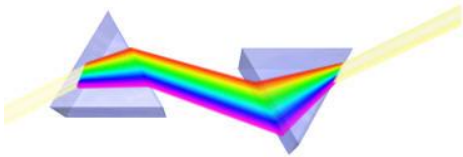


The Colour of Light (Section 10.1)

WAVE THEORY OF LIGHT (p.386)

1. Describe the experiment performed by Isaac Newton and state his conclusion.



2. How does the wave theory explain the colours of visible light?

3. List the colours of visible light in order from longest to shortest wavelength (use only first letters).

ADDITIVE COLOUR THEORY (p.387)

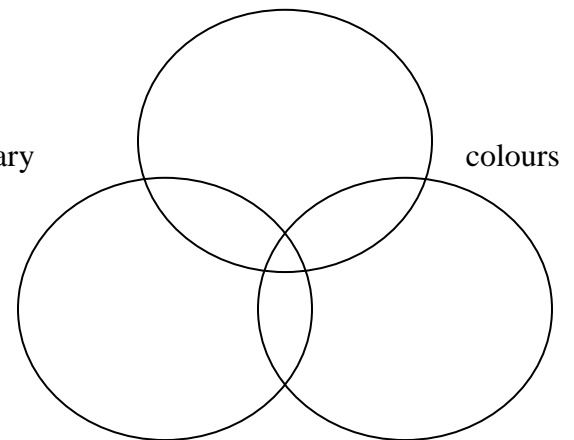
4. What are the three primary colours? _____

5. Can they be formed from other colours? _____

6. What are the three secondary colours? _____

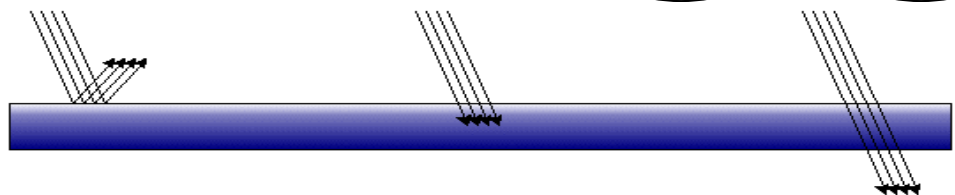
7. What combination of primary colours forms each secondary colour?

8. On the diagram below: label and colour the primary and secondary of the additive colour theory.



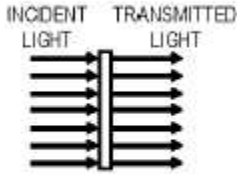
Transmission, Reflection & Absorption

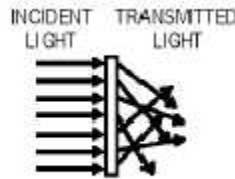
9. Use each of three words to the following diagram:
transmission,
reflection,
absorption.

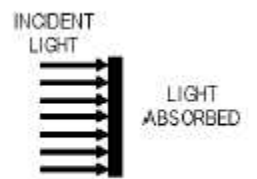


these label

10. Label each object in the following diagram as either: *opaque*, *transparent* or *translucent*.

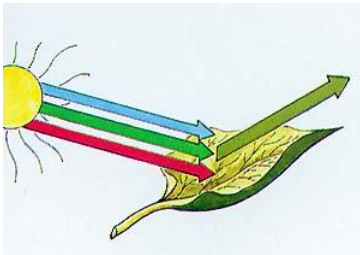






SUBTRACTIVE COLOUR THEORY (p.388)

11. For the following diagram, explain, in detail, why we see the leaf as green.



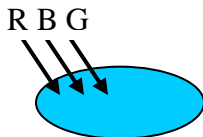
12. What are the three primary colours of the subtractive (pigment) theory?

13. What are the three secondary colours of the subtractive (pigment) theory?

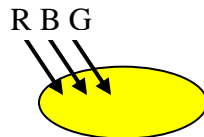
14. What combination of primary colours forms each secondary colour?

