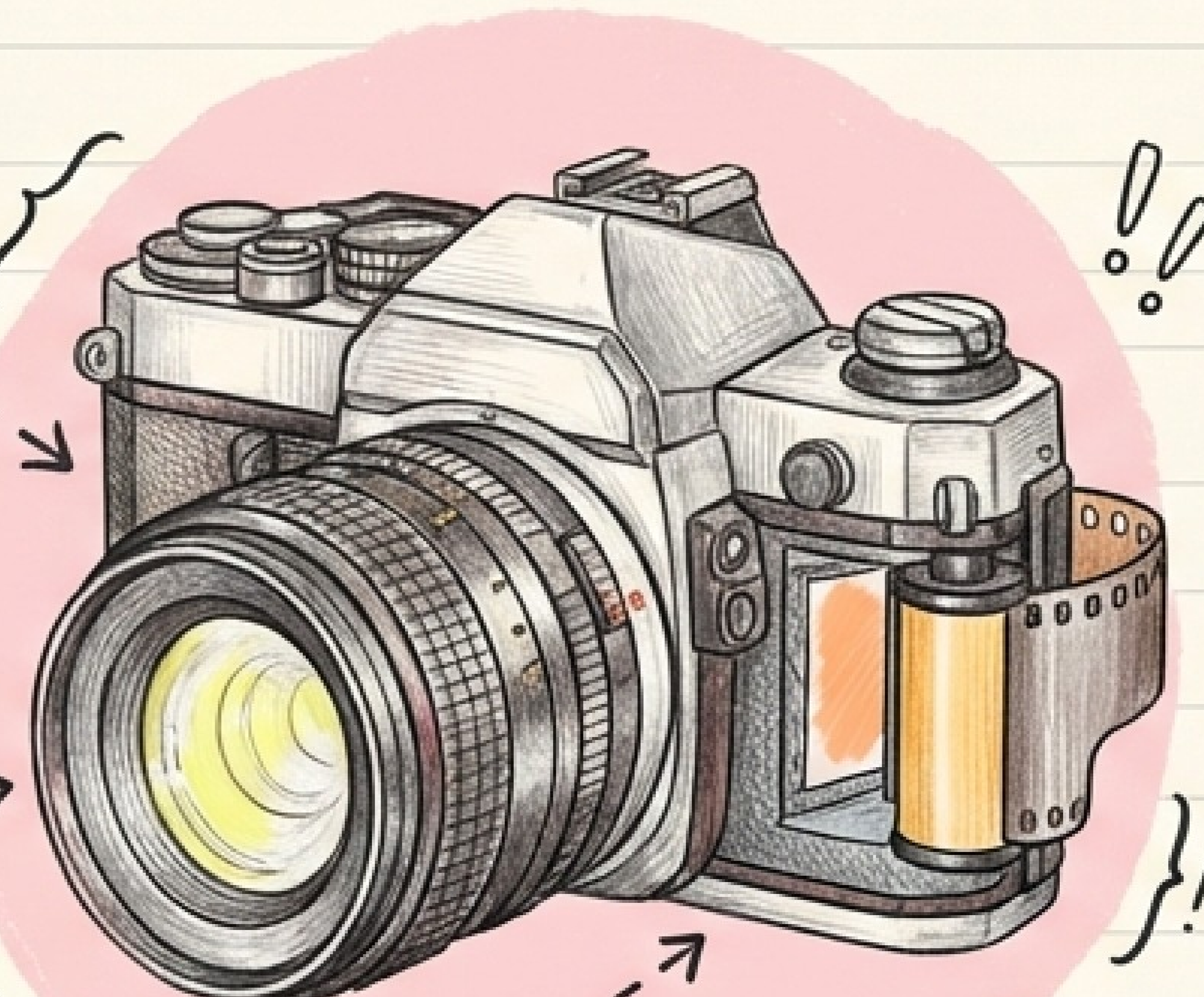
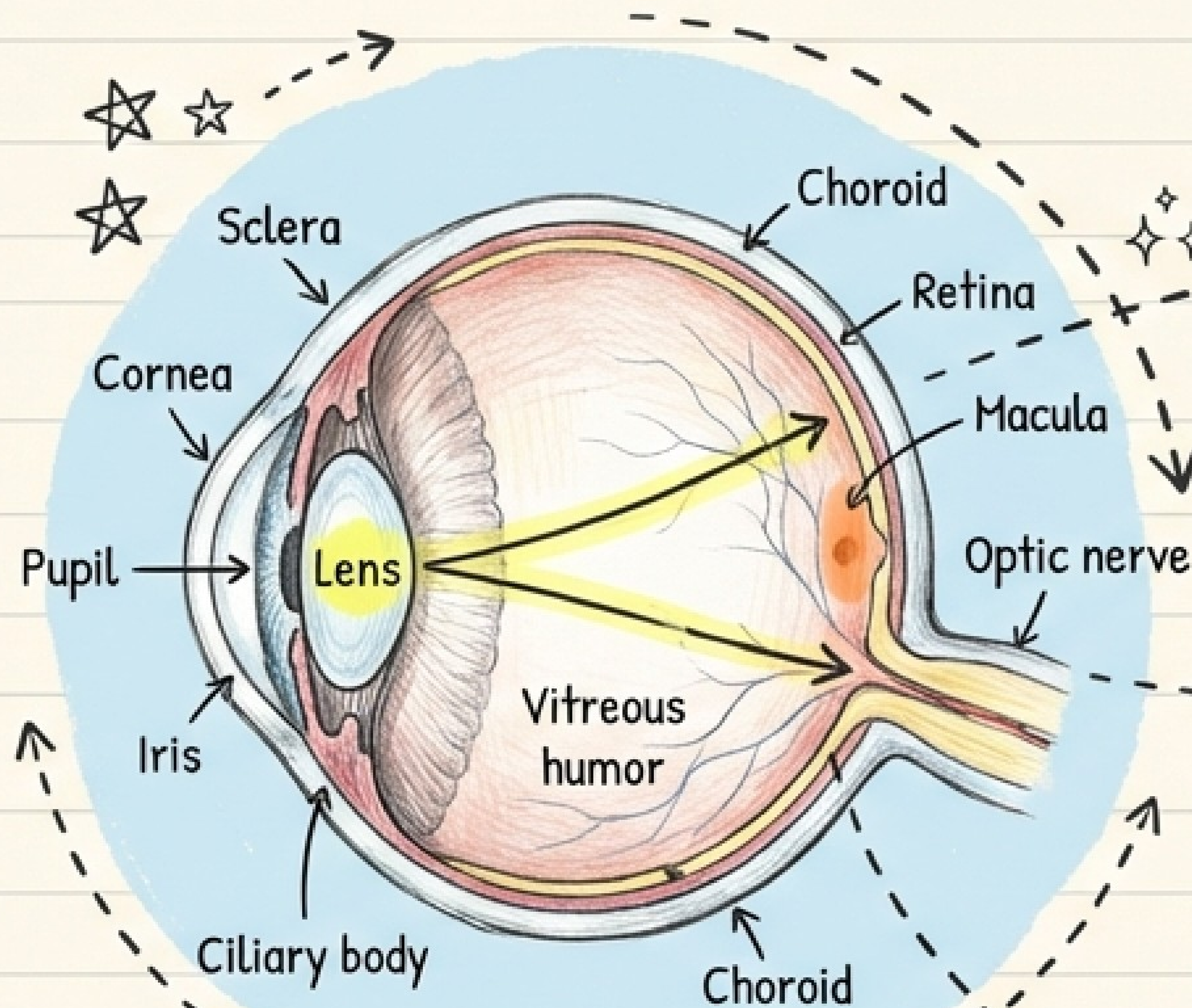


