Layers of Climate Change
Issues and Solutions from Sky to Sea

Earth is an interconnected system—changes in one part ripple throughout the world. Anthropogenic climate change throws that system out of balance and endangers biomes, livelihoods, and lives. As countries around the world work to lower carbon emissions and switch to renewable energy sources, scientists also are developing innovative ways to mitigate climate impacts. Read below to learn about some of the pressing problems the world faces and solutions in the works to help communities adapt. Scan the QR codes to learn more.

**ATMOSPHERE**
- Carbon dioxide (CO₂) warms the atmosphere
  - Foster natural ecosystems and innovative technologies that capture and sequester carbon
- Methane (CH₄), a greenhouse gas more potent than CO₂, is on the rise
  - Plug methane leaks in natural gas wells, storage, and pipelines
- Hurricanes and cyclones become stronger and more frequent
  - Integrate climate adaptation measures into coastal communities and infrastructure
- Shifts in the El Niño–Southern Oscillation (ENSO) endanger food security
  - Provide accessible Earth system data to smallholder farmers

**CLOUDS**
- Worsening drought conditions increase risk of wildfires
  - Develop new forest management strategies and wildfire hazard maps that account for shifting rainfall patterns
- Excessive deforestation harms biodiversity, heightens drought risks, and erodes soil faster
  - Cultivate forests sustainably, protect vulnerable forest ecosystems, and replant trees

**FORESTS**
- Melting glaciers raise sea levels, which threaten to flood coastal communities
  - Track changes in glacial extent with satellite data and share publicly to boost coastal resilience
- Urban heat islands disproportionately affect historically underserved communities
  - Create accessible and equitable urban green spaces to improve public health

**CITIES**
- Flood zones shift and expand, and infrastructure is outdated
  - Use green spaces and eco-friendly building materials in new urban construction to improve drainage
- Acidifying ocean waters imperil marine food webs, threatening fisheries
  - Implement sustainable fishing practices, monitor ocean pH, and cultivate acid-buffering coastal landscapes

**OCEAN**

Text by Kimberly M. S. Cartier
Illustration by Mary Heinrichs