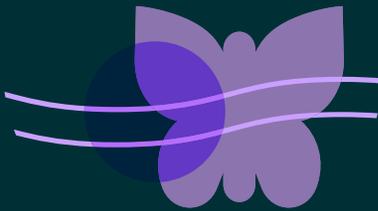
 exploring
causes  and
 solutions

This resource provides a summary of current best practices in CCE for elementary school teachers within the elementary Culture and Citizenship in Québec program (CCQ), and suggestions for how implement them. Teachers will also find a checklist with suggestions to integrate the required CCQ sub-themes with current best practices in climate change education.

Climate change is a complex and difficult problem that has no single, simple solution, and our values, beliefs, community and emotions inform how we understand the causes of the climate crisis, how it impacts all living beings and what are the possible actions we can take. Having hope, the capacity to envision a different future, think of ways to move towards it, and remain encouraged during this process, is directly linked to positive environmental behaviour (Ojala, 2013).

1

Connections
over fear

Teachers can draw on systems thinking (Meadows, 2008) to show students the different ways in which we are all connected and dependent on each other. Different elements such as human and non-human beings come together with different purposes, forming relationships. As students gain an understanding of the world they are a part of, they will feel more inspired to take actions to care for it (Kelsey & Armstrong, 2012).

2

Acknowledge and
explore emotions that
come up in dialogue

Elementary school age children can easily feel overwhelmed by climate change (Peacock 2004). Kids are naturally concerned for the wellbeing of humans and the environment, and are very sensitive to fairness. Climate change affects vulnerable populations in disproportionate ways. Make a point of encouraging students to feel and share their feelings about climate change. With sufficient support, even negative emotions can result in student driven initiatives and cultivate empowerment (Hicks & Bord, 2001). Whether these emotions sit uncomfortably or not, they are oftentimes at the centre of our critical thinking, discussion and the way we interact with ideas and experiences different from our own (Ojala, 2013). Educators must work alongside with students to help them develop coping strategies to address difficult emotions. These strategies include strengthening community connections, particularly with other individuals with similar concerns, and making a space for these emotions as they arise, regardless of what they may be.

- | | | |
|---|------------------------------------|---|
| 3 | Focus on successful, local actions | Encourage students to engage in activities in their local communities, including school communities. Specially in the younger grades, students do not need to be introduced to all of the world's ecological concerns at once. Focusing on local challenges and being part of tangible actions promotes empowerment (Armstrong, 2010). |
| 4 | Action-based learning | Action-based learning emphasizes hands-on, project-based learning. It helps students organize their thinking and learning and apply it to collaborative scenarios (Council of Europe, 2022). In CCE, it empowers students to identify a climate change impact they are concerned about or interested in their school and local community, and develop a plan to address it. . |
-

①

Make it personal and engaging

- Make climate change lessons personally relevant and meaningful for the student. Great ways to do this include using project-based learning and encouraging students to pick the causes and themes they are most passionate about.
- Design and draw on materials that are engaging to your targeted age group, such as narrative texts, science experiences, storytelling, and arts-based projects.

②

Focus on competencies rather than content

(Selby & Kagawa, 2010; Leichenko & O'Brien, 2020; Rousell & Cutter-Mackenzie-Knowles, 2020; Bryan, 2022).

- Our scientific understanding of climate change and the natural world is constantly evolving, as are environmental laws and practices, and how these are enacted by different people.
- Focus on widely-applicable and adaptable skill sets, such as critical thinking rather than content memorization that may quickly change in the future (Kawaga & Selby, 2012; Seo et al. 2020).

③

Integrate climate change education into as many subjects as possible

- Provide sustained integration of climate change concepts across various subjects and themes and over time. Projects are a great way to do this.
 - Examples of how CCE can be integrated in different subjects includes science experiences, storytelling and writing, painting, and photography among many others.
-

4

Encourage students to think of different conceptions of “a good life”

(Selby et Kagawa, 2010)

- Have conversations with students about what makes life good, and what we want our futures to look like for ourselves, our friends and families, communities, and all human and non-human beings. Present versions of good life that do not depend on consumption or profit and emphasize community and connection.

5

Use models to make sense of complex relationships

- Teach students to build flexible models that they can continue adding to over time. Use graphic organizers such as Venn diagrams, or concept maps. Come back to them at different points in lesson plans or learning evaluation situations (LES). They can include personal, cultural, ethical and scientific components (Linn et al., 2004).
 - Help students begin to develop awareness for the larger cultural, economic, and political power structures that we live in. By thinking critically about why we do the things that we do at individual and collective levels, we can question whether we want to change our actions (Slevin et al., 2020; Freire 2018).
 - You can use models to slowly introduce components to systems and visualize the relationships between them.
-

6

Prioritize local active learning

- Local, and tangible action results in greater individual behaviour and attitude changes.
- Help your students identify small ways in which they can act in their communities, moving from smaller community to the larger community i.e. home or classroom, school, neighbourhood, town/city. Activities can include but are not limited to create a vermicompost for the classroom, create information visuals for the school, build a school garden and bee hives, conduct waste audits, do clothes swaps, write to local government representatives etc.
- Create a platform, hub, newspaper or website that showcases student projects.

7

Draw on climate justice practices to help students understand local and global inequalities

- Climate change is inherently unjust, disproportionately affecting the most vulnerable communities and community members both locally and globally. In Quebec, these groups include Indigenous and Black communities, rural communities, unhoused community members, and the very young and very old. Acknowledging this reality can help prevent students realise that even if we do not think we feel climate change in our day-to-day, others around us most certainly do.
 - Draw both on examples close and far away from home to show how different people experience the climate crisis, and equally as important, examples of initiatives of different sizes that individuals have created to combat these inequalities.
-

8

Draw on a diversity of voices and experiences in Quebec, and outside of the province.

- Our worldviews, values and emotions shape how we experience and respond to climate change. These are influenced by the social environments we live in (Leichenko & O'Brien, 2020).
- Use audio, video and written accounts from different perspectives, such as publications from different news outlets, TikToks, etc. Different perspectives can support students to have intentional and nuanced conversations and debates.
- Prioritize including Indigenous voices, if possible, by inviting Indigenous speakers to class or reading/viewing/listening to material by Indigenous creators and other creators from oppressed communities.

9

Share examples of action at all levels: individual, collective and systemic
(Leichenko & O'Brien, 2020).

- Show students that action is always possible even if it is not at the level they would hope for (Yeghoian, 2022) and provide examples where this is already occurring such as through the work of individuals and local organizations.
- Show students how to measure and keep track of their changes in behaviour, such as through journalling, charting and calculators. These sorts of measurements can also be done for the entire class.
- If possible, develop partnerships with community organizations.

