DESIGNING FOR THE FUTURE
SUSTAINABLE CITIES AND COMMUNITIES

MCIC
Manitoba Council for International Cooperation

INTRODUCTION

Students will explore a community scenario and its sustainability problems. Collaboratively, students will brainstorm and explore possible creative sustainability solutions. Students are free to explore possible solutions through design thinking and create their potential solution using various materials provided. Students will think critically and creatively about common sustainability challenges that occur in both local and global cities and communities. **This lesson focuses on the themes of sustainability, sustainable communities, effects of climate change, inclusive communities, sustainable structures, and heritage and culture.**

AUDIENCE

- Grades 5-12
- 16-60 participants

LENGTH

- 40-90 minutes

MATERIALS

- Design Kits can contain whatever materials or supplies facilitators have available or can find. In ours, we included the following supplies in each Design Kit:
    - 34 wood skill sticks (notched popsicle sticks/building sticks)
    - 40 popsicle sticks
    - 10 small craft dowels
    - 7 long skewers
    - 3 short skewers
    - 4 toothpicks
    - 1 container of playdough
    - 3 sponge blocks (large sponge cut up)
    - 4 pom-poms (various sizes)
    - 4 Styrofoam balls
    - 1 stack of post-its
    - 10 building blocks (Lego style)
    - 1 play propeller
    - 5 water balloons (with no water)
    - 5 cotton balls

- - o 8 pipe cleaners
    - o 5 wooden blocks
    - o 1 craft wire bundle
    - o 1 piece of aluminum foil
    - o 1 handful of elastics
    - o 2 foam craft sheets
- In addition to the above supplies, we supply the following for all students to use:
    - o Large balloons
    - o Glue sticks
    - o Tape
    - o Scissors
    - o Markers
    - o Pens and pencils
    - o Chalk
    - o Large sponges
    - o Modelling clay
    - o Straws
    - o String
    - o Small and large elastics
    - o Clothespins
    - o Magnets (craft or large)
    - o Ziploc bags
    - o Tennis balls
- Every group should get a hard, portable surface to build their solutions on
    - o 1 foam board or plywood (can usually be found as cut scraps at the hardware stores)

DESIGNING FOR THE FUTURE

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SET-UP

- Build the Design Kits for however many groups of students you will have. We recommend groups of 3-5 students.
  - o If you do not have enough supplies or time for individual Kits, allow students to access materials all together.
- Print out the Solution Kit for the facilitator(s) and/or teacher(s) (see attached)
- Print out and cut Topic and Problem Cards (see attached)
- Print out 'Designing for the Future worksheet (1 per student or group) (see attached)
- Separate students desks or tables into groups

INSTRUCTIONS

1. Separate students into groups of 3-5 and have them sit at tables, desks or on the floor.
2. Have students assign themselves the following roles: *(optional)*
   a. Recorder x2
   b. Presenter
   c. Drawer/Sketcher x2
3. Once in their tables, hand out the following:
   a. One "Designing for the Future" worksheet (per student)
   b. One or two 'Designing for the Future' topic and scenario cards (per group)
   c. Writing materials (pens, pencils, etc.)
4. Have students read the scenario cards and choose one topic and scenario to focus on. Students should check their chosen topic and problem. and record the key identifiers of the scenario and problem.
5. Working through the sheet, have students complete the following sections:
   a. "Describe the problem in the bow below!"
   b. "List 2 things that are making the problem worse!"
   c. "What would make the situation better or worse?"
   d. With your group, choose one of your ideas to make things better! Brainstorm it below!"
   e. Sketch, doodle and design your solution!
6. Ensure that students are communicating effectively and sharing ideas. Everyone has different experiences and perspectives, one positive to someone may be a problem for someone else.
   a. Ask the question "Will you… change something, build something, teach something, or stop something?" to encourage students to think critically about their solution.
7. After brainstorming what would make the situation better or worse and deciding on their main solution, have students begin to design their solution using blank page provided.
8. Once written down and sketched out, students can begin designing and building their solution.

  a. Encourage them to think outside of the box, using the materials provided as inspiration.

  b. Some ideas for encouragement: Physical models from building materials, playdough or modeling clay structure, blueprint, awareness or campaign posters, new rules for the area, etc.

