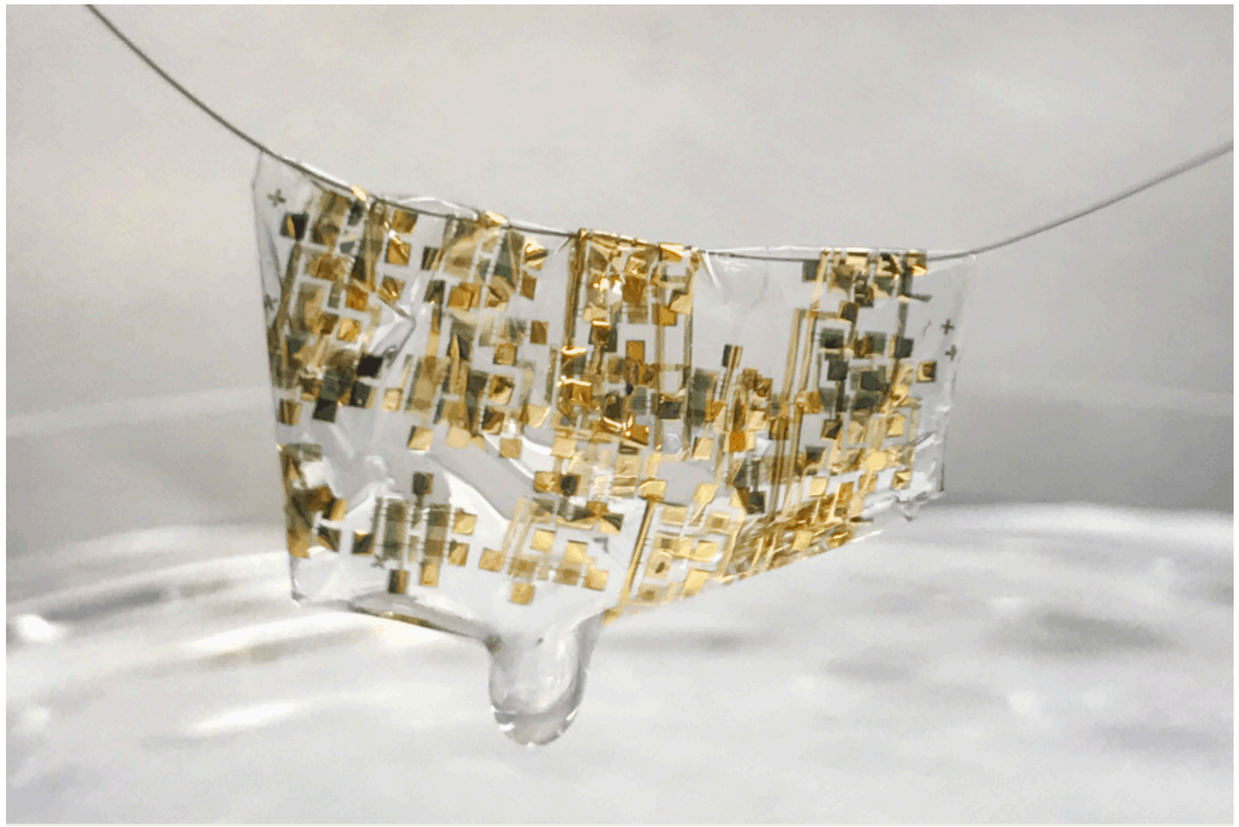


GREEN CONSTRUCTION

- Create buildings that are both environmentally friendly and resource-efficient
- Use eco-friendly building materials
- Material: recycled or reclaimed materials, sustainability harvested timber, concrete alternatives that absorb carbon dioxide.

BIOPLASTICS

- Reduce environmental footprint
- Alternative to traditional petroleum-based plastics
- Made from renewable sources like corn starch or sugar cane
- Biodegradable
- Reduce pollution and waste
- Less energy to produce than traditional methods



ASSIGNMENT DETAILS

- Imagine you are serving on a city planning committee for your class's city of the future.
- The mayor has hired you to work in groups to make sure that your city reduces the emission of greenhouse gas into the atmosphere.
- Each group will focus on a sustainable practice or technology that they believe their mayor, and their city, should invest in from one of these four sectors: 1) energy, 2) transportation, 3) carbon dioxide removal, and 4) building and industry.
- You and your group will pitch your solution and investment opportunity to the mayor, who will decide if this practice will be introduced into the city.

ASSIGNMENT INSTRUCTIONS

1. Choose one technology, solution or practice within your sector (from the 4 sectors listed above), and create a “pitch” using slides.
2. Research your technology. How does it work? How much is it? How does it reduce GHGs? How will it affect local human residents?
3. Identify both pros and cons of this technology.
4. Provide an image of your technology.
5. Present your findings in a 3-5 minute presentation that is visually appealing, informative, and well delivered.

ASSESSMENT CRITERIA

1. The pitch reflects accurate research and understanding of how technology reduces GHG emissions.
2. Both the pros and cons (benefits and drawbacks) of the technology are described and analyzed in the pitch.
3. The impact of the technology on humans who are resident in the area is explained.
4. The photo of the technology in the pitch is relevant.
5. The presentation is well prepared and delivered in 3-5 minutes by group members.

THANK YOU