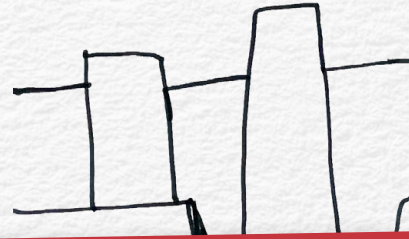# Hot! In the City

How does extreme heat impact New Yorkers?

On the same day in New York City, surface temperatures can sometimes vary between 20 degrees or more between different neighborhoods.

Why are some neighborhoods hotter than others?

What is the urban heat island effect?

## How does it impact us and what can we do about it?

In the spring of 2022, Teaching Artist Alex Cabana collaborated with students from The Academy of Urban Planning and Engineering (AUPE) to take a closer look at extreme heat and the urban heat island effect. To investigate the issue, students talked to community members in Bushwick, interviewed stakeholders working on the issue, and created mixed media art to process the information.

The team gathered what they learned and created this booklet to teach others about the urban heat island effect, the impact of extreme heat on New Yorkers, and what changes we need to help us navigate and survive this extreme heat in the city.

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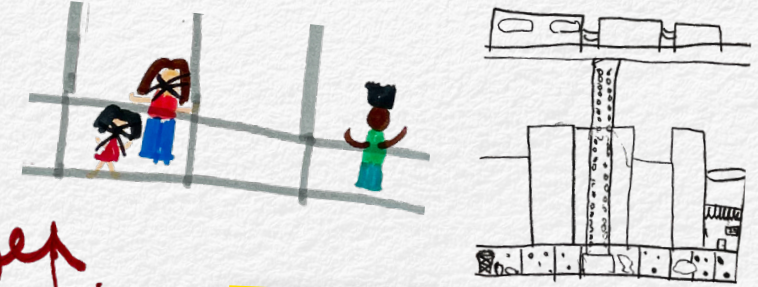
There are an estimated 350 heat-related deaths every year in New York City.

"Extreme heat essentially limits the ability of our bodies to maintain some level of a thermal balance. So our bodies are constantly trying to essentially reject heat to the atmosphere, and the hotter it is outside or the hotter the air is around us the harder it is for our bodies to [regulate that balance]." **- Luis Ortiz,** Visiting Research Scholar with the Urban Systems Lab at The New School and Climate and Data Fellow at the Office of the Secretary of the US Department of Transportation

What is extreme heat?

Extreme heat is a period of high heat and humidity with temperatures above 90 degrees for at least two to three days. In extreme heat your body works extra hard to keep a normal temperature, which can lead to heat-related illness. Extreme heat often causes the highest yearly number of deaths of all weather-related disasters.

What is the Urban Heat Island effect?

Heat islands are city areas that experience higher temperatures than areas outside of the city. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes like forests and water bodies.

Urban areas, where there are a lot of big buildings close together and less green areas, become "islands" of higher temperatures. Daytime temperatures in urban areas are about 1–7°F higher and nighttime temperatures are about 2-5°F higher.

Welcome to **HUMID**

*Greetings from* **SCORCHING**

Welcome to **FLAMING**

"The urban heat island [effect] is essentially this phenomenon that has been observed since even the 1800s, or probably even longer than that, where we have found that the temperatures in an urbanized or built up area are often higher than the temperatures in the surrounding more rural or more vegetated areas…but chiefly because we are changing the natural surface of the earth in a particular place, which changes the way that the heat moves in various ways." **- Luis Ortiz**

What causes the Urban Heat Island effect?

City Infrastructure and Lack of Green Space

"We see a certain type of development pattern in cities, which is why cities like New York City, Boston, etc, have a similar experience [and] a similar type of [extreme heat] phenomenon." **- Daphne Lundi,** Deputy Director for Social Resiliency at the NYC Mayor's Office of Climate and Environmental Justice