9. Once students have had the chance to record and design their solution, pair groups up and have students share their ideas.

  a. Because there are only 4 topics, some groups may have the same scenario and/or problem but could have different solutions!

DEBRIEF

To begin, have students review their scenarios, the problem they chose to address and their solutions with the rest of the class.

Have students discuss the following questions in groups or as a whole.

1. Was there anything you had trouble understanding in the scenario or the problems?
2. Did you encounter any challenges or barriers while brainstorming your solutions?
3. Where else do you think these scenarios would occur in the world?
   a. What are some other problems that might exist in your scenario?
   b. Who is affected by your scenario and/or problem?
   c. What services or programs could be effected by your scenario and/or problem?
4. With your solution, would there be any challenges in making your solution happen?
   a. Example: lack of funding, lack of support from political leaders, etc.
5. What would help with these challenges?

DESIGNING FOR THE FUTURE – TOPIC & PROBLEM CARDS

SUSTAINABLE STRUCTURES

Cities can grow very quickly from **rural-urban migration**. This is when a lot of people move from a rural area to a city in the hope of getting a job and earning more money. This can make cities grow very quickly.

The city of **Lagos, Nigeria** in Africa has grown a lot in the last 10 years. What was once a city of 4.5 million people in 1990, now has approximately 21 million people in 2018. The government and investors are quickly transforming the city, hoping that fast population growth will also bring economic growth and prosperity. But, along with the development of skyscrapers, shopping centers, and city-wide transportation, a part of the population is being forgotten. Located close to Lagos' waterfront, overcrowded, poor areas called **slums** are being cleared for bigger development and newer buildings. This not only threatens their homes but their jobs and income.

The government will sometimes destroy an entire slum village in a day, making all of the people who live there suddenly homeless. Yet, when one slum is torn down another will quickly rebuild since everyone needs somewhere to sleep. This ongoing cycle widens the gap between the rich and poor. This can affect development and housing; access to food, electricity, and water; security; availability of social services, and the success of the city overall.

SUSTAINABLE STRUCTURES – PROBLEM 1

In the quest for building and developing the city, the government will sometimes destroy entire slums in a day, leaving its residents homeless. Yet, when one slum is torn down another will quickly rebuild since everyone needs somewhere to sleep. **What would your solution be?**

SUSTAINABLE STRUCTURES – PROBLEM 2

Social services like housing assistance, education, recreational programs, and health care are services provided for the benefit of the community. During times of rapid growth, some of the population can be left behind and social services may fail because they cannot keep up with population growth, or were never put into place. **What would your solution be?**

PROTECTING HERITAGE & CULTURE

Including culture and heritage in community buildings and events is human nature. Culture and heritage in urban (city) areas includes the protection of physical landmarks and buildings, consideration of heritage and culture in decision-making, and community celebrations. However, sometimes these cultural practices and involvement in decision-making can be threatened. As communities continue to grow, consideration of cultural or heritage significance is not always a priority.

Indigenous people lived in what is now Canada long before any Europeans claimed it as their own. To this day, their culture and heritage lives on in practices and traditions across Canada. There are more than 600 First Nations communities that represent more than 50 Nations and 50 Indigenous languages, Inuit communities, and Métis communities. More and more Indigenous people are moving to Canada's larger, urban communities as urban areas continue to grow. However, as in other places around the world, cultures and traditions are being lost through these changes, as communities continue to grow and take up more land. In Canada, this loss of Indigenous land has been associated with a loss of culture.

PROTECTING HERITAGE & CULTURE – PROBLEM 1

As part of a collective memory, elders in Indigenous communities pass down knowledge to future generations through stories and ceremonies in their native language. As more Indigenous people move to urban areas, and as a result of residential schools, some practices and traditions are beginning to be left behind, such as speaking the native language. In a quickly changing world, **what would your solution be?**

PROTECTING HERITAGE & CULTURE – PROBLEM 2

Cultural heritage and traditions can help build identity and pride in a community. Whether that community is big or small, practicing your culture in a shared space can serve as a source of strength, peace, and reconciliation. However, as communities grow and develop economically, the importance of a shared community space and place of belonging can sometimes be lost, affecting the community's well-being and understanding of different groups.
What would your solution be?

