Globisens

Labdisc
activities

for Elementary School Science

Labdisc Activity
A Walk in the Park

Supporting Labdisc Data Logger, GlobiWorld and GlobiLab Software

For Elementary School Science

A Walk in the Park

Introduction

We can find green parks in almost every city. Going to the park is a lot of fun, but is this the only reason why we should create parks?

Cities are crowded with people but also with cars and industrial plants. All these elements increase air pollution in the city and can even change the city's weather conditions.

Parks are called green lungs. Their main role is to consume air pollution, mainly carbon dioxide (CO_2) and produce oxygen! This is done by the parks' trees and other vegetation through a process called photosynthesis. In addition, parks reduce the heat created by cars, and industrial plants.

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The Experiment

In this activity we will record temperature changes at a city's busy intersection and in a nearby park or garden.

Equipment Needed

No equipment is needed for this activity.

Labdisc Setup

For this experiment we will setup the Labdisc from the Labdisc menu.

1. Turn on the Labdisc by pressing the On/Off key

2. Rotate the Labdisc plastic ring to expose the sensors

3. **SENSORS:**

   Press SCROLL key to open the sensor menu. Then select the SETUP icon and the SET SENSOR icon. Using the sensor keys select both the External Temperature and GPS.

4. **SAMPLING RATE:**

   Press the ESC key to leave the previous menu and then select the SAMPLING RATE icon. Use the SCROLL key to choose 1/sec. Press the SELECT key to confirm.

5. **AMOUNT OF SAMPLES:**

   Press the ESC key to leave the previous menu and then select the NUMBER OF SAMPLES icon. Use the SCROLL key to choose 1000. Press the SELECT key to confirm.

Experiment Procedure

1. Select a park full of vegetation and located within walking distance from a busy intersection in the city.
2. Make sure the Labdisc battery is charged.
3. Start the experiment when located close to the busy intersection.
4. Connect the external temperature sensor, hold it in the air and wait for the reading to stabilize.
5. Make sure the GPS icon shows the 3 arcs, indicating that the GPS is working properly.
6. Press the SELECT key to start recoding.
7. Slowly walk to the center of the park.
8. Wait for the temperature reading to stabilize and stop recording by pressing the SELECT key and then the SCROLL key.

Data Analysis

1. Make sure your computer is connected to the Internet.
2. Connect the Labdisc to the computer, either with the USB cable or through the wireless Bluetooth channel.

3. Click the Lab icon to open the Lab software.

4. Click on the download icon to transfer the last recording from the Labdisc memory to the software. After the download is complete, the software displays the graphs of the temperature at GPS speed.