10

Go outside

- When possible, take the learning outdoors. Consider developing a garden or incorporating activities that can take place outside.
-

11

Address emotions

- Make space for emotional responses, that may range from denial, grief, hopelessness, to joy, hopefulness and conviction. Help students unpack their emotional responses- they can give indicators about interests, priorities and biases.
-

12

Reflect

- Encourage students to go through cycles of action and reflection.
 - Soyez attentifs aux idées préconçues et aux préjugés des élèves.
-

Activity name: _____ Learning aims: _____

CCE Best practices fostered	Targeted CCQ Sub-themes	Techniques employed
<input type="radio"/> Critical thinking and creativity	Cycle 1 <input type="radio"/> Self-awareness	<input type="radio"/> Practical, hands-on, experiential
<input type="radio"/> Fostering connections	<input type="radio"/> Relationships between individuals	<input type="radio"/> Student-directed learning
<input type="radio"/> Understanding inequalities	<input type="radio"/> Rituals and celebrations	<input type="radio"/> Dialogue
<input type="radio"/> Diversity of experiences	<input type="radio"/> Relationship to other living beings	<input type="radio"/> Systems thinking
<input type="radio"/> Critical thinking	Cycle 2 <input type="radio"/> Self-perception	<input type="radio"/> Interdisciplinary
	<input type="radio"/> Group dynamics	<input type="radio"/> Focus on skills over content
	<input type="radio"/> Existential questions	<input type="radio"/> Outdoor learning
	<input type="radio"/> Living environments	
	<input type="radio"/> Knowledge in digital spaces	
	Cycle 3 <input type="radio"/> Identity	
	<input type="radio"/> Collective life	
	<input type="radio"/> Opportunities to think about own lif	
	<input type="radio"/> Ecological transition	
	<input type="radio"/> Relationship to digital tools and spaces	

Note : The checklist below is adapted from Gobby and Newell-Macintosh's (2023) checklist for developing assignments and lectures based on the findings from their extensive literature review. This capsule's modified checklist integrates some of the items they identified with competencies from the CCQ, and is adapted to Elementary school.

- Armstrong, C. L. (2010). No tragedies before grade four? Expert opinion on teaching climate change to children (Master's thesis). Retrieved from <http://gradworks.umi.com/MR/69/MR69054.html>.
- Bryan, A. (2022). Pedagogy of the implicated: Advancing a social ecology of responsibility framework to promote deeper understanding of the climate crisis. *Pedagogy, Culture & Society, 30*(3), 329–348. <https://doi.org/10.1080/14681366.2021.1977979>
- Council of Europe. (n.d.). *The action-oriented approach*. Retrieved November 25, 2024, from <https://www.coe.int/en/web/common-european-framework-reference-languages/the-action-oriented-approach>
- Freire, P. (2018). *Pedagogy of the Oppressed: 50th Anniversary Edition* (D. Macedo, Trans.). Bloomsbury Publishing USA.
- Gobby, J., Newell-Macintosh & HPR faculty members of John Abbott College (2023). *Community energy engagement tool kit for sharing* [PDF]. Retrieved November 25, 2024, from <https://jengobby.wordpress.com/wp-content/uploads/2023/08/cee-tool-kit-for-sharing-1.pdf>
- Hicks, D., & Bord, A. (2001). Learning about Global Issues: Why most educators only make things worse. *Environmental Education Research, 7*(4), 413–425.
- Kelsey, E., & Armstrong, C. (2012). Finding hope in a world of environmental catastrophe. *Learning for sustainability in times of accelerating change, 187–200*.
- Leichenko, R., & O'Brien, K. (2020). Teaching climate change in the Anthropocene: An integrative approach. *Anthropocene, 30*, 100241. <https://doi.org/10.1016/j.ancene.2020.100241>
- Linn, M. C., Davis, E. A., & Eylon, B.-S. (2004). The Scaffolded Knowledge Integration Framework for Instruction. In *Internet Environments for Science Education*. Routledge.
- Meadows, D. H. (2008). *Thinking in systems: A primer*. D. Wright, Sustainability Institute (Ed). London, UK: Earthscan
- Ojala, M. (2013). Emotional awareness: On the importance of including emotional aspects in education for sustainable development (ESD). *Journal of Education for Sustainable Development, 7*(2), 167–182.
- Peacock, A. (2004). *Eco-literacy for primary schools*. Stoke on Trent, UK and Sterling, USA: Trentham Books.
- Rousell, D., & Cutter-Mackenzie-Knowles, A. (2020). A systematic review of climate change education: Giving children and young people a 'voice' and a 'hand' in redressing climate change. *Children's Geographies, 18*(2), 191–208. <https://doi.org/10.1080/14733285.2019.1614532>
- Selby, D., & Kagawa, F. (2010). Runaway Climate Change as Challenge to the 'Closing Circle' of Education for Sustainable Development. *Journal of Education for Sustainable Development, 4*(1), 37–50. <https://doi.org/10.1177/097340820900400111>
- Slevin, A., Elliott, R., Graves, R., Petticrew, C., & Popoff, A. (2020). Lessons from Freire: Towards a Pedagogy for Socio-Ecological Transformation. *Adult Learner: The Irish Journal of Adult and Community Education*.
- Seo, E., Ryu, J., & Hwang, S. (2020). Building key competencies into an environmental education curriculum using a modified Delphi approach in South Korea. *Environmental Education Research, 26*(6), 890–914. <https://doi.org/10.1080/13504622.2020.1733493>
- Yeghoian, A. (2022b, October 20). Talking with Green Teachers, *Episode 47: Climate literacy and resilience* (I. Shanahan, Interviewer) [Podcast].



Climate change results from a number of complex processes that impact all human and non-human beings on Earth. Activities in this module will provide students with background in some of the key concepts of climate change, and how it manifests in Quebec specifically. Students will engage in this exploration by looking at the role of colour in temperature regulation, the urban heat island effect, and colour as a tool for climate change understanding.

Cycles

2 and 3

CCQ Learning Progress Indicators

Observation of cultural realities

- Ask themselves comprehension questions
- Compare observations and information
- Assess the relevance of observations and information
- Identify information in documentary resources

Understanding of emotions

- Recognize different emotions
- Associate reactions with emotions
- Identify possible triggers for emotions
- Discern the emotions involved in forming points of view

Examination of points of view

- Identify points of view, the ideas they consist of and the reference points on which they are founded

Dialogue

- Put into place conditions conducive to interaction
- Support own ideas using different methods

Expression of own understanding

- Draw up findings based on comparing observations and taking into account emotions
- Develop responses that take into account the situation, oneself and others
- Justify own responses

Aims and learning goals

- Understand the roles of lighter and darker colours in heat absorption and reflection. Explore how these colours can contribute to heat island effects.
- Learn about other components of heat island effects, including vegetation.
- Consider the role of colours in data visualization- blues and greens often used to represent cooler, healthier environments while reds, oranges and yellows often represent higher temperatures, and extreme climate.
- Use colour to make data more compelling and to support their climate communication.

Colour is an accessible way to start conversations around climate with children. In the following three activities, students will begin to understand concepts of **heat absorption, reflection, heat islands, and how colour is used in data visualization** when communicating climate change. The retention of heat in the atmosphere and oceans (also referred to as heat sinks or heat reservoirs) and the reflection of light and heat by snow and ice (known as albedo) plays a huge part in the regulation of our planet's temperature. Forests and green areas are also involved in this heat dance- through transpiration, vegetation such as trees release water back into the air around them, cooling it. In urban areas, trees also provide some shade, reducing the amount of light that hits and is absorbed by buildings and pavement. The materials used in buildings and pavement tends to absorb a lot of heat, both because of their dark colours and the materials used in their construction. These urban areas with little vegetation, and lots of buildings and roads experience a **heat island effect**, resulting in much warmer temperatures than rural areas. Higher temperatures can be dangerous to everybody that lives in the heat island, and contributes to global increased temperatures especially in the summer months.

