



Lesson Plan: Urban Forests in your Neighbourhood

Why teach this lesson plan?

Urban Forests are receiving more and more recognition due to their important role in mitigating and adapting to climate change. Urban forestry is a broad multi-disciplinary subject that reflects not only natural and ecological sciences but also many social, cultural, political, economic and technological factors that are relevant to Social Studies, as well as to Science. Our lesson on Urban Forests aim to provide you with the resources and information you need to teach your students about this important topic affecting everyone's lives today and in the future. It may open their eyes to important natural features and functions that they have never noticed before.

The Urban Forest lesson includes three Sessions incorporating indoor and outdoor learning opportunities, to engage students in hands-on activities such as measuring trees, mapping, and in-depth discussions on the importance of urban forests in helping to tackle climate change and what students can do to help the trees.

Session 1: Urban Forests 101

This session introduces what urban forests are and their importance at a neighbourhood level. Students will learn different ecosystem services that urban forests perform.

Session 2: Urban Forest Quest

Time to go outside! This session takes the students outside to a block adjacent to your school, to count the number of trees, measure their size, and observe canopy cover ('squirrel habitat'). Hands-on learning can help students engage with the topics and pique their interest.

Session 3: Habitat Mapping

This session is about identifying different 'habitats' or landscape types in the local urban forest, to estimate how much of an area is impermeable (eg. sidewalks and buildings) or permeable (eg. grass fields and gardens). The students will be using their observational and creative drawing skills to colour the different 'habitats' of their local neighbourhood.



Urban Forests

Introduction

What is an urban forest? Why are trees important? How do they help mitigate and adapt to climate change and improve people's health? This lesson plan answers these questions using exercises from the Citizen's Coolkit. The selected Coolkit activities introduce students to initial discussions about the urban forest within their neighbourhood, the role that trees and greenspace play in the urban environment, and how to map important features of the urban forest landscape in their community.

✓ Lesson Objectives

By the end of this lesson, students will be able to:

- Understand and define an 'urban forest'
- Understand why urban forests are important for people
- Observe and measure urban forests in their neighbourhood
- Identify different 'habitats' in urban forests with implications for future resilience
- Understand how urban forests can help climate-proof their neighbourhood
- Hold discussions with peers about their local urban forest

 **Time Requirements**
3 x 80 hour class periods

 **Materials Needed**

- Citizens Coolkit (full version: page 5, 16, 21) Can be found at:
http://calp2016.sites.olt.ubc.ca/files/2019/01/2019-Jan_Coolkit-Full-Version.pdf
- Projector or whiteboard
- PowerPoint slides
- Measuring tapes (over 2 m long)
- Colourful markers

Session 1: Urban Forests 101

1. 1. Objectives

- Understand and define an 'urban forest'
- Understand and explain why urban forests are important for us

1.2. In-class activity

1. Ask the students what their home and surrounding green environment looks like. Have the students talk about their answers in pairs or groups.
2. Ask the students if they know what an 'urban forest' is or what an 'urban forest' means to them. This is to get the students to begin thinking in a different context. Using a document camera projector or white board, write down their answers (eg. mind map).
3. Define an 'urban forest' and explain how the students' thoughts/answers tie into the definition.



urban forest: includes a variety of vegetation and landscape types such as parks, streetscapes, natural areas, and private yards, which together form a complex system of urban greenery (Citizens Coolkit, 2018)

Teacher's Guide: Coolkit Module

LOCAL LESSONS FOR A COOL CLIMATE

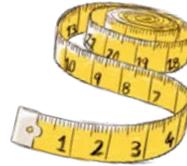


- 3.1. Alternatively, or in addition to step 3, you can show the students a short video that introduces urban forests -- <https://www.youtube.com/watch?v=jAnIzROqU9s>
- 3.2. Together as a class, brainstorm or research 'indicators of healthy urban forest'.
4. Ask the students what types of urban forests are near their home and why they think they are important. Have the students discuss in pairs or small groups. Students could be encouraged to look at their own street in Google Streetview, to help stimulate discussion. What sorts of trees can they identify, and how might they classify them?
5. Ask each pair/group to share one key observation from their discussion.
6. Explain why urban forests are important – e.g. for mitigating climate change and improving people's health. Use page 5 from the Coolkit for reference.
 - 6.1. For example, urban forests are important because they:
 - Help reduce flooding through increased infiltration rates;
 - Absorb carbon and create clean air for people;
 - Cool temperatures to help humans and wildlife as climates warm;
 - Provide habitats for wildlife (eg. squirrels and birds).
 - Provide health benefits through stress reduction and filtering air pollution