15. Draw rays of light to show how white light interacts with each of the following **opaque objects**:

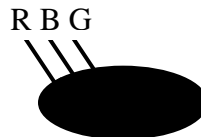
A. a cyan object



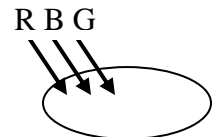
B. a yellow object



C. a black object

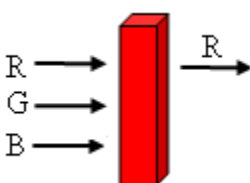


D. a white object



16. Draw rays of light to show how white light interacts with each of the following **transparent coloured filters**:

A. red



B. green



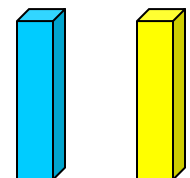
C. yellow



D. magenta



E. cyan + yellow



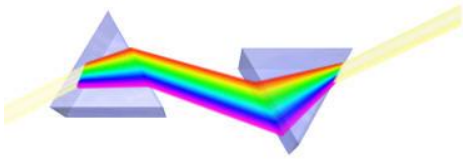
17. In a paragraph on a separate page: compare and contrast the two theories of colour.

18. On separate paper, answer page 388 Learning Check #1 to 5 AND page 391 #8, 9, 12, 13.

The Colour of Light ANSWERS

WAVE THEORY OF LIGHT (p.386)

1. Describe the experiment performed by Isaac Newton and state his conclusion.



White light is composed of all the different colours. The individual colours are pure and cannot be broken down further.

2. How does the wave theory explain the colours of visible light?

Each colour of light has a unique frequency and wavelength.

3. List the colours of visible light in order from longest to shortest wavelength (use only first letters).

ROYGBIV

ADDITIVE COLOUR THEORY (p.387)

4. What are the three primary colours? **Red (R), Green (G), Blue (B)**

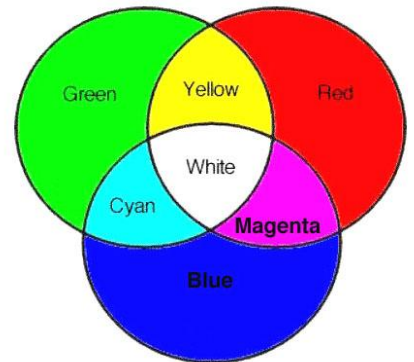
5. Can they be formed from other colours? **NO**

6. What are the three secondary colours? **Cyan (C), Magenta (M), Yellow (Y)**

7. What combination of primary colours forms each secondary colour?

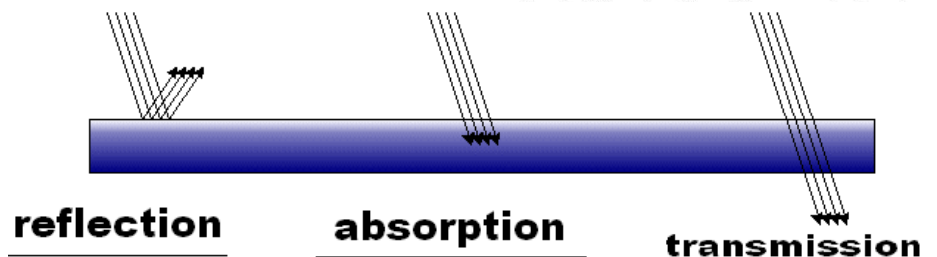
$R + B = M$ $R + G = Y$ $G + B = C$

8. On the diagram below: label and colour the primary and secondary colours of the additive colour theory.

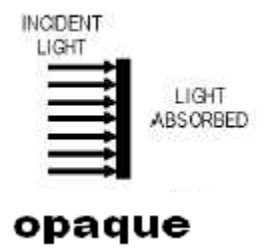
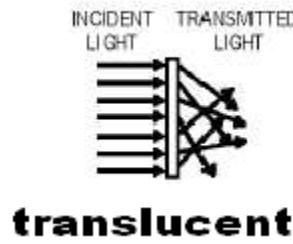
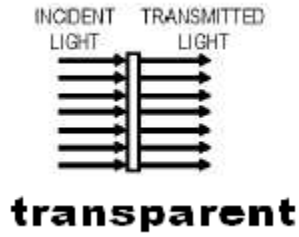