Colour and heat

Darker colours such as blacks, grays and browns (colours that feature prominently in our cities) **absorb all** wavelengths of light. This light is then converted to heat. Light colours (such as white snow) **reflect all** wavelengths of light, and therefore do not get as warm as dark colours. As a result of higher temperatures not only in cities but around the world, the amounts of snow and ice that cover the Earth are decreasing and are present for shorter amounts of time. As a result, more dark ground is present, and the planet is absorbing more heat, which in turn increases the temperature even further, resulting in a **feedback loop**. Colours also play a part in how scientists, artists, politicians and community members communicate information around climate change. As with stoplights, most people in western countries associate green with good, and red with danger. In temperature maps, blues and greens are often used to represent healthier environments while yellows, oranges and reds often represent more extreme or dangerous environments. Blues are also used to represent cooler temperatures, and orange and red with warmer temperatures. For example, blue and red stripes are used in "warming stripes", a type of visualization of used to show how temperatures have increased over time.

1

the albedo effect

module 1

Activity presentation

In this activity, students will explore how light and dark colours impact temperature. The ability of surfaces to absorb and reflect light known as the albedo effect, is an essential part of beginning to understand climate change. At a global level, the albedo effect is involved in decreasing ice and snow cover, increasing temperatures in the Arctic and impacting global climate.

Materials

-  2 containers or shoeboxes
-  2 Heat lamps or lamps with non-LED (for adaptation see activity breakdown)
-  2 oven thermometers
-  Ice cubes
-  Appendix Ia: Albedo sheet
-  2 small transparent plastic containers
-  Sheets of black paper
-  Sheets of white paper to cover the inside of the boxes

Activity breakdown

①

Let students know you will be looking at colours and how they relate to temperature. *Ask students to describe what the seasons are like in Quebec. Is it warm? Is it cold, and is there snow?* Across Quebec in 2024, temperatures ranged from below -20 degrees Celsius to above 30 degrees Celsius!

②

Ask the students to reflect on the colours they associate with winter, drawing special attention to the colour of snow, and the colour of the coats they see most often in the winter. Students may point out that snow is white and that many people wear dark colours in the winter. *Ask students why they think lots of people wear dark colours in the winter.*

- 3 Cut the white and black sheets of paper to fit inside the cardboard boxes. Place the white sheets in one box (box 1) and the black sheets in the other (box 2) to cover the inside of the boxes. In each box, put one small transparent container with equal amounts of ice. *Note For a quicker activity, place only one ice cube.* If available, place a thermometer in each of the two boxes, next to the plastic container. Finally, secure the heat lamps around 12 inches above the boxes, reminding students to avoid touching the lamps. *Note If you do not have access to heat lamps and temperatures allow, conduct the activity outdoors.*

- 4 Explain to the students that you are going to observe how light and dark colours impact temperature. *Ask students to make guesses on whether the ice in box 1 or box 2 will melt more quickly and why.*

- 5 Observe the boxes every 10-20 minutes for a period of one hour, depending on the room temperature and how much ice you put in the container. Each time, record the temperature on the thermometer using the accompanying sheet. *Note If you have light sensors, you can also measure the amount of light(lux) reflected in each box.*

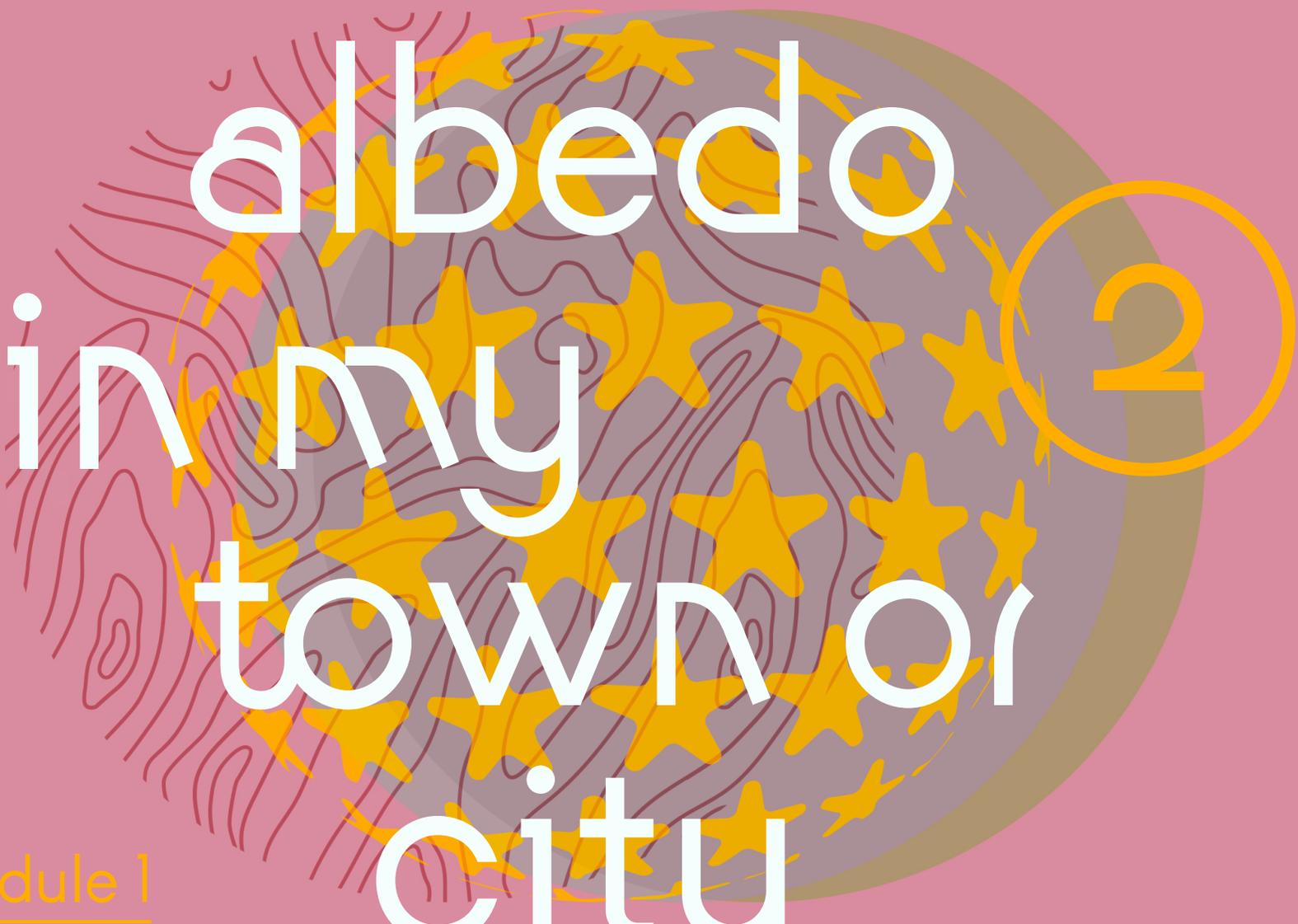
- 6 Students will see that the overall temperature was slightly higher in box 2 (the black box) than in box 1 (the white box), and that the ice in box 2 will have melted more quickly. *Ask students why they think that is, thinking back to the colour of winter coats.*

Conclusion

Explain to students that darker colours such as blacks, grays and browns (colours that feature prominently in our cities) **absorb** light, which then becomes heat. Light colours (such as white snow) **reflect** light, and therefore do not get as warm as dark colours. This is called **albedo**. Dark colours are said to have a **low albedo** and light colours a **high albedo**. At a global level, the decrease of ice sheets and snow over ocean water in the arctic means less light is being reflected. Simultaneously, the exposed ocean and ground has a lower albedo, absorbing heat and contributing to further rising temperatures. In the next activity, students will continue exploring albedo and discover its role in rising temperatures in their hometowns and cities.