*The Human Eye &
The Colourful World:
A Master Study Guide*

Anatomy, Optics, and the Physics of Light

The Human Eye

The Vintage Camera



Both focus the light.

Both control how much light gets in.

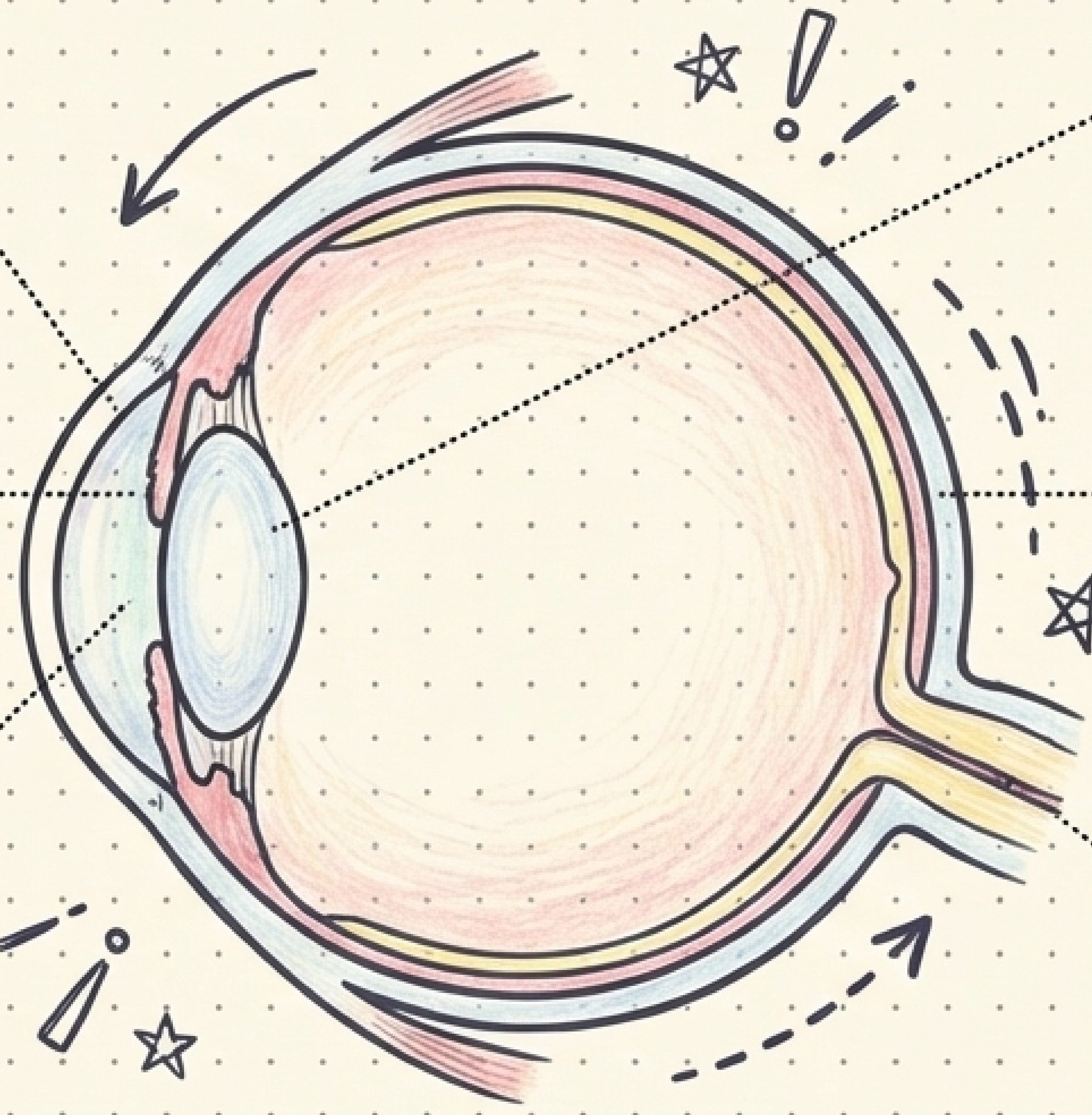
Both capture the final image.

Pro-tip:
Think of vision as taking a photograph. If the parts don't line up perfectly, the picture comes out blurry!

Cornea
Transparent front part
that refracts light.

Iris
Controls the size
of the pupil.

Pupil
Opening through
which light enters.

