



xploris  
SCIENCE

Day and night: Measurement of light intensity and temperature throughout the day

# xploris

SCIENCES

## MEASUREMENT OF LIGHT INTENSITY AND TEMPERATURE THROUGHOUT THE DAY

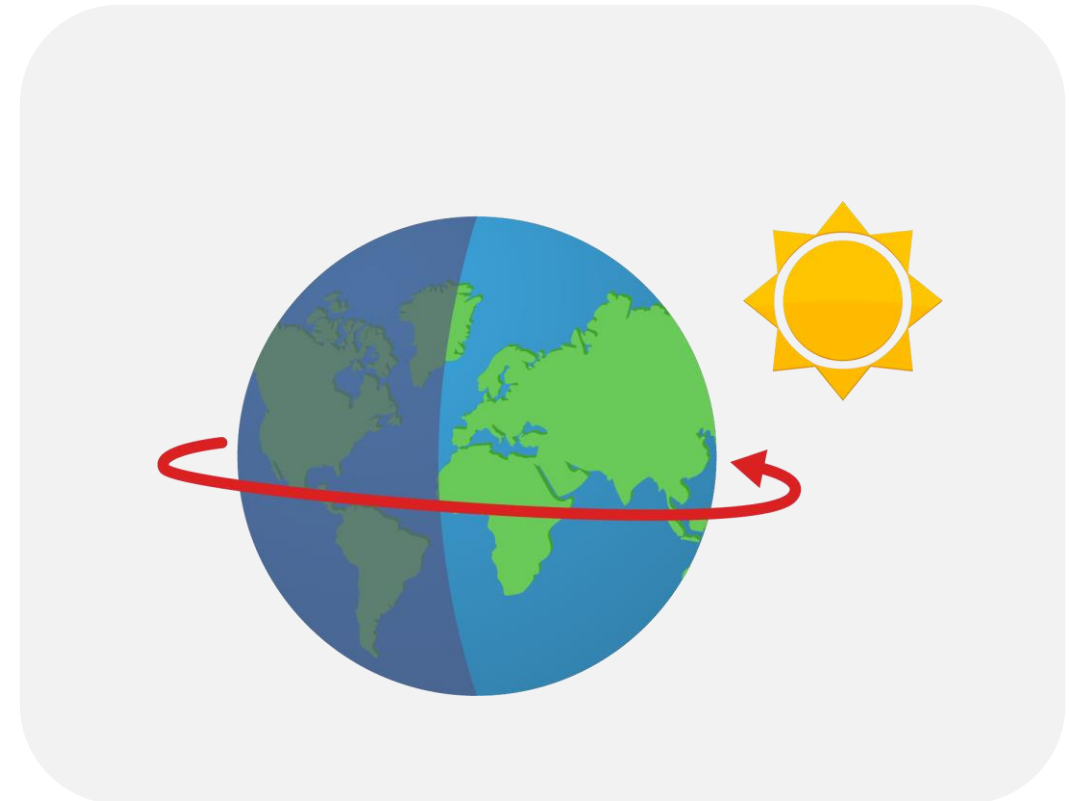
- 1 Introduction
- 2 Setting up the experiment
- 3 Data collection
- 4 Data analysis
- 5 Questions
- 6 Activity summary

## 1 Introduction

Did you know that you are moving even when you are completely still? This happens because the Earth rotates around itself all the time. This movement is called **rotation**.

The Earth's rotation lasts approximately 24 hours and produces day and night, since one part of the planet will be oriented directly towards the sun, where it will be daytime, while, at the same time, the other part of the Earth will be opposite to the sun, so it will be nighttime, as shown in the image.

In this activity we will study day and night in our own city! The question we will answer will be:

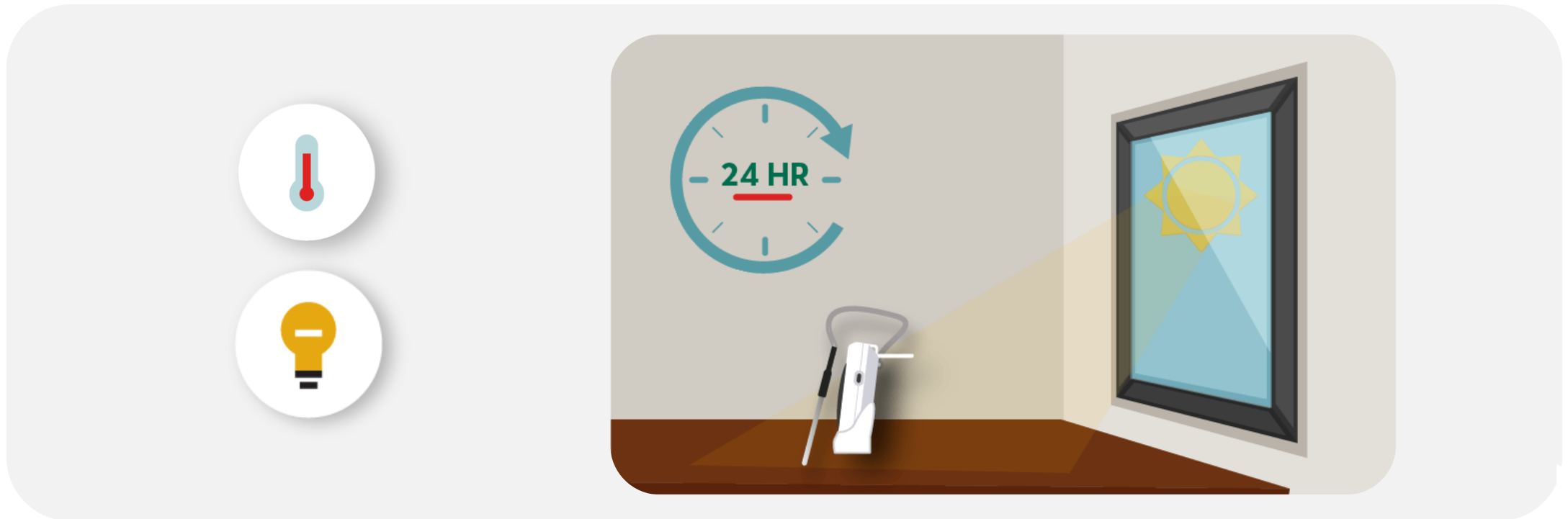


How does the temperature change throughout the day and night in our city?

2

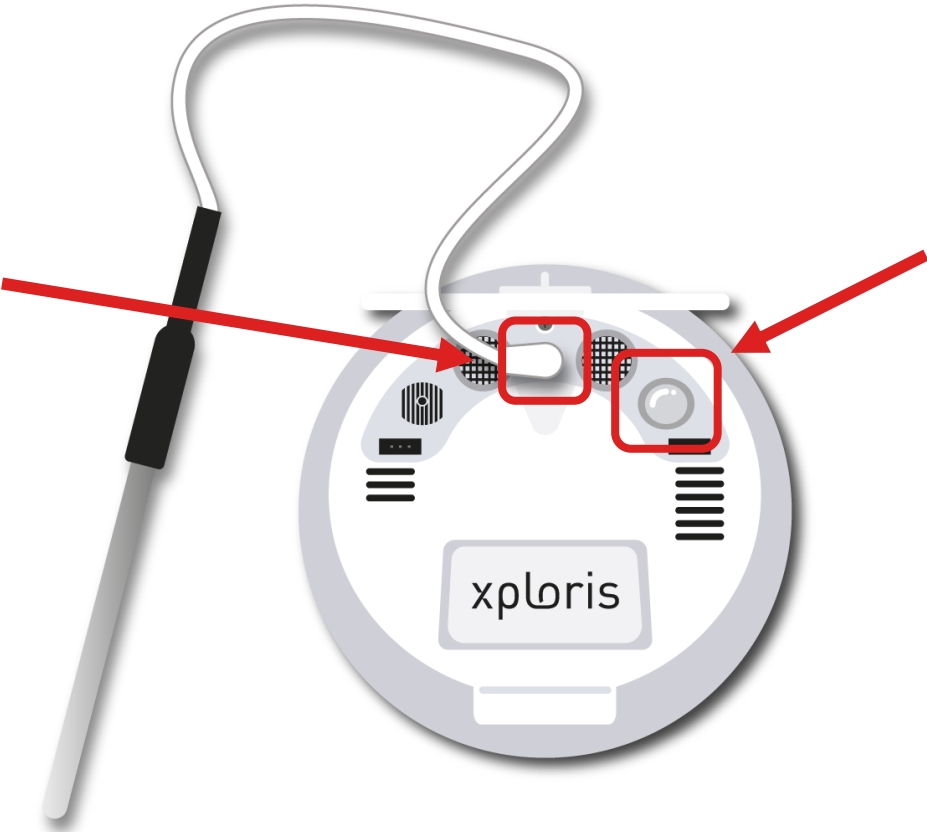
## Setting up the experiment

You will measure the ambient brightness and temperature using the external probe of the Xploris and observe the changes recorded during 24 hours.