Heat island effect :

albedo
in my
town or
city



module 1

Activity presentation

In this activity, students will apply their understanding of albedo to their own towns and cities and explore how this effect impacts climates at small and large scales. Albedo is a large part of the phenomenon of **urban heat islands (UHI)**. Understanding how heat islands develop and their impact on the well-being of everyone who lives in these heat islands, as well as potential solutions, provides students with a micro-example of climate change and its potential impacts.

Materials

Ⓐ Appendix 1b: Images of surfaces with different albedo: asphalt, forests, grass, soil, ocean, desert sand, ice, snow

Activity breakdown

1

In the *Albedo effect* activity above, students understood that darker colours have a low albedo, and lighter colours have a high albedo. Surfaces with high albedo like snow, reflect light and therefore do not heat up as much as surfaces with low albedo, like asphalt. In this activity, students will apply what they have learned by exploring the albedo of different types of surfaces, and how these impact the temperature of their hometowns or cities.

- ② Separate your class into small teams of 3-5. Print one set of the images included for each group. Conversely, you may choose to display them on a screen if available.

- ③ *Ask students to rank the images from lowest albedo to highest albedo and explain their reasoning.*
Lowest albedo – asphalt → ocean → forest → grass → sand → ice → snow – Highest albedo

- ④ *Ask students if they have seen the albedo effect around their neighbourhood. For example, if they walk pets, have they ever had to make sure the ground outside wasn't too hot for them?*

- ⑤ Explain to students that in urban spaces like cities, most of the surfaces have a low albedo, such paved roads, buildings and parking lots. The materials used in buildings and pavement tends to absorb a lot of heat, both because of their dark colours and the materials used in their construction. These urban areas with little vegetation and lots of buildings and roads trap heat, becoming **heat islands**, resulting in much warmer temperatures than rural areas. For example, Montreal's temperature has been recorded as being over 10 degrees Celsius warmer than it's surrounding rural areas in the summer (Ville de Montréal, n.d.)

Activity breakdown (continued)

6

Students may point out that oceans and forests have high albedo effects as well, but we typically think about “nature” broadly, and forests as “good for the environment”. Remind students that global climate is maintained through relationships, and that it is largely human-caused changes that have led to drastic changes in a very short period of time. For example, forests help maintain cooler temperatures through the process of transpiration. In the same way that sweat helps cool our bodies down, transpiration cools down temperatures in forested areas.

7

Ask students why they think heat islands can be dangerous to human and non-human beings..

Conclusion

Explain that albedo can have an impact on both **micro** (small-scale) and macro (large- scale) climates. As an extension to this activity, students can conduct an analysis of what types of surfaces are most common in their school or community. Students can develop proposals for school administrations and local politicians to reduce local heat island effects.



commu-
nicating
through
colour

3

Activity presentation

In this activity, students will use colour theory and their acquired knowledge about the albedo effect to create material to increase awareness of the urban heat island (UHI) effect within their school and larger community.

Materials

-  Warming stripes website
-  Colouring materials
-  Posters, banners or sheets of paper
-  Appendix 1c: Communicating through colour

Activity breakdown

①

Ask students to look around the room and identify the different colours that surround them, drawing attention in particular to green, blue, yellow, orange and red. *Ask students how the different colours make them feel, and why.* Teachers may want to use the colours included in this toolkit. *How would students visualize or indicate that something is hot or cold?*

②

Explain to students that colour plays an important role in climate change both in understanding the causes and effects of climate change, but also in how it is communicated. This is done through **colour theory**. Throughout history colours have had different meanings to different peoples. In Quebec, as in most Western societies, cool colours like green and blue indicate nature, calm and cold. Warm colours like yellows, oranges and reds many times represent energy, heat, and danger. Even within the same communities and cultures, the same colours can give different feelings. For example, red can indicate both danger and love in images and advertisements in Quebec, and yellow can represent both caution and happiness.

Activity breakdown (continued)

3

*Using the provided graphic organizer, ask students to consider what colours they would use to create visual explainers or posters about heat islands for their school and community. Ask students to consider not only their own opinions, but also their targeted audiences. You can use examples such as Ed Hawkins' *Climate stripes* (Hawkins, n.d.), which show progressions of cooler (blue) to warmer (red) stripes over time to indicate increases in temperatures.*

4

Invite students to create these materials using what they have learned so far about UHIs and climate change broadly. ^{Note:} You might choose to do this activity later in the term or year if you would like students to create materials on different themes and learnings about climate change.

Conclusion

Explain to students that facilitating climate conversations with others is part of everyone's responsibilities. However, to do so successfully, we need to consider different people's experiences and interests. We can also draw on as many tools as possible, including creating visually interesting material that uses colours in engaging and emotive ways.



Human-caused climate change is not caused by any single action. Instead, it is the result of many events and systems that put pressure on the planet's delicate balance, causing feedback loops that change the climate. Feedback loops are like circles where an event happens, and its results impact what happens next. In this module, students will begin to explore connections between humans and other beings on this planet.

Cycles

2 and 3

Connections to the CCQ

Observation of cultural realities

- Ask themselves comprehension questions
- Ask themselves philosophical and ethical questions
- Make observations in their extended cultural environment
- Make observations about Quebec society
- Compare observations and information
- Characterize relationships between people, groups or institutions

Examination of points of view

- Identify discrepancies or tensions
- Identify points of view, the ideas they consist of and the reference points on which they are founded
- Compare ideas while identifying different reasoning errors

Dialogue

- Put into place conditions conducive to interaction
- Consider own feelings
- Inquire about the ideas of others

Expression of own understanding

- Draw up findings based on comparing observations and taking into account emotions

Aims and learning goals

- Develop an understanding for different systems and their role in them
- Explore elements in the clothing industry

Recognizing the interconnected nature of this world is foundational to climate change education. It provides us with information about the intricate relationships that make the world work. Students can use **systems thinking** to identify interconnected **elements** that work together with a purpose (Meadows, 2008). In order to achieve their purpose, they form **connections** or relationships. In the case of CCE, we can think of systems at many different scales, ranging from a school garden to the planet Earth, as well as systems of education, production, and consumption among others. The causes and responses to climate are influenced by our economic choices, politics, science, and culture amongst others. We can also explore how these systems change over time, from weeks to millions of years. Because climate change occurs at all of these scales, systems thinking can help teach in and about climate change and is an especially helpful tool to map out all of the different elements that come together on planet Earth. These elements can range from individual organisms in ecosystems, to large scale interactions between countries. Elements can be living or non-living, a distinction that varies across communities and cultures.

