Reflection and refraction notes pdf download free

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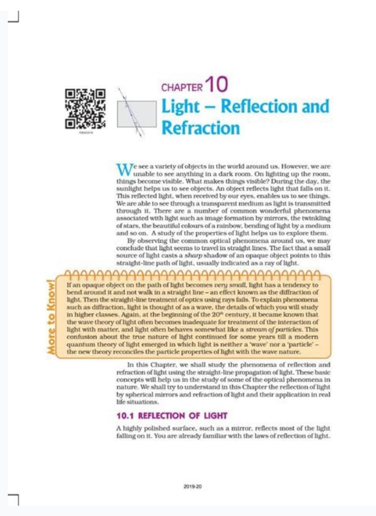

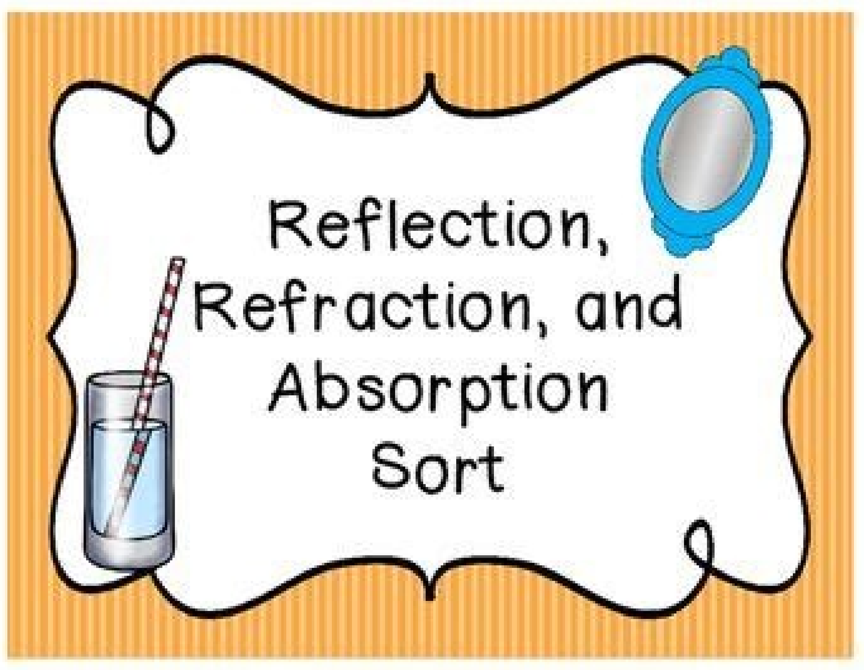

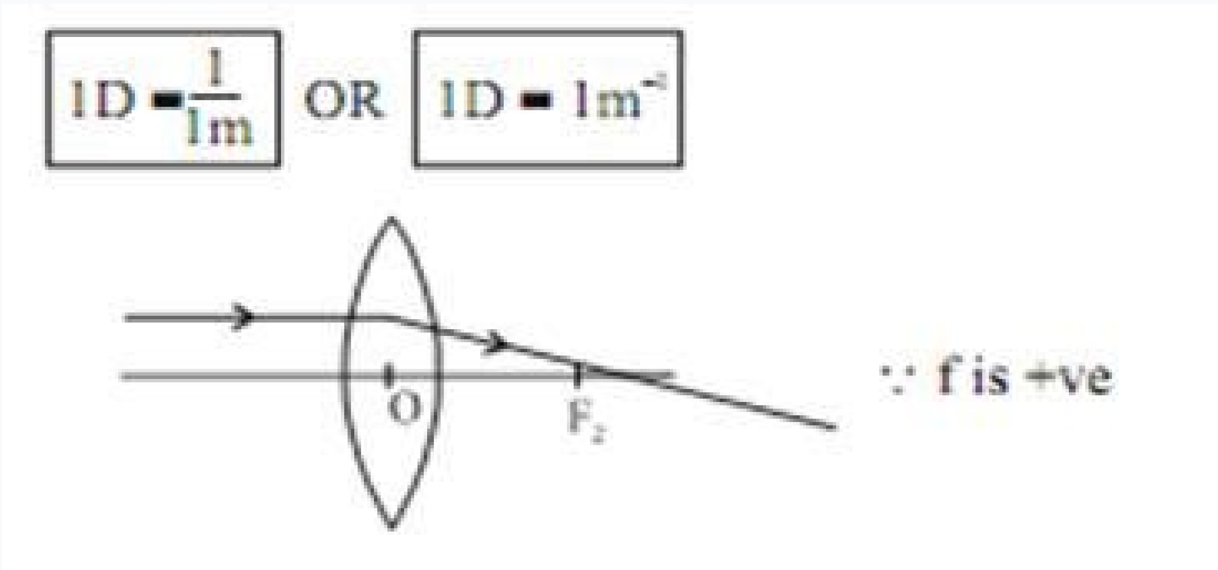

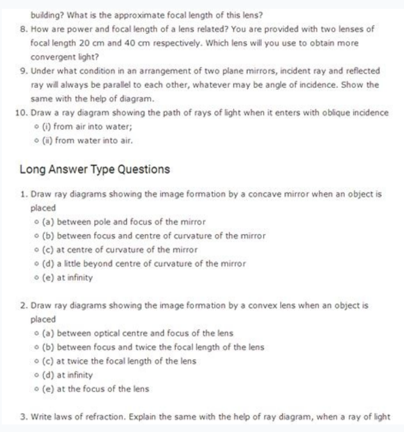

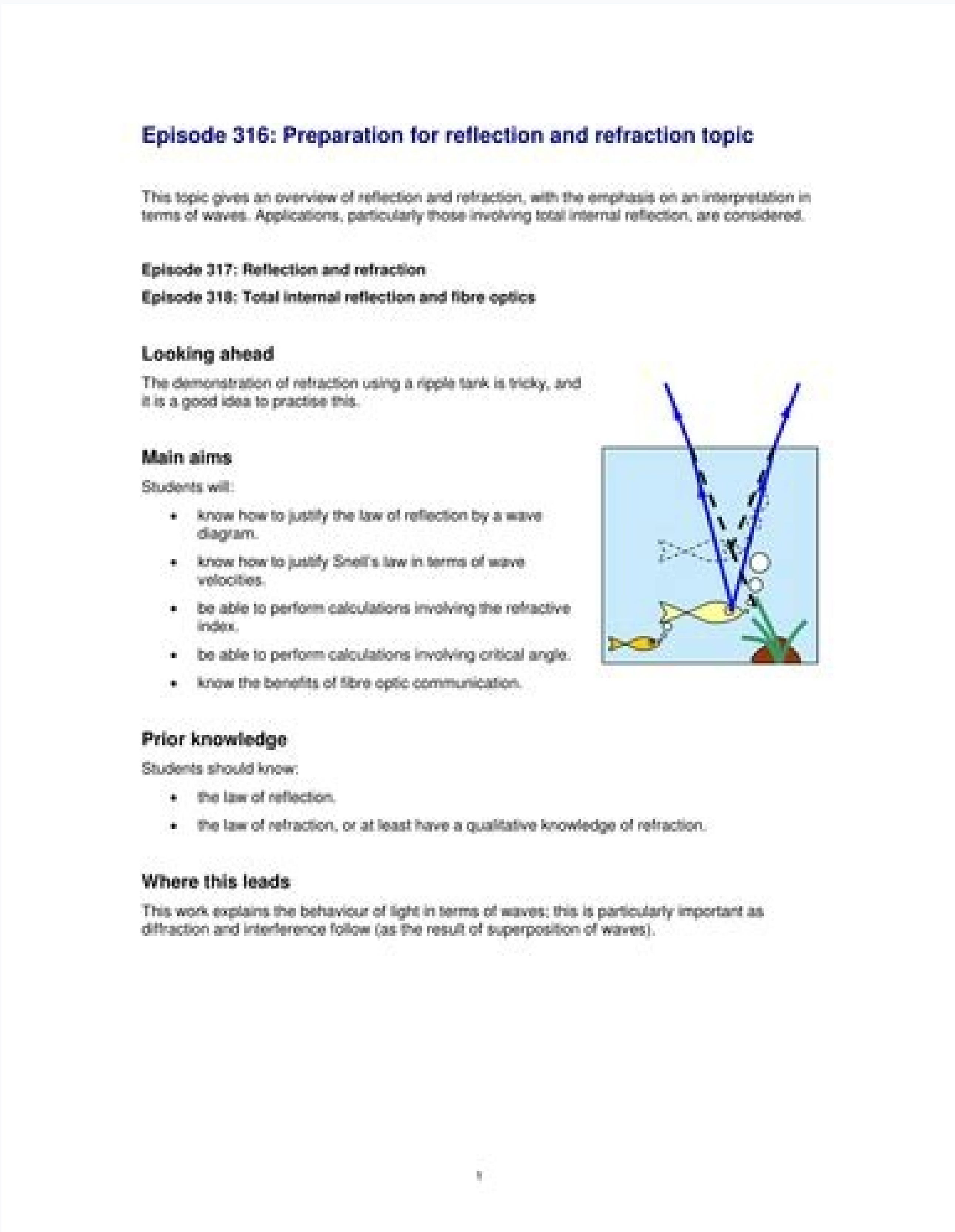

Episode 316: Preparation for reflection and refraction topic

This topic gives an overview of reflection and refraction, with the emphasis on an interpretation in terms of waves. Applications, particularly those involving total internal reflection, are considered.

Episode 317: Reflection and refraction

Episode 318: Total internal reflection and fibre optics

Looking ahead

The demonstration of refraction using a ripple tank is tricky, and it is a good idea to practise this.

Main aims

Students will:

- know how to justify the law of reflection by a wave diagram.
- know how to justify Snell's law in terms of wave velocities.
- be able to perform calculations involving the refractive index.
- be able to perform calculations involving critical angle.
- know the benefits of fibre optic communication.

Prior knowledge

Students should know:

- the law of reflection.
- the law of refraction, or at least have a qualitative knowledge of refraction.

Where this leads

This work explains the behaviour of light in terms of waves; this is particularly important as diffraction and interference follow (as the result of superposition of waves).

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Reflection and refraction lab report discussion. Reflection and refraction of light notes pdf. Refraction of light form 3 notes. Refraction notes pdf. Reflection and refraction notes pdf.