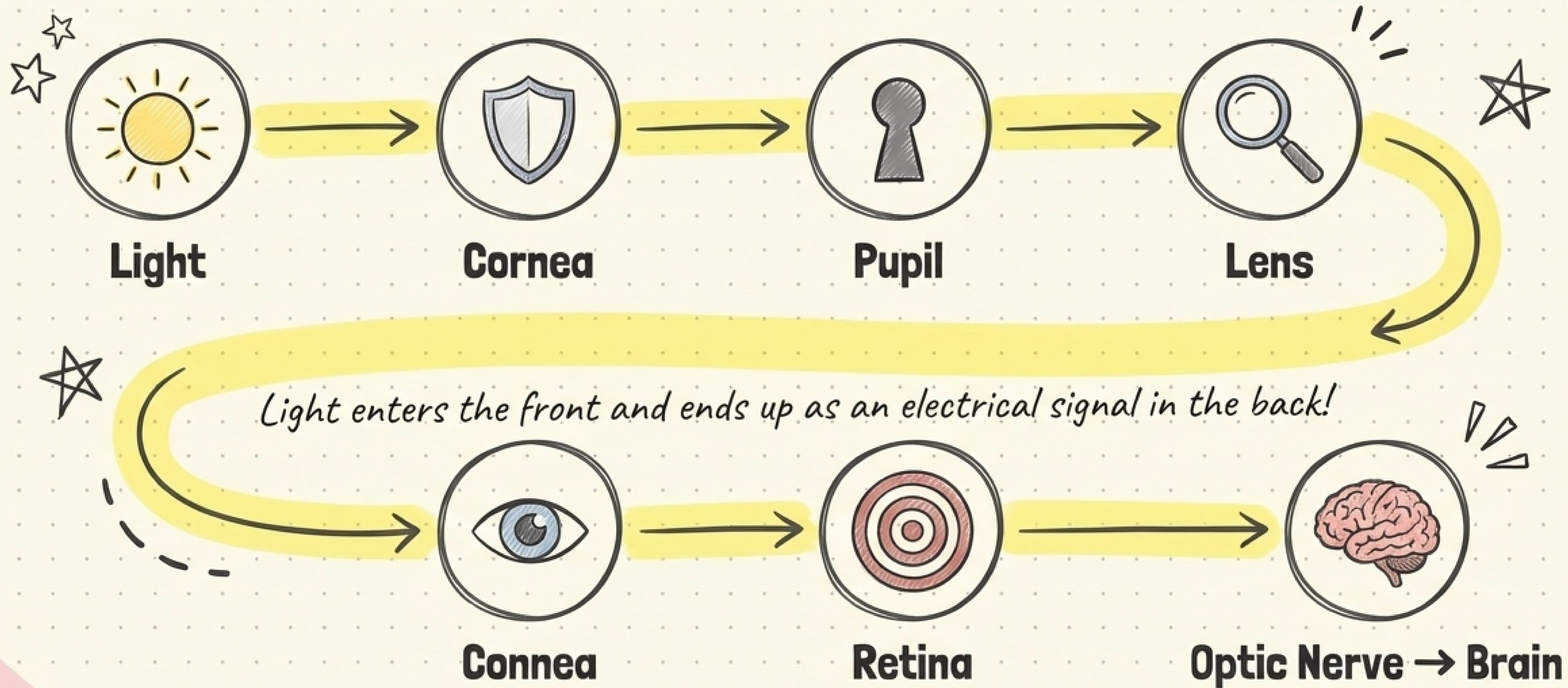


Lens
Focuses light onto
the retina.

Retina
Contains light-sensitive
cells (Rods & Cones).

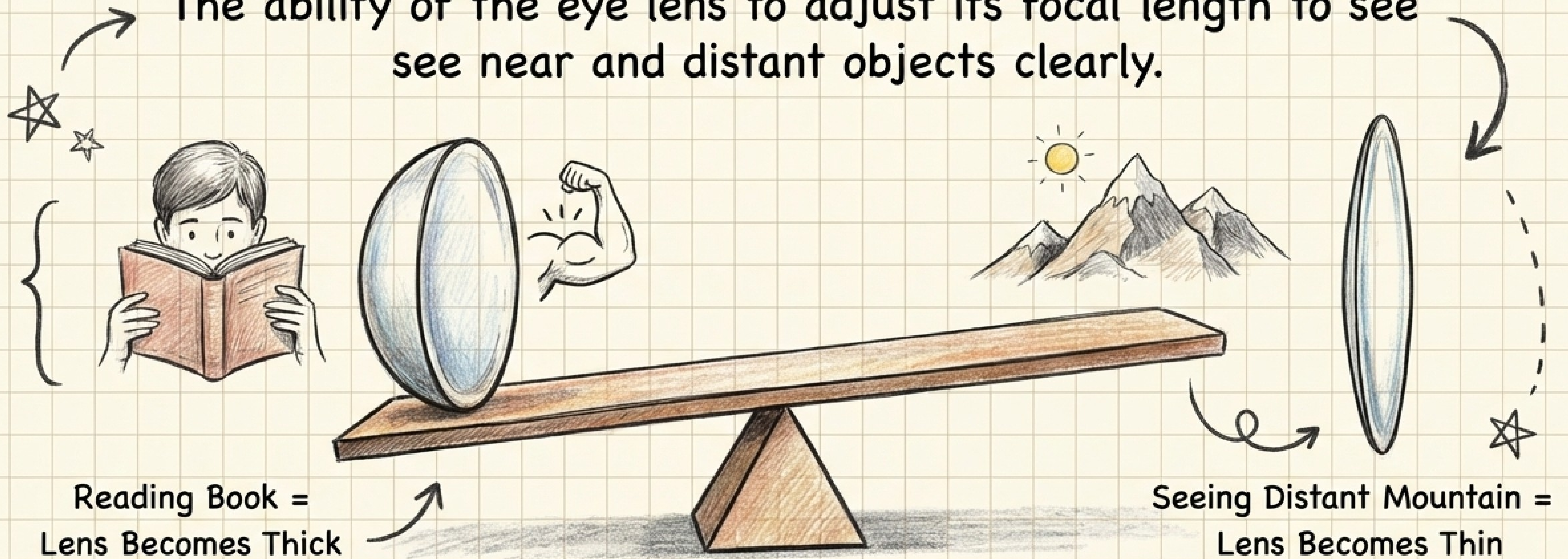
Optic Nerve
Sends the image
signals to the brain.