Systems exist in a state of **balance**. When there is a change either in the elements or in the connections they form, it can cause the system to become unbalanced, and change. Systems are resilient and will try to restore balance to themselves but if too many changes occur too quickly, they may not be able to return to their previous state of balance. Global climate change is the result of many systems changing at an unprecedented rate. The good news is that all these systems also represent multiple points of entry into positive climate action. The activities in this module will encourage students to explore connections between different non-human and human beings. Positive learning and environmental behaviour as students understand themselves as being a part of larger systems and see the relationships, we all share.



connecting with the outside

module 2

1

This short, outdoor activity invites students to use their senses to appreciate their connection to others, and the natural and human worlds. While this activity is great outdoors near forests and water, it also works well in any outdoor setting, including in the middle of a city. It is adapted from a grounding technique often credited to therapist Betty Alice Erickson. Understanding humans' roles and responsibilities within climate change requires us to see each ourselves as part of this world and not apart from it. This grounding exercise invites students to begin noticing the world they are living in. In the next activity, students will begin to draw connections between themselves and this world. This activity can be done as often as desired.

Activity breakdown

①

Invite students to sit outside on the ground. Take a few deep breaths together. Let the students know you will be asking them to notice three things around them with different senses. Depending on group size and age, teachers may ask students to share one or several of their three things.

②

Ask students to take note of three things or beings they see around them. These can include beings like fellow students, animals or plants. They can also include the sky, clouds, cars, or buildings.

③

Ask students to identify two things they can feel. This may include the ground under their feet, grass under their hands, the sun or wind on their face, or their clothing or shoes on their body.

④

Ask students to think of one thing they can hear. These may include animal or bird sounds, movement of coughing of a friend, a body of water, or cars and people talking.

⑤

*Discuss with students how they felt doing this activity. *Did they notice something different from what they usually notice? How did the activity make them feel?**

Conclusion

Explain to students that we are always existing with many other humans, animals, plants, and other parts of our world such as the sun, clouds, air, and bodies of water. We depend on each other in many ways. Humans for example, depend on many of these elements and beings for many things from food and clothing, to shelter and beauty. In the following activities, students will explore this connection further.

module 2

connecting through yarn

2

Activity 2: Connecting through yarn

Activity presentation

Note : This facilitation tool is widely used in different educational and community spaces. It is a simple and effective way to demonstrate how individuals in a group are connected. It has been adapted to meet this module's learning aims.

In this activity, students will take some of the elements that they recognized in the previous activity, as well as other human and non-human beings, and consider how they are related to each other. Recognizing the relationships between human and non-human beings, and the impacts of human action on these relationships is a core aim of climate change education. As young students begin to see themselves as part of this world rather than apart from it, it can set the stage for further and larger conversations of our responsibilities towards each other and the Earth.

Matériaux



1-2 large balls of yarn or thread



Words or images of different animals, plants and things in your community

Activity breakdown

1

Give each student a word or image of an animal, plant or other thing that they might have seen in the previous activity, “Connecting with the outside”. Make sure to include other elements that exist in your community but that students may not have noticed. These can include different human and non-human beings, as well as cars, and elements such as the sun, wind, clouds and rain.

Activity breakdown (continued)

2

Ask all students to stand in a circle.

3

Students will now pass around a ball of yarn, connecting their own card to another, holding onto the end of the ball, thus creating a web. For younger students, teachers may create a story that incorporates all of the cards, demonstrating their connections. For instance, the sun shines brightly on the tree, which then provided shade to a kid reading a book. Older students can be invited to think of the connections themselves. However, try to encourage students to pass the ball to every student once, so that everyone has a chance to participate in the web.

4

After the ball of yarn has run out, or every card has been used, invite the students to admire the web they have created.

Conclusion

Explain to students that this web represents a web of life, or the ways in which all living beings are connected to each other. Ask one of the students to tug on the string they are holding onto. Students should be able to see that movement in one part of the web will affect every other part of the web. The elements that are closest to the tug will feel it more intensely, but the movement will reverberate through the entire web. If a string is tugged on hard enough, or too many students pull on it at the same time, a student might let go of the web, causing the web to falter or collapse, or the string to break apart. Explain to students that this symbolizes what happens when some relationships are out of balance. Think together what sorts of actions the tugging could represent.

what's in a t-shirt?

module 2

3

Activity presentation

In this activity, students will begin thinking about the lifecycle of clothing. They will trace the paths that a single article of clothing took from the country/area of manufacture, to where it was purchased. This activity serves as a steppingstone to a larger discussion on the true environmental and social cost of clothing.

Materials

-  One t-shirt per student (preferably a loved shirt)
-  Appendix 2a: What's in a t-shirt
-  Appendix 2b: Map of the world
-  Appendix 2c: A t-shirt's web of connections

Activity breakdown

1

Let the students know that through this activity, they will begin to think through all the human and non-human beings that come together to create the clothes that we are wearing. Clothing is universal to nearly every single human being on the planet. It can be a form of self expression, a demonstration of faith, and an absolutely necessity to protect us from the elements! *Ask students where they think their clothing comes from.* Take note of some of the ideas, which may include the store, family, friends or factories. Ask students if they have any idea how much t-shirts can cost. Work with students to establish a consensus definition of cost. At this point, cost may mean only how much someone may pay for a t-shirt.

②

Using the included sheets, ask students to estimate how much each of the categories might cost. *Ask why students chose that amount.* Students will then look into the cost of different t-shirts to determine how different locations or brands will price a t-shirt. Students can do this research, can be provided with the information. It is important to note that prices may differ greatly in different towns or cities and can spark conversations with students about why this might be. For example in Montreal in 2024,

- Second hand/thrift store: 5 - 8 \$
- “Affordable” retail brand (like Old Navy): 10 - 20 \$
- “Expensive” retail brand (like La Baie): 30 - 40 \$
- “Ethical” or “sustainable” brand: 40 - 200 \$
- “Fashion” brand 500 - 1500 \$

③

Once students have completed their organizer, *ask why there might be such a difference in the price range. What makes the expensive t-shirts more expensive, and the affordable shirts affordable? Are the expensive shirts “better”?*

④

Students will now use their own favourite t-shirt to consider how interconnected human and non-human beings (such as animals and plants) come together in a single t-shirt. Ask the students to read the labels and tags on the t-shirt and try to extract as much information as possible. This information might include the material in percentages (for example 60% cotton, 40% polyester), where it was made, and the care instructions, sometimes written out in words, sometimes in symbols).

Activity breakdown (continued)

5

Have a discussion on what the clothes are made of. Explain how natural fibres can come from plants and animals (such as cotton and wool), while synthetic fibres are man-made, and are made of plastics. If available, invite the students to look at and touch examples of these materials. *Ask students how they think that materials are related to the well-being of the Earth.* Some examples of conversation could be what is required to produce and make these materials, including planting, harvesting and weaving these materials.

6

Using the map, ask students to identify where their shirt was made. *Are they familiar with this country? Have they heard of it before? How far away is it from their home town or city?*

7

Drawing on the second activity in this module (connecting through yarn) ask students to reflect on who and what have been involved in the creation of their t-shirt from its inception to their hands. Use Appendix 2c- *A T-shirt's web of connections* to visualize these connections.

