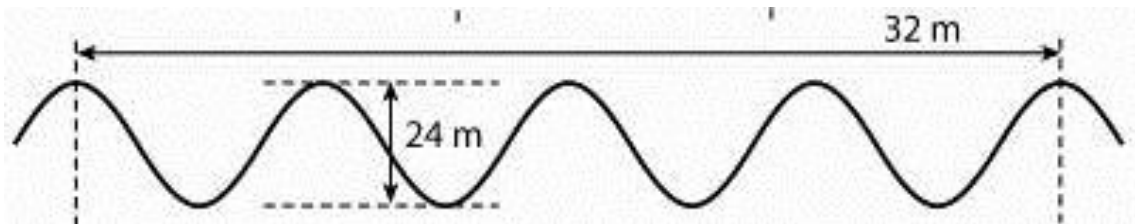6.1.1 Types of wave
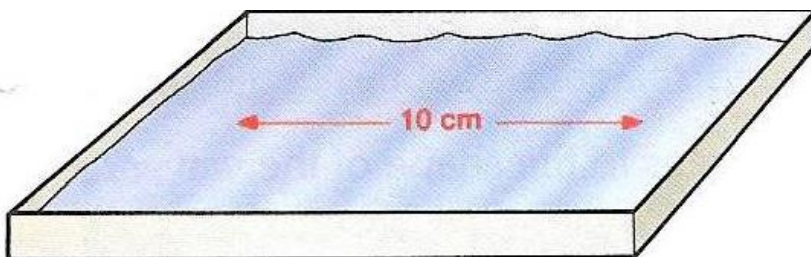
6.1.2 Wave Quantities

1. Light waves are transverse

2. Sound waves are longitudinal

3.

       Wavelength = 32m/4 = 8m   Amplitude = 24m/2 = 12m

4. Frequency = 270waves/90s = 3Hz

5.

      Wavelength = 10cm/5 = 2cm

      Wave speed = frequency x wavelength = 2cm x 20Hz = 40cm/s

6. Speed of sound = $\underline{distance}$ = $\underline{\quad 2m \quad}$ = 340 m/s
                    time   0.005882s

6.1.4 Sound Waves
6.1.5 Waves for exploration

1. Frequency = $\dfrac{\text{speed}}{\text{Wavelength}}$

(a) $\dfrac{352\text{m/s}}{3.52\text{m}}$ = 100Hz   (b) $\dfrac{352\text{m/s}}{0.00352\text{m}}$ = 100 000 Hz   (c) $\dfrac{352\text{m/s}}{352\text{m}}$ = 1 Hz

2. (a) 2kHz audible   (b) 2Hz   infrasound   (c) 22000Hz   ultrasound

    (d) 3.52m audible   (e) 352m infrasound   (f) 3.52mm ultrasound
         100Hz   1 Hz   100 000 Hz

3.   d = vt = 352m/s x 0.25s = 88 m

6.2 Electromagnetic waves

1 (a) Radio waves communicating
  (b) Microwaves communicating
  (c) Infra red waves burning
  (d) Ultraviolet waves security
  (e) X waves imaging bones

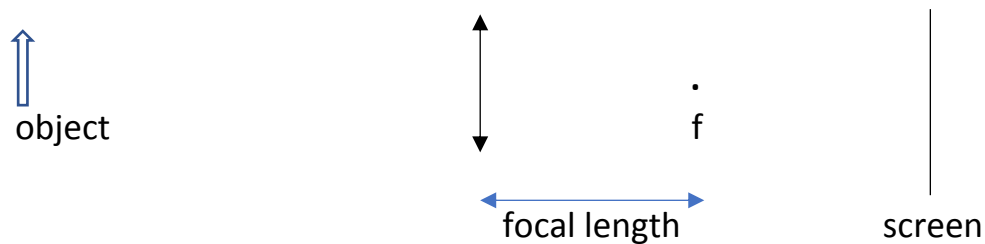2. $f = \dfrac{v}{\lambda} = \dfrac{300\ 000\ 000}{1500\ \text{m}}$ m/s $= 200\ 000$ Hz