INCLUSIVE COMMUNITIES

As cities and communities continue to grow, inclusion is even more important. Residents need to feel as if they belong to the city, and that cities and communities provide them with jobs and housing as well as infrastructure (physical and organizational structures and facilities) that support their well-being, health, and happiness. It is often said that sustainability should be a pillar foundation, not an afterthought. Yet in many cases, as cities and communities develop, the importance of sustainability, people's well-being, the presence of nature, and accessibility can sometimes be missed in the design process. When sustainability isn't taken into consideration, cities and communities are not always inclusive and do not always benefit all of the residents who live there.

In **Jakarta, Indonesia**, residents of the country's capital are facing major sustainability problems. With a rising population of 30 million (including the surrounding area of Greater Jakarta) there is a large and ever-increasing demand for food, energy and transportation. Jakarta is turning to coal for energy, but this is also contributing greatly to air pollution, along with the use of vehicles to transport millions of residents every day. Large development projects and poor planning have left the city with large urban sprawl – spread out with poor transportation systems – with little to no green spaces.

INCLUSIVE COMMUNITIES – PROBLEM 1

Millions of people around the world depend on some form of transportation every day. Whether it is getting to work, going to social events, or getting groceries, the ability to travel is often at the front of city planning. However, Jakarta is facing a big problem – it has been named the world's worst city for traffic. On an average day, there are 3.5 million people who commute by car in the area of Greater Jakarta (Jakarta and surrounding area) and it can take 2-3 hours to travel 40 kilometers in bad traffic (in Manitoba, that would take about 45 minutes). Installing a public transportation system in such a large city can sometimes take years.
What would your solution be?

INCLUSIVE COMMUNITIES – PROBLEM 2

Green spaces such as parks, sports fields, woods, wetlands, and other natural ecosystems have a positive impact on and are important for urban ecosystems. As trees produce oxygen they help clean the air, and water spots like rivers and lakes can help cool the air. Green spaces help physical and mental health, and can provide safe and inclusive areas for a community's residents to interact, travel through or relax in. However, when green spaces are not planned, developing them afterwards can sometimes be very challenging. Jakarta has run into this exact problem. **What would your solution be?**

EFFECTS OF CLIMATE CHANGE

If everyone on Earth were to live like the average **North American**, we would need approximately 5 Earths to support our habits. This is because of our ecological footprint: the amount of land, sea and other natural resources that are used to produce what people need. This includes food, living conditions, material goods, and anything dependent on electricity. Cities and communities can have a big ecological footprint. Also, a lot of cities and communities experience climate change through natural disasters like wildfires, flooding, rising sea levels, droughts, and hurricanes. Some have the money and resources to be equipped to handle these events, while others are left unprepared and vulnerable.

As humans, we affect our planet's health in many different ways. From the amount of carbon dioxide we produce through activities like large-scale farming or using vehicles, to the amount of plastic products that end up in our oceans and landfills, our actions can often have negative consequences for the planet. Unfortunately, cities and communities can often be a part of this problem and can often worsen our negative impact.

EFFECTS OF CLIMATE CHANGE – PROBLEM 1

Some of the biggest natural disasters in recent years can be linked to the Earth's changing climate as a result of human behaviours. The most common consequences we see are rising sea levels, flooding, droughts, and hurricanes. Vulnerable populations are people who are unable to predict, deal with, resist or recover from the impact of these disasters. They are often those who are poorer, a minority population, or located in the most at-risk areas for natural disasters. Experiencing extreme drought can weaken communities financially, place families in danger of starvation, and affect food security worldwide. **What would your solution be?**

EFFECTS OF CLIMATE CHANGE – PROBLEM 2

55% of the world's population lives in urban areas. This means that there is a high demand for resources such as food, electricity, transportation and housing in large, densely populated areas like cities. With so much growth, cities and communities need to design for sustainability at the beginning and not consider it an afterthought. However, planning for sustainability and putting it into practice physically or through awareness programs can sometimes be challenging. City and community residents produce a large amount of waste (garbage, food, clothing, etc.) and a lot of that is plastic. This can end up on the land and in the oceans, causing pollution problems that contribute to climate change. In order to combat this, cities and communities need to be aware of their environmental impact and take steps to become more sustainable. **What would your solution be?**

SOLUTION KIT

This Solution Kit can be used to help students when they are struggling to complete the student worksheet and creating their solution. Use the Prompts section and the Creative Sustainability Solutions charts to help encourage discussion, brainstorming and unique solutions.