Session 2: Urban Forest Quest



2.1. Objectives

- Observe and measure urban forests in their neighbourhood

2.2. Preparation before Session 2:

- Inform the students before class that they will be going outside and to dress for the weather
- Select a suitable and safe stretch of adjacent or nearby street with street trees, that can accommodate your class of students
- Copy and print page 16 from the Coolkit for each pair/group
- Note: measuring tapes are required for this activity

Divide students into pairs or groups of 3. Head outside to the selected streetscape and complete the Urban Forest Quest on page 16 of the full Coolkit (the copies you printed). Once each group has completed the handout, head back inside the classroom to lead into the following discussion questions.

2.3. Discussion:

1. What is the importance of having a lot of trees?
2. What does having different sizes and species of trees indicate about an urban forest?
3. Why is it important to have a connected tree canopy? (Are non-native squirrels necessarily a good thing?)
4. What benefits do urban forests provide for us and why are they so important in today's changing environment? (eg. climate change). Revisit page 5 from the Coolkit, if needed.
5. How long do you think the existing trees will live? (Check Vanmap for tree locations and ages)
6. Could you use this exercise to engage your family or neighbourhood on urban forestry? How could you go about doing this? What would you do differently
7. How can we get people to take better care of trees, eg. during droughts, avoiding damage, calling city arborists if there are problems?

Homework (optional): Instruct the students to interview/speak to a family member, friend, or neighbour regarding the lesson taught today. Example interview questions (you can also print the questions with space provided to record each answer):

1. Do you know what an urban forest is? (If no, what do you think it is?) list examples.
2. In your opinion, has the urban forest in our neighbourhood changed significantly in the last few years? If so, how?
3. What are some ways we could get our neighbours to take better care of the trees in our neighbourhood?
4. What would you like to see different in our neighbourhood regarding trees or green spaces?



Session 3: Habitat Mapping



3.1. Objectives

- Identify different habitats in urban forests
- Understand how urban forests can play a role in tackling climate change
- Create discussions with peers about the urban forest in their neighbourhood

3.2. Preparation for Session 3:

- Using Google Earth/Maps, take an aerial screenshot of your school grounds and adjoining street. Print these screenshots (preferably 11x17).
- Print the Habitat Mapping handout on page 21 of the Coolkit.
- Note: colourful markers are required.

To pique students' interest in Activity 3, a **preview activity** (i.e. assigned a few days before you teach the lesson) is suggested:

Preview activity instructions: Go home tonight and take a picture of your street with your phone. If you do not have a phone, quickly draw your street view (you can also use Google Maps to draw the street). Include features such as houses, trees, shrubs, sidewalks, etc.

3.3. In-class activity:

If doing the preview activity: Ask your students to take out their preview activity. Then, proceed into a discussion about Vancouver's tree canopy cover. Refer to page 5 and 6 of the Coolkit and introduce information about Vancouver's tree canopy cover and its future goals and challenges. A "cheat sheet" to support this discussion is attached to this lesson plan for your convenience. Relate the city's goals and urban forest benefits to the students' pictures of their own streets.

Split the class into small groups and handout a Habitat Mapping handout (page 21 of Coolkit), the printed screenshot of your school, and four different coloured markers. Explain the four different 'habitats' on page 21 (squirrel, worm, pigeon, and car) and discuss why these features are important. Instruct the students to assign one colour to each 'habitat' and colour the appropriate area on the printed screenshot that corresponds with the 'habitat' then lead into a discussion with the following prompts:

1. Estimate the canopy cover ('squirrel habitat') as a percentage of the total area.
2. Estimate the area of pervious area ('worm habitat') as a percentage of the total area.
3. Might the amount of canopy cover affect property values of nearby houses? If so, positively or negatively?
4. Is this neighbourhood well adapted to climate change? Explain.
5. How would you improve this urban forest? What effects do your changes have on Questions 1 to 3?

