

Climate Change: Research Questions

Picture a city of today. How is climate change affecting it? Are the storms worse than usual, are the summers hotter and drier than they used to be, or are there other changes?

Now picture that same city at least 100 years in the future. What might the effects of climate change be? What actions will the city need to take today to withstand and lessen the impact of climate change in the future?

For the competition, your team will choose a climate change impact facing a city today and design a futuristic climate change adaptation and mitigation to keep your future city residents healthy and safe. Below you will find some information and questions to help start your research.

Climate Change and Its Impact

The term “climate change” describes the long-term shifts in weather patterns that are occurring all over the world. The main cause of climate change is global warming, a phenomenon in which greenhouse gas emissions trap the sun’s heat and cause temperatures to rise. Burning fossil fuels—oil, coal, gas—is the main source of greenhouse gas emissions but not the only one. Cutting down forests, landfills, and conventional farming methods are other contributors.

Climate change is causing a wide range of impacts beyond warming the planet: flooding, mass extinctions, freshwater scarcity, severe storms and fires, and more pandemics are all a result of climate change.



What is Climate Change Adaptation and Mitigation?

While climate change is unavoidable, there are many things we can do to ensure our future cities are livable and their residents are healthy and safe. Two approaches are:

1. Climate Change Mitigation—Mitigation focuses on lowering the amount of heat-trapping greenhouse gases in the atmosphere by:

- Reducing carbon sources. Sources include burning fossil fuels for cars, trucks, planes, electricity, heat, and more.
- Enhancing and protecting carbon sinks. Sinks are anything that absorbs more carbon from the atmosphere than it releases. Our biggest natural sinks are oceans, forests, and soil.

Mitigation can be achieved by using new technologies and renewable energy sources, improving energy efficiencies, designing and scaling effective carbon capture technology, and changing how we produce goods and services.

2. Climate Change Adaptation—Adaptation is about adjusting to climate impacts by reducing our vulnerability to its harmful impacts, like developing green infrastructure projects such as rain gardens and doing regular storm drain cleaning to protect against flooding from more intense storms.

Adaptative solutions vary from place to place and involve many trade-offs, including cost, cultural and historical significance, balancing the needs of other pressing problems, and addressing competing demands for action from many different groups (businesses, tourism, and vulnerable populations). No matter what challenges a city faces, adapting to climate change also presents new opportunities to design solutions that address more than one problem.

An example of this is the city of Alcaldía de Medellín in Colombia. It has both high temperatures and very high rates of unemployment. The city hired and trained people from disadvantaged backgrounds to plant and tend 358,000 shrubs and trees. This program cooled the city by up to 3°Celsius, reduced crime, and improved public health.

Watch this video: Adaptation and Mitigation | Climate Wisconsin

Climate Change Research Questions

Before you start to design your future city, it is important to gain an understanding of climate change's impact on the cities of today.

- What is climate change?
- What are the causes of climate change?
- What problems is climate change causing in cities today?
- If a city made no changes to address climate change, what might life be like in this city 100 years from now?
- What climate change impact is most important for your city to manage?
- What infrastructure is vulnerable to changing weather patterns?
- Does climate change impact a city equally or are different areas of the city affected in different ways?
- Which populations are the most vulnerable to climate change in the city?
- How are today's cities adapting to climate change? What solutions are innovative or futuristic?
- Who is leading the efforts to implement climate change adaptation (for example politicians, environmentalists, business leaders, and/or insurance companies)? How are they making it happen in their city, including getting the resources to make the necessary changes?
- Cities face a lot of issues in addition to climate change. Are there opportunities to design climate change solutions that address other issues in a city?
- What mitigation strategies are today's cities exploring or using? How are they reducing carbon emissions? What are they doing to capture carbon?
- What mitigation strategies are being used in the city's infrastructure (beyond energy production) like in transportation, housing, parks, etc?
- What trade-offs do today's adaptation and mitigation strategies require?

What other questions do you have about climate change and how to adapt and mitigate its effects? Do some research on climate change; there are lots of good places to start on Future City's list of suggested research resources.