SUSTAINABLE STRUCTURES PROMPTS

PROBLEM 1

How can city officials help those living in the slums of Lagos? What contributes to housing being more sustainable (apartment complexes, financial assistance, sustainable energy sources)? What types of structures would help the problem? What type of investments would you make? What kinds of technology might help?

PROBLEM 2

How could you improve social services? What would those services look like? What do you think people in this situation need the most? Where would you put social services in the community? How can you ensure everyone has access? What do good social services look like? Libraries, food banks, public recreation programs, schools, hospitals, housing?

PROTECTING HERITAGE & CULTURE PROMPTS

PROBLEM 1

Who would you talk to in order to come up with a solution? What types of social services will you want to include? Who in your community would you want to participate or attend? How would you help communities protect and share their language with the next generation? How can we support Indigenous efforts to protect language and culture?

PROBLEM 2

What does a shared community space look like? Who is affected by this? Does anyone feel excluded with how things are now? How many times would your solution idea be needed in order to make a lasting impact? How can you create a space where everyone feels welcome?

INCLUSIVE COMMUNITIES PROMPTS

PROBLEM 1

What forms of transportation do you think would help? What kind of technology might be effective? Who is the most affected by the problem? What will you need from Jakarta and Greater Jakarta residents for your solution to work? How will you gain their support? What needs to be built or taken down in terms of infrastructure (road, buildups, etc.)?

PROBLEM 2

Who is affected by this problem? Whose opinion would you ask? What types of green spaces can you think of? How do you fit a green space into a city that is already designed? What are some ways to add green spaces like parks, trees, and community areas to the city?

EFFECTS OF CLIMATE CHANGE PROMPTS

PROBLEM 1

Who are the people most affected? What types of adaptation strategies might help with droughts? Who do you think would be willing to help? How can cities and communities prepare for droughts as a result of climate change? What else can be done?

PROBLEM 2

Who is affected by this problem? What systems can you think of that help problems like this in your community? What type of technology could you use? Is there a way to involve local business owners? How can you reduce the amount of garbage (esp. plastic) generated by cities and communities?

CREATIVE SUSTAINABILITY SOLUTIONS

Listed below are creative solutions for sustainable cities and communities. Solutions are categorized by the topics discussed in Designing for the Future (Sustainable Structures, Protecting Heritage and Culture, Inclusive Communities, Effects of Climate Change) and subcategorized by type of solution (physical structure, business/economic model, legal/policy, services, sustainable energy, technology).

SUSTAINABLE STRUCTURES

Physical Structure	- Zero-net energy housing - Co-operative housing models
Business/Economic Model	- Protection of the informal economy - Job creation
Legal/Policy	- Change laws to protect poor or offer lower cost housing - Protect land rights of poor and vulnerable populations
Services	- Small, affordable homing program for residents - Social services (libraries, food banks, public recreation programs, schools, hospitals, housing, etc.)
Sustainable Energy/Technology	- Use of sustainable energy in homes (solar, wind, hydro, etc.)

