

**SCIENCE WORKSHEET**  
**CHAPTER 8 : Light and optics**  
**8.4 -8.7**

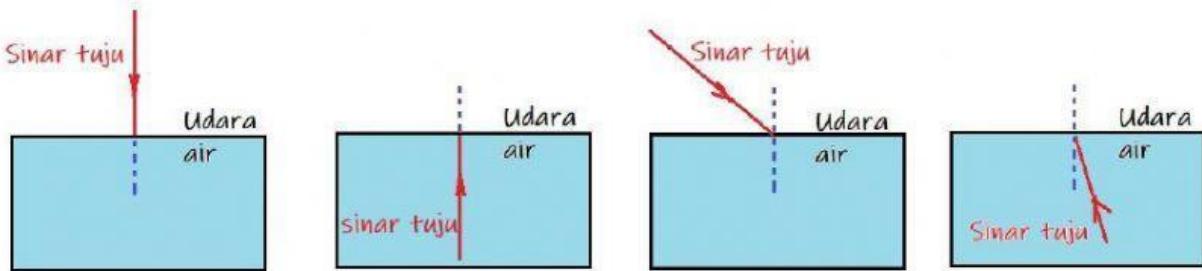
**A. LIGHT REFRACTION**

1. Based on your understanding, complete the ray of light as it passes through medium of different density and label the angle of refraction

*Sinar tuju= incident ray*

*Udara = air*

*Air= water*



1. Fill in the blanks.

towards	away,	Not refracted
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- a) when light hits the surface at  $90^\circ$ , it is \_\_\_\_\_ because the incident rays are parallel to the normal
- b) Light bends \_\_\_\_\_ from normal line when it travels from water to air (more dense medium to less dense)
- c) Light bends \_\_\_\_\_ normal line when it travels from air to water (less dense medium to more dense)

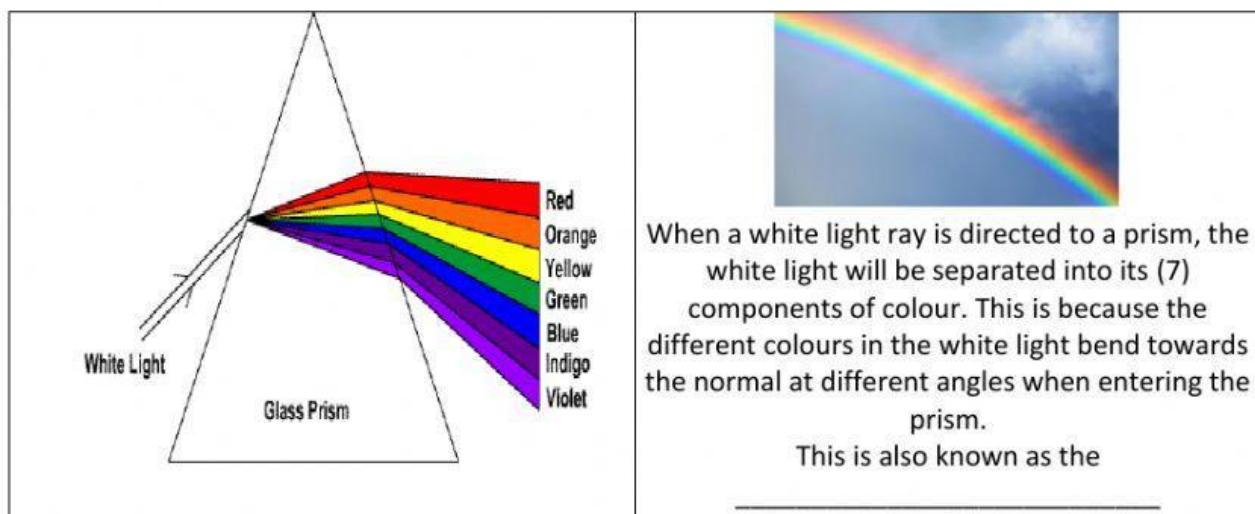
**B. DISPERSION OF LIGHT**

1. Light scattering occurs because each of these constituents of \_\_\_\_\_ will move at different \_\_\_\_\_ in a medium.
2. Dispersion is defined as the separation of \_\_\_\_\_ into different colours when the light is passed through the \_\_\_\_\_
3. The scattering of light depends on the \_\_\_\_\_ of the light. Therefore, it can be said that the degrees of deviation is dependent on the wavelengths.

## A. LIGHT SCATTERING

The two natural phenomena are caused by the scattering of light. Scattering of light occurs when light is reflected in all directions by clouds or particles in the air.