How We See: The Path of Light



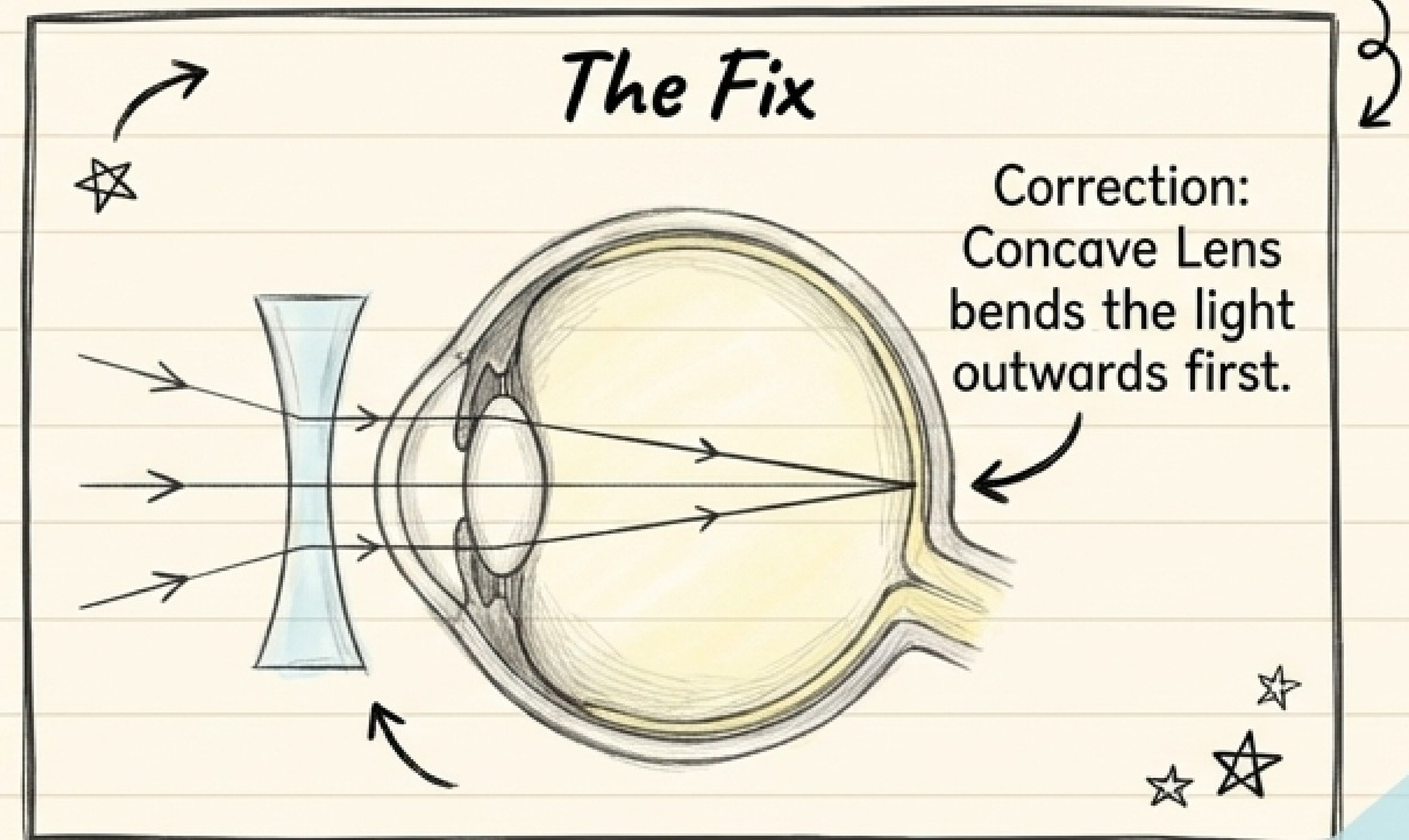
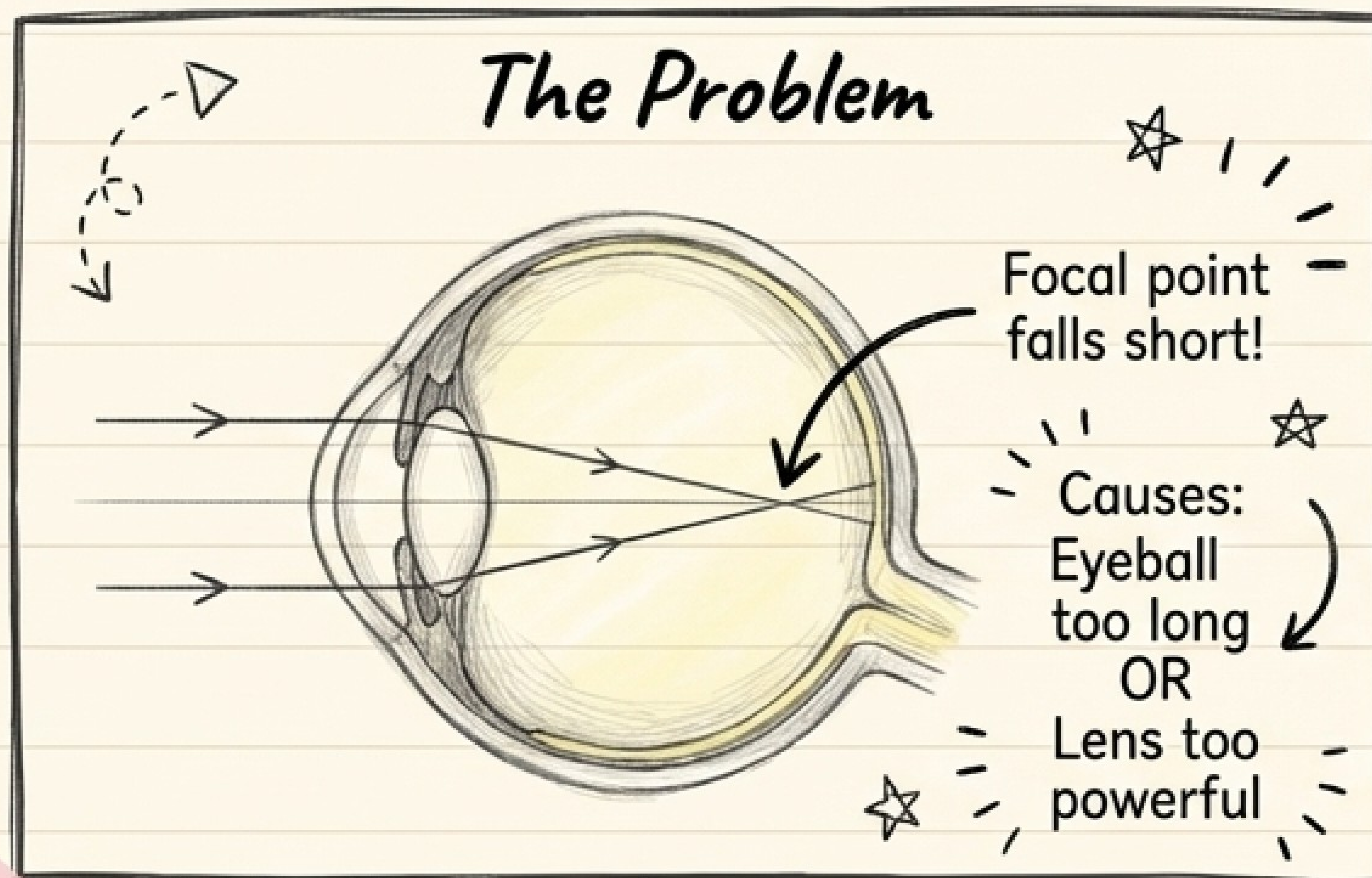
Power of Accommodation

The ability of the eye lens to adjust its focal length to see near and distant objects clearly.



