



Mitigation or Adaptation?

Climate Solutions Card Sort: Teacher Key

Adaptation cards:

Studying Crops: Researchers in India study what happens to crops when CO₂ levels are higher to help farmers grow food as the climate continues to change.

Explanation: You might think that increasing the amount of CO₂ in the atmosphere would be good for plants, but often one change in the Earth system leads to other changes that can actually decrease plant growth and thus reduce crop yield. For example, changes in the amount or frequency of rain (drought or flooding) can make it harder for plants to grow. Researchers are coming up with different strategies, including altering plant genetics and cultivation techniques, to find ways to ensure that crop yields can meet the demand for food.

Raising Homes: People who live on the coast in Louisiana are building homes on stilts to keep them from flooding as sea levels rise and hurricanes become stronger.

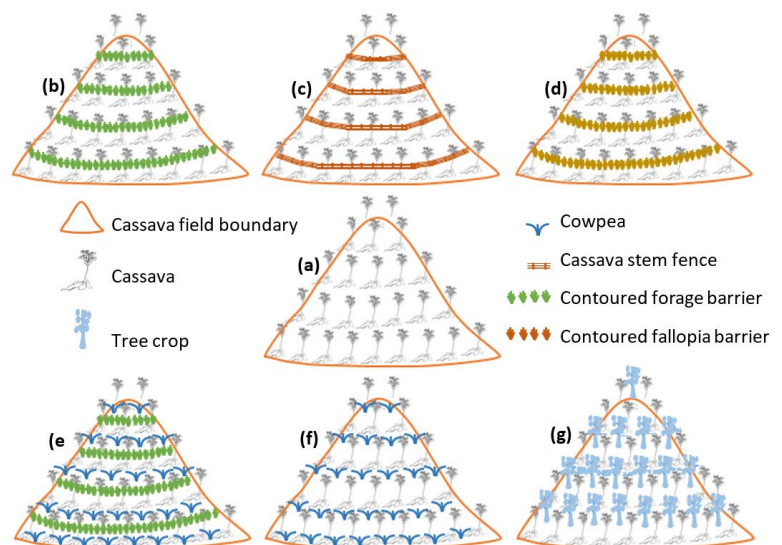
Explanation: Louisiana loses about a football field worth of land every hour due to subsidence (which is caused by the natural settling of land and a slowing in the rate of new land formation through sedimentation) coupled with sea level rise. Hurricanes in the Gulf Coast region are becoming more severe, bringing more storm surge. Some communities are planning to relocate, while others are adapting by building homes to withstand these changing conditions.

Planning Evacuation Routes: In places where hurricanes are becoming more dangerous, communities plan ways to keep people safe, such as creating evacuation routes and setting up shelters.

Explanation: Since establishing evacuation routes and enhanced safety practices during hurricanes, communities report that more citizens can safely evacuate in advance of dangerous storms. Communities often have funds set aside to handle costs associated with storm management and recovery.

Planting in New Ways: Farmers in Vietnam are fighting food shortages by planting cassava between rows of different crops across the hillsides. This makes the soil healthier and increases the amount of food they can grow.

Explanation: For many years, cassava was planted intensively as a monocrop, which led to soil depletion and deforestation. More recently, farmers in Vietnam have been planting cassava along with other crops and trees in different configurations (see diagram to the right), which has helped decrease soil erosion and return nutrients to the soil to sustain production, even as the climate changes.



Illustrations of cassava-related management practices. Source: Bui et al., 2020



Mitigation or Adaptation?

Climate Solutions Card Sort: Teacher Key

Mitigation Cards:

Eating Plant-rich Diets: Eating less meat means less land needs to be cleared for grazing. Plant-rich diets also help to reduce greenhouse gas emissions and are healthier too!

Explanation: More people can be fed using less land and less carbon-emitting fertilizers when a plant-rich diet is followed. Cattle burp methane, which is a greenhouse gas. Chronic diseases associated with high-meat diets account for \$1 trillion in global health care costs annually.

Switching to Renewable Energy: Using solar panels to collect energy from the Sun instead of burning coal and natural gas for electricity reduces the amount of carbon dioxide emissions that enter the atmosphere.

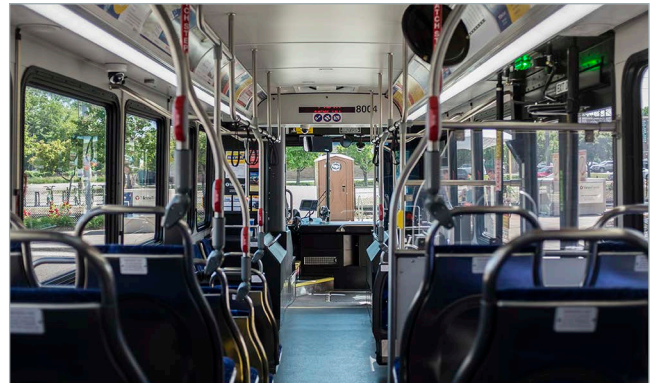
Explanation: Burning coal and natural gas for electricity account for 25% of carbon dioxide emissions. Switching to renewable energy sources (solar, wind, hydro, geothermal, or nuclear) to power industry, buildings, and homes will have a significant impact in reducing carbon emissions.

Using Less Energy at Home: Setting the thermostat to keep your house a little bit cooler in the winter and a little bit warmer in the summer will use less electricity. Most electricity comes from burning fossil fuels.

Explanation: Regulating the temperature of buildings, offices, and homes can help to reduce energy demand. Smart thermostats can be programmed so that your home uses less energy when everyone is away. Proper insulation and using energy-efficient appliances also reduce energy usage at home.

Using Public Transportation: Including public transportation, such as buses, subways, and high-speed trains, in city planning cuts down on the need for individual cars. Some public transit is powered by clean energy, too.

Explanation: City planning that includes adequate public transportation for the population size of an area can greatly reduce carbon dioxide emissions by decreasing the number of personal cars on the roads. Some cities also use biofuel, natural gas, or even electric-powered mass transit, which reduces the amount of CO₂ added to the atmosphere.





Mitigation or Adaptation?

Climate Solutions Card Sort: Teacher Key

Both:

Establishing Urban Forests: Planting trees and green roofs in cities helps cool the Earth's surface by creating shade and also removes CO₂ from the atmosphere.

Explanation: Cooling is an adaptation to increasing temperatures, especially in cities that experience urban heat island effects. But removing carbon dioxide from the atmosphere as a result of photosynthesis also helps to mitigate carbon emissions.

Planting Rain Gardens: In Vermont, where climate change is expected to bring a lot more rain, people are building rain gardens to manage stormwater that causes flooding. Rain gardens also reduce pollution from runoff.

Explanation: In the Northeastern US, climate models predict an increase in the amount of rainfall in the coming years. Areas with parking lots, roads, and impervious surfaces experience flooding that carries pollutants into waterways. Rain gardens contain plants that can tolerate high water levels and the nutrients in the runoff. The ground cover helps to reduce soil erosion and removes CO₂ from the atmosphere.

Educating Girls: 130 million girls in the world today cannot go to school. Educating girls helps them learn skills to deal with the changing climate. On average, in places where all of the youth have more education, family sizes are smaller. This can help to slow down population growth, which helps the climate.

Explanation: Improving the lives of women through education allows them to take a more active role in the economy, their communities, their families, and even in climate actions. Reducing population size is an important step towards reducing carbon emissions. Educating girls allows them to practice family planning that improves their health and that of the planet.