HOT SIMULATION

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six global youth roles

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These materials are pending scientific review and fact checking

Luiz is a 15-year-old from **the Brazilian Amazon** who has a passion for **history**.

Name: **Luiz**
Born and raised in: **Manaus, Brazil's Matto Grasso Amazon**
Climate impact: **Flooding**
Displacement in: **Taua, Brazil**
Alternative energy connection: **Solar power**
Interests: **Historical sights, understanding the relationship between the past, present, and future**

Students in Luiz's role…

- chronicle events like a detective looking for clues
- look at how events unfold
- dig for evidence to find meaning and resolution
- seek to understand the historical narrative

Luiz's questions:

- How have things changed?
- Which events are pivotal?
- How has history unfolded?
- What can we do to write history in our own ways?

Luiz grew up in Manaus, Brazil with his father, mother, and three older brothers. Luiz's father came to Manaus when he was young from a small village along the Amazon River inhabited by Ticunas Indians. As Luiz's father grew, so did Manaus. It became the Brazilian Amazon's largest city, with a population of around 2 million people. With his father working in the military, Luiz's family led a modest and good life, unlike many Ticanas who were very poor and unable to overcome the challenges of urban life and ethnic prejudices.

Luiz's grandfather was determined to preserve the family's indigenous roots. While many in Luiz's family were easily bored by their grandfather's repetitive stories of Ticana history, Luiz could not get enough of them. He developed a special bond with his grandfather; they spent a lot of time together making masks and creating an oral history from interviews with village elders living in Manaus.

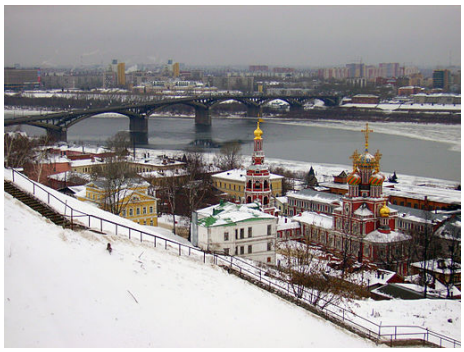
Luiz's mother and brothers all worked for a tour company, specializing in eco-history of the Amazon. The city was a popular destination for thousands of international visitors who came to experience the Amazon, among the world's most beautiful and biologically diverse ecosystems. The company specialized in Amazon cruises, which took Luiz's mother and brothers away for many days at a time. For the past two years, the company struggled because the usual weather extremes of high to low rainfall on the river were getting worse. Brazilian scientists believed the usual flooding and droughts of their regional climate were now being exacerbated by a warming global climate.

When the rainy season arrived a month early, more than 200,000 people were at risk of dangerous flooding. Luiz's father was sent with other troops to evacuate people. While he was away helping others, his own family barely escaped Manaus in a raft Luiz and his brothers had made. Their home on the outskirts of Manaus was lost in a mudslide.

The entire family migrated more than 2,000km away to Taua. Luckily, Luiz's father found work with the military police. Luiz and his grandfather became involved in an Internet project at a local library studying Brazil's displaced indigenous people. Historically, Luiz's people often built their lives around the sun. In this way, the family returned to their roots as Luiz's brothers were hired on a construction crew building Brazil's largest solar power plant. Luis and his grandfather looked up everything they could on solar energy, a new topic of interest and chapter in the family history.

Natasha is a 16-year-old from **Norilsk, Russia** who loves to **read, write,** and **tell stories**

Name: **Natasha**
Born and raised in: **Norilsk, Russia**
Climate impact: **Melting permafrost**
Displacement in: **Nizhny, Russia**
Alternative energy connection: **Nuclear energy**
Interests: **Facts and fiction, writing, metaphors**



Students in Natasha's role…

- focus on headlines, punch lines, and story lines
- use empathy to connect a story to an audience
- craft analogies and metaphors
- use writing to show significance, consequence, and relevance
- write effectively to inform and move audiences

Natasha's questions:

- Who are the characters? What are their views?
- Why should we care?
- What do we need to know?
- What have we learned?

Natasha grew up in Norilsk, one of largest cities in Siberia, where people were amazingly resilient in the face of harsh conditions. Industrial pollution produced heavy smog that filled their lungs each day. The winters were long, with below freezing temperatures and limited sunlight.

