ScienceCube

Light Transmission Rate

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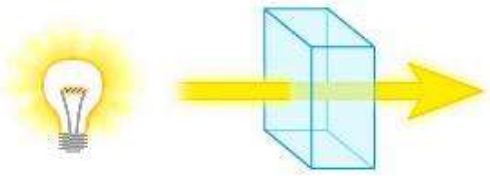
1. **Compare and explain the light transmission rates of transparent and translucent objects.**
2. **Compare and explain the characteristics of light transmission rates according to color.**

Fundamental Concept

1. Transmission

Light has the property of traveling in a straight line.

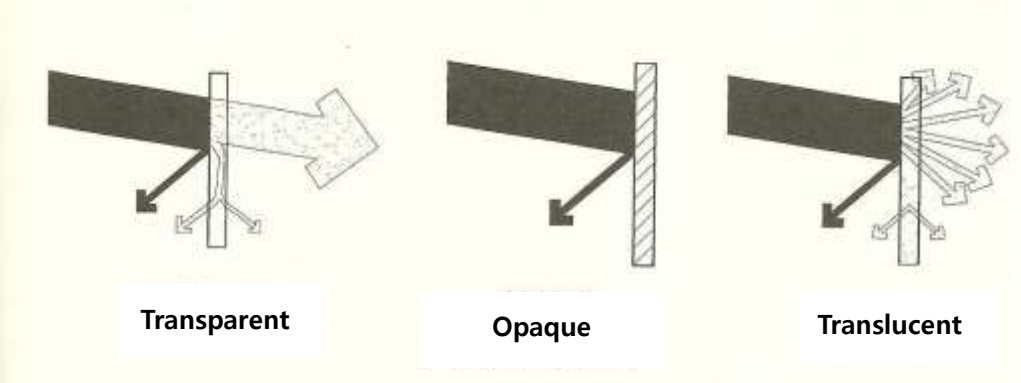


2. Transparent, Opaque, and Translucent Objects

(1) Transparent Objects: Light passes straight through the object. Example: Glass

(2) Opaque Objects: The object reflects or absorbs light, so no light passes through.

(3) Translucent Objects: Light passes through the object but is scattered in all directions, forming diffuse light. Therefore, objects cannot be seen clearly through a translucent object.



3. Transparency

Transparency varies with thickness.

Very thick glass or water can become opaque, while a thin metal film can be transparent or translucent.

Experiment

Materials Needed

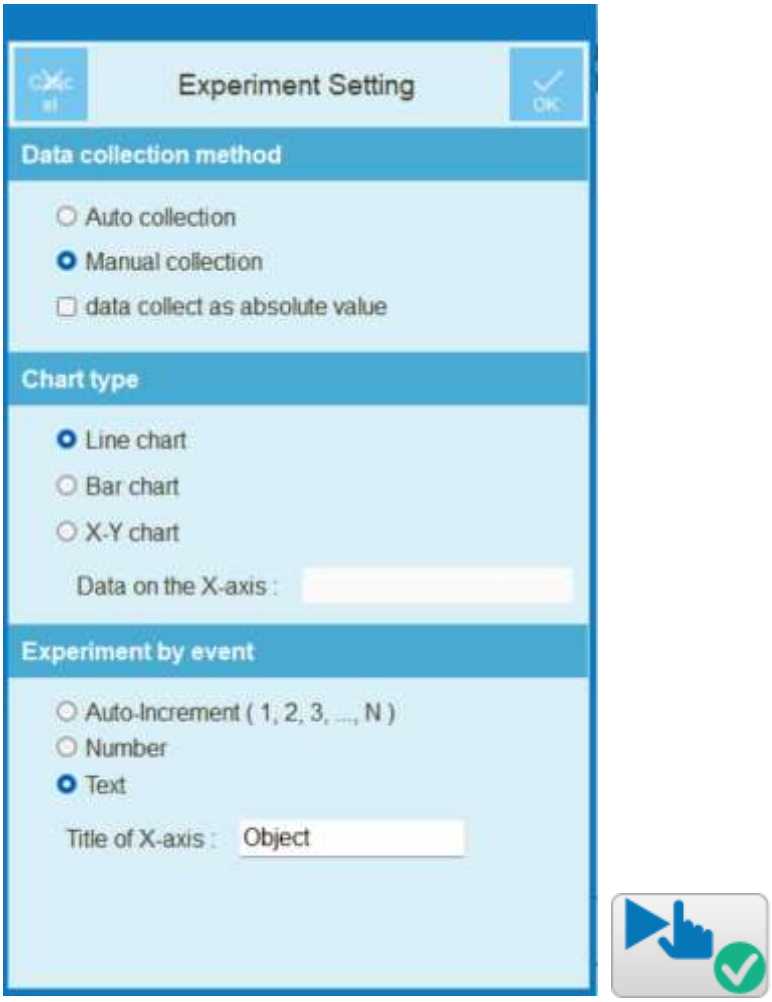
Smart sensor box, Science# program, Stand (lighting), PVC sheets of each color, 3 sheets each of transparent and translucent PVC

Experiment Preparation

1. Place the smart sensor box on the desk and adjust the angle of the stand's light to face the light sensor.

Interface Setup

1. Run the Science# program.
2. Connect the smart sensor box to the program.
3. BUILT-IN sensors Activate the light sensor in.
4. Press to set up the experimental environment as shown below or press for automatic setup.



Data Collection

[Experiment 1] Comparing the Transmission Rates of Transparent and Translucent

Objects

1. Press 

to set the chart to a bar graph..
2. Press  and  then to measure the light intensity of the stand and enter the value on the X-axis.
3. Place one transparent film over the light sensor and press  to measure the light intensity..

4. Measure the light intensity for up to three layers of transparent film.
5. Measure the light intensity for up to three layers of translucent film using the same method.
6. Press  to end the experiment..

[Experiment 2] Comparing Light Transmission Rates by Color

1. Press  and open a new chart..
2. Press  to measure the light intensity of the stand and enter the value on the X-axis..

3. Measure the light intensity while changing the color of the film each time.

4. Press  to end the experiment..

Data Analysis

Recording Data

1. Using bar graphs, show the light intensity for each layer of transparent and translucent film up to three layers.

2. Compare the light intensity of each color of PVC film using bar graphs..

Data Application

1. Based on the experimental results, identify and describe the similarities and differences between transparent and translucent films.

2. Explain why objects beyond a translucent film are not clearly visible, despite the film's good light transmission.

3. Describe the differences in light intensity according to color. Use inequality signs to list the colors in order of best light transmission.

4. Explain how the visibility of objects through the film changes as the light transmission rate of each colored film increases.

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