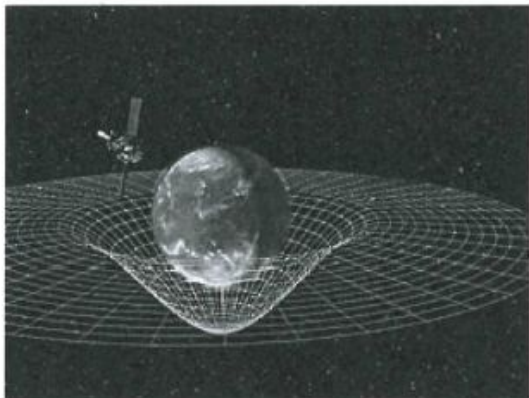


IF LIGHT HAS NO MASS, HOW IS IT POSSIBLE FOR GRAVITY TO BEND LIGHT?

By Anaiya Suchak



The Mass of Light

Light is composed of Photons. Photons are massless particles. It can be argued that they have energy and momentum and will exert pressure on a surface but no mass. As momentum can exist without mass, this cannot act as evidence that light has any mass at all.

Visible light is a form of radiation which can be defined as an energy that travels in the form of electromagnetic rays. Visible light is a type of radiation on the electromagnetic spectrum

which is made up of a continuous range of wavelengths. The electromagnetic rays are a form of radiation that travel through the universe. The charge of the electromagnetic rays is zero.

Wave-Particle Duality

The behavior of light can be understood using a concept called the wave-particle duality. In certain experiments and observations, light behaves like a wave, showing particular characteristics such as diffraction. However, in other experiments, light behaves like a particle, which we call a photon.

Photoelectric Effect

The particle nature of light is related to the photoelectric effect. The photoelectric effect occurs when light shines on a metal surface and causes the emission of electrons. electrically charged particles are released from or within a material when it absorbs electromagnetic radiation. The effect is often defined as the ejection of electrons from a metal plate when light falls on it. The photoelectric effect proves that light has particle-like activity.

Gravitational Lensing

Gravitational Lensing occurs when a massive celestial body - like a galaxy cluster, for example, Hercules-Corona Borealis Great Wall - causes a significant curvature of spacetime, causing the path of light around it to visibly bend.

It's actually the matter that the light is within that bends. The mass warps the surrounding Space-Time which the photons in light travel through.

Einstein's Relativity Theory

According to his theory, time and space are fused together to form a quantity known as spacetime. Within his theory, massive objects cause spacetime to curve, and gravity is simply the curvature of spacetime. The theory states that gravity is not a force acting at a distance, it is a curvature of spacetime caused by the presence of mass and energy.

According to his theory, massive objects like planets and stars bend the spacetime around them, creating what we perceive as gravitational attraction. The theory shows that space and time are not separate but are interconnected and influenced by matter and energy.

Conclusion

In general relativity, gravity is not described as a force acting on objects with mass but rather as the curvature of spacetime caused by the presence of mass and energy. Mass and energy curve the spacetime around them, and objects follow the curvature of this spacetime as they move. When light passes through a region of curved spacetime, its path is also influenced by this curvature, causing it to appear as if it has been bent by gravity.

Light itself is massless, meaning it has no rest mass. However, it still carries energy and momentum, and according to general relativity, it is affected by the curvature of spacetime in the presence of mass and energy. The amount of bending experienced by light depends on the strength of the gravitational field it passes through and the proximity to massive object/s.

Light is influenced by gravity because the curvature of spacetime caused by mass and energy affects the path of light rays passing through that curved spacetime, even though light itself has no rest mass.



Le cancre The dunce

Jacques PRÉVERT

Il dit non avec la tête He says no with his head.
 mais il dit oui avec le cœur but he says yes with his heart. → mad laughter seizes him
 il dit oui à ce qu'il aime He says yes for the things he likes
 il dit non au professeur he says no to the teacher
 il est debout He stands
 on le questionne ~~for the question~~ he is questioned
 et tous les problèmes sont posés and all the problems arise
 soudain le fou rire le prend Suddenly the school boy laughs
 et il efface tout He wipes everything off
 les chiffres et les mots The ~~phrases~~ numbers and the words
 les dates et les noms The dates and the names
 les phrases et les pièges The sentences and the traps
 et malgré les menaces du maître in spite of the threats of the teacher
 sous les huées des enfants prodiges under the boos of the smart children
 avec les craies de toutes les couleurs with the ~~chalk~~ all the coloured chalk
 sur le tableau noir du malheur On the blackboard of the disaster.
 il dessine le visage du bonheur. He draws the face of happiness.



"Le Cancre", tiré du recueil "Paroles" paru aux éditions Gallimard

History

CAUSES OF WWI

Caring only about your own nation (nationalism)

Assasination of Franz Ferdinand sparks war.

Unions between countries/alliances escalated the number of countries involved

Sophie - Franz Ferdinand's pregnant wife was also shot

Entente (Triple Entente are France, Russia and Great Britain).

Serbian terrorist groups are to blame for the assassination.

Ottoman Empire was one of the central powers (along with Germany, Austria-Hungary and Bulgaria).