Light is a type of energy that can be converted into other types of energy.Light does not require a physical medium to propagate.Light's velocity in air or vacuum is $3\times 10^{8} \mathrm{~m}/ \mathrm{s}$.Rectilinear Propagation of LightÃ ÂLight travels in a straight line in a homogeneous transparent medium, which is known as rectilinear propagation of light.Ã ÂReflection of LightÃ ÂReflection of light describes the phenomenon by which a ray of light changes its propagation direction when it encounters a boundary between different media through which it cannot pass.Ã ÂThere are two types of reflection of light:Ã ÂRegular reflection or specular reflectionÃ ÂIrregular reflection or diffused reflectionÃ ÂRegular ReflectionÃ ÂThe perfect, mirror-like reflection of light is known as specular or regular reflection. Regular reflections include reflections in mirrors, water surfaces, and highly polished floors.Ã Â(Image will be uploaded soon)Irregular Reflection:Ã ÂIrregular reflection, also known as diffused reflection, occurs when a ray of light strikes a rough or unpolished wall or wood. In this case, the incident light is reflected in different directions by different parts of the surface. There is no definite image formed in such cases, but the surface becomes visible. It is commonly referred to as light scattering. As a result of the diffused reflection, non-luminous objects become visible.Ã Â(Image will be uploaded soon)Reflection of Light by a Plane Surface:Ã ÂThe diagram depicts how a light ray is reflected by a plane surface. Assume MM' is a reflecting surface. When a light ray strikes MM' in the direction IO, it is reflected along the direction OR. The incident ray is denoted by IO, the point of incidence by O, and the reflected ray by OR.(Image will be uploaded soon)Let ON be the perpendicular normal to the surface MM' at the point of incidence. The angle of incidence, denoted by the letter I is the angle formed by the radius with the normal to the point of incidence. The 'r' reflection angle is the angle formed by the reflected radius and the normal at the point of incidence. A reflective surface is something similar to a mirror. Reflection laws: it is observed that the laws of the reflection apply to the reflection of any flat surface. The accident ray reflected the radius, and normal at the point of incidence is all found in the same plane, according to the laws of reflection. The angle of incidence is the same as the angle of reflection. Nature of the image formed by a surface that reflects on the flat: ã ¢ an image can be both real and virtual. When the rays of light intersect after reflection, a real image is formed. When the rays of the light after the reflection do not intersect but seem to diverge from it, a virtual image is formed (these rays of light intersect when they are produced backwards). (The image will be loaded early) Diagrams of rays of the flat mirrors: ã ¢ Diagrams, the following rays are generally taken into consideration: a ray of incident light at 90 degrees on a flat mirror is reflected by the mirror along the same route. A ray of light that falls into any corner on a flat mirror is reflected by it in such a way that the angle of incidence is equivalent to the angle of reflection. The image is formed when the reflected rays seem to clash. (The image will be loaded soon) spherical mirrors: ã ,a spherical mirror is a mirror with a shiny and reflective surface that is part of a sphere of glass or plastic quarries. One of the two curved surfaces of a spherical mirror is covered with a thin layer of silver, followed by a hand of red lead leading paint. Consequently, one side of the spherical mirror is opaque, while the other is a highly lucid reflection surface. The opaque side of a mirror is always euges euges emoc otacifissalc ¨Ã ocirefs oihcceps oL .ossor ni otaiggerbmo ¨Ã etnettelfir otal li ertnem ,itnatsottos immargaid ien otaiggerbmo ulb ¨Ã etnettelfir non e ocapo otal li ehc etneserp ineiT .ammargaid nu ni I'm sorry. I'm sorry. erutrepa raenil eht sa denifed si yrehpirep s'rorrim eht no)Y dna X(stniop emertxe eht neewteb ecnatsid ehT :erutrepA raeniL)noos