5. Using the software markers you can observe the minimum and maximum temperatures reached during this recording. In the example below the maximum measured temperature was 30.5 °C and the minimum measured temperature was 28.3 °C.
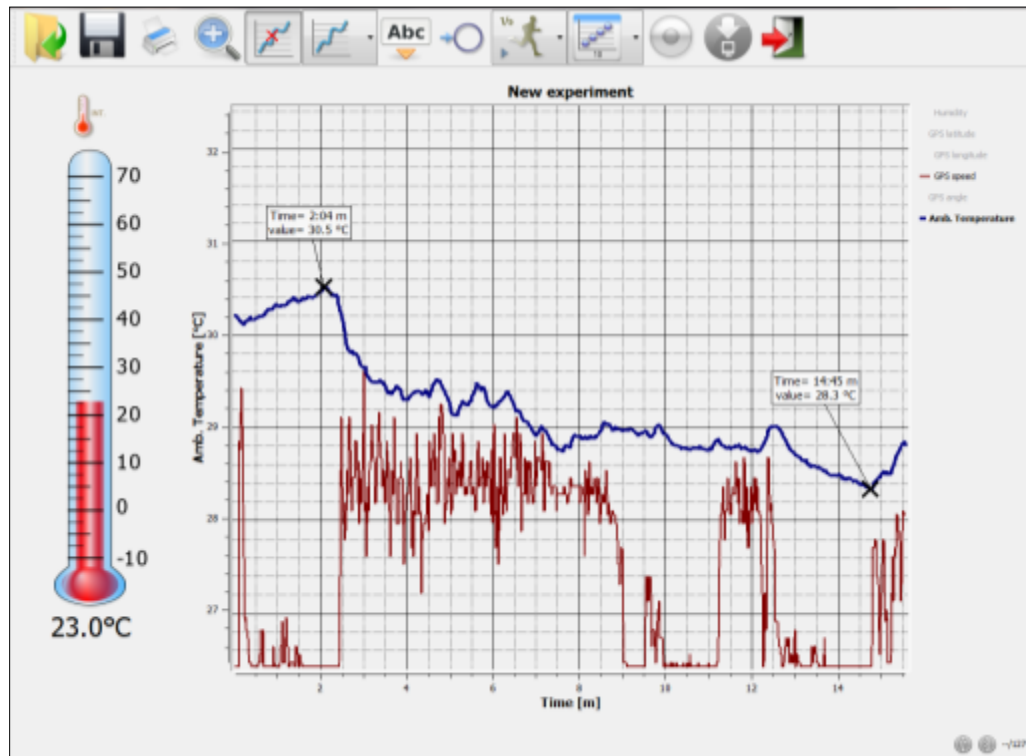
6. Press the right triangle on the Display Option icon. Select the Map icon. The software will automatically open the Google Map application and display a satellite picture of the area where you conducted your recording. In addition it will plot the temperature recorded during the experiment as a layer of color-coded data over the map.
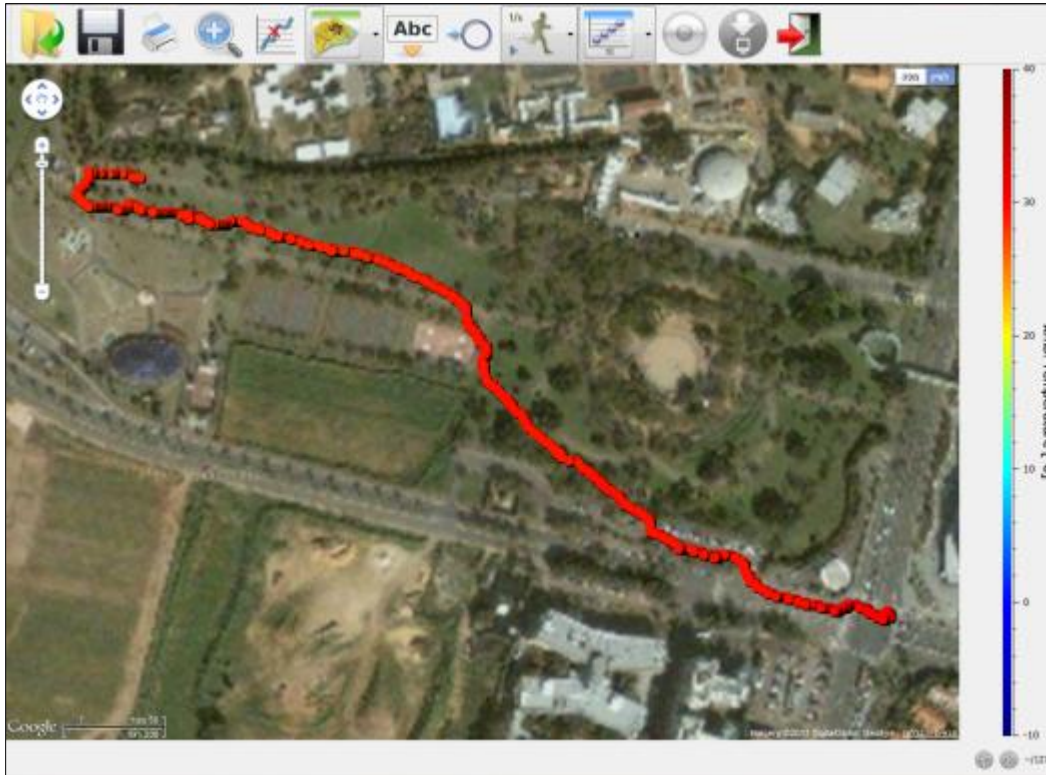
The colors represent the different temperatures measured at each location. You may move your mouse over any point to get a numeric value of the temperature.

7. As the temperature change is only by a few degrees, you should set the color scale minimum and maximum values accordingly, in order to see the color scale more clearly representing the range of temperature measured during the trip.