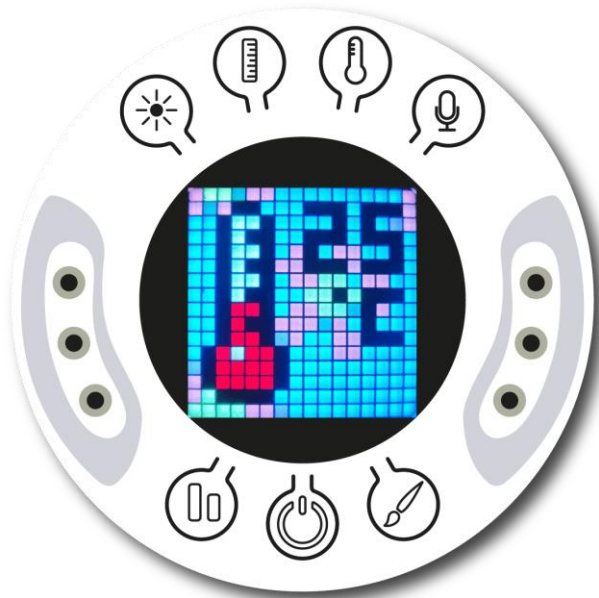
2 Setting up the experiment

Remember that to use the external temperature sensor you must connect the probe to the Xploris sensor.



The "light" sensor is located at the back of the Xploris, make sure it is uncovered as shown in the picture.

## 2 Setting up the experiment



Turn on your Xploris and connect it to your computer or tablet, to make sure that Xploris holds a charge during the entire measurement.



Open the XploriLab software on your computer or tablet.



Once inside XploriLab, select the icon to connect the device by cable or bluetooth as applicable.



Go to the SCIENCE section and then to DATA LOGGER.



2

## Setting up the experiment

↖ XploriLab software configuration

1

To start any configuration related to the sensors, please select the “setup” icon.

The sensors you will use for this activity will be the **external temperature and light sensors** and you will configure them to take **one sample per minute (1/min) and a total of 10,000 samples.**

Once the configuration has been completed, select “Apply” to save it.



### Choose Sensor ✕

- Light
- Voltage left
- Voltage Right
- Ext. Temperature
- Amb. Temperature
- Distance
- Speed
- Pulse
- Heart rate
- Sound

Rate:  Samples:

**Apply**

3 Data collection

Build your graph and observe how temperature and brightness vary in your city during 24 hours.

### 24-HOUR TEMPERATURE AND LIGHT GRAPH

Time [h]	Ext. Temperature [°C]	Light Intensity (Relative)
0.1	25.6	0
6.1	25.6	0
12.1	25.6	44
18.1	25.6	0



4

## Data analysis

1

Use markers on the graph to:

- Highlight the coldest and hottest point on the graph.
- Highlight the darkest and lightest points on the graph.
- What was the difference between the daytime and nighttime temperature in your city?

2

Use markers to add labels to the graph points. To do this you must select the icon:



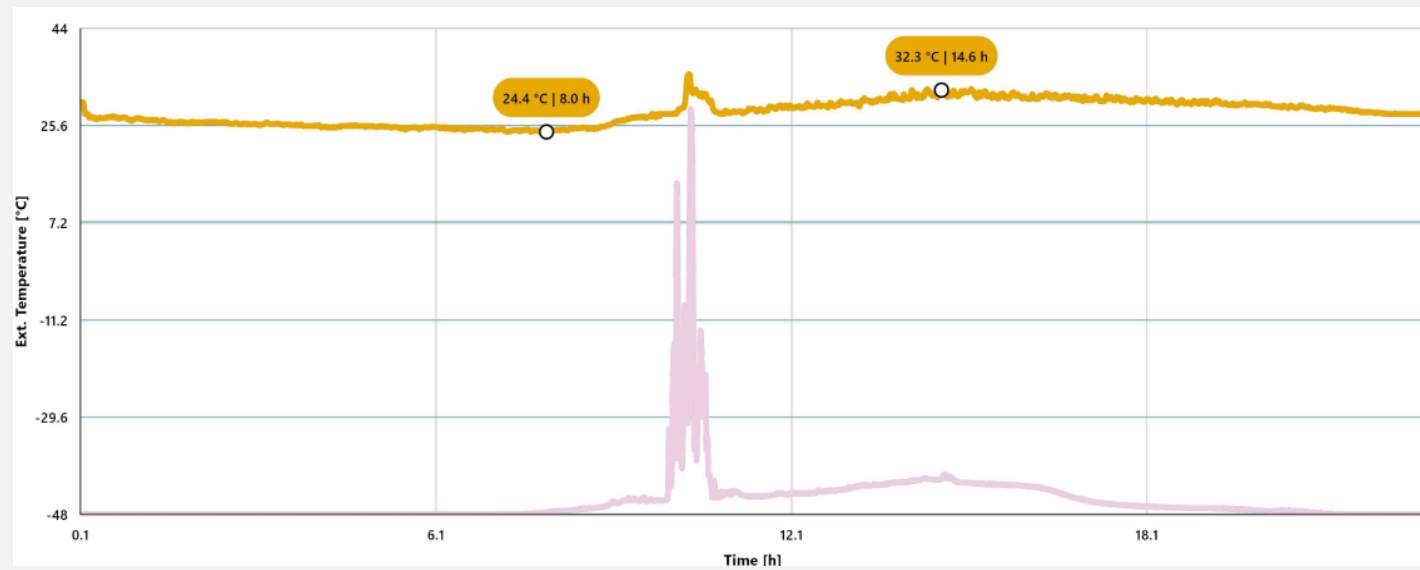
To lock the marker, select it and press the lock icon to lock it.