dedaolpu eb lliw egamI(. R rettel eht yb detoned si tI .erutavruc fo suidar eht sa denifed si ,trap a si rorrim eht hcihw fo ,erehps eht fo suidar ehT :erutavruC fo suidaR)noos dedaolpu eb lliw egamI(. ♪mirror), and this point is indicated as the main center or focal point of the mirror. Focal length: The focal length of a mirror is the distance between the pole and the fire. It is symbolized by the letter f.Characteristics of Focus of a Concave mirror and a Convex MirrorConvex MirrorConcave MirrorThe focal point is hidden behind the mirror. The focus is on the mirror. Because light rays after reflection seem to come from fire, fire is virtual. The fire exists because the bright rays converge in the center after reflection. Signature conference for spherical mirrors In the ray diagrams of the spherical mirrors, the following sign convention is used to measure various distances: The object is always placed on the left of the mirror. All distances are measured by the pole of the mirror. The distances measured in the direction of the accident radius are positive, while the distances measured in the opposite direction are negative. The distances measured above the main axis are positive, while the distances measured under the main axis are negative. (Image will be loaded soon)(Image will be loaded soon) When an object is placed in front of a concave mirror, the light rays of the object are reflected on the mirror. To the point where the reflections intersect or appear intersect, an image is formed. The formation of a mirror image is typically depicted by drawing radius diagrams. To create a ray diagram, we need at least two rays with known paths after reflection from the mirror. These rays must be chosen according to our needs. To obtain the image, two of the following rays can be considered. After reflection from a concave mirror, a radius of light parallel to the main axis passes through its focus. (Image will be loaded soon) After reflection, a radius of light passing osrevartta osrevartta assap ehc oiggar li emoC)otserp atacirac Âras enigammI (.elapicnirp essa'lla etnemalellarap egreme ovacnoc oihcceps onu id ocouf li Central center acts like a normal in the spherical mirror, a radius that passes through the center of curvature traces its path after reflection. (The image will be loaded soon) According to the law of reflection, a radius of light is reflected that affects the mirror to its pole. (Image will be loaded soon) Image formation from a concave mirror when the object is infinite when an object is placed in infinity, its rays are parallel to each other. Consider two rays, one that affects the mirror pole and the other passing through the center of curvature. The accident ray to the pole is reflected according to the law of reflection, and the second ray that passes through the center of curvature of the mirror traces its path. After reflection, these rays form an image in the center. The resulting image is accurate, inverted and climbed. The image is to F Real Inverted decrease (image will be uploaded soon) when the object is positioned beyond the two rays considered to obtain the image are: a radius that crosses the center of the curvature. A ray that runs parallel to the main axis. After reflection, the radius that passes through the center of curvature traces its path, and the ray parallel to the main axis passes through the fire. After reflection, these rays intersect at a point between C and F. The image is inverted, real and squeezed. The image is: between C and F Real inverted decrease (image will be uploaded early) when the object is positioned at the center of the curve in this section, we will look at two rays, one parallel to the main axis and the other passing through the focus. After reflection, the ray of light parallel to the main axis passes through fire. After reflection, the other ray that passes through the fire emerges parallel to the axis. After reflection, these rays collide at the center of the curvature to form an inverted image that is real and the same size of the curvatureThe image is: at Câ Realâ Invertited ... Objectâ (the image will be loaded soon) when