A right mouse click over the color scale bar will open the Google Map dialog box. This dialog box allows you to view other sensors over the Google Map and also set the range of each sensor. Select the range and enter the minimum and maximum temperature values recorded during the trip.

Humidity
GPS latitude
GPS longitude
GPS speed
GPS angle
Amb. Temperature

Set Range

Show route

Press OK and you'll receive the plot below.
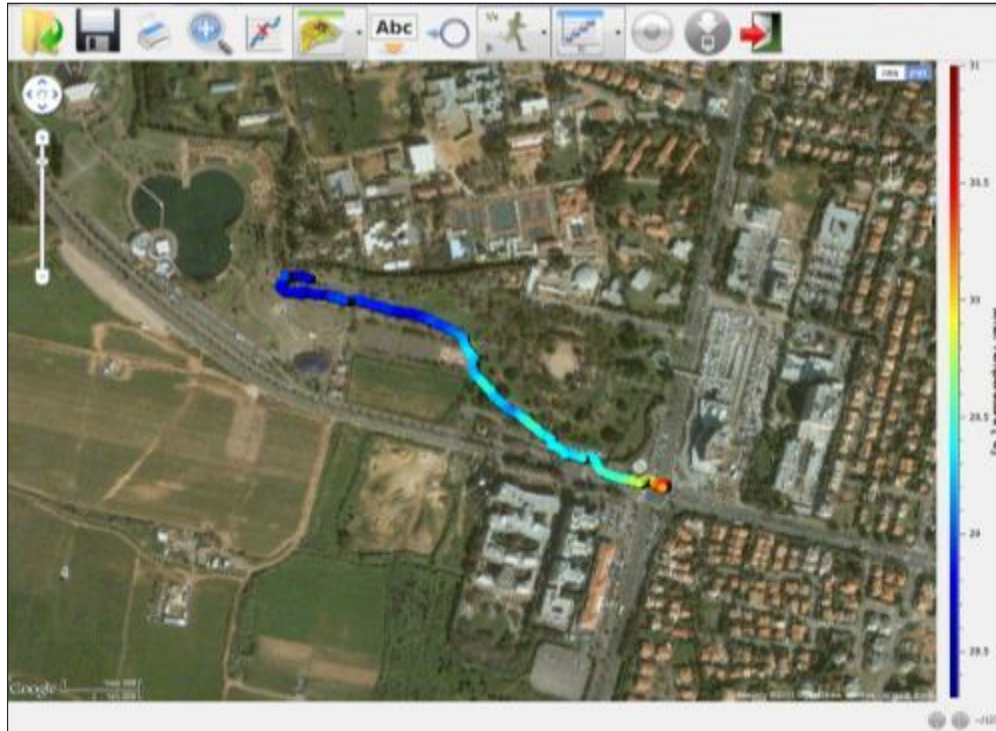
It is very clear from the recording above that the park has a lower temperature than the nearby intersection.

8. Save your project by clicking on the SAVE icon

Investigation and Questions

Try to answer the questions below using your collected data and software.

1. What were the hottest and the coldest areas?

☐ The hottest area was the intersection and the coldest area was the park

☐ The hottest area was the park and coldest area was the intersection.

2. Can you explain the temperature change?

☐ The temperature in the park was lower because of the shade from the trees

☐ The temperature in the park was lower because of cold winds

☐   The temperature in the park was lower because of water evaporation from the park's trees and grass

3. Explain the difference between climate and microclimate?

☐ Microclimate and climate are the same

☐ Microclimate describes the weather in the city and climate describes the weather in the country

☐   Climate is an average weather condition measured in a certain area. Microclimate is a local zone where the climate differs from the surrounding area.

4. Would the temperature difference in the park and at the intersection change if this experiment was conducted at the weekend?

☐ The temperature difference would be smaller due to less traffic

☐ The temperature difference would be the same

☐   The temperature difference would increase since many more people would be in the park

☐ The temperature difference would decrease since there would be fewer people in the park

Further Suggestions

1. While in map view, right click with your mouse to the left of the color scale and choose GPS speed. Verify your walking speed along the trip.
2. Repeat the activity while recording both temperature and sound level.
3. Repeat the activity at different seasons of the year.