

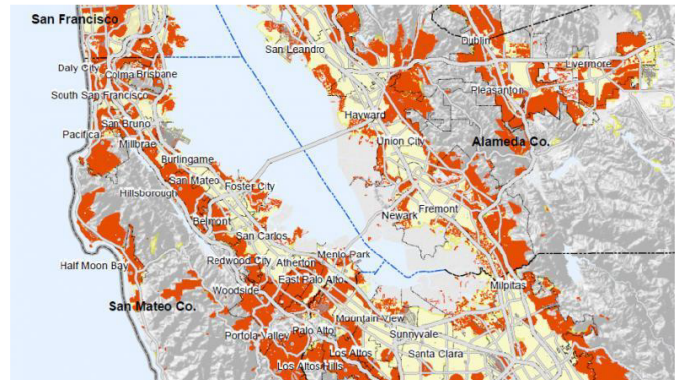
Scenario Six: Fire Prevention and Air Pollution

Core Problem

Your school is one of the many schools within the county that is susceptible to wildfires and air pollution caused by neighboring fires. Wildfires have become a common phenomenon in California due to the increase of dry weather and landscape, which is projected to increase due to the impacts of climate change.

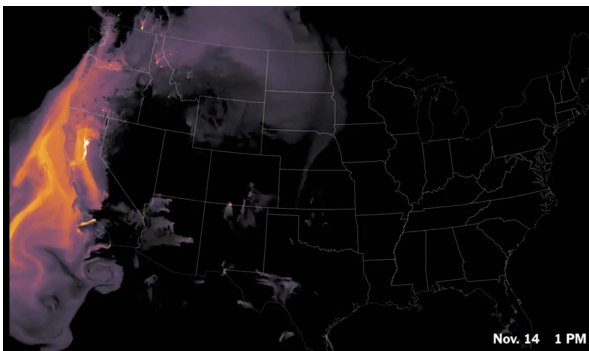
Background Information

A wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. Approximately 5% of the entire San Mateo County population lives in areas identified as very high severity zones, less than 1% of the total population lives in areas identified as high severity zones, and less than 1% of the population lives in moderate severity zones. In total, 5.8% (45,732 people) of the County's population lives in a wildfire risk area.

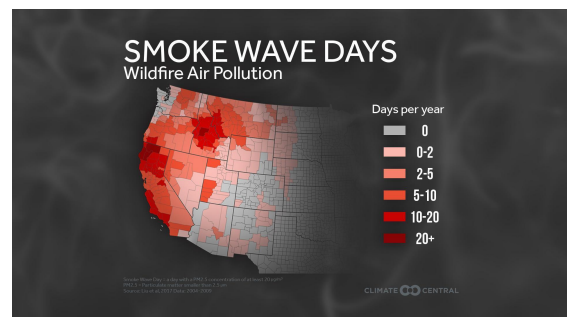


Fire Risk Map: Red areas of greatest risk span San Mateo County from bay side to coast side, impacting 15 cities and 5 towns

100% of San Mateo County lives in areas that are impacted by the severity of temporary poor air quality due to wildfires taking place throughout the state. Two examples in recent years were the 2017 fires in Sonoma County, and the Butte County Camp Fire in November 2018. In both cases thousands were displaced, homes, schools and businesses were destroyed, and there was harm to the cities, towns, and counties that are down wind. During the first week of November 2018, air pollution in San Mateo County reached unhealthy levels of health concern, ranging from 159 (unhealthy) to 212 (very unhealthy). All schools in San Mateo County were impacted, with the large majority having to shut down temporarily.

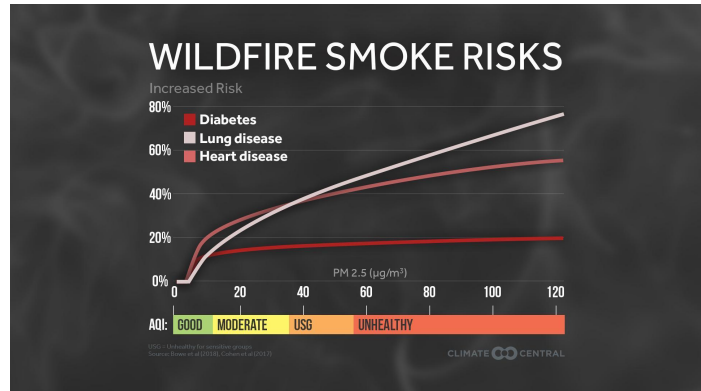


See video of smoke plume during Nov 2018 [here](#)



2018 wildfire smoke wave days

Fires increase particulate matter, also known as particle pollution or PM, a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. For example, air pollution caused by fires can result in an increase in asthma, chronic obstructive pulmonary disease (COPD), bronchitis, irritated eyes, etc. Children are more susceptible to air pollution as their respiratory systems are still developing, which requires them to breathe more air (and air pollution) per pound of body weight than adults.



Design Challenge: Adaptation Solutions

Your team has been asked by city engineers to design an infrastructure solution to dealing with **one** of the natural disasters: fire prevention or air pollution as a result of wildfires. Examples of infrastructure solutions to combat fires and air pollution include: improved air filters, fire resistant plants, etc. The solution should be focused on your school community, but could scale up to other parts of the city or residential neighborhoods if applicable.

This will be your first brainstorming session, and you have been asked to brainstorm ideas and then rapid prototype one of the ideas. It is recommended you use your time in the following way:

- Brainstorm Ideas: 5 minutes
- Make 2-3 ideas visible with a drawing: 10 minutes
- Create a 3D prototype: 15 minutes

Resources: [EPA: What is Particulate Matter](#); [Climate Ready - Preparing for Wildfire Convening - March 2019](#); [SMC Sheriff's Office Resources](#); [NPR: Trauma After The Fire](#); [Air Now: How Smoke From Fires Can Affect Your Health](#)