Example discussion questions:

1. How does tree canopy cover provide benefits to human health?
 - Provides shade for humans
 - Reduces urban heat island effect
 - Intercepts precipitation and reduces amount of rainfall that has to be infiltrated into the ground/run-off into the ocean
2. Does the distribution of tree canopy cover matter? How?
 - Yes, because we want a world high in biodiversity and interconnected. Fragmented canopy cover reduces the amount and quality of ecosystem services that an urban forest can provide.
 - Typically, areas with lower household income have less access to green areas such as parks.

Teacher's Guide: Coolkit Module

LOCAL LESSONS FOR A COOL CLIMATE



3. How do roadways/pavement and buildings affect the surrounding urban forest?
 - Pavement reduces the space that trees can grow (ie. Roots cannot spread)
 - Construction sites impede on root space, hit trunks of trees, and chemicals can leach into the ground which trees can uptake.
4. What are some ways you can better integrate pavement and buildings with urban forests/greenspace?
 - Plan for trees to grow
 - Integrate green spaces into building design such as green roofs and green walls

Rubric:

5 – Understands and can explain what urban forests are, how they help mitigate climate change effects, and why they're important for ecosystem services and human health

4 – Understands what urban forests are and how they help with climate change

3 – Understands that urban forests are important

2 – Can define urban forests

1 – Participated in all activities





Urban Forests – ‘Cheat Sheet for Teacher’s’

WHO – You! Teachers, students, friends, or anyone in your neighbourhood can make a difference in helping mitigate climate change. We can do this by learning about what urban forests are, why they are beneficial to humans, how we can take care of our urban forests, and spread the message to our loved ones. Remember, little steps make big actions!

WHAT – Urban Forests are described as a “variety of vegetation and landscape types such as parks, streetscapes, natural areas, and private yards, which together form a complex system of urban greenery” (Citizen’s Coolkit, 2018). But essentially, urban forests are any plants or animals you see outside on your street. Examples include: trees, shrubs, garden plants and flowers, squirrels, birds, and more! Vancouver’s Urban Forest is made up of:

140, 000 street trees;

300, 000 park trees;

And an unknown number of trees on private land

Vancouver’s tree canopy cover is 18%, but the City is working to increase it to 22% by 2050!

WHEN – Now! We need to act now as a community in order to make a difference in helping mitigate climate change. Unfortunately, we are not able completely stop climate change. But good news – we are able to help *mitigate* the impacts that humans will face! However, we need to act quickly and change our lifestyle.

WHERE – On your own street. Climate change impacts are occurring right now, and you are able to see them on your own street. Examples include: an increasing number of cars, an increase in impermeable surfaces (e.g. concrete sidewalks and buildings), decreasing number of wildlife habitats (e.g. less trees).

WHY – Urban Forests play a critical role in helping mitigate climate change impacts. Urban Forests perform many important ecosystem services that help support and regulate our environment. Examples include:

1. Cooling the rising temperature in cities: The Urban Heat Island effect

- Climate change is increasing the global temperature and cities will feel the effect most. This is because cities are able to retain a lot of heat due to an abundance in concrete surfaces (e.g. buildings and sidewalks).

2. Sequester carbon

- As we release more carbon into the atmosphere, we need to increase the Earth’s ability to absorb it back, so all the carbon does not stay in the atmosphere. Trees are *carbon sinks* and can absorb carbon. If we reduce our carbon emissions and increase the number of trees we have, we can help mitigate climate change!

3. Create shade

- Climate change increases the chances of unpredictable weather events such as, heat waves. Not only with Urban Forests help mitigate the Urban Heat Island effect but they will help humans stay cool in potential heat waves by creating shade.

Teacher's Guide: Coolkit Module

LOCAL LESSONS FOR A COOL CLIMATE



4. Manage storm water

- As mentioned in **3. Create shade**, climate change is going to increase the chances of unpredictable weather such as, heavy rain storms. An increase of trees will increase permeable surfaces which will help intercept and filter storm water.

HOW – What can YOU do? Some actions that you can do to help urban forests are:

- Plant more trees
- Drive less and walk or bike more
- Tell your family, friends, and neighbours and create discussions about urban forests and how we can help mitigate climate change



Resources

Websites

Citizens Coolkit: A visual and fun guide for people to engage with family, friends, and neighbours on issues and solutions related to urban forestry and climate change on their block. Link: <http://calp.forestry.ubc.ca/home/urban-forestry-toolkit/> (soon transferred to the new Coolkit website – www.iCoolkit.net)