Citizen Science
Urban Microclimate Project

START HERE

Congratulations on volunteering to participate in the Urban Microclimate Citizen Science Project! This kit contains everything you need to get started doing some urban heat island (UHI) experiments in your own backyard or other outdoor places of interest.

Your goal as a citizen scientist

The Microclimate Measurement Kit you have received contains all the equipment you need to start collecting data about UHI in a location of interest to you.

The experiment works by looking at the air temperature in your location and comparing it to a 'Reference Station' at a known location. By looking at the difference between the air temperature at your location and the air temperature at a reference location we hope to learn something about UHI.

For example, if the air temperature at your location stays higher than the reference location overnight, it may mean that there are features at your location tend to trap heat at night-time, contributing to the UHI affect.

Conducting a microclimate experiment

Conducting a microclimate experiment is meant to be easy, but it will take a bit effort at first. This guide will help you get started and hopefully make sense of results. Importantly, it will also show you how to contribute your results to the Urban Microclimates Project, enabling other scientists to analyse your results in order to achieve a better understanding of UHI in Australian cities.

Step 1 Get organised

In order to get started you will need to make sure you have the following:

a) Your Microclimate Measurement Kit
b) A mobile device such as an Apple iPhone or Android enabled phone
c) If you can, change the time your phone stays on before 'Auto lock'. If you can extend this to a few minutes, it will help make sure your phone does not sleep while you are using the App.
d) Access to the internet using your mobile device
e) A valid email address (needed for registration)
f) About 15 minutes to assemble the kit and start your experiment

Step 2 Assemble your Citizen Sensor and download the App

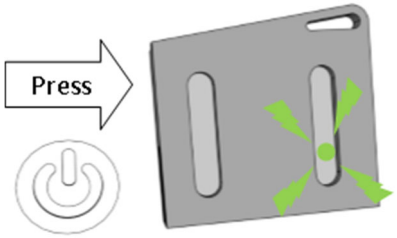
Follow the **Assembly Instructions** (enclosed). They will walk you through:

a) installing the Citizen Science Microclimate App. on your phone (don't use it yet!)
b) Assembling the Citizen Sensor

Step 3 Connect your Citizen Sensor and register it

Now the fun part begins!

a) Open the app on your phone and press the on button for one second to get the green light flashing



b) Select your sensor from the list. It will have a name that starts with "CSSMicro" followed by a number. If you can't see it, try pressing the refresh button  at the top right

c) Once connected you should be able to register for the experiment by following the prompts on the App.
d) There is a video that explains how to do this at https://citizenscienceproject.org.au/mobile-app/

If you have trouble pairing, here are some things to try:

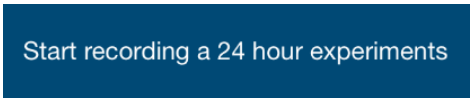
- Make sure that 'Bluetooth' on your phone is on. If not, then turn it on and try again
- Try closing the app and launching it again. Repeat the pairing procedure
- Make sure the light is flashing green on the Urban Microclimate Sensor. If not, it could be a battery problem. Try a new battery (provided) by following steps 4 to 6 on the **Assembly Instructions**
- If none of this works consult the FAQ at the project website https://citizenscienceproject.org.au/mobile-app/ and/or send us an email **cs.microclimate@rmit.edu.au**. Don't forget to include your **sensor number** (marked under the red cover of the sensor).

Step 4 Start an experiment

Hopefully your Sensor is now connected and working. The Sensor is designed to work in two modes. You can use it to take air temperature and humidity measurements as if it were an instrument OR you can use it to collect data over a 24 hour period. In this second mode the sensor logs a measurement every 30 minutes which you can recall and view at the end of the experiment. This section will show you how to set up such an experiment.

a) Find a good spot to place your sensor. Choose a place where you are interested about how temperature might change over the course of a day. Make sure your location is secure – you don't want your sensor getting stolen! Also, don't forget to use the bags in the kit to weigh down the sensor so it doesn't blow over

b) Connect to the sensor (as in Step 3) and select "Start recording a 24 hour experiment"



c) Complete the information requested by the App. When you push "Start Recording" it may take a while (30 seconds) so please be patient. Don't let your phone go to sleep during this time.

d) Now exit the App. By pressing the button in the top left corner)

e) You will know the sensor is working if you see a red flashing (slow) light on the sensor near where you usually see the green light flashing

f) Now you can leave the sensor for 24 hours while it collects air temperature and humidity data

Step 5 Come back and collect your data.

