

Air-conditioned by Trees

This activity will help you explore how your tree affects the microclimate in its surroundings and how trees help us to cool the urban environment.

Your students will

Compare the temperature measured under a tree and under an umbrella and describe the effect of a tree on the temperature around it.

Basic information

- The temperature during the day is mainly influenced by the amount of sunlight. Trees reflect a lot of the sunlight and absorb some of it through their canopy. Thus, the temperature in the tree canopy increases during the day, while the temperature at ground level remains lower.
- The heat from the sun causes the leaves to evaporate water. This cools the leaves (similar to the sweating of human skin) and makes the area around the tree wetter. For example, deciduous tree with 10 m crown diameter evaporates about 400 leaves of water (about 2 full bathtubs) in one warm day.

You will need

- 30 minutes of time on a warm sunny day
- parasol or umbrella, thermometer/infrared thermometer, pen and paper, optionally hygrometer if you decide to measure also humidity

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Making a prediction: To begin with, have students think about how a place under an umbrella is different from a place under a tree. What are their advantages and disadvantages? What do both places have in common? Students can guess how the temperature will be different in these two places. Have students write down their thoughts and guesses. You can use the worksheet on the next page.

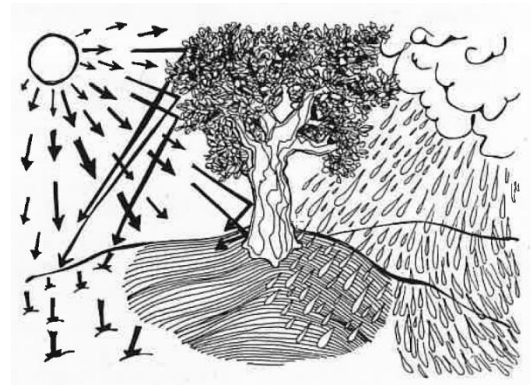
Choosing a research area and measuring: You will need two sites, one shaded by an umbrella, the other by a tree canopy. Visit your tree or find another suitable tree. We recommend that you pick a larger deciduous tree if you can - the difference from the umbrella is more obvious then. Nearby choose a site, where you can place an umbrella.

Students measure the temperature (and humidity if you like) in shade under the tree and under the umbrella roughly 1 meter above ground and record their measurements. You can also use an infrared thermometer to measure the surface temperature under the tree and umbrella. In such case it is important that the surface in both places is the same (e.g. grass). We recommend taking several measurements at both locations.

Comparing: After you finish with the measuring, compare the results. Try to answer this question together: What effect does the tree have upon the ambient temperature? And what is the effect of the umbrella? In what ways do they differ? Students can make a chart with the results and calculate the average temperatures.

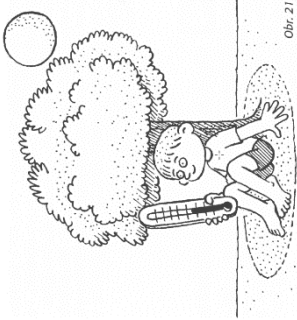
Reflection: Discuss the result with students. What have they discovered? Was it surprising? Did other questions arise?

Sharing: Share pictures of your measurements and your results at the [discussion forum](#). You can also prepare a fact sheet containing data you have discovered and put it on the tree or on the notice board at school to inform other students and teachers.



More information about how cities help to cool cities and about the Urban Heat Island topic can be found at [Urban Heat Island Effect Campaign website](#).

Air-conditioned by Trees - Worksheet



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