the object is between C and Fâ consider a light beam parallel to the main axis and another radius passing through the focus. The parallel beam to the main axis passes through the main focus and radius that emerges parallel to the main axis after reflection. The reflexed rays collide at a point beyond C, resulting in a real, inverted and enlarged image. The image is: Â Beyond the real inverted zephate (the image will be uploaded soon) when the object is at the center of attention Parallel to the main axis and another radius that passes through the center of the curvature. The parallel beam to the main axis passes through the focus, while the radius through the center of the curvature portrays its path. The reflexed rays are parallel to each other and would meet only infinity, which implies that the image is formed infinity and is a true, inverted and enlarged image. The image is infinite: Realâ inverted â (image will be uploaded Quickly) when the object is located between the pole and focus considers a parallel light beam to the main axis and another radius passing through the center of the curvature. After reflection, the radius that passes through the center of the curvature portrays its path and the other radius that is parallel to the main axis passes through the focus. When the reflexed rays are extended backwards, these rays seem to meet behind the mirror. The image is erect, virtual and enlarged. The image is: â behind the mirror hect hect hect hert hecfied her will be loaded soon) the uses of concavi helrs mirrors of mirrors are used to obtain a parallel light radius in the following applications: as the following applications: as Reflectors in the headlightsResearch lights in torches and so on. The light source is positioned at the focus of the concave reflector for this purpose. (The image will be loaded early) Fig. Fig. .oipma ¹Âip ovisiv opmac nu odnenrof ,onretse'l osrev ivruc onos issevnoc ihcceps ilg ©Âhcrep orteid ad anicivva is ehc ociffart led enoisiv araihc anu etnecudnoc la ecsinrof ossevnoc oihcceps otseuQ .otua'nu ni erosivorter otteihcceps onu-ossevnoc oihcceps olled isu)otserp atacirac Ârrev enigammi'l(¢Âtcere Â " ottodir etnemamertse eh sucof la otamrof ¢Â :¨Ã enigammi'L - otinifni a ¨Ã otteggo'l odnauq)otserp Ârehcirac is reh treh lautreh tceh attere sucof al e olop li art otamrof ¢Â :¨Ã enigammi'L ¢Âoihcceps olled olop li e otinifni'l art otsop ¨Ã otteggo'l odnauq" ossevnoc oihcceps onu ni enigammi'lled enoizamrof aL .elautriv enigammi'nu erpmes ecudorp ossevnoc oihcceps onu ,enoizisop allad etnemetnednepidnI .etteflfir is oihcceps olled olop li osrev otterid e elapicnirp essa'llA etnemauqilbo osonimul etnedicni id oiggar nu ,osselfir led iggel ella otteccA .enoisselfir al opod elapicnirp essa'lla olellarap Âregreme ossevnoc oihcceps onu id elapicnirp sucof li osrev otterid ecul id oiggar nu)otserp atacirac Ârrev enigammi'L(.osrocrep ous li ognul ettelfir is e o09 a iploc oihcceps olled arutavruc id ortnec li osrev aiggaiv ehc ecul id oiggar nu)otserp atacirac Ârrev enigammi'L(.oihcceps ol orteid enoiznetta aus allad eravired arbmes elapicnirp essa'lla olellarap aiggaiv ehc ecul id oiggar nu ,ossevnoc oihcceps onu ad otuttelfir reva opoD .enoizaredisnoc ni iserp onognev iggar itneuges i ,iggar id immargaid onaerc is odnauQ xevnoC rorriM .adlacsir ol e enoisselfir al opod aznatsos allus egrevnoc eralos ecul aL .opocs otseuq a ovacnoc erottelfir ednarg nu id ortnec la otanoizisop eneiv eradlacsir ad aznatsos al o obic lI .otnemadlacsir id ivitisopsid eralos len etartnecnoc onos iralos inoizaidar el)otserp atacirac Ârrev enigammi'l(osiv led atagralla attere enigammi'nu erenetto rep occurt e arutasar id ihcceps emoc)otserp atacirac Ârrev enigammi'L(.atsitned lad otanimase eresse rep etned lus otazzilacof ¨Ã thgilraC id ednarg ednarg nu us ecul al eraived rep inoipmal ien itazzilitu onognev irottelfir i)otserp otacirac Âras enigammi'L(.aznaligiv id oihcceps onu ¨Ã'c ,inizzagam idnarg ien)otserp atacirac Ârrev .etnedicni oiggar li emoc oton ¨Ã oiggaiv ni ¨Ã ilauq i osrevartta aidem ied enoizarapes alled eicifrepus al ecsiploc ehc ecul alled oiggar lI -)OI(ETNEDICNI