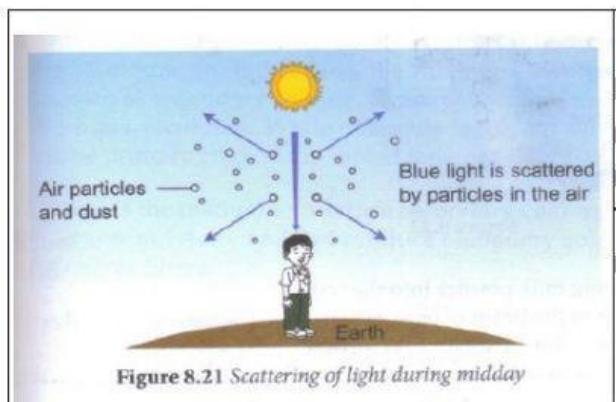
Q: Light scattering occurs when light rays are \_\_\_\_\_ and \_\_\_\_\_ in all directions by clouds or particles in the air.



The diagram on the left shows a triangular glass prism. A bundle of light rays, labeled 'White Light', enters the prism from the left. The light is refracted as it enters and again as it exits, dispersing into a spectrum of colors. The colors are labeled from top to bottom as: Red, Orange, Yellow, Green, Blue, Indigo, and Violet. To the right of the prism is a photograph of a rainbow arc in a blue sky with white clouds.

When a white light ray is directed to a prism, the white light will be separated into its (7) components of colour. This is because the different colours in the white light bend towards the normal at different angles when entering the prism.

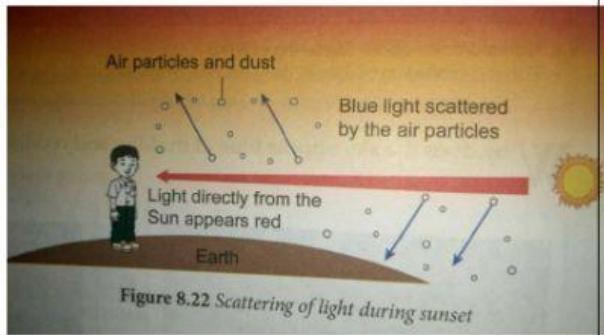
This is also known as the \_\_\_\_\_



The diagram on the left shows a person standing on Earth, looking up at the sun. Arrows point from the sun through the atmosphere to the person. Labels indicate 'Air particles and dust' and 'Blue light is scattered by particles in the air'. The light rays are shown bending and scattering in various directions.

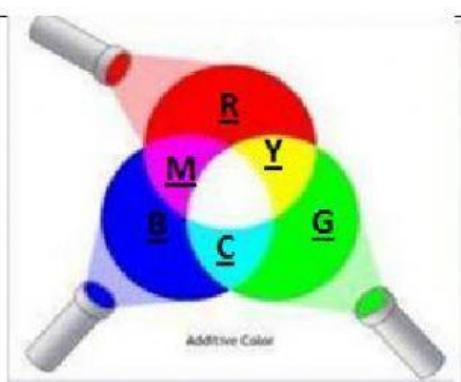
During midday, the \_\_\_\_\_ light is scattered most in all directions by the fine air molecules in the atmosphere. Therefore, the sky looks \_\_\_\_\_ during midday

**Figure 8.21** Scattering of light during midday



- During sunset, the sun is at the horizon .
- \_\_\_\_\_ and \_\_\_\_\_ light are less scattered and will go through the atmosphere to reach your eyes.
- Other colored lights such as blue light are scattered away.
- Therefore, the sky looks \_\_\_\_\_ during sunset.

## B. ADDITION OF LIGHT



➤ **RED + GREEN = YELLOW**  
➤ **RED + BLUE = MAGENTA**  
➤ **BLUE + GREEN = CYAN**

Tips:  
**ROBERT YELL GOT CYANIDE BY ME**



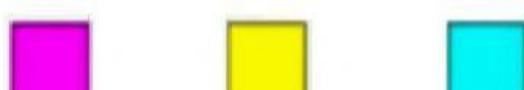
**PRIMARY COLOURS**

- \_\_\_\_\_ colour
- Cannot be produced by colour mixing



**SECONDARY COLOURS**

produced from \_\_\_\_\_ of 2 colours



### C. SUBTRACTION OF LIGHT

The same color of light as opaque objects will be reflected to our eyes, while other colors will be absorbed.

#### 1. Primary coloured objects



a ) The green leaves only reflect \_\_\_\_\_ light .

Light of other colours are absorbed, therefore the leaves appear \_\_\_\_\_.

b ) The red flowers only reflect \_\_\_\_\_ light.

Light of other colours are absorbed, therefore the flower appear \_\_\_\_\_

c ) The blue butterfly only reflects \_\_\_\_\_ light. Light of other colours are absorbed, therefore the butterfly appears \_\_\_\_\_.