Conclusion

Explain to students that there are thousands of people involved in different processes of the clothing industry across the entire planet. All of the processes involved in making clothing requiring a lot of energy and resources and generate waste. In the next module, we will consider how some types of waste can be rethought and repurposed.



Waste generation and management is both a cause and effect of the climate crisis. This module will encourage students to explore the type, amount, and frequency of waste that is generated in their community and consider different ways to engage with it.

Cycle	CCQ Learning Progress Indicators	Aims and learning goals
-------	----------------------------------	-------------------------

3

Observation of cultural realities

- Ask themselves comprehension questions
- Compare observations and information
- Assess the relevance of observations and information
- Identify information in documentary resources

Understanding of emotions

- Recognize different emotions
- Associate reactions with emotions
- Identify possible triggers for emotions
- Discern the emotions involved in forming points of view

Examination of points of viewer

- Identify points of view, the ideas they consist of and the reference points on which they are founded

Dialogue

- Put into place conditions conducive to interaction
- Support own ideas using different methods

Expression of own understanding

- Draw up findings based on comparing observations and taking into account emotions
- Develop responses that take into account the situation, oneself and others
- Justify own responses

- Determine how much waste is created in a learning space, and how that waste might be reduced.
- Determine what makes materials that become waste so popular, particularly plastic.
- Come up with alternatives for the waste generated in the learning space and consider strategies to divert this waste.

In the previous module, students began to think about the different elements that are part of a system. A balanced system does not produce **waste**. Waste is a product that cannot be transformed into something else that can be used by another being. In 2022, Quebec produced almost 3 million tons of waste (Statistics Canada, 2024)! Although the province has several programs in place to reduce or divert waste, the amount of waste we produce yearly has continued to increase (BAPE, 2022) This module will encourage students to think about the waste that is generated in their learning spaces. Students may not have yet spent much time thinking about the packaging of the materials they use in the classroom. As they collect, classify and identify these materials, the students will begin to understand why this material is used, and try to come up with alternatives to decrease its

use. Most of the waste we produce is what we call trash, waste that presently does not serve the other earth inhabitants. Humans continuously generate more and more waste, and this amount is not expected to start decreasing until after 2100, when we will be producing an estimated 11 million tons of trash per day (Stromberg, 2013). Not only is this amount increasing, but the type of waste that is generated has been changing dramatically over the years. Most of the things we use in our daily life are made to be disposable, or we simply treat them as such. They are made of petroleum-based materials, such as plastics. Therefore, recycling is an important part of waste management, but it is not the solution. Waste will continue being a growing concern for humanity. One of the steps we can take to address it, is to better understand the waste we produce.

module 3



waste audit

1

Activity presentation

In this activity students will conduct a waste audit. Waste audits are important tools to get an understanding of the quantity and composition of waste, as well as how it changes over time. RECYC-QUEBEC has twelve categories (Boucher, 2024), but waste audits in schools can be more simplified. After identifying the types of “waste” their class generates in the first activity, students will then use some of the materials to create art.

Materials

-  Scales to weigh the waste
-  Gloves for students or teachers
-  Access to recycling, trash and composting
-  Graphic organizer

Activity breakdown

①

Explain to students that they will conduct a waste audit in their learning space. This can be a community space, a classroom, or even an entire school depending on the number of students and the amount of time available. Whether the audit is conducted in one day or over the space of several days to a week depends on the amount and type of waste generated in the space.

- ② As a class, collect waste generated from a classroom or community space. How you collect the material depends on the space and the type of bags used in the space. For example, it is easiest if your school uses clear trash bags. If the school does not, only collect recyclables bags or classroom wastebins. Make sure to wear gloves.

- ③ Ensure there are no sharp objects, decaying food or any material with bodily fluids. As a class, sort the waste. *Ask the students if they are able to easily identify sealed bags (for example, recycling). Was there any waste you might dispose of in another way? How much of the waste consists of food?*

- ④ Use the provided sheet to classify the waste into different categories, depending on the waste management of the learning space. These categories might be recyclables (sorted into glass, cardboard and paper and plastics), organics (if there is a composting system in place), and landfill. Ask students to identify what type of waste goes in each category in your municipality, and whether *Ask if these are useful categories? Does the waste fit neatly into them? Is the waste sorted "properly"?*

- ⑤ Once the waste has been sorted into categories, students will rank the waste based on which is most common. Students should decide how they will determine the rank of the waste- for instance, they may choose to count the pieces or weigh the waste if there are scales available. *Ask if there any challenges in trying to determine how to rank them.*

Activity breakdown (continued)

6

Ask students to determine what they think the waste materials were used for. *Is there an alternative that could be used that would not have to go to landfill or go into a recycling bin? Alternatives could include using already existent materials in different ways, or coming up with entirely new materials. Ask students if they can come up with other uses for the materials they have identified through the bags.*

Conclusion

Explain to students that findings from waste audits can give us a lot of important information. We are oftentimes not aware of how much stuff we're throwing away. Conducting a waste audit gives us a clear visual of not only the amount, but the types of waste that are generated. Once we have a clearer idea of the type of waste that is created in a space we can come up with strategies to reduce waste, and repurpose the waste that is already created.



the museum of found art

2

module 3

Activity presentation

Introduce the concept of found object art, where objects are found by artists and then used to make art. These objects can be absolutely anything, but for this lesson, students will be using materials that we typically think of as “trash”, and creating artwork from them. In the process, students will also have conversations about what trash really is.

Materials

-  Clean recyclable materials from waste audit
-  Broken toys or classroom materials
-  Arts and crafts scraps
-  Old clothes
-  Graphic organizer

Activity breakdown

Note : In preparation for this activity, ask to collect broken materials, and clean recyclables from neighbouring classrooms or from students' homes. Ensure that these materials are not toxic, sharp, or dangerous to manipulate.

1

Explain to students that one way to reduce all the waste that goes to landfill is to reframe how we think about the materials that we usually throw away. These materials can be repurposed in many ways, including as art.

2

Ask students what they think of when they think of art. Introduce the concept of **found object art**, where objects are found by artists and then used to make art. These objects can be absolutely anything, but for this lesson, students will be using materials that we typically think of as “trash”. This can include empty plastic containers, dry ad empty pens and markers, scraps from art activities, cardboard and paper, amongst others.

Activity breakdown (continued)

3

Show students some examples of found art.

4

Lay out the found objects from the previous activity, as well as any other materials you collected. Make sure to point out which objects the students found in their waste audit.

5

Using the graphic organizer provided, ask students to draw out a piece of art that they could create using some of the found objects. Ask students to describe their drawing, and write out how they are using the objects. *Ask students which objects are best suited to their piece. How do the objects change as they are combined?*

6

Once students have drawn a draft of their art, provide time to construct the pieces.

