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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.

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.*

Notes:

During the video segment, use words, phrases, or drawings to take notes.

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?"

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Unit 6G
Polarization
Questions to Consider TEACHER

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.