What's Your Idea?

Physics – Reflection and Refraction

The students are discussing how a mirror works.

It emits light so you can see your face.

It doesn't emit light, it reflects light.

It only works if you look at it straight on.

It's like a camera and shows you a picture of whatever it's pointing at.

What's your idea?

Possible Points of Discussion

It emits light so you can see your face.
A mirror does not emit light. It is not a luminous object.

It doesn't emit light, it reflects light.
This is correct. A mirror is designed to provide a highly reflective surface, which is smooth and shiny – this way it ensures that the light is reflected back in the opposite direction, rather than being dispersed.

Possible Points of Discussion

It only works if you look at it straight on.

The mirror reflects the light directly because of its smooth surface. If the mirrors surface was rough (for example if it was shattered), the reflected light would be scattered in many directions.

Mirrors can be used to look around corners (like a periscope) because the angle of reflection is always equal to the angle of incidence.

It's like a camera and shows you a picture of whatever it's pointing at.

A camera works differently to a mirror. A camera transmits the light through the lens and refracts it to focus the image onto a special surface that absorbs the light to produce the image. It is in this way that a camera is like the human eye.

The students are discussing why the straw looks bent in the glass of water.

The water melts the solid particles in the straw and makes it bend.

It's because the water makes the light waves bendy.

It's because the light travels at a different speed from the water.

What's your idea?

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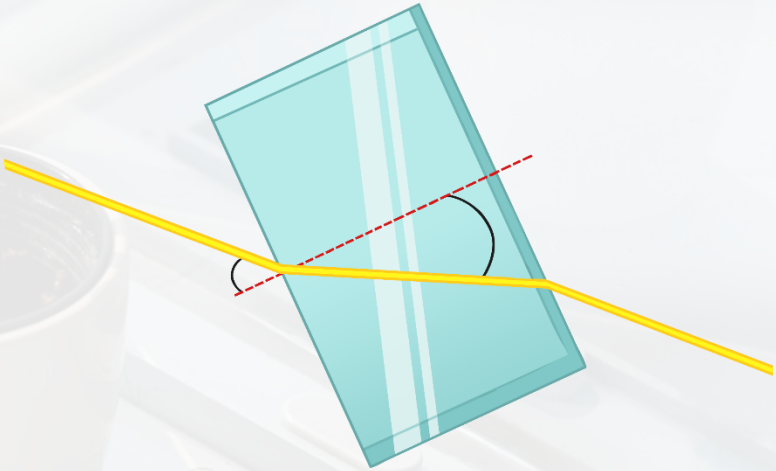
Possible Points of Discussion

The water melts the solid particles in the straw and makes it bend.
The water does not interact with the plastic in the straw to cause the apparent bending. The particles in the straw are unchanged.

It's because the water makes the light waves bendy.
Light waves always travel in straight lines, although they can travel in any direction and can be reflected and refracted to change direction.

It's because the light travels at a different speed from the water.
The light reflecting from the straw below the water is refracted as it travels more slowly through the water particles, and then much quicker through the air, therefore making the straw appear to be in a different position to where it actually is.



The students are discussing how contact lenses and glasses help with vision.

They focus the light by bending it towards the pupil.

They focus the light by reflecting it towards the retina.

They work by refracting the light towards the optic nerve.

They focus the light by refracting it towards the retina.

What's your idea?

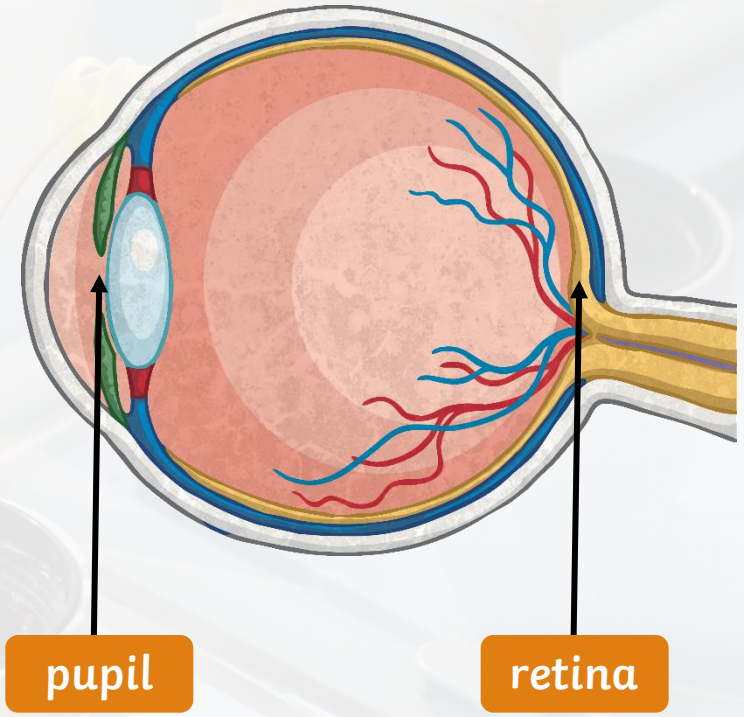
Possible Points of Discussion

They focus the light by bending it towards the pupil.

Light enters the eye through the pupil. The lenses (glasses or contact) work to focus the light correctly, through the pupil, and onto the retina.

They focus the light by reflecting it towards the retina.

The lenses (glasses or contact) work to focus the light correctly, through the pupil, and onto the retina.



Possible Points of Discussion

They focus the light by refracting it towards the retina.

Our vision becomes blurred and out of focus when the lens is unable to focus the light specially onto the retinal cells at the back of the eye. When a person is short-sighted (distance vision is blurry), the lens is focusing the light in front of the retina. When a person is long-sighted (close vision is blurry), the lens is focusing the light behind the retina.

The lenses (glasses or contact) work to focus the light correctly, through the pupil, and onto the retina.

They work by refracting the light towards the optic nerve.

The function of the optic nerve is to carry the message as an electrical impulse to the brain.