Natasha's father worked in Norilsk's nickel mines. Smelting at the mines emitted sulfur and other gases that polluted the air in the city. In contrast, her mother was a college-educated woman who worked as a freelance journalist.

Like her mother, Natasha has a special ability to craft stories to entertain friends and family. Recognizing that "the apple had not fallen far from the tree", Natasha's mother teamed up with her daughter to start a newsletter and blog to raise awareness about environmental health issues in Norilsk. Natasha and her mother shared a deep concern about the environmental conditions and the effects on its people; even Natasha's brother Morris suffered from respiratory illness. Respiratory problems, like asthma, were common in children and the elderly, who are among the most vulnerable to the poor air quality. Their newsletter and blog became very popular because they captured moving portraits of life in Norilsk – below, in the nickel mines, and above, in the city streets. Their narrative reporting was coupled with links to expert advice on environmental issues and a web site to crowdsource ideas for improving local challenges.

During the summers, the people of Norlisk faced melting permafrost (frozen ground) due to rising global temperature and increasingly warm summers. It was creating a public safety problem, damaging the foundations of 20% of Norilsk's buildings and structures. One afternoon, during a particularly warm summer, the reality of melting permafrost came into Natasha's life. Natasha and her mother returned home to find emergency vehicles around their apartment—it had collapsed. The likely causes: melting permafrost paired with poor building construction. The family went to an emergency shelter until they could move to Nizhny Novgorod, Russia, where Natasha's uncle Vasily lived.

Natasha was crazy about the new city and her uncle. Vasily was infamous; briefly Russia's U.S. Ambassador, he was removed after controversial comments that heat waves, melting snow and ice, and wild fires in Russia should be a "wake up call" for the country's leaders to start taking climate change seriously. A nuclear physicist by training with enormous popularity, he became President of the State University of Nizhny.

This summer, Vasily was especially vocal about nuclear energy as heat waves and wild fires raged within eyesight across the Volga River and southern Russia. These dramatic events and the potential for nuclear energy to reduce carbon-emitting fossil fuels headlined Natasha's recent blog post. The post was picked by Aubrey's Vale's Google hangout with youth impacting by climate change.

Jia is a 16-year-old from **the Yangtze River Basin** who sees the world as an **engineer**.

Name: **Jia**
Born and raised in: **China's Yangtze River Basin**
Climate impact: **Flooding**
Displacement in: **Nanjing, China**
Alternative energy connection: **Sustainable Biofuels**
Interests: **Form and function, engineering, agriculture**

Students in Jia's role…

- understand form and function
- test possibilities
- find solutions
- imagine designs
- construct models

Jia's questions:

- What has been tried?
- What are the choices?
- How might we think differently?
- What are the resources?
- What are the constraints?

Jia and her parents lived in a small town on the banks of China's Yangtze River until flooding caused by the Three Gorges Dam forced them to move to the city of Nanjing. The Yangtze is the world's third longest river and influences daily life for over 350 million people in China, including Jia. An influx of development in this region causes many to use the Yangtze to transport industrial cargo, while others—like Jia and her family—depend on it to irrigate their rice fields.

Jia enjoys tagging along with her father, helping him fish and learning about farming. She's especially interested in how farmers manage the floodwaters to irrigate the land. Even if their fixes are low-tech, she thinks their designs are clever and sometimes assists with the building. Jia is an engineer at heart, always eager to learn how things work.

One evening, a dramatic reality dampened her spirits. Her parents sat her down and broke the news: they must leave their home. They had to move because planned flooding from the release of dam waters was expected to wash away their home that had been in her family for generations. Her father explained that as many as 1.5 million people might be displaced. The low-lying land near the river is practically at sea level, making it prone to flooding but completely unprotected from the dam water to be released.

How could this be? Jia wondered. Her teachers had taught her that the amazing dam was supposed to benefit the people; it was harnessing enough hydroelectric power to replace the burning of 50 million tons of coal, the dirtiest fossil fuel contributing to global climate change. Yet, it was also having negative consequences for her family.

Their family received a small stipend from the government to relocate to Nanjing. Their modest home along the Yangtze was replaced with one, crowded apartment in a historic—yet extremely polluted—city. The air in Nanjing is heavy with black carbon, a byproduct of industrial pollution. Some days Jia could barely see a building a short distance away do to the dirty air conditions. Atmospheric black carbon also contributes to global warming.

