Unit 6G Polarization *Note-Taking Guide TEACHER*

Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

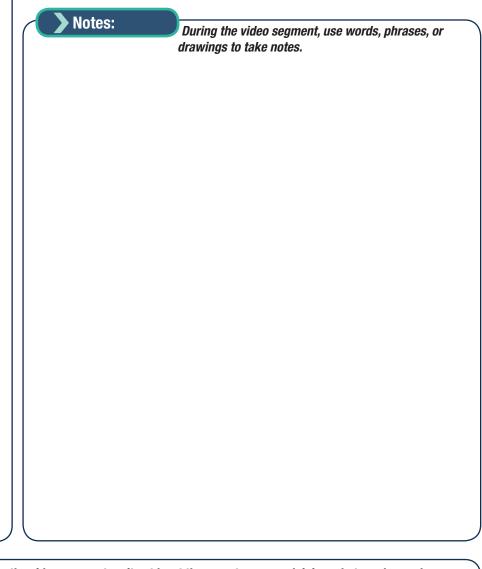
PHYSICS

gpb.org/physics-motion

INMOTION

Objective(s):

- Understand how polarization filters affect the electrical field of light waves.
- Calculate the intensity of light that passes through a polarization filter based on the original intensity of the light and the orientation of the filter to the light wave.



Summary:

After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"



Answer the following.

1. Which field of light is the focus of polarization?

The electric field can be polarized.

2. How are the electric field vectors oriented relative to the direction of motion of the light wave?

The electric field vectors of the light wave are perpendicular to the direction of motion of the wave.

3. Describe what it means for light to be unpolarized.

When light is unpolarized, the electric field vectors point in all

directions outward from the direction of motion of the wave.

4. When light is polarized, the electric field vectors point in *one* direction.

5. When a filter points upward, what kind of polarized light passes through it?

Only the vertical oscillations of a light wave pass through a filter pointing upward.

6. When a vertically oriented filter overlaps with a horizontally oriented filter, how much light passes through the filters?

When a vertically oriented filter and a horizontally oriented filter overlap, no light passes through.

7. Complete the equation for Malus's law:

 $I_{outgoing} = I_{incoming} \cos^2 \Theta$

8. By what factor does a polarization filter reduce the intensity of unpolarized light?

A polarization filter reduces the intensity of unpolarized light by half.

9. By how much does a filter angled at 45° to polarized light reduce its intensity?

A filter angled at 45° reduces the intensity of polarized light by half.

The cosine of 45° is 0.707 which, when squared, is 0.5.