Light

Engineering optics	the study of how light interacts with matter
Luminous Flux	the measure of the total amount of energy radiated per second from a light source in all directions (measured in lumens (lm)
Illumination	a measure of the light that falls on a surface (measured in lux (lx))
Illumination Formula	$E = P/4\pi r^2$ (E = illumination, P = luminous flux, r = distance)
Diffraction	the spreading of waves around barriers
polarization	the restriction of light to one direction
Primary colours	RGB

Characteristics of Spherical Mirrors

concave	depends on position
convex	virtual, upright, smaller
concave properties	
infinitely large	real, inverted, highly diminished at focus
at focus	real, inverted, infinitely enlarged (no image)
beyond focal point	virtual, erect, enlarged image
2x the focal length	real, inverted, same size

before focal point = inverted and smaller

after focal point = erect and larger

virtual images cannot be collected on screen

Spherical Lenses

convex lens	collects light
concave lens	scatters light
Magnification	the ratio of the image's length to the object's length
Magnification formula	M = hi / ho or -di / do (M is -ive if its real)
1/f = 1/di + 1/do	

Interference

interference	when two waves superimpose to form a wave with a higher or lower amplitude
young's double slit experiment	explains interference; uses monochromatic light to create dark and light bands
λ = xd/L	

Reflection Off a Plane

Reflection Law	incident angle = reflected angle
Properties of a plane image	
1- virtual	2- upright
3- same size	4- horizontally inverted
5- same distance	

Spherical mirrors

concave mirror	collects light rays (used in telescope)
convex mirror	scatters light rays (sides of cars)
Principal Axes	center line
Focus / focal point	the point at which light rays appear to converge
Focal Length	the distance between the center of the mirror and the focus
focal length formula	f = r/2 (r = radius of curvature)

Refraction of Light	
Refraction	the bending of light through a medium
snell's law	n1sinθ1 = n2sinθ2 (n is the refractive index)
refraction index	n = c/v (c is the speed of light, v is the speed of light in the medium)
complete reflection	reflection within a medium that occurs when the angle of incidence is greater than the critical angle
critical angle	the angle of incidence that causes the reflected angle to have 90 degrees
complete reflection applications	optical fibers
mirage	an optical illusion caused by a difference in temperature that creates refraction
rainbow	when light is scattered by water droplets

Sight defects	
farsightedness (long focal length)	corrected with a convex lens
nearsightedness (image forms in front of retina)	corrected with concave lens