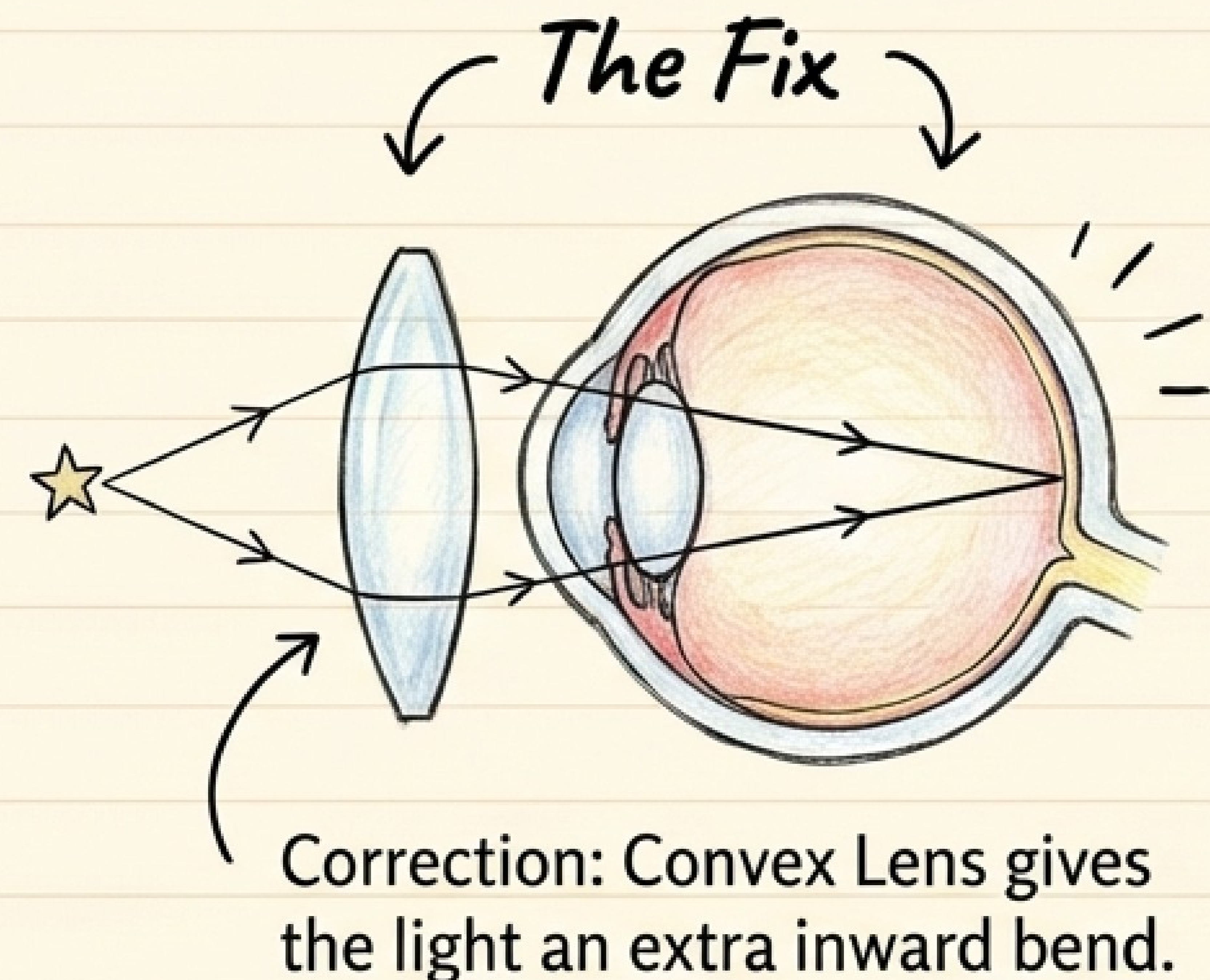
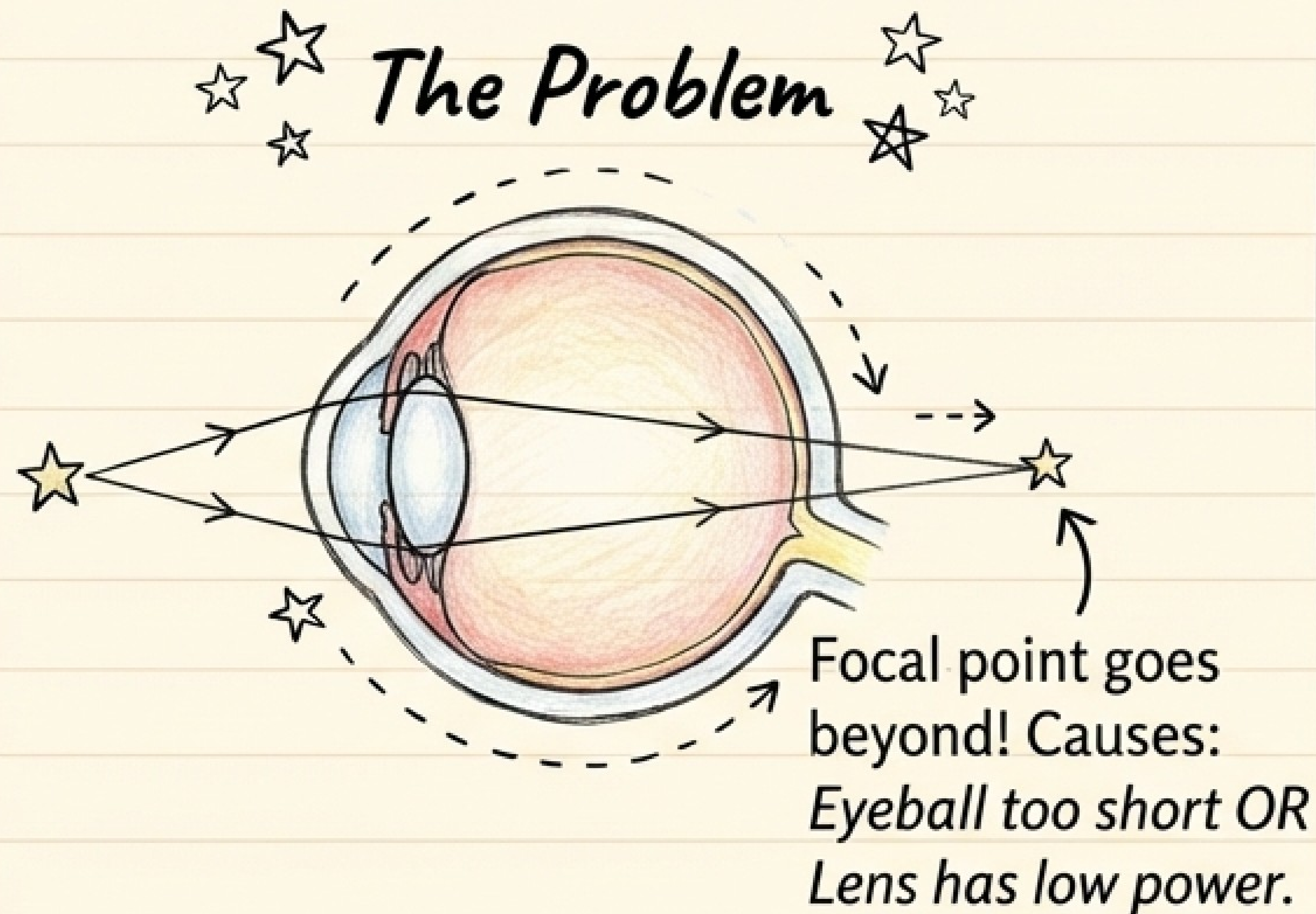
Defects of Vision: Myopia (Short-sightedness)