"[So] the city itself adds another component, or exacerbates that extreme heat hazard in many ways. From [city structures] absorbing more heat, all the way to limiting plant life availability, or space for plant life, which leads to lessened operation of water, which [is important because] the ground has to cool off…" **- Luis Ortiz**
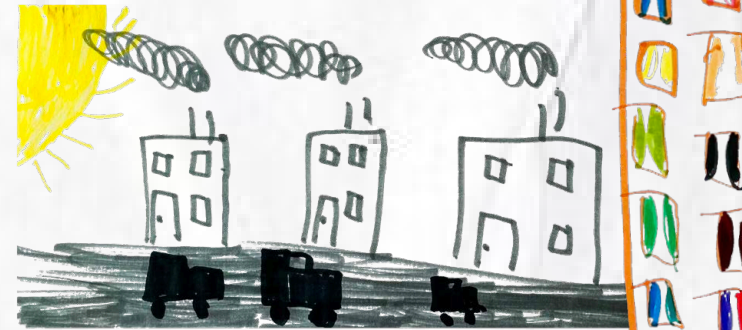
Materials

"So much of the impact/effect is driven by materials…a lot of our buildings are made with dark surfaces, like dark materials…it matters if there's a place that has light colored sidewalks versus dark colored sidewalks, all of those things, either help trap heat or help reflect heat."
- Daphne Lundi

Climate Change

"Since about the year 1900, the city experiences about two fewer days below freezing every 10 years. So we think our winters are almost going away to some extent…they're definitely getting more mild, whereas our summers are definitely not getting any more mild." **- Luis Ortiz**

"Recognizing that extreme heat is sort of a developing global thing [is important]… [and] that it sort of exacerbates the urban heat island [effect in cities]. It has been shown in New York City and many other cities over time." **- Luis Ortiz**

What does it look like in our city?

Lack of Shade

"In a place like New York City…people walk around, you know, we're pedestrians. And so it's different to experience extreme heat if you're in a place like Houston, where you're just kind of like moving from air conditioned space to air conditioned space, but if you're actually having to sort of walk around in the city, lack of access to shade, lack of access to cooling, can really be a struggle" **- Daphne Lundi**

Buildings That Trap Heat

"Because temperatures are a little bit higher in cities, compared to its surroundings, it means that people who live in cities are often exposed to higher temperatures. It means that the spaces within our buildings are gonna get warmer because we've built buildings that are very good at trapping heat." **- Luis Ortiz**

Cost of Energy Goes Up

"[We also see that] our cost of energy goes up because we have to spend more money on air conditioning."
- Luis Ortiz

Last summer, the average monthly Con Ed bill for a typical NYC resident was $104.05

Redlined Areas

"One thing that's always important to bring into the conversation around extreme heat is redlining. If you are at all familiar with the history of redlining, you know certain neighborhoods, particularly where like black and brown people live…[are] a lot of the same neighborhoods where fewer investments were made.

So when it comes to things like green space, new housing, etc, like, even though redlining as a policy is from several several decades ago, you can still see those impacts today, which is why if you live in Flatbush, or you know, parts of Bed Stuy, there are probably fewer trees if you live in a place like Park Slope. That's changed over time but we're still dealing with that history… [So] there's like this compounding effect of it not just being an issue of extreme heat, but also understanding how it intersects with disparities to access to health care, disparities in economic security, or disparities in housing quality."
- Daphne Lundi