Now you are ready to collect your results. Remember you need to have left the Citizen Sensor for at least 24 hours or you will not collect meaningful data (one measurement is collected every 30 minutes).

a) Connect to the Sensor (as in Step 3) and press "Stop recording and review results. Once stopped you cannot restart". This will collect the data from the sensor

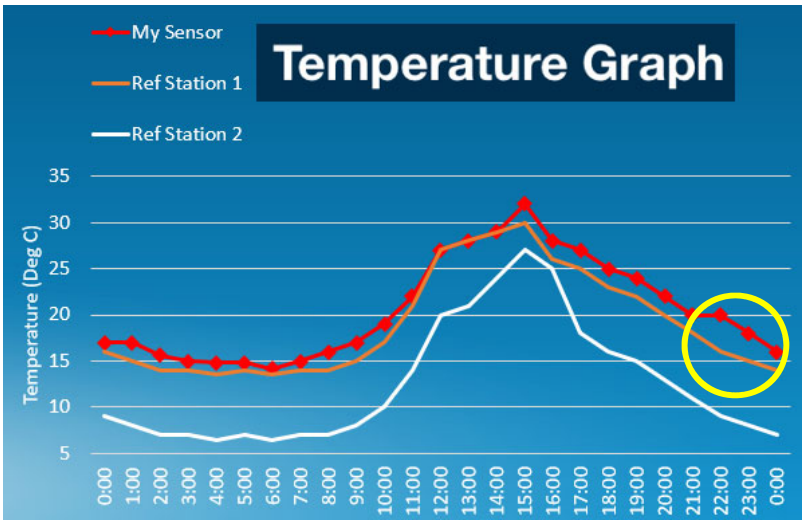
b) Now the interesting bit. Select the State you are in at the top of the screen (ie. Vic - Victoria) then chose two reference and/or weather stations[1]. These stations will be used as comparisons to the data you have collected. If you can, try to choose a station near you that is in an urban environment and one that is in a rural environment

c) Now review your data graph. Don't forget to save it as a photo.

Step 6 Review your results

Now, what does it all mean? The graph below is an example[2] of what you might see. The red line shows the temperature data for 'My Sensor', and the other lines show data for reference sensors. The differences in temperature suggest that the location where the Citizen Sensor is placed may be holding heat, when compared to the reference points, especially in the evening (circled in yellow).

What you see might be different to this as there many other local variables influencing measurements. Keep track of your results as photos and see if you can spot evidence of UHI.



[1] Reference Stations are run by the Urban Microclimate Project and report data more frequently than Weather Stations which are run by the Bureau of Meteorology.

[2] The graph is based on fictitious data and is for illustrative purposes only.

Step 7 Do another experiment!

Once you have your experimental technique under control, try doing another experiment. This time you could try:

a) The same location but a different kind of day (eg. try a hot day and a cold day)
b) Try a different location. Do one where there is lots of concrete and one where it's mainly grass or garden
c) Compare the front yard to the back yard
d) Or something else. What area are you interested in?

Each experiment you do will contribute data to the Urban Microclimate Citizen Science Project. The more data you collect the more we will learn about UHI in your area. Do as many experiments as you can!

Step 8 I have had enough, what do I do now?

Once you have done a few experiments (aim to do 10 or more, if you can), you may want to finish your involvement in the project. While we will be sad to see you go, we do understand.

a) Once you have completed your experiments (try to do at least 10), please place the red sensor in the reply paid envelope and mail back to the University.
b) Please try to find some uses for the tripod and other components. Recycle what you cannot use.
c) Thank you! Stay in touch with the project at https://citizenscienceproject.org.au/

Problems, questions?

If you have any questions regarding the experiment, try looking for help at the project website:

https://citizenscienceproject.org.au/mobile-app/

If you can't find an answer at the website, send us an email at:

cs.microclimate@rmit.edu.au

Good luck with your science!