PROTECTING HERITAGE AND CULTURE

Physical Structure	- Community garden - Shared public spaces - Music, dance, food festivals
Business/Economic Model	- Support of local businesses and products
Legal/Policy	- Protection of historical structures or sacred areas - Reclaiming land
Services	- Social services (libraries, food banks, public recreation programs, schools, hospitals, housing, etc.) - Record keeping of Indigenous speakers and stories
Sustainable Energy/Technology	- Energy self-sufficient shared spaces (charging wall, outdoor heater, etc.) - Sharing languages online or through apps

INCLUSIVE COMMUNITIES

Physical Structure	- Tree planting campaign - Community gardens, parks or recreational areas - Reclaiming neglected spaces or de-paving spaces
Business/Economic Model	- Motorcycle or bike delivery for less space taken up by cars
Legal/Policy	- Land use policies that protect poor and vulnerable populations - Limited vehicle programs – license plate correlates to days of the week you can drive to work
Services	- Telecommuting programs (working from home) - Public transit systems
Sustainable Energy /Technology	- Solar panels in empty parking lots or as car cover structures - Grey water or recycled water from showers and drains that is filtered and fed into water features, lakes, etc.

EFFECTS OF CLIMATE CHANGE

Physical Structure	- Green spaces (parks, recreation, water features, etc.) - Tree planting campaign
Business/Economic Model	- Financial incentive to install and use sustainable energy sources - Support for locally grown and/or made products, produce, meat, etc. - Trash exchange program – every 5 pounds of trash = a cash value to residents
Legal/Policy	- Limiting the amount of electricity used by household (considering family size, income, etc.)
Services	- Recycling program - Compost program - Public transportation - Food banks or food/agriculture exchange programs
Sustainable Energy/Technology	- Urban and vertical farming - Grey water or recycled water from showers and drains that is filtered and used for urban agriculture or greenery - Repurposing ash and/or plastic into bricks for homes

DESIGNING FOR THE FUTURE

Name: _____

School: _____

What topic did your group get?

☐ SUSTAINABLE STRUCTURES ☐ PROTECTING HERITAGE & CULTURE ☐ EFFECTS OF CLIMATE CHANGE ☐ INCLUSIVE COMMUNITIES

What problem are you going to try and solve?   Problem # _____

Describe the problem in the box below!

What country are you in?
Who is affected?
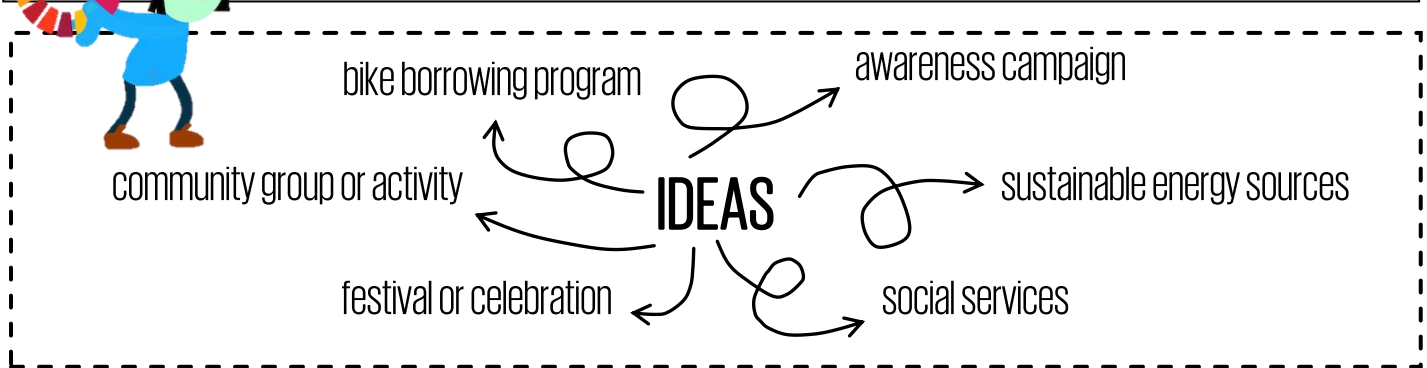
List 2 things that are making the problem worse!

What could help solve this problem? What could make it worse?

BETTER

WORSE

With your group, choose one of your ideas to make things better! Brainstorm it below!

Will you...
Change something?
Build something?
Teach something?
Stop something?

bike borrowing program

awareness campaign

community group or activity

IDEAS

sustainable energy sources

festival or celebration

social services

Use this sheet to sketch, doodle, and design your solution!

Once your group has come up with your solution, it's time to bring your idea to life!
Try building your design with the supply kits provided!