Force - the use of military methods to gain power (militarism)

Wars (e.g. Franco-Prussian war, which Prussia won, contributed to WW1)

Weapons and army

Imperialism and taking countries

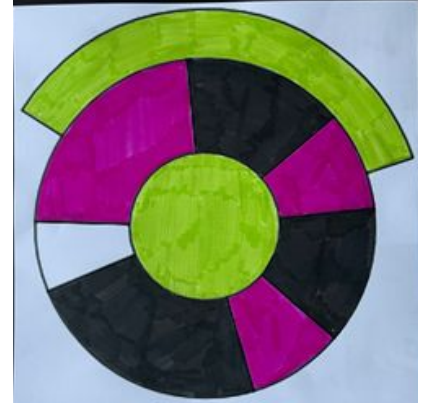
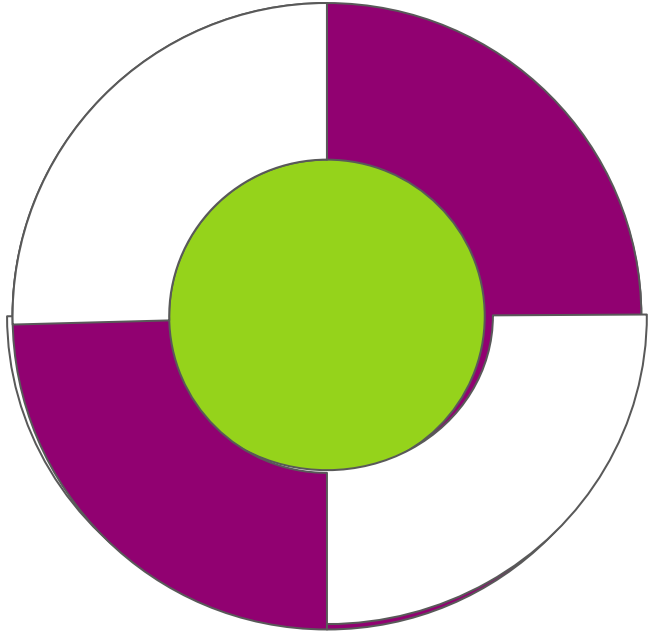


Write an acrostic poem
to sum up today's
lesson and help you
remember the key
points.

Challenge Activity
You're a poet!

Maths

Colours



Reflecting on water polo...

Passion. One word to sum up a lifetime of experiences and memories I have had the luck to enjoy through my sport. Water polo is more a lifestyle than a hobby with it taking over my social life and packing my schedule to the brim but when i'm in the water, adrenaline pumping, heart racing, legs aching and mind in overdrive, when I hear the sound of a ball hitting the back of the net or the support of my teammates every worry or problem goes away and it's just me, the ball and my teammates all in this together fighting and playing in unison like a well oiled machine. I love the sport with all my heart and trust me it's big but as much as I hate to admit it, there have been some bumps along the way including lots of crying in changing rooms and pep talks from mum.

I found out about this underrated sport through my competitive swimming club when I was aged 8 and no I didn't fall in love with it straight away as many of you will expect. Rather I absolutely hated it which resulted in me actually giving up and I know now that was not the right mindset or attitude. When I gave up my sister continued being the decisive headstrong girl she is. She knew what she wanted and she was going to achieve no matter what. Me on the other hand, a small not so confident weakling who didn't like anything I wasn't good at decided to stop. I decided to give it another try when I was 9 and I didn't hate it so much, which was progress!

On the 19th of November I joined the 2008/2007 National Academy Squad after being scouted at a game by the National coach (Nick Humes). Obviously playing in a higher age group was very hard for me especially with girls at such a high level and most of which I had no idea who they were. The training was long hours and by the time each one was done every part of my body was aching to a point it was semi numb and my eyes burned from the chlorine which resulted in lots of crying trying to clean my eyes of the chemical.

i would have never got anywhere without my older sister. She gives me the best advice and forces me to take it even when I don't want to. It's the most comforting thing knowing that she'll always be there with me if I need some words of wisdom or a quick hug when things aren't always going right. I know she'll never judge me and will always be cheering me on. When we're playing we have a connection and play hand in hand, she's not only my sister but my teammate, my best friend and the person I look up to and rely on. People often ask us who's better but we have different strengths and weaknesses that help us play different positions and which compliment each other perfectly. She's my right arm and I would have no idea what to do without her.

Waterpolo is a very intensive sport that requires a lot of funding, time, long drives and being a confident swimmer: if you tick all the boxes then you're perfect for water polo and should definitely give it a try like me you may even find a love for it.

mi familia :2

tren

Fue raro

fue un
desastre

Comi paella



Escribi
SMS

¿por que?

coche

Viste
monumentos

fue
horrible

¡Que mal!

Perdi mi
pasaporte

fue genial!

Mande
SMS

barco

¿que hiciste en tus vacaciones?



YELLOW

WALLPAPER

interesting & creative ideas

within the article:

GILMAN'S EXPERIENCES:

- It was found that the author of 'The Yellow Wallpaper' was writing out of her own 'agonising' experience. 5 years before she had written her novel, she began to suffer from postpartum depression - and because she was a woman in the 19th century, she was strictly ordered to follow the treatment of a man named Dr Silas West Mitchell, who was thought to be 'America's leading expert' in women's mental health. His theory was grounded in the belief that "if modern girls stopped wanting things - education, the vote, and above all, "work" - they would become "happy".

Obviously, because Gilman was instructed to stop doing these things, and live a domestic life where she was to "never touch pen, brush or pencil" as long as she lived. After Gilman's "treatment", she wrote: "I...

came periodically close to losing her mind, similarly to the experience that the narrator in 'The Yellow Wallpaper' had.

THE YELLOW WALLPAPER & THE #METOO MOVEMENT:

- Gail Marshall, a professor of Victorian literature and culture at the University of Reading states that "The Yellow Wallpaper" speaks directly to our #MeToo movement".

The #MeToo movement is an awareness campaign against sexual abuse, sexual harassment, and rape culture. Marshall explained that even though there are no mentions of physical violence, the narrator describes psychological torture, in which her own sense of reality is constantly assaulted.