4 Data analysis

3

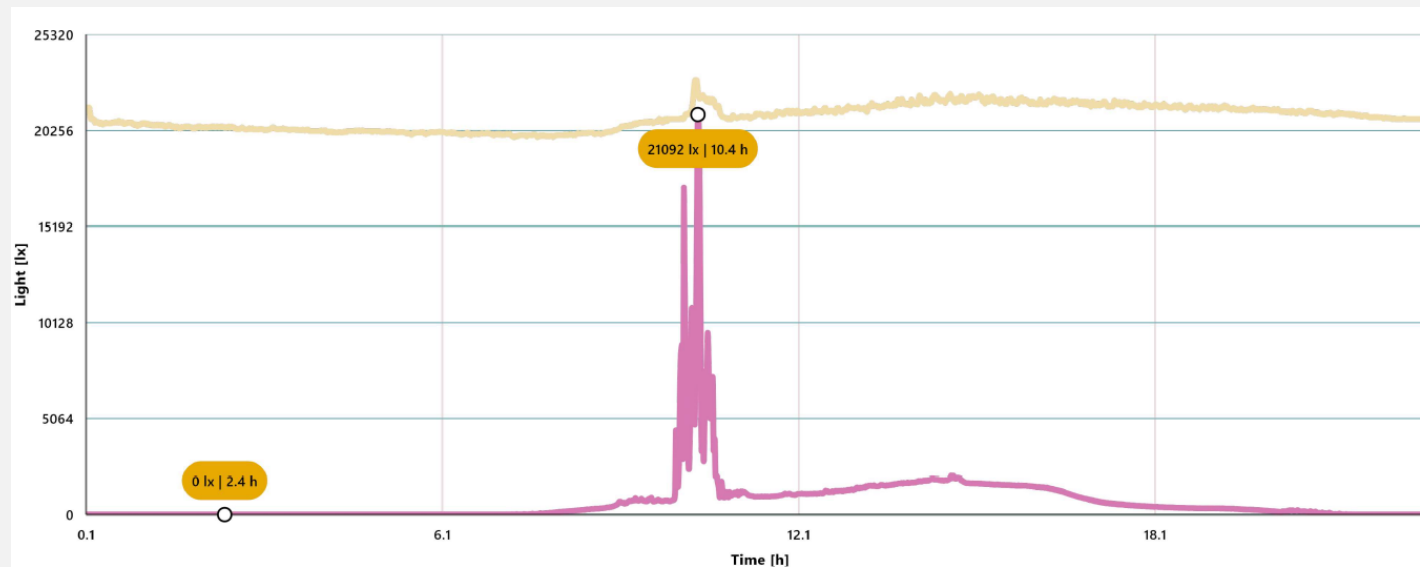
GRAPH WITH TEMPERATURE MARKERS



4 Data analysis

4

GRAPH WITH LIGHT MARKERS



## 5 Questions

1

Let's evaluate the data:

How did the light intensity change during the morning, afternoon and evening?

2

Let's evaluate the data:

How did the temperature change during the morning, afternoon and evening?

3

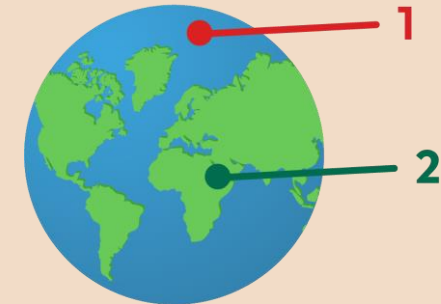
Let's take a look at the graph:

Do you think there is a relationship between the recorded changes in light intensity and temperature in your city?

4

Let's travel!

If you were located in different places on the planet, for example in 1 and 2, what differences do you think there would be with respect to the graph you obtained in your city?



5

Let's investigate!

Find which areas of the Earth have the most daylight hours in summer and create a graph of how you think the light and temperature will vary there.



6

## Activity summary



You used Xploris ambient temperature and light sensors to measure the changes in temperature and light in your city throughout an entire day and constructed a line graph showing the recorded variations.



You analyzed the data to establish the coldest, warmest, lightest and darkest times and evaluate whether they occurred during the day or at night.



You answered questions by researching and using your imagination to establish how light and temperature would change in other places on the planet.