#### 2. SECONDARY COLOURED OBJECTS



(yellow object)

d) A yellow object reflects **yellow**, **red** and **green** colors. The overlap of red and green lights causes the object to appear \_\_\_\_\_

e) White objects reflect all colors in \_\_\_\_\_ light



(white object)

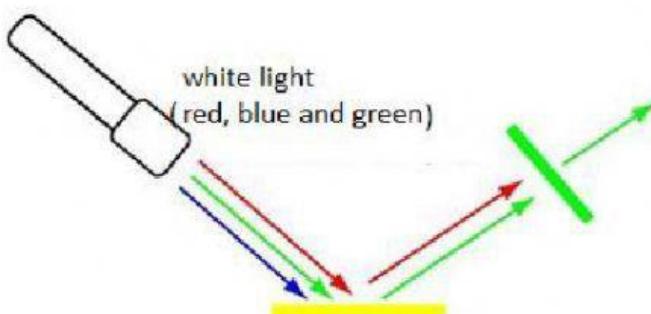
- Black objects absorb all colours in \_\_\_\_\_ light.
- No coloured lights are \_\_\_\_\_
- Therefore, the objects appear \_\_\_\_\_



(Black object)

#### D. ( COLOUR FILTER) Penapis warna

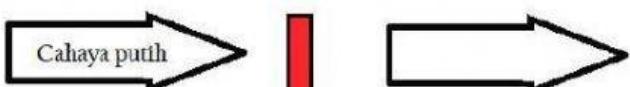
1. Fill in the blanks.



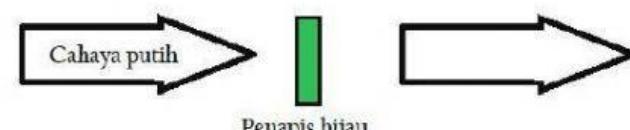
Green filter allow only \_\_\_\_\_ to go through it

yellow object reflects red and green light

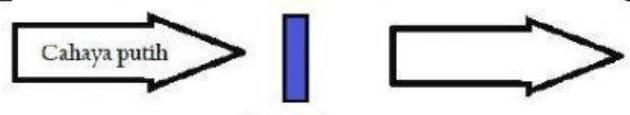
2. Write the color of the light that passes through the **primary color filter**.



*Cahaya putih = white light  
Penapis merah = red filter*



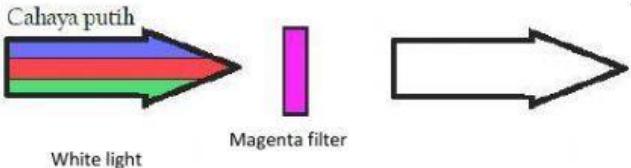
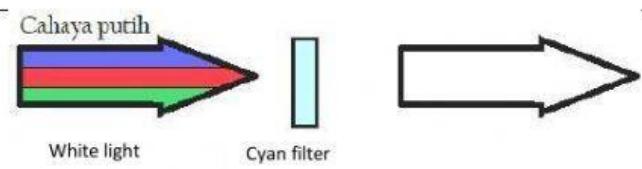
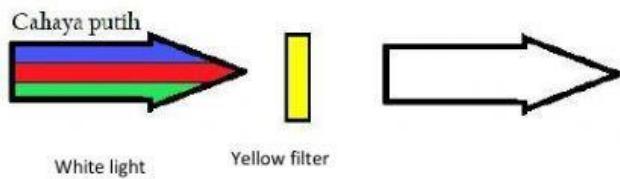
*Cahaya putih = white light  
Penapis hijau = green filter*



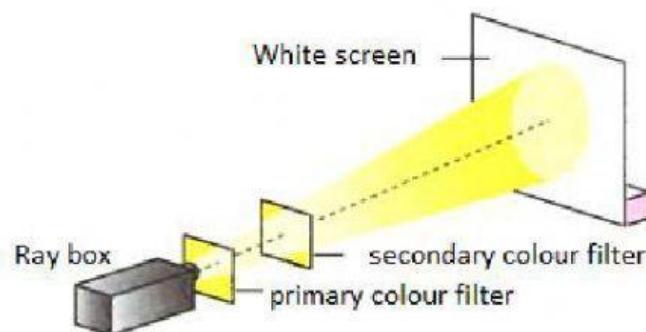
*Cahaya putih = white light  
Penapis biru = blue filter*

3.2. Write the color of the light that passes through the **secondary color filter**.

**Tips : Secondary colour filter : Allow only the light of the same colour and the light of primary colours which form the secondary colour to pass through. Light of other colours are absorbed**



## **E. Effects of primary color filters and secondary color filters on white light and colored light**



Primary colour filter	Secondary Colour filter	Colour that appears on screen
Merah / Red ●	Blue ●	<i>No light/ tiada cahaya</i>
	Yellow ● ●	
	Magenta ● ●	
Biru / Blue ●	Cyan ● ●	
	Magenta ● ●	
Hijau / Green ●	Yellow ● ●	
	Cyan ● ●	
	Magenta ● ●	