



Goggles - How do goggles help us to see better underwater?

Fact

- Our eyes work best when they are looking through the air.
- When we swim underwater water presses against our eyes and it is harder to keep our eyes open. Goggles stop the water touching our eyes so we can see more comfortably.
- We see things when light reflects off them and travels into our eyes. The light needs to hit the right place at the back of our eye for us to see a clear image.
- Light travels differently through water. The water bends the image so the image gets distorted.
- And when water touches our eyes it makes it harder for us to focus and get a clear image.
- Goggles allow space for us to focus the image and they also make it easier to judge the distortion from the bending of the image as it travels through the water.

Do you know

- Fish have much thicker, sharply curved lenses in their eyes that do the focusing work so they don't need to wear goggles!
- If you normally wear glasses to help you see more clearly you can get your glasses prescription put into your goggles so you can see more clearly underwater.

Experiments you can do

Next time you go swimming look down at your legs underwater. What do they look like? This happens because of the refraction (bending) of light.

Now try looking underwater with and without goggles on. Which is better – with or without goggles?

What about above the water? Which is better – with or without goggles? Now try filling up your goggles with water. What's it like to look through them underwater and then above?

Other Investigations

Next time someone you know catches a fish have a good look at the fish's eyes. Get someone to cut out the tough eyeball for you. Have a good look at it then get them to cut the lens out – it's very different from a human lens.

Put a bucket on the ground a few paces away from you and try throwing coins into it. After a few tries you'll probably get the coin in quite easily. Make sure the bucket is clean then put it in a swimming pool so that it fills with water and sinks to the bottom. Try throwing coins into the bucket now. Is it as easy now? What do you have to do so you can get a coin in the bucket?

Stand a pencil in a glass of water. What does it look like from the top? How about from the side. That's refraction at work again. Use it as a magic trick to show your family and friends then explain how refraction is the way water bends light. So it's sending a distorted image to your eyes.

Jokes

What do you call a deer with no eyes? No idea!