7

Once the artworks are completed, organize a gallery walk where students can walk around and view each other's creations. *Ask students if how they viewed the "trash" changed throughout the activity.*

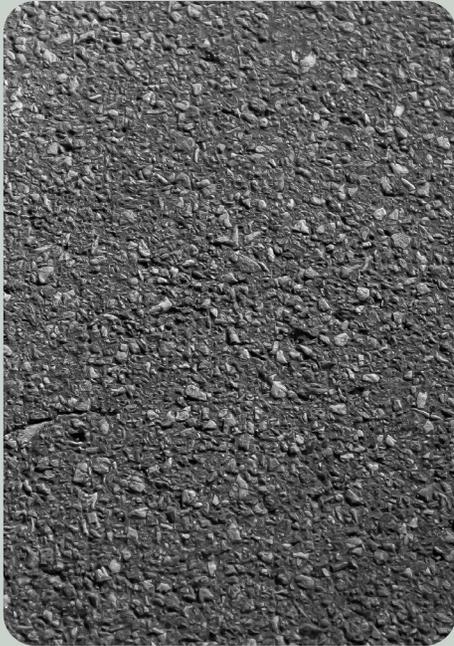
Conclusion

Explain to students that what we consider "unusable" depends entirely on our beliefs and values. Activities such as these allow us to reframe how we view trash.



graphic
organizers



















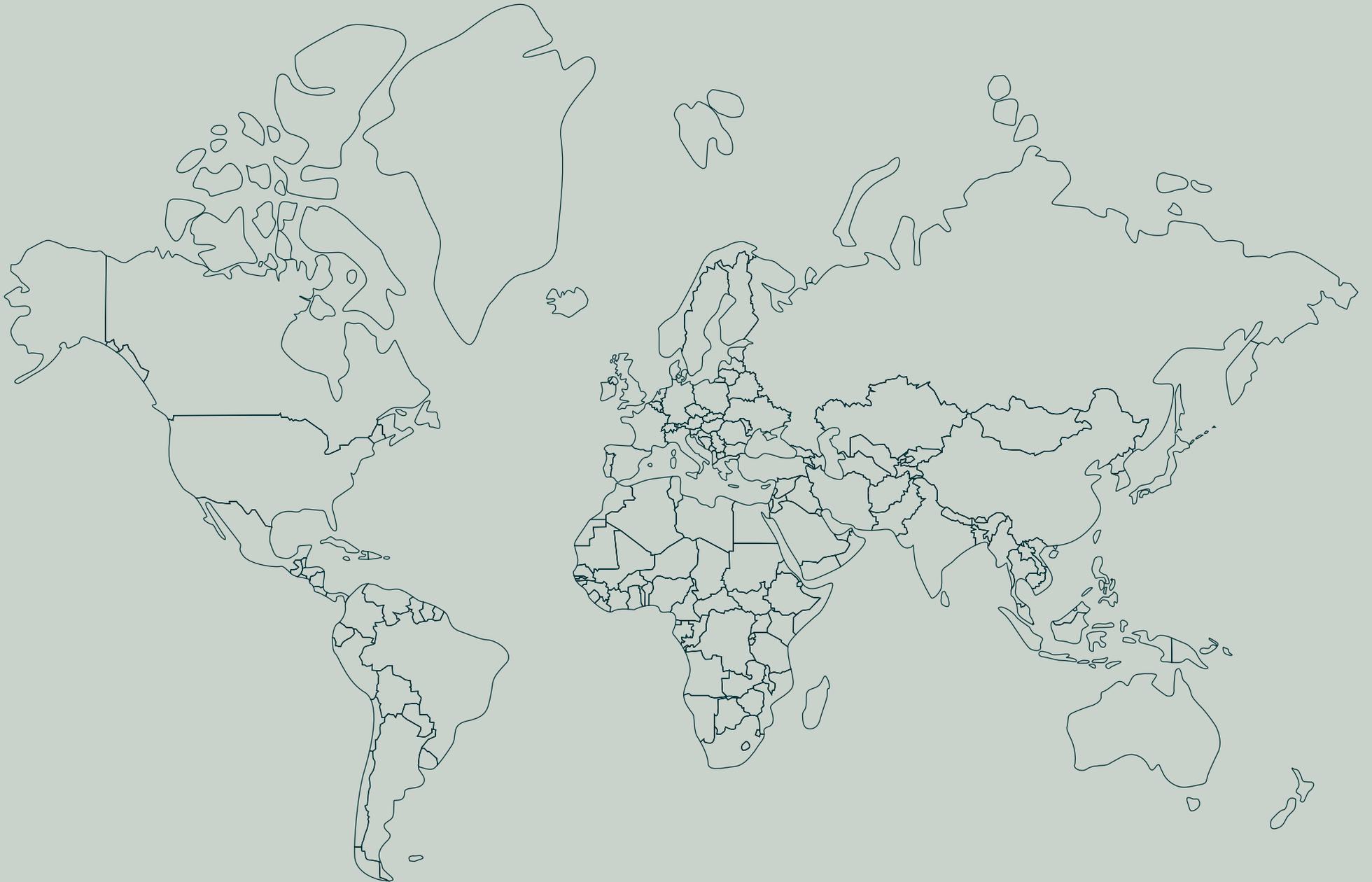


Albedo

Colour theory sheet

My visual explainer





How much does a t-shirt cost?

Where does shirt come from?

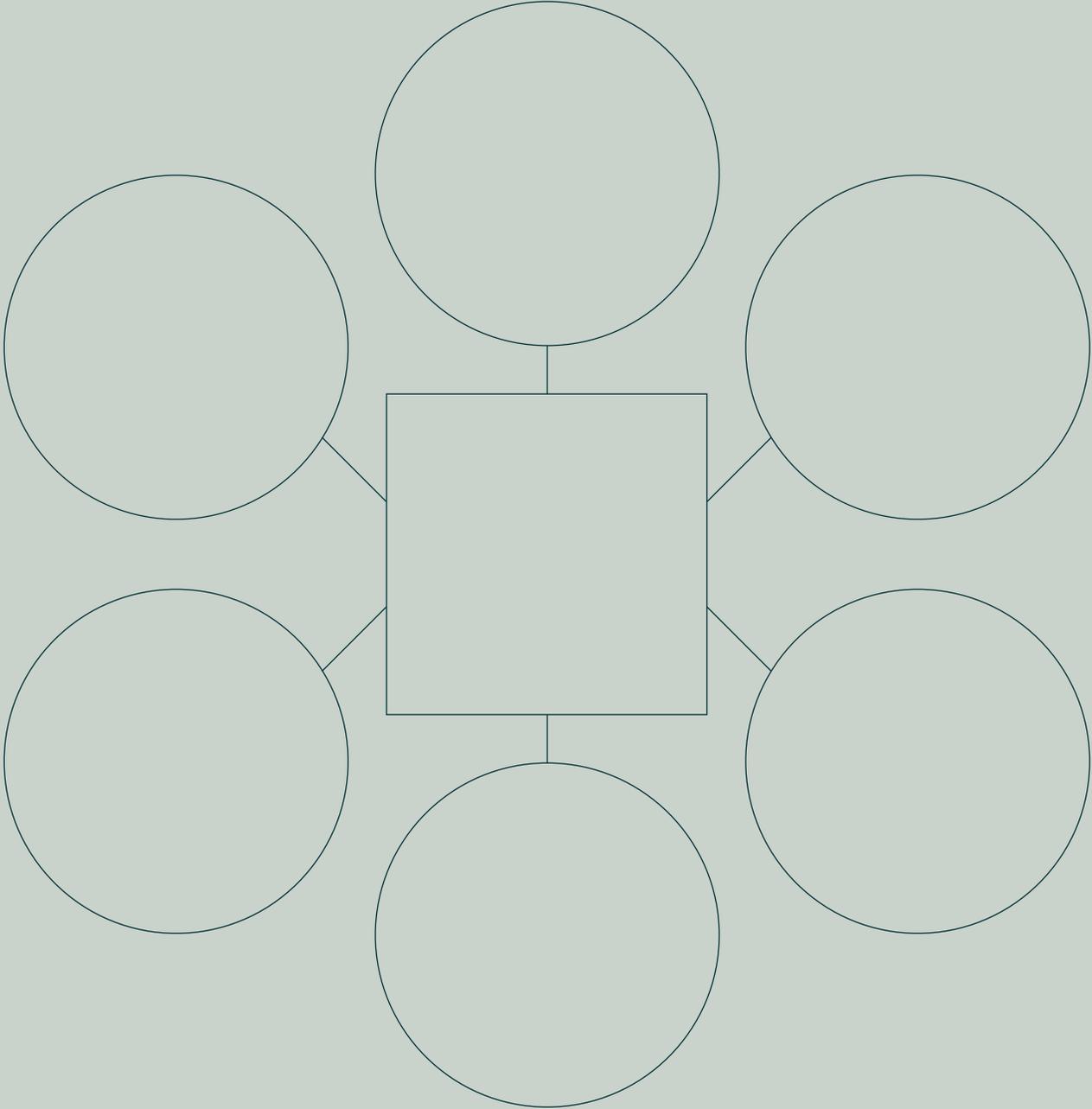
Gifted
Second hand/thrift store
"Affordable" retail brand (like Old Navy)
"Expensive" retail brand (like Simons)
"Ethical" or "sustainable" brand
"Fashion" brand

