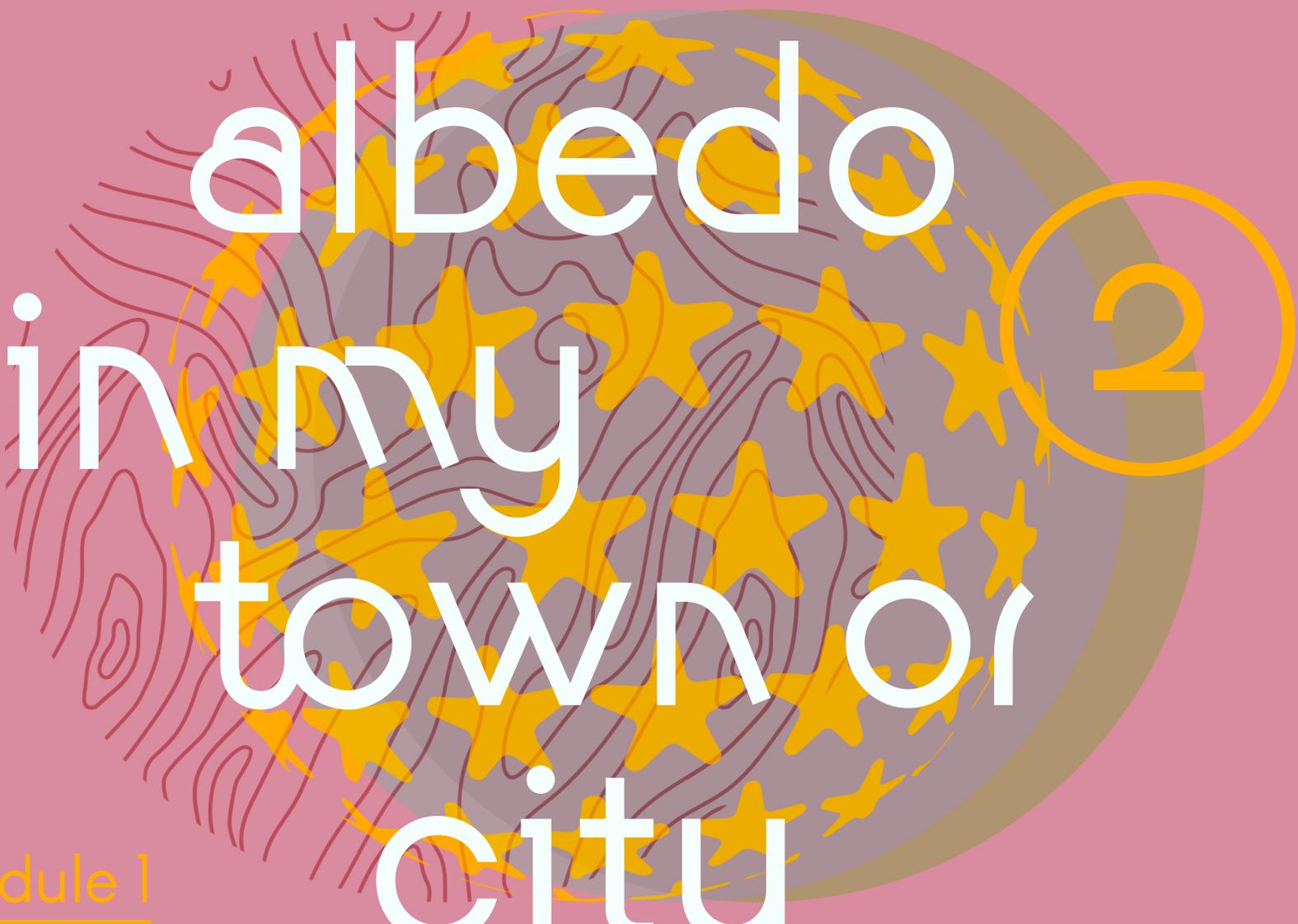


Heat island effect :

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 its 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.