YAR .allets alled etnallitnics otteffe'lla enigiro Âd ²ÂiC .ehcna auttulf oihcco'l egnuiggar ehc ecul alled Âtisnetni'l e etnemreggel aibmac allets alled enoizisop etnerappa'l ,ertserret arefsomta'lled inoizidnoc ilovetum elled asuac A .elaer enoizisop aus alled atla ¹Âip etnemreggel erappa allets al idniuQ .arefsomta'l osrevartta assap otnauq ni elaer enoizisop aus allad asrevid etnemreggel ¨Ã allets alled etnerappa enoizisop al ,elamron al osrev ageip is ecul al ©ÂhcioP .erallets ecul alled enoizarfir acirefsomta a otuvod ¨Ã ellets elled arutillur lI .enoizarfir atamaihc ¨Ã Âtisned asrevid id ozzem ortla nu a ozzem nu ad assap odnauq ecul alled osrocrep len enoizaived al :enoizarfeR .elautriv ¨Ã enigammi'l ehc acidni otnemidnargni'lled erolav len ovitisop onges nU .elaer ¨Ã enigammi'l ehc acidni otnemidnargni'lled erolav len ovitagen onges lI $ }u{ }v{ carf \-= }h{ }}emirp \{^h{ carf \ = m $:emoc osserpse eresse ²ÂuP .)V(enigammi id aznatsid e $)}u{ mrhtam \($ otteggo aznatsid alla otalerroc ehcna ¨Ã $ }m{ mrhtam \ $ otnemidnargni'L $ }H{ .olratneserppar rep atasu etnemenumoc ¨Ã M arettel aL .otteggo'lled azzetla'l e enigammi'lled azzetla'l art otroppar li emoc atinifed ¨Ã enoizacifingam aL .otteggo'lled enoisnemid alla enoizaler ni atidnargni ¨Ã otteggo nu id enigammi'l iuc ni arusim al acidni ocirefs oihcceps onu ad ottodorp otnemidnargni'L ¢ÂenoizacifingaM.elacof azzehgnul al ¨Ã $ f $ e enigammi'lled aznatsid al ¨Ã $ v $,itteggo ilged aznatsid al ¨Ã $ u $,iuq $ }u{ }1 - hsiinimidelop e sucof a itnavad oihcceps olled olop e otinifni art tebtebtcere e ottodir etnemetnazzilacof tatinifni anigammi'lled arutanigammi'lled ezegamI fo noitisoPtcejbO id at which the incident ray strikes the surface of separation of the two media is called the point of incidence.Ã ÂNormal (N)Ã ÂThe perpendicular drawn to the surface of separation at the point of incidence is called the normal.Ã ÂRefracted Ray (OR)Ã ÂThe ray of light which travels into the second medium, when the incident ray strikes the surface of separation between the media 1 and 2, is called the refracted ray.Ã ÂAngle of Incidence (i)Ã ÂThe angle which the incident ray makes with the normal at the point of incidence, is called angle of incidence.Ã ÂAngle of Refraction (r)Ã ÂThe angle which the refracted ray makes with the normal at the point of incidence, is called angle of refraction. A ray of light refracts or deviates from its original path as it passes from one optical medium to another because the speed of light changes.Ã ÂLaws of RefractionÃ ÂThe incident ray, the refracted ray and the normal to the surface at the point of incidence all lie in one plane. For any two given pair of media, the ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant. The above law is called Snell's law after the scientist Willebrod Snellius who first formulated itThus,Ã Â$\frac{\sin i}{\sin r}=\text { a constant }=\mu$Where ÂµÂ is the refractive index of the second medium with respect to the first medium.The refractive index of glass with respect to air is given by the relation.Ã ÂIn general, if a ray of light is passing from medium 1 to medium 2, thenÃ ÂIf the medium 1 is air or vacuum, the refractive index of medium 2 is referred to as the absolute refractive index. The refractive index of a medium depends on the following factors: The nature of the medium. The colour or wavelength of the incident light.Ã ÂRefraction of Light through a Glass SlabÃ ÂWhen a ray light is passing from air to glass, that is, from a rarer medium to a denser medium, the refracted ray bends towards the normal drawn at the of incidence. In this case angle of r. But when the beam of light passes from the glass to the air, that is from a thicker medium to a more rare medium, the refract radius bends away from normal. In this case angle of i. The emerging radius, O1E which is nothing but the refract radius that emerges from the glass plate is parallel to the incident beam. This means that the refract radius (emergent radius) has been moved from its original path of a XY distance. This shift is indicated as a lateral shift. The lenses - A lens is a portion of a transparent refractive