After some time, Jia's dad finally finds a manual labor job far away in Beijing, at a factory. When Jia hears what the factory does, she laughs thinking her dad is kidding. "That's right, it recycles cooking oil into biofuel," he tells Jia. Adding to her further disbelief, he goes on to tell Jia they are engineering a way for planes to fly using cooking oil as a biofuel. She can't help but think how much cooking oil is used in China, the potential for this renewable and clean source of energy, and figures that an engineer was behind this innovation.

Aubrey is a **16-year-old** from **Maryland** who is fascinated by **networks** and **connections.**

Name: **Aubrey**
Born and raised in: **Maryland, USA**
Climate impact: **Hurricane**
Displacement in: **New York City, USA**
Interests: **Networking, social media, relationships, and connections**

Growing up near Maryland's Chesapeake Bay filled Aubrey's childhood with adventures in North America's largest estuary. Many were at the side of her grandfather, an acclaimed climate scientist, Dr. Jack Hanover. They would explore the local collection of rivers, hidden inlets, forests, wetlands, and the magnificent Bay. Every adventure uncovered tales of early explorers, lost colonies, pirates, shipwrecks, oyster wars, the Underground Railroad, and of course, nature.

Most recently, the two observed that the Monarch butterfly population was dwindling. With Grandpa Jack's direction, Aubrey tended to the insects' backyard habitat by helping a patch of milkweed withstand the summer's blazing heat. She recorded daily observations and drew pictures, all the while wondering how the butterflies would survive their annual journey to Mexico in the hottest summer on record. Aubrey did what she does best: she got connected. Aubrey found an online forum of scientists discussing the Monarchs' migration. She and Grandpa Jack learned that 30% fewer Monarchs made it to Mexico that year because a long stretch of their migration path in Texas had been ravaged by drought and wildfires.

The butterflies were not the only ones affected by climate change. One day, a massive hurricane destroyed her family's home in Maryland, forcing them to move in with Grandpa Jack in New York City. Paired with her scientific discoveries on the monarchs, she "connected the dots" and thought maybe the butterflies' habitat was not the only one at risk from climate change around the world.

She settled into a routine in her new home. Her days were filled with school, long subway rides, and hanging out "way too much" on the Internet. Finally she found something to get interested in (more like obsessed). After repeated lectures from Grandpa Jack about being more energy efficient, she started doing Internet research about how energy efficient light bulbs and other steps to improve efficiency could help curb energy consumption and reduce the CO_2 emissions contributing to climate change. She started to wage an energy efficiency campaign, first with her family—and then at her school. It started with replacing traditional light bulbs with the more efficient alternative bulbs. "Even small steps like this are a good thing to do," she told friends and teachers.

Students in Aubrey's role…

- realize the value of collaboration
- understand networking
- connect the dots
- pool thinking

Aubrey's questions:

- How are things related?
- What are we learning and why does it matter?
- What's the goal and who can help us achieve it?

Albert is a 16-year-old from **Kenya** with a **scientific mind**.

Name: **Albert**
Born and raised in: **Turkana District, Kenya**
Climate impact: **Drought**
Displacement in: **Nakuru, Central Kenya**
Alternative energy connection: **Geothermal**
Interests: **Science, asking questions, explaining things**

Students in Albert's role...

- make observations
- collect and analyze data
- explain connections
- search for patterns
- make predictions
- find relationships

Albert's questions:

- How does this work?
- What is different?
- Why should we care?
- What if…?
- How are things changing?

For most of his life, Albert lived with his parents and sister in Northern Kenya. Like many kids, Albert learned from his parents' wisdom and advice. Albert's father taught him about raising animals, the hot and dry climate of the Great Rift Valley, and their relationship with the land. Albert enjoys asking questions, discovering new ways of doing things, and understanding the natural world. Growing up in the region known as the "cradle of life" fueled Albert's curiosity. His parents often find him by the lake pretending to be on expeditions, digging for fossils, and conducting all sorts of experiments on the lake water. Friends and family nicknamed him the "Science Guy."

As Albert grew older, water became scarce in his village. Temperatures were rising, causing Lake Turkana, the largest desert lake in the world, to dry up. A drought was also causing a health and economic crisis, leading to conflicts in the region over scarce water supplies. Several men from Albert's village—including his father—died in the fighting. After his father's death, Albert's uncle moved their family to the outskirts of Nakuru in Central Kenya.

