ScienceCube

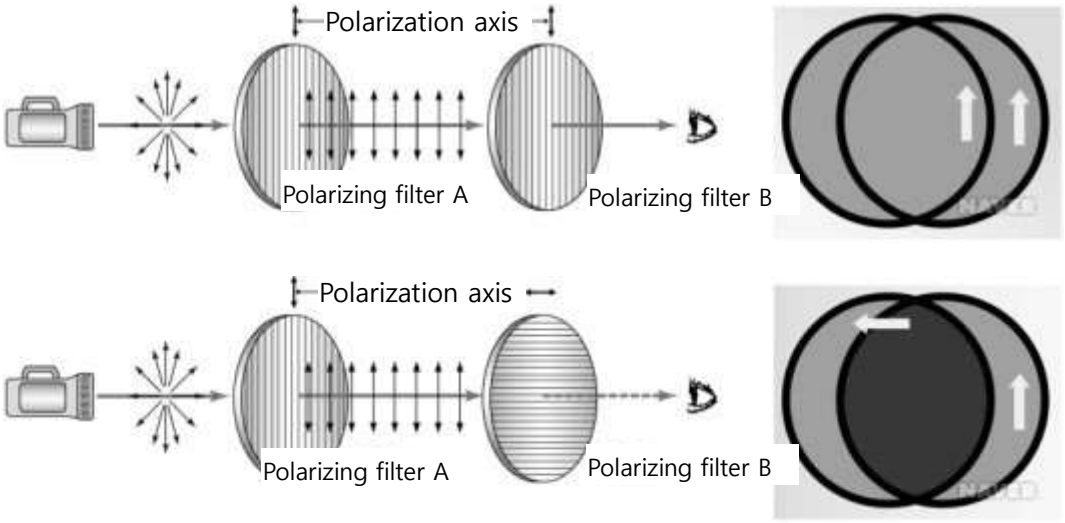
Polarization

Using polarizing filters, the light transmittance at different angles can be measured, and the principle of polarization can be explained.

Fundamental Concept

Polarization

Since the beginning of the study of light, there has been debate about whether light is a wave or a particle. Until the photoelectric effect and Compton effect were discovered, interference and diffraction phenomena clearly indicated that light is a wave. However, through interference and diffraction, it was not possible to determine whether the wave-like nature of light is transverse or longitudinal. Since light vibrates in all directions, light that vibrates in only one direction after passing through a filter called a polarizing filter is referred to as polarized light.



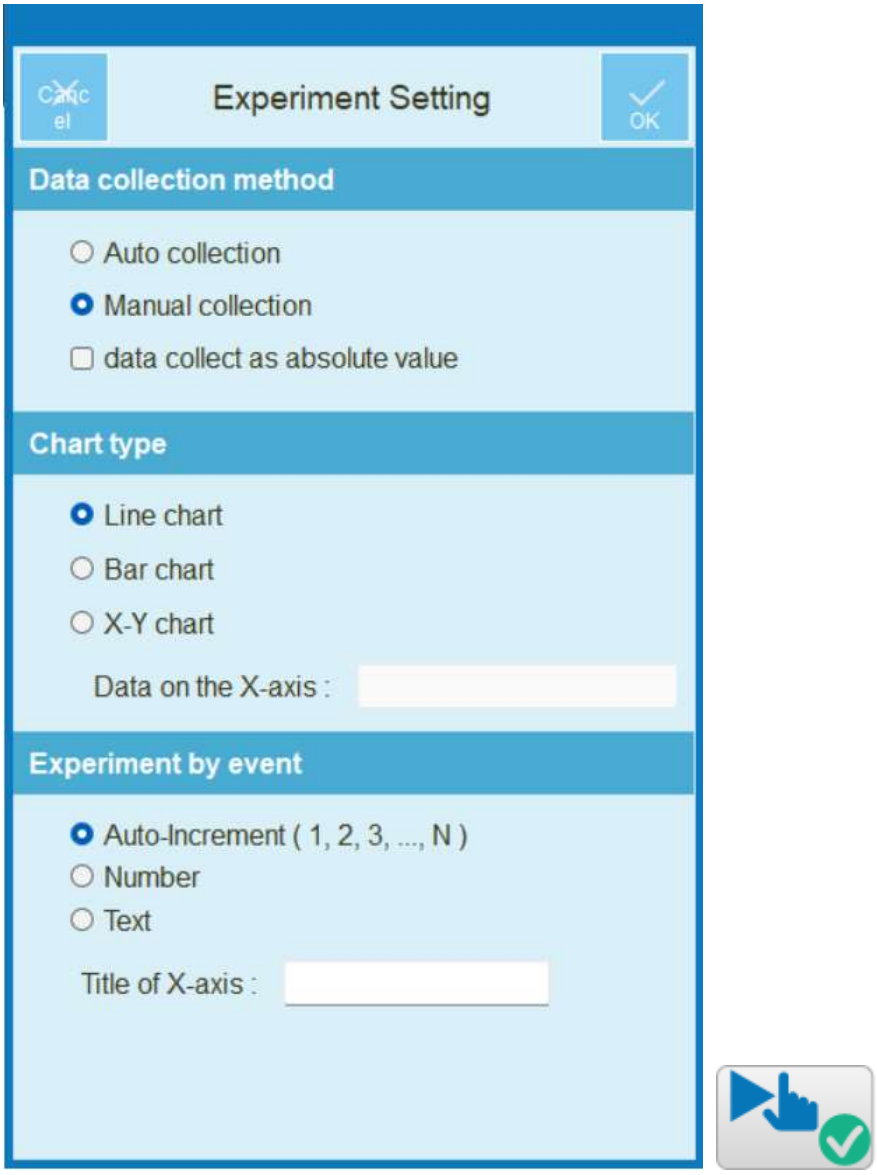
Experiment

Materials Needed

Interface, Science# program, Smart device, Light sensor, Polarizing filters (2), Stand lamp

Interface Setup

1.  Run Science#.
2. Connect the light sensor to the interface or select 'Light' from the built-in sensors of the Smart Sensor Box.
3.  Click to configure the experiment settings as shown below, or click for automatic settings. 



Data Collection

1.  Click to set up a bar graph.
2.  Click to start data collection.
3. Turn on the stand lamp, keeping it about 20cm away from the light sensor..
4.  Once the readings stabilize, click and enter 'No Polarizing Film' in the Text input box.
5. Next, place one polarizing film between the light sensor and the lamp, click  and

enter 'One Polarizing Film'.

6. imilarly, place two polarizing films at the same angle (0°), and enter 'Two Films 0°'.
7. Rotate the polarizing films to various angles such as 'Two Films 30°', 'Two Films 45°', 'Two Films 90°', and measure the light intensity at each angle.
8. Once the measurements are complete, click  to stop data collection.

Data Analysis

Recording Data

1. Measure the light transmittance at different angles of the polarizing films and plot the light intensity values on a graph.

2. Based on the data, fill in the light intensity values at different angles of the polarizing films in the table below..

Condition					
Light Intensity (Lux)					

Data Analysis

1. Using the measured data, explain the relationship between the angle of the polarizing films and light transmittance.

2. Examples of polarization can be easily found in daily life. Find and describe cases where the principle of polarization is applied.