Can see near clearly, but distant objects are blurred.
Image forms in front of the retina.



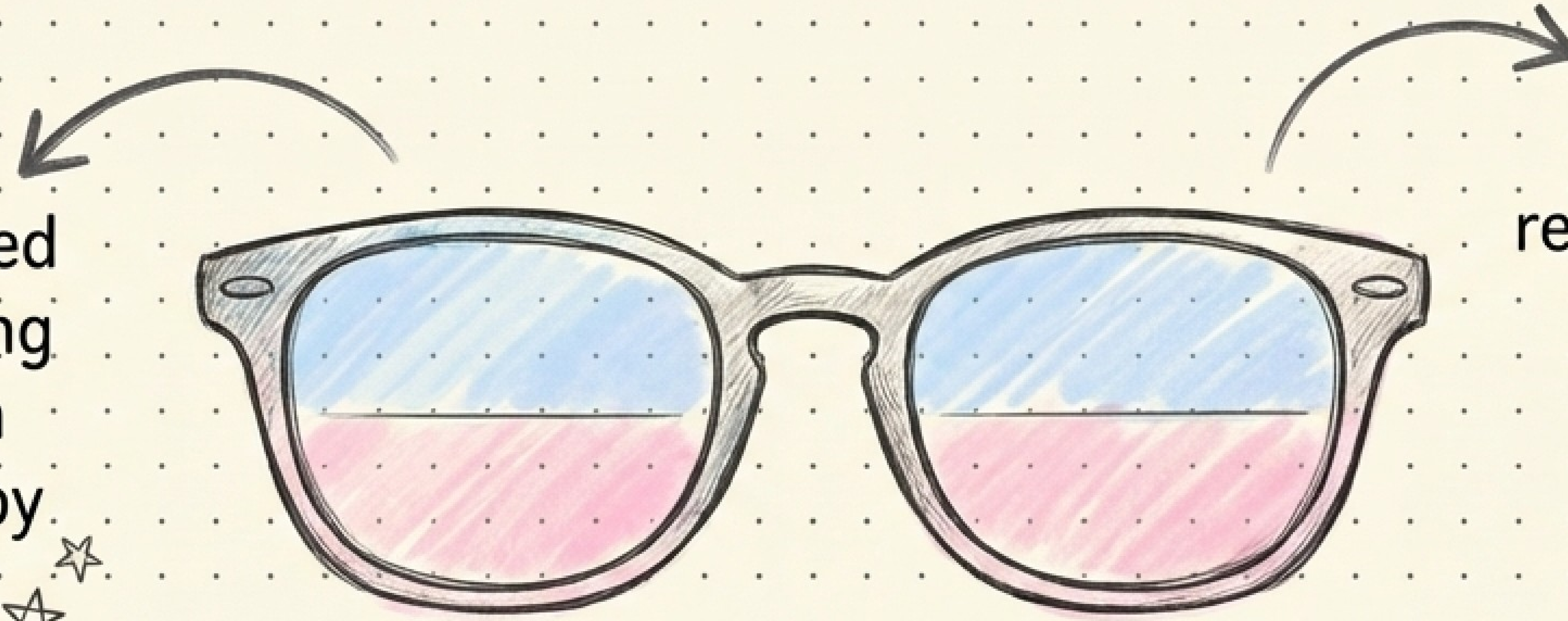
Defects of Vision: Hypermetropia (Long-sightedness)

Can see distant clearly, but nearby objects are blurred.
Image forms behind the retina.



Defects of Vision: Presbyopia

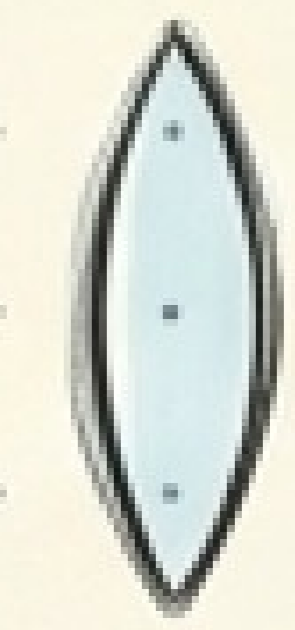
☆ ☆
An age-related defect causing difficulty in seeing nearby objects. ☆ ☆



Weak eye muscles and reduced flexibility of the lens. ☆ ☆ ☆ ☆



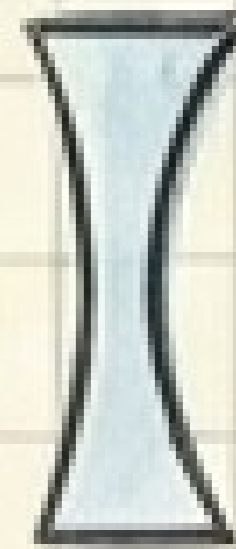

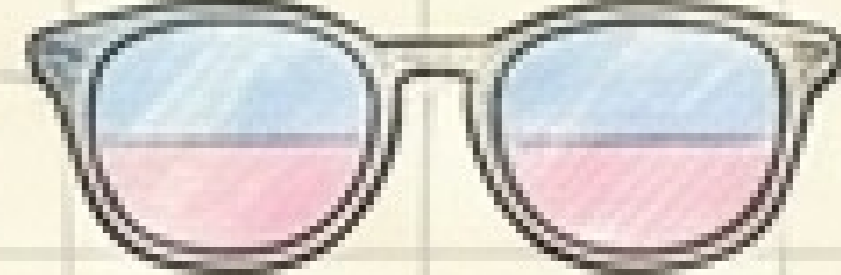
For distant vision.