Nakuru's main water source, Lake Naivasha, began receding. Even though Albert's mom is able to secure a job at Flamingo Homegrown, Kenya's largest flower company, the drought soon affects flower production and stresses the local economy. Both his mother and uncle's hours are cut back, severely limiting the family's already limited resources.

At school, Albert learns about the drought. His teacher tells the class that drought is worsened by climate change affecting Africa. Their already arid climate is especially sensitive to warming global temperatures. He learns that CO_2 gases, a byproduct of burning fossil fuels for energy, are likely contributing to his country's drought. *How strange*, he thinks, *that gas emissions from factories half a world away became a factor in his losing his father, his home, and his family's way of life*.

There is some good news. Flamingo is putting in place more sustainable practices, using less of the lake water through improved agriculture practices. Climate change is a part of life in Kenya now and the people are developing ways to adapt as much as they can and deal with it by cutting their water consumption.

One day, a visitor tells his class about the largest geothermal plant in Kenya, which is being built nearby. Albert had never heard of such a thing: using heat from inside the earth to power things! That night, Albert tells his mom, "Imagine, instead of suffering because of climate change, Kenya could be at the center of the solution: helping to replace fossil fuels with geothermal energy! Now *that* is something I want to make happen." His mother noticed Albert's passion yet again: Albert, the Science Guy!

Will is a 14 year-old from **Bangladesh** who thinks about the world **in systems**

Name: **Will**
Born and raised in: **Chandpur District**
Climate impact: **Cyclone, Flooding**
Displacement in: **Dhaka, Bangladesh**
Alternative energy connection: **Wind power**
Interests: **Games, systems thinking, risk taking**

Map of Bangladesh, Photo Credit: Creative Commons

Katubia Island Wind Farm

Will's questions:

- What are the skills needed?
- What are system's inputs and outputs?
- What are the cause-effect, feedback loop relationships?
- What are the obstacles and rewards?
- How do we change the world?

Students in Will's role...

- Learn through experience
- Model how things work
- Play games
- Look for cause and effect
- Find what's needed to advance in a challenge

Will moved to Dhaka when floods ruined his family's rice crop for the third consecutive year and washed away their home. He vividly remembers the day Cyclone Aria hit Bangladesh and destroyed thei way of life. He could not see very far in front of him because the rain came down in powerful streams. This was the second large-scale cyclone in the past 18 months. When Aria hit, people were still trying to put their lives back together from previous cyclone that flooded coastal regions, completed eliminated villages and killed hundreds.

Every year, people in Bangladesh suffer many losses - animals, crops, homes, livelihoods and their lives - due to the typhoons and cyclones that are part of the region's climate. Because most of the country sits barely above sea level and because the region is prone to intense extreme weather, climate scientists say that global warming is only going to worsen the impacts of climate change for people of Bangladesh in the future. By 2050, scientists project that rising sea levels, resulting from melting glaciers, and increasingly fierce weather, could flood or erode significant portions of land along the country's coastal areas and produce a major humanitarian crisis, potentially causing 20-30 million people in Bangladesh to loose their homes and look for new places to live.

With nothing left in their village in the aftermath of Aria, Will, his mom, dad and 2 brothers moved to Dhaka, one of the fastest growing megacities in the world. Will lives in Korail, a large slum adjacent to Gulshan, an affluent neighborhood, with mansions, restaurants and western-style shops. The family barely scrapes by on the meager $2 per day that comes in from his dad's rickshaw cart and his mom's work as a domestic. Bangladesh is among the most densely populated in the world and many live in poverty. One evening, Will's dad laments, "Climate change is ruining the country. We are like refugees, forced to move to towns and cities, away from the places we call home."

While out one day, Will and his brothers see a poster advertising that an international aid group is producing a film called "Climate Change Witnessed." They are looking for people to tell their stories. The boys connect with the group to tell their family's story. In the process, they learn that the film project is being produced for a government-funded agency called Bangladesh Climate Change Adaptation and Solutions. The aid workers take a liking to the brothers and invite them to come along with them on their next filming. They are off to the country's island, Kutubia, to film workers who just finished constructing 50 off shore wind turbines for producing alternative energy. The project is the first of what government officials, hope are many off-shore wind farms to lower Bangladesh's fossil fuel consumption.