

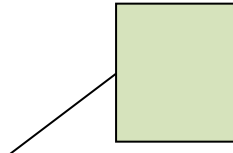
Shedding Light on Colour

Name: _____

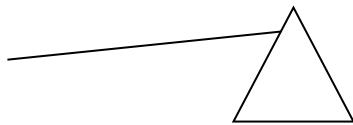
PART A: Coloured Light.

1. Not including a light globe, list two sources of incandescent light (which is light generated from a very hot object).

2. White sunlight is made of a mixture of the colours _____, _____, _____, _____, _____, _____, and _____.
3. Explain what refraction is and draw a diagram showing a light beam refracting.



4. Explain how a prism splits the components of white light and draw a diagram.



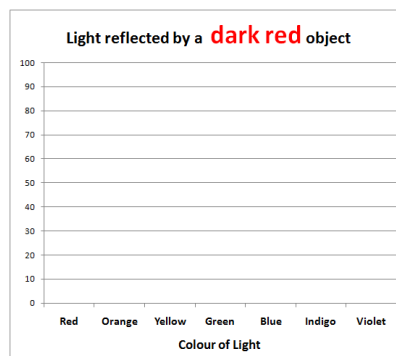
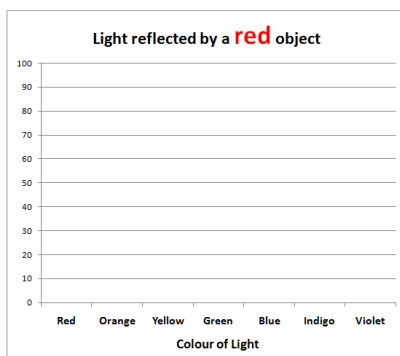
5. Why does a green object appear green?

6. Why does a white object appear white?

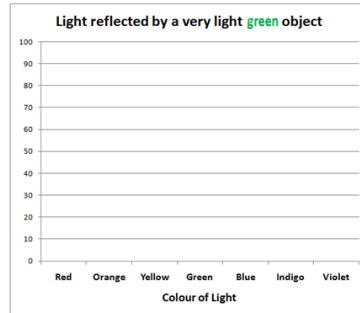
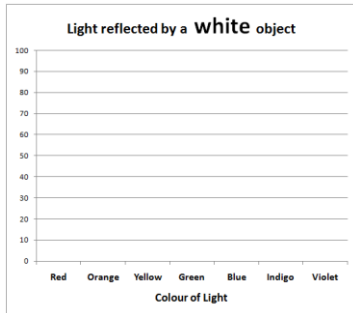
7. Why does a black object appear black?

8. Why do cricketers, who traditionally play in summer, wear white-coloured clothing?

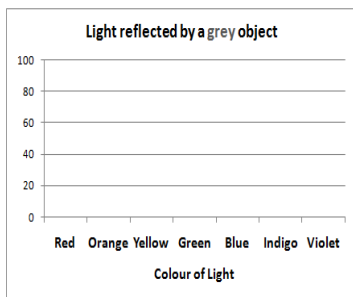
9. Draw graphs showing how white light reflects from a red object and a dark red object. (The second graph is not shown in the program.)



10. Draw graphs showing how white light reflects from a white object and from a very very light green object. (The second graph is not shown in the program)



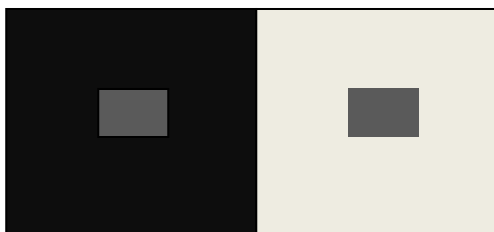
11. Draw a graph showing how white light reflects from a grey object. (The answer is not in the program.)



12. Describe what a green filter does.

13. Why does a green piece of paper appear black when red light is shining onto it.

14. The small grey rectangles inside the squares are the same colour. Why do they appear different?



PART B: Mixing Coloured Light

15. The three **primary colours of light** are _____, _____, and _____.
16. Red light + Green light (of equal strength) = _____ light.
17. Red light + less intense Green light = _____ light.
18. Blue light and Green light = _____ light.
19. Red light and Blue light = _____ light.
20. Red light + Green light + Blue light = _____ light.
21. Describe what a colour LCD screen looks like up close.

22. How does an LCD TV screen produce white?

23. How does an LCD TV screen produce yellow?

24. How does a computer's colour control window work?

PART C: Mixing Paints and Inks

25. The three traditional **primary colours of paint** are _____, _____, and _____.

26. Explain why mixing red and yellow paint produce orange paint.

27. What are the four "process" colours?

28. Why are the process colours used in printing instead of red, yellow and blue?

29. The primary colours of light that cyan ink reflects are _____ and _____ .

30. The primary colours of light that yellow ink reflects are _____ and _____ .

31. When mixed Cyan and Yellow ink reflect only _____ light.

PART D: Coloured Light and Vision

32. Moving magnetism produces _____.

33. Moving electricity produces _____.

34. A fast-moving electron can produce an e_____ -f_____ wave, which then produces a m_____ -f_____ wave, which then produces an e_____ -f_____ wave and so on.

35. How fast do these "electromagnetic" waves travel? _____

The Visible Light Spectrum	
Colour	Approximate Wavelength range in nanometres (nm) (1 nanometre = 1 billionth of a metre)
red	750 – 610
orange	610 - 590
yellow	590 - 570
green	570 - 500
blue and indigo	500 - 450
violet	450 - 400

36. Light is an electromagnetic wave. What range of wavelengths are perceived as red light?

37. A laser is marked with the expression 405nm on its case.

(a) What does this mean?

(b) What colour will the laser light be?

38. State what wavelengths of light are perceived by humans to be green?

39. What are cone cells and why do we have three types?

40. What are rod cells? What is their disadvantage and what is their advantage over cone cells?

41. A person with red-green colour blindness is looking at a rainbow. How do they perceive it?

42. Birds, humans, primates (gorillas, orang-utans, monkeys etc), marsupials, and reptiles are trichromats. Most mammals, including rabbits, cats, dogs, sheep, and cows are dichromats. What is a trichromat and what is a dichromat?

43. Why is it relatively easy to diagnose colour blindness in humans, but very hard to determine how animals perceive the world?

44. Is everything coloured? Is anything colourless?