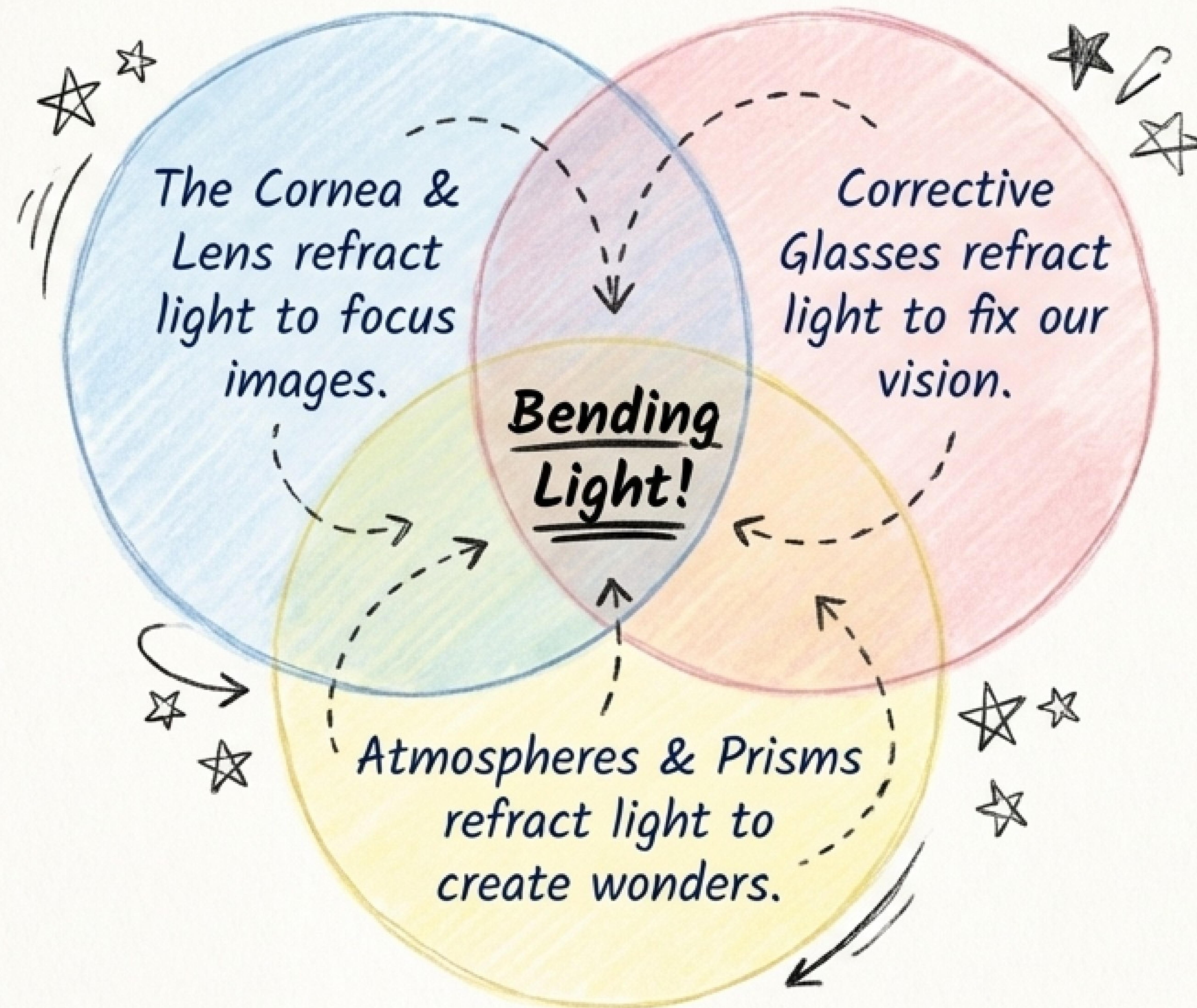
For near vision.

{ Correction: Bifocal Lenses! }

The Vision Defects Diagnostic Table.

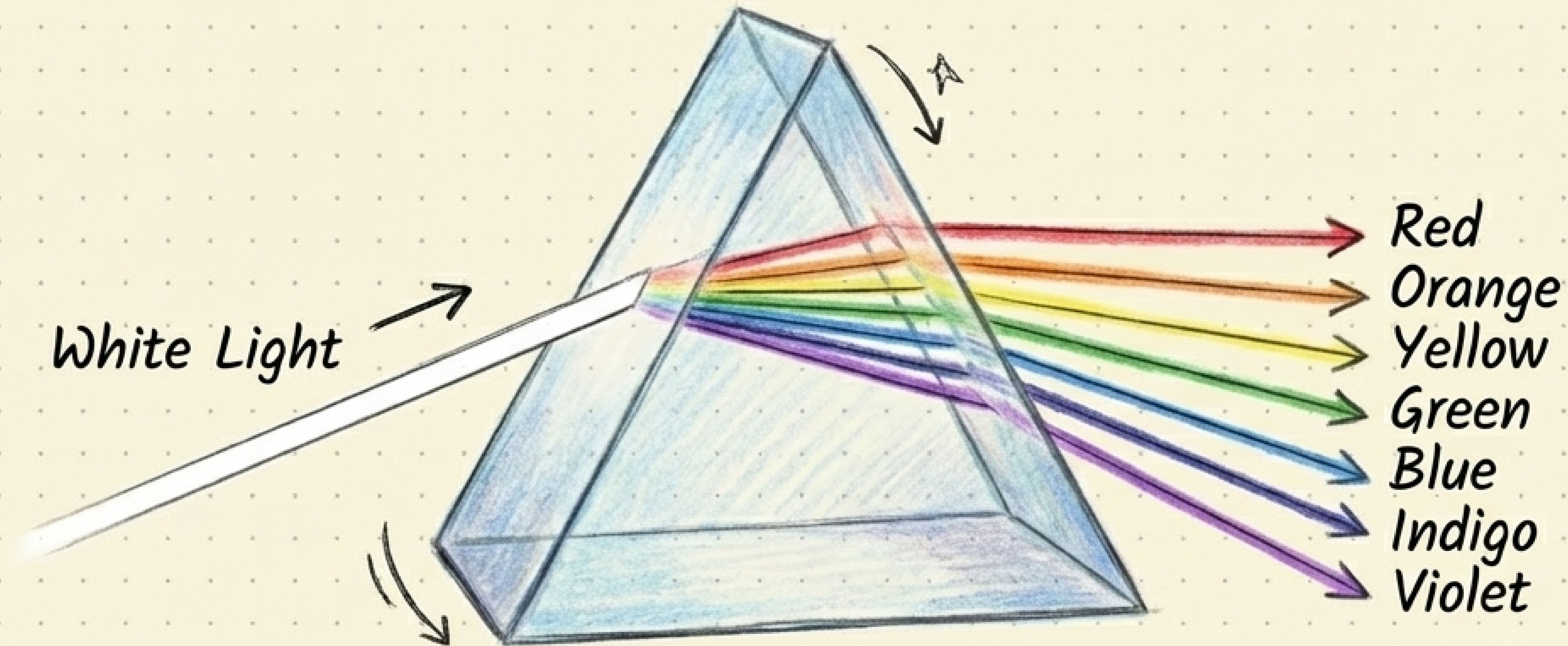
Defect	The Symptom	The Cause	The Fix
Myopia	Near clear, far blurry	Eyeball too long Lens too strong	Concave Lens 
Hypermetropia	Far clear, near blurry	Eyeball too short Lens too weak	Convex Lens 
Presbyopia	Near blurry (Age-related)	Weak muscles Stiff lens	Bifocals 