medium bounded by two generally spherical or cylindrical surfaces, or a curved surface and a flat surface. Convex lenses and converging lenses are the two types of lenses. The convex lenses of a convex lens is thicker in the middle and thinner at the edges. A convex lens has at least one surface that swells in the middle. Convex lenses are classified as bi -convex or double convex, convex and convex lens - convex lenses based on their shape. (The image will be loaded soon) a concave lens is a concave lens is a thinner in the middle and thicker the edges. These lenses, such as convex lenses, are classified as: â Bi -Concaveâ Plano - Convexo - Convexo - Concaveâ (the image will be uploaded soon) used in the optical optical center of optics (the image will be loaded soon) It is the focal point of a lens. It is represented by the letter O. A radius of light passing through the optical center of a lens does not differ in any way. It is also known as an optical center. Main Axis (the image will be loaded soon) The main axis is the straight line connecting the warp centers of the two curved surfaces of a lens. Light fireworks can pass through the lens in any slow direction, so there will be two main outbreaks on both of them.of the lens, which are indicated as the first and second main outbreak of a lens, respectively. respectively. Focus (F1) is a point on the main axis of the objective in which the rays of light starting from it (convex objective) or which seem to meet at the point (concave lens) become parallel to the main axis of the objective after the refraction from the two surfaces of the objective. (Image will be loaded soon) (Image will be loaded soon) the distance between the optical center and the first focus is indicated as the first focal length of the lens (F1). Second main focus (F2) is a point on the main axis of the objective in which the luminous rays parallel to the main axis of the objective after refraction by both surfaces of the lens pass through (convex objective) or seem to come from this Point (Concavo goal). (Image will load soon) (Image will be uploaded soon) The distance between the optical center and the second main focus is indicated as a second focal length of the lens (F2). The first and second focal length will be the same if the vehicle on both sides of the lens is the same. The focus of a convex lens is physical, while the focus of a concave lens is virtual. Convention of signs for spherical lenses all distances are measured by the optical center of the objective. The distances measured in the direction of the incident light are considered positive, while the distances measured in the opposite direction of the incident light are considered negative. All measurements carried out above the main axis are considered positive, while the measurements carried out under the main axis are considered negative, that is, the height of the object is always considered positive, while the height of the image is considered positive only for virtual images. Image formation of a convex lens a ray of light that passes through the optical center of the lens travels straight and without deviation. Only in the case of a thin lens, nu nu ,enoizarfir al opoD)otserp otacirac Ãrrev egamI(.ocouf li osrevartta assap elapicnirp essa'lla olellarap etnedicni oiggar nu ,enoizarfir al opoD)otserp atacirac Ãras enigammI (.orev ¨Ã The ray that passes through the fire of a lens emerges parallel to the main axis. (Image will be uploaded soon) When the object is positioned between F1 and O (Image Verrã loaded soon) The image is: format behind the Virtual Erect Magnified object when the object is positioned at 2f1 (the image You are uploaded early) The image is: format at 2F2 Real Inverted same size as the object when the object is positioned between F1 and 2F1 (Image will be loaded soon) The image is: formed over 2f2 Real Inverted magnificent when the The object is positioned in F1 (Image will be loaded early) The image is: formed to the infinite real inverted enlarged when the object is placed over 2f1 (image will be loaded soon) the image is: format between F2 and 2F2 Royal Real Decreased. When