3. gamma X UV visible light IR micro radio

4. UV, X and gamma are ionising, then other EM waves are not

1. The thicker the lens the more the refraction
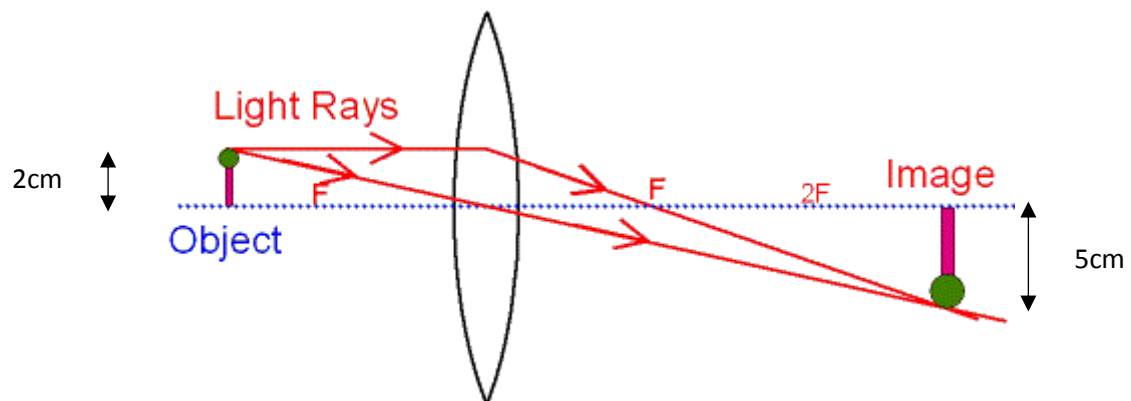
2. Real images can be formed by convex lenses

3.

object   f

focal length   screen

The image formed on the screen would be
<u>REAL</u> VIRTUAL MAGNIFIED SAME SIZE <u>SMALLER</u> <u>UPSIDE DOWN</u> UPRIGHT

4.

Light Rays

2cm

Object   F   F   2F   Image

5cm

The image formed on the screen is
<u>REAL</u> VIRTUAL <u>MAGNIFIED</u> SAME SIZE SMALLER <u>UPSIDE DOWN</u> UPRIGHT

The magnification = <u>image height</u> = <u>5cm</u> = 2.5
                    object height   2cm

1. Violet indigo blue green yellow orange red

2. $f = \dfrac{v}{\lambda} = \dfrac{300\ 000\ 000\ \text{m/s}}{500 \times 10^{-9}\ \text{m}} = 6 \times 10^{14}$ Hz

3. Specular reflection forms clear image. Diffuse reflection produces an unclear image

4. Red, green and blue filters transmit only one colour each

5. Magenta and cyan filters transmit 2 colours

6. A yellow filter transmits yellow, red and green light

7. The snowman is white because snow reflects all coloured lights
   The carrot is orange because it reflects orange light
   The hat is blue because it reflects blue light

8.
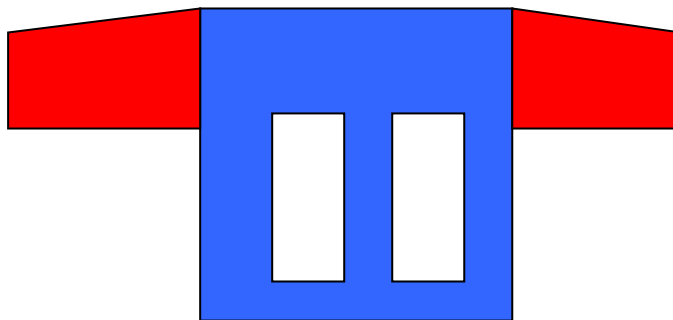
Describe the appearance of the shirt if only red light shines on it

Black with red sleeves and red number 11

And if only green light shines on it

Black with black sleeves and green number 11

If you looked at the shirt through a blue filter, what would you see ?

Blue shirt, black sleeves, blue number 11