We Need More Energy

"[Since] so many people live in New York, you can imagine if it gets very hot suddenly, we [will] need all this extra amount of energy to cool everything. But that leads to blackouts sometimes and it has in New York in the past…A single blackout in a particular area will affect a lot more people in a place like New York because of that density [of people]." **- Luis Ortiz**
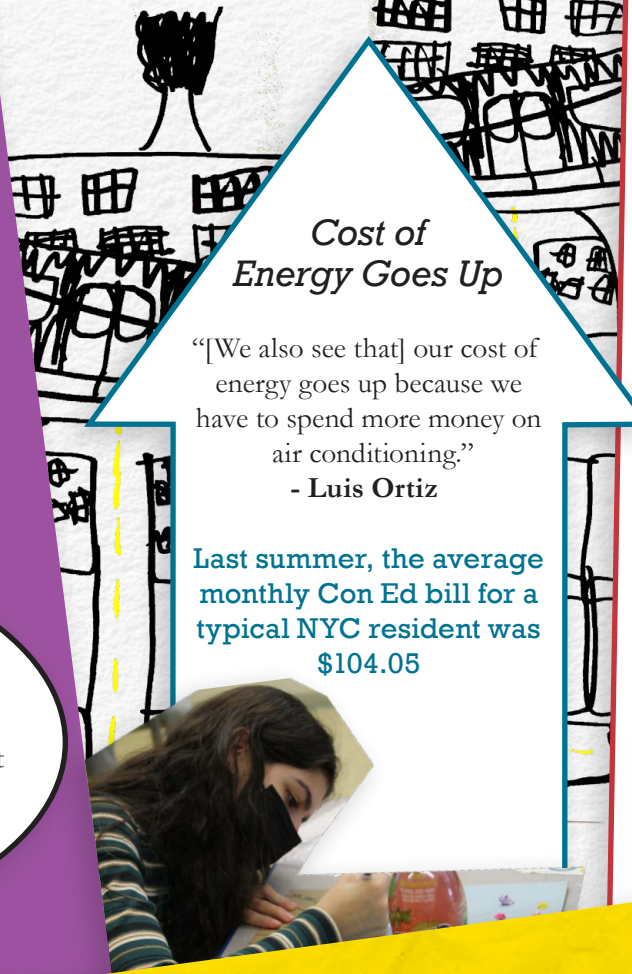
LUIS

Divestment In Communities and Difficulty Accessing Resources

"Our capacity to adapt [is] also very unevenly distributed across neighborhoods. Many of those same [redlined] neighborhoods also have the lowest air conditioning adoption….the Department of Health in New York [has shown] that's also where the highest heat related mortality is. So that's a very clear signal that [those neighborhoods are where] we see most folks get really affected by extreme heat by a combination of all these things." **-Luis Ortiz**

Heat Related Illness and Death

"In the summer months we just experience hotter temperatures than some of our suburban neighbors. And what that means is that, depending on the type of building stock you're in, depending on age, health, etc, during a heatwave event, it can mean life or death for some people.

So we at the city work really closely with professionals in the Public Health Department and what we find is that in summer months if you're in a building that doesn't have air conditioning, or isn't properly ventilated, it tends to be a lot hotter and stay a lot hotter through a heatwave.

So that might be okay if you're an able bodied healthy person that is able to sort of thermo regulate yourself. But if you're somebody that's older, have some sort of underlying health issue like asthma or heart disease, etc, that heat exposure and that sort of long term exposure can really lead to hospitalizations or in some cases death."
- Daphne Lundi

DANGER

Daphne Lundi

NYC

Mayor's Office of Climate Resiliency

DAPHNE

Enzo + Medina

What do our neighbors think?

In the spring of 2022, AUPE students went out into the community and surveyed their neighbors about extreme heat.

73% of our neighbors believe that extreme heat is a problem.

23% of our neighbors do not have ACs in their home.

80% of our neighbors have never visited a cooling center before.

73% of our neighbors are worried that this summer will be hotter than last.

Brooklyn Public Library
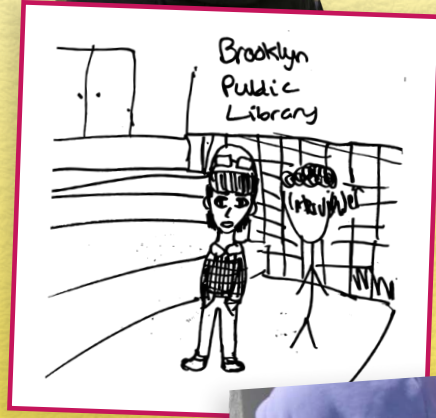
MYRTLE-Wycoff Subway Station

Have you ever visited a cooling center?

What do students think?