the object is placed indefinitely when the object is indefinitely, the rays from it are parallel to each other. The image is: formed with highly decreased real f2 (Image will be loaded soon) Convex lenses are also used in glasses to correct the hypermetropia viewing problem. IMAGE formation of a concave lens after refraction, a ray of light accident from a parallel object to the main axis of a concave lens seems to come from its fire. (Image will be uploaded soon) A ray of accident light that passes through the optical center comes out of the lens without deviation. (Image will be loaded soon) Whatever the position of the object, a concave lens always produces a virtual image, erected and decreased. We now draw radius diagrams to show where the images are when the object is placed - In infinity, between O and F1, and everywhere between Infinito and O.When the object is in Infinity (image will be loaded soon) the Image is: formed with a decreased virtual F1. When the object is positioned in any position between O and Infinity the image is: format isU isU)otserp otacirac Ãras egamI(otiunimid elautriv ottere 1F e O Concave Lens is used to correct myopia in glasses. It is used in combination with a convex lens to correct defects such as chromatic and spherical aberration (the failure of the rays to converge to a single objective due to a defect in a lens or mirror). Convention of signs for lenses for the measurement of various distances, the following convention of signs is used: (Image will be uploaded soon) (Image will be uploaded soon) All the distances on the main axis are measured by the optical center. The distances measured in the direction of the accident rays are positive, while the distances measured in the opposite direction of the accident rays are negative. All measurements made above the main axis are positive. Consequently, the height of an object and the height of an upright image are both positive, while all the distances measured under the main axis are negative. Note: The rules are the same for spherical mirrors. The signs convention for lenses is shown in the table below: for the measurement of various distances, the following convention of the signs is used: (image will be loaded soon) The optical center is used to measure all the distances along the axis principal. The distances measured in the direction of the accident rays are positive, while the distances measured in the opposite direction of the accident rays are negative. All measurements made above the main axis are positive. Consequently, the height of an object and the height of an upright image are both positive, while all the distances measured under the main axis are negative. Formula Lens The formula or equation of the lenses describes the ratio between the distance of the object (U,) the distance of the image (V,) and the focal length (f) of the objective. This objective formula works for both convex and concave lenses. Note: odoirep odoirep li etnaruD .inges ied enoiznevnoc al odnoces otairporppa onges orol li noc itazzilitu eresse onoved iton irtemarap ied irolav I .ovitteibo'lled alumrof al azzilitu is odnauq etnem a erenet ad the unknown parameter should not be given a sign.Â ÂMagnificationÂ ÂMagnification is defined as the ratio of image size (hI) to object size (ho).Depending on the size and nature of the image, the magnification produced by a lens can be equal to one, greater than one, or less than one.Case IÂ ÂWhen the image's height (hI) equals the object's height (ho).$\mathrm{m}=\frac{\mathrm{h}_{\mathrm{I}}}{\mathrm{h}_{\mathrm{o}}}=1$As a result, when the magnification is set to one, the size of the image is the same as the size of the object.Case IIWhen the image's height $\left(\mathrm{h}_{1}\right)$ is greater than the object's height $\left(\mathrm{h}_{\mathrm{o}}\right)$.$\mathrm{m}=\frac{\mathrm{h}_{\mathrm{I}}}{\mathrm{h}_{\mathrm{o}}}>1$The image is magnified.Case IIIWhen the image's height $\left(h_{1}\right)$ is lesser than the object's height $\left(h_{0}\right)$.$\mathrm{m}=\frac{\mathrm{h}_{\mathrm{I}}}{\mathrm{h}_{\mathrm{o}}}

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