

Experiment M-9 Light and Shadow



Objectives

- To learn about the concepts of light and shadow.
- To investigate how light intensity and temperature change between a sunny area and a shaded one.

Modules and Sensors

- PANDA-1 Panda Multi-sensor 

Introduction

Light is a form of energy made of photons. The sun is our biggest source of light. We also have electric light bulbs and candles that bring us light. A shadow is made when an object blocks light. The object must be opaque or translucent to make a shadow. A transparent object will not create a shadow, as light will pass straight through it.

In this experiment, you will investigate how light intensity and temperature change between a sunny and a shaded location.




Procedure

Experiment setup

1. Choose a location that is exposed to the sun, and a shaded location (below a tree for instance).

Do not use the Panda outside when it is raining. It is important to not get the Panda wet!

Settings

2. Press on the **Sound sensor** icon  on the top left of the screen.
3. Use the arrows   to select the light sensor.
4. Press on the “lx” button on the top right of the screen.
5. Press on the **0-60,000 lx** button (if you see you need a higher range during the experiment, change it to “**0-240,000 lx**”).

Testing and measurements

6. Go to the shaded location and point the sensor towards the sky (vertical to the ground).






7. Write down the value in the following table.

Light intensity in the shaded location (lx)	Light intensity in the sunny location (lx)

8. Go to the sunny location and point the sensor towards the sky (vertical to the ground).



9. Write down the value in the table on the previous page.
10. Press on the **Light sensor** icon  on the top left of the screen.
11. Use the arrows   to select the temperature sensor.
12. If a “°C” button is seen on the top right of the screen, press it and choose “°F”.

13. Go to the shaded location and measure the temperature.



14. Write down the value in the following table.

Temperature in the shaded location (°F)	Temperature in the sunny location (°F)

15. Go to the sunny location and measure the temperature. The values might continuously go up because the internal temperature sensor is getting warmed up by the sun.
16. Wait about 2 minutes and write down the value in the table above.

Summary questions

1. Explain your light intensity results. Why were the values different between the shaded and the sunny locations?
2. Explain your temperature results. Why were the values different between the shaded and the sunny locations?
3. Did you perform the experiment in a sunny or cloudy day?
How would that affect the results?
4. How does light impact your life?