"We need to work as a community because just one person can't make a change."
- Medina Lekperi, AUPE student

"Extreme heat is a problem in NYC because it can cause health problems that can be dangerous to some people."
**- Sincere Davis,** AUPE student

"We need to make greener infrastructure and architecture. And also offer ways for people to get cool."
- Emely Baez, AUPE student

"We need to build more cooling stations and make water more accessible to everyone."
- Elisha Shabazz, AUPE student

"I learned that extreme heat can affect certain areas more than others."
- Vincent Slaughter, AUPE student
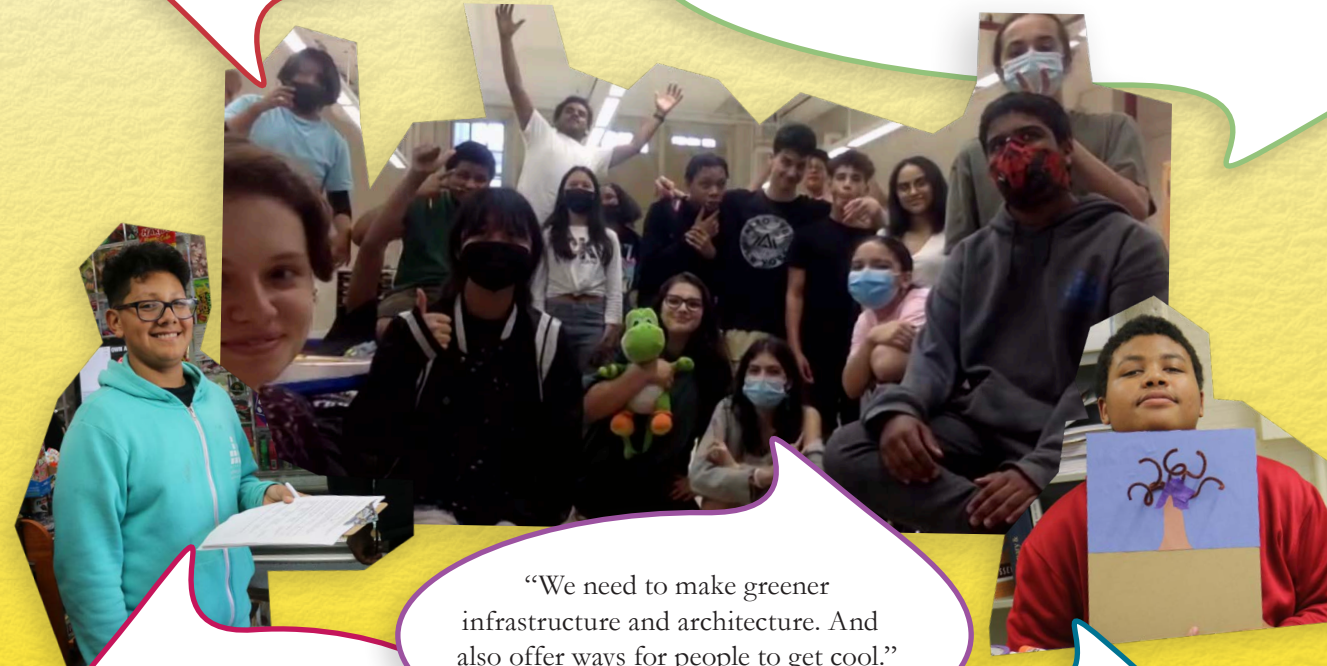
How can we change things?

Join Your Community Board

"Reducing barriers for a wide variety of people to [be able to] participate in community boards…and other types of political action is extremely important. Because of these [decisions] that happen when people are working… they can't effectively participate in the decision making that affects where these [changes] get put in and where the resources get allocated." **- Luis Ortiz**

Sharing Information and Resources

"Teaching folks the science of heat stress [is important]…people might not know what heat stress feels like versus some other ailment…[you can say to them] if you feel like this an extremely hot day maybe you should go to an air conditioned shop, a cooling center, a shaded area, drink more water…. just creating general awareness because one of the biggest problems with extreme heat is it's not really a big event that you see coming." **- Luis Ortiz**

Talk To Elected Officials

"Getting to know your local elected officials is also a really important avenue. So for example, every [council] member has a community board. Really recently they lowered the age to join a community board to 16…That can be a really helpful way for electeds to know what constituents, particularly younger constituents care about and are passionate about…So just staying connected with the local electeds and sort of what's happening on the ground is a great sort of avenue to be involved too."
- Daphne Lundi

Support The Youth Climate Movement

"[Climate change is the] collective issue of our time and I do really believe that there are things that we all can be doing. I've also been really inspired by the Youth Climate Movement that's been happening for years now. Because in a lot of ways, you know, we're doing our best as adults in the roles that we're in but also fully understanding that a lot of decisions of adults are going to be inherited by the next generation. And so how are we [as adults], through talking with young people and supporting the work that y'all are doing, [inevitably] supporting us all in getting to better climate futures." **- Daphne Lundi**

How could things be different?