Transmission, Reflection & Absorption

9. Use each of these three words to label the following diagram: *transmission, reflection, absorption.*

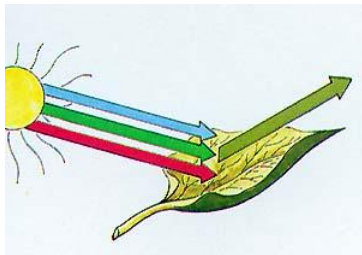


10. Label each object in the following diagram as either: *opaque*, *transparent* or *translucent*.



SUBTRACTIVE COLOUR THEORY (p.388)

11. For the following diagram, explain, in detail, why we see the leaf as green.



*White light (R, G, B) strikes the leaf.
Green is reflected into our eyes, but red and blue are absorbed by the leaf.
(Our eyes have receptors that detect R, G and B)*

12. What are the three primary colours of the subtractive (pigment) theory? **C, M, Y**

13. What are the three secondary colours of the subtractive (pigment) theory? **R, G, B**

14. What combination of primary colours forms each secondary colour?

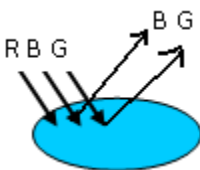
$C + M = B$

$M + Y = R$

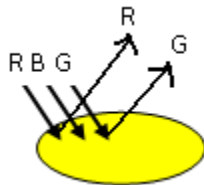
$C + Y = G$

15. Draw rays of light to show how white light interacts with each of the following **opaque objects**:

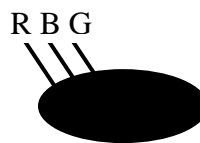
A. a cyan object



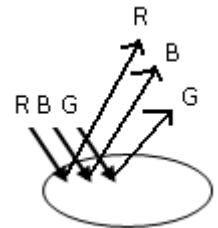
B. a yellow object



C. a black object

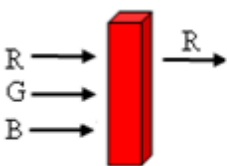


D. a white object

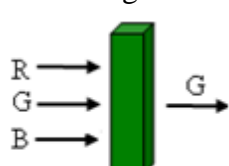


16. Draw rays of light to show how white light interacts with each of the following **transparent coloured filters**:

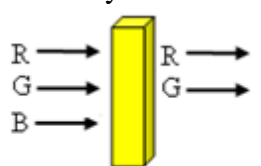
A. red



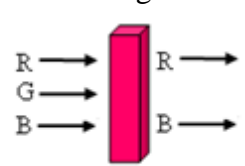
B. green



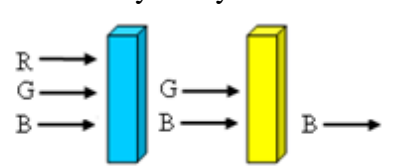
C. yellow



D. magenta

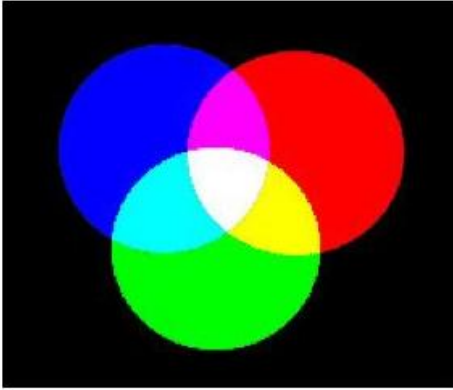


E. cyan + yellow



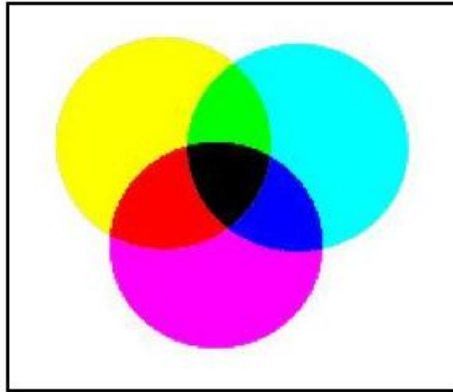
17. In a paragraph on a separate page: compare and contrast the two theories of colour.

**Additive mixing of
light sources**



**used in TVs and
monitors**

**Subtractive mixing of
absorbing pigments**



**used in colour
printing**

**The primary colour of one are the secondary colours
of the other.**