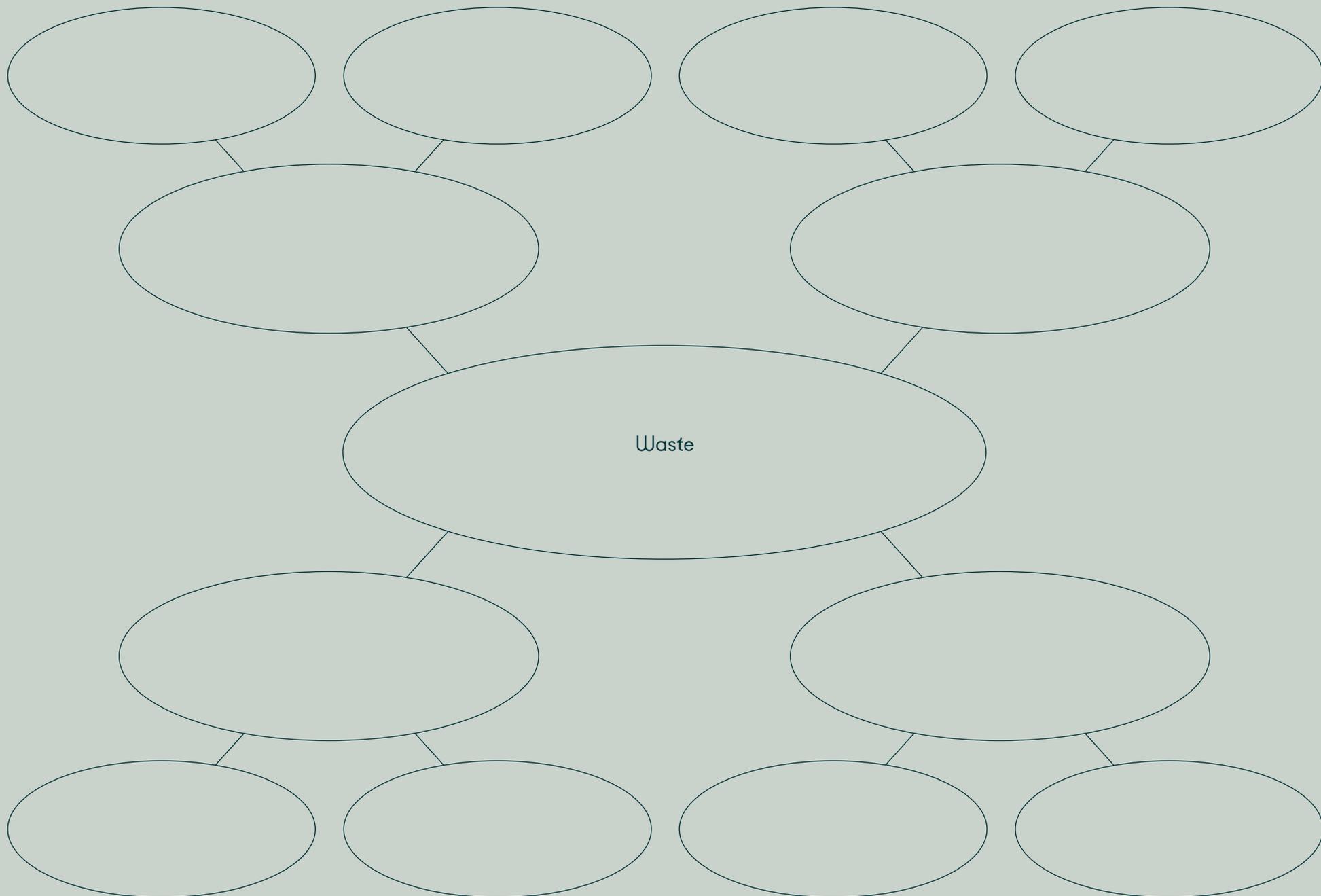
How much I think it costs

How much it costs

Why do you think there is such a difference in price ranges?

Web de connexions : un t-shirt





My found art

Found objects I am using: _____

A large, empty white rounded rectangle with rounded corners, occupying most of the page below the text. It is intended for students to draw or write their found art and the objects they are using.

References

Boucher, M-K. (2024, Nov. 1). *Quebec's provincial waste audit- Trash talk* [Presentation]. Beyond the grave: A circular All Hallows' Eve, Alberta. [Quebec.ca/en/education/preschool-elementary-and-secondary-schools/quebec-education-program/elementary/culture-citizenship-quebec](https://quebec.ca/en/education/preschool-elementary-and-secondary-schools/quebec-education-program/elementary/culture-citizenship-quebec)

Bureau d'audiences publiques sur l'environnement (BAPE). (2002). *[Site inventory and final waste management: Inquiry and public hearing report summary]* [PDF]. Retrieved from <https://voute.bape.gouv.qc.ca/dl?id=00000274296>

Hawkins, E. (n.d.). *Show your stripes*. Retrieved November 25, 2024, from <https://showyourstripes.info>

Meadows, D. H. (2008). *Thinking in systems: A primer*. D. Wright, Sustainability Institute (Ed). London, UK: Earthscan

Stromberg, J. (2013, October 30). *When will we hit peak garbage?* Retrieved from <https://www.smithsonianmag.com/science-nature/when-will-we-hit-peak-garbage-7074398>

Ville de Montréal. (n.d.). *Îlots de chaleur*. Montréal Open Data Portal. Retrieved November 25, 2024, from <https://donnees.montreal.ca/dataset/ilots-de-chaleur>