More Cooling Centers

"In the past, I think another thing that the city has been doing is making sure that during heat waves there are places for people to go to stay safe indoors, if cooling at their home isn't possible or feasible. So the city will do things like run cooling centers at libraries. So people, you know, can check out a book while also being in a place that's air conditioned." **- Daphne Lundi**

Find a cooling center here:
https://maps.nyc.gov/cooling-center/

Plan Ahead For Heat Waves

"So people just fundamentally [need to] know what to do and what to expect when there's a heatwave. A lot of it is like a behavioral shift of knowing you should probably be drinking more water if you're working outdoors during a heatwave or making sure that your air conditioner is functional ahead of heat season, to make sure that you have that cooling." **- Daphne Lundi**

Invest Resources In Our Communities

"The city also runs a program that's called HEAT, which is the Home Energy Assistance Program, for quite some time. And that's a program where you can apply and get access to an air conditioner for free if you're a low income person." **- Daphne Lundi**

Create Heat Resistant Buildings

"For so many cities in the Northeast we traditionally built our buildings for winter time. So we built our buildings to make sure that they stayed warm during the winter. And I think now we're in this kind of turning point…where we have to think about, like, okay our winters are going to get milder but our buildings are sort of oriented towards cold months. So how do we make sure that our buildings are able to be retrofitted to accommodate longer summers, more intense summers, etc." **- Daphne Lundi**

Do you know about NYC CoolRoofs?

Launched in 2009, the NYC CoolRoofs program helps install energy-saving reflective rooftops in NYC buildings. They do this by installing rooftops with a white, reflective coating that reflects the sun's thermal energy, thus creating a cooling effect. By installing a cool roof, buildings can reduce air conditioning cots by 10% to 30% on hot summer days.
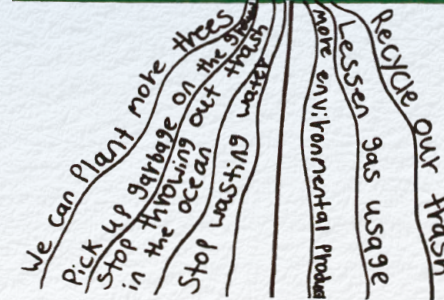
Top Four Resources!

Based on our community survey results, our neighbors want more parks, free ACs, swimming pools and trees in their neighborhood.

Center Voices of Most Vulnerable Communities

"The pattern we see across the board for all types of [climate] hazards is that people who are already vulnerable, whether it's economic vulnerability, racial inequality, etc, are the same people that feel the brunt of climate hazards the most. So I think that is the [analysis] that we have to always keep front of mind when it comes to achieving climate justice, environmental justice… the fact that people that are struggling already will feel [these consequences] even worse. And so if that's the case, how are we making sure that the folks that are struggling and will struggle, are centered in how we make investments, how we do communications, etc. But that's kind of the foundational piece of it…climate risk exacerbates other types of risk."
- Daphne Lundi

Increase Our Tree Canopy

"A big thing that we've been working on as a city has been to increase our tree canopy…[because] one of the biggest ways we can sort of help to mitigate the urban heat island effect is increased green spaces. And so for the past many, many years, the city has been basically planting trees in areas that historically haven't had trees as a way to, over [the span of] 10 years, build the tree canopy [that can] help improve shade….[particularly in] neighborhoods where that shade didn't exist." **- Daphne Lundi**

The **Center for Urban Pedagogy (CUP)** is a nonprofit organization that uses the power of design and art to increase meaningful civic engagement, in partnership with members from historically marginalized communities.

This project is part of a **City Studies**, CUP's project-based, in-class and afterschool programs that use design and art as tools to research the city. To learn more, visit **welcometoCUP.org.**

The **Academy of Urban Planning and Engineering (AUPE)** is a public school on a mission to build a community of learners and empower students as advocates through STEM education. To learn more, visit **aupenyc.org.**

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