The Secret to Everything: Refraction.



Note to self:
Once light leaves an object, the way it **BENDS** dictates exactly how we see the world.

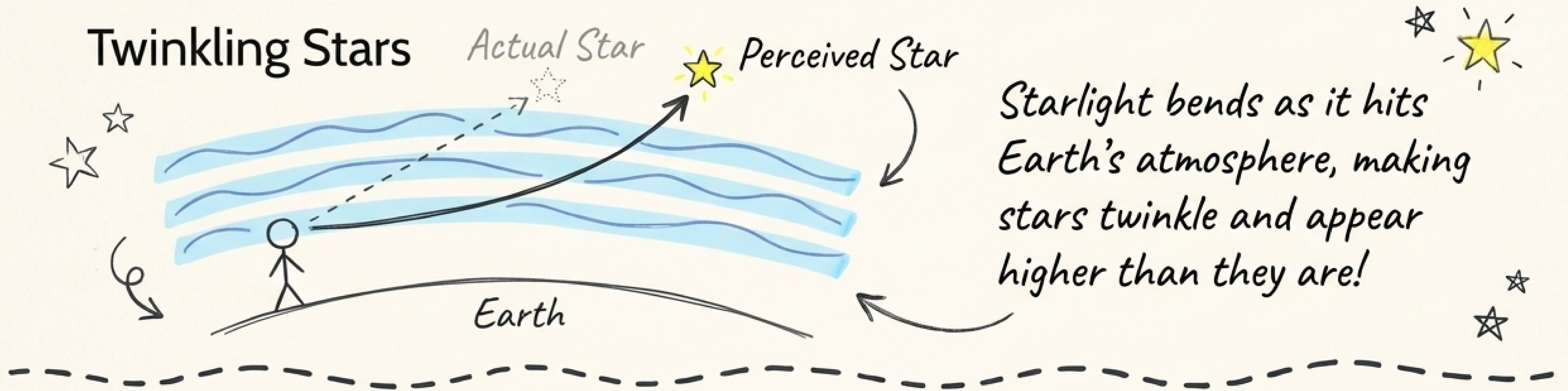
Caveat: Refraction Through a Prism & Dispersion.



Dispersion: The splitting of white light into its seven component colours when it passes through a prism.

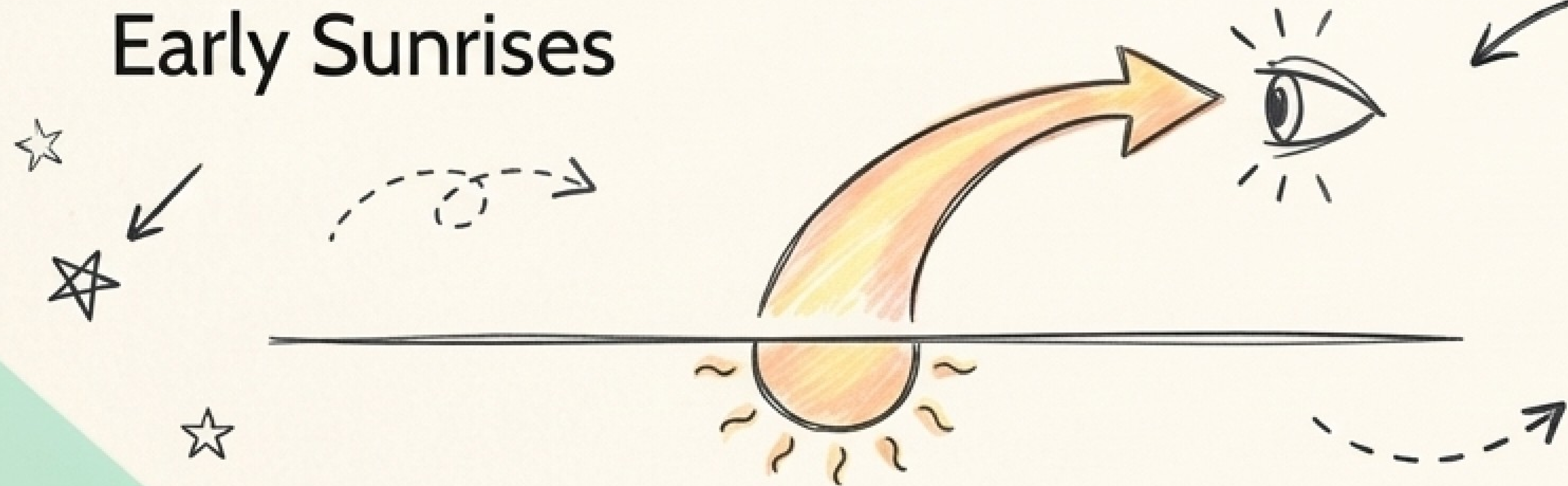
Atmospheric Refraction in the Wild

Twinkling Stars



Starlight bends as it hits Earth's atmosphere, making stars twinkle and appear higher than they are!

Early Sunrises



Refraction bends sunlight over the horizon