OCR (B) Physics GCSE

PAG 08 - Investigating the reflection of light off a plane mirror and the refraction of light through prisms.

Flashcards

What is reflection?

What is reflection?

When waves bounce off a surface that cannot transmit them.

What are the two types of reflection?

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Specular and **diffuse** reflection.

Define specular reflection.

Define specular reflection.

Reflection off smooth surfaces (such as mirrors) in a single beam which makes the **same angle** with the normal as the incident beam.

Define diffuse reflection.

Define diffuse reflection.

Reflection off a rough surface, resulting in the scattering of light.

What kind of image is produced by reflection off a plane mirror?

What kind of image is produced by reflection off a plane mirror?

A virtual image.

What is a virtual image?

What is a virtual image?

An image produced on the same side of the lens as the object.

A virtual image cannot be formed on a screen as the light rays never cross after the lens.

What measurements should be taken when investigating reflection?

What measurements should be taken when investigating reflection?

The angle of incidence and the angle of reflection.

What is the angle of incidence?

What is the angle of incidence?

The angle (relative to the normal) at which light is incident on (hits) the mirror.

What is the angle of reflection?

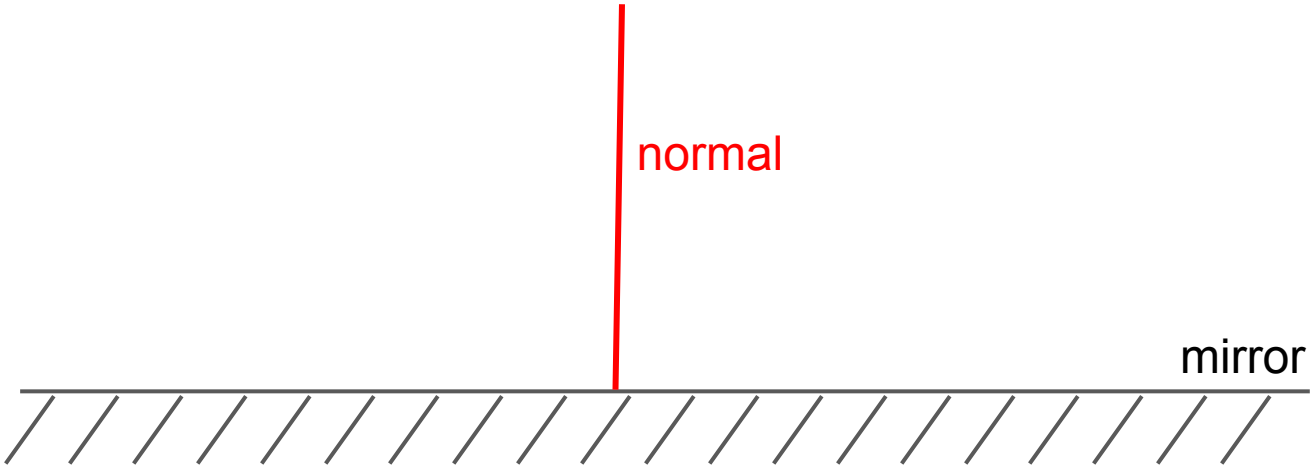
What is the angle of reflection?

The angle (relative to the normal) at which light leaves/moves away from the mirror.

What is the normal?

What is the normal?

Any line perpendicular to the surface of the mirror.



What apparatus is needed to investigate reflection?

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- Ray box
- Plane mirror
- Pencil and paper
- Protractor

Describe a method to investigate reflection.

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- Position a plane mirror so it is perpendicular to the surface of the desk and place a piece of paper in front of it. Draw the normal with a pencil and ruler.
- Use a ray box to shine rays at various angles of incidence (measured with a protractor) and record the corresponding angles of refraction. You may need to trace the lines before you can measure them.

What should you observe from the results?

What should you observe from the results?

angle of incidence = angle of refraction

This should be true for all angles of incidence.

What is refraction?

What is refraction?

Refraction is the change in **speed** of a wave as it reaches a boundary between two media, usually resulting in a change in direction (if it enters at an angle).

What apparatus is needed to investigate refraction?

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- Ray box
- Prism (glass or perspex block)
- Paper
- Pencil
- Protractor

Describe a method to investigate refraction.

Describe a method to investigate refraction.

1. Place the prism on a piece of paper. Trace around the prism.
2. Shine a light through the prism, tracing the angle of incidence and refraction.
3. Remove the block and use a ruler to draw normals to the lines. Use a protractor to measure the angles.
4. Replace the prism
5. Repeat for every 10°
6. Plot a graph of sin i against sin r
7. Repeat for different prisms

What is meant by sin(angle)?

What is meant by sin(angle)?

It is the sine of the angle. You can input this into your calculator by clicking the sin button and then entering the angle.

What can be derived from the graph of sin(i) against sin(r)?

What can be derived from the graph of sin(i) against sin(r)?

The refractive index of the prism.

What does the refractive index represent?

What does the refractive index represent?

The ratio of the speed of light in air to the speed of light in the prism.

How can the refractive index be worked out?

How can the refractive index be worked out?

It is equal to the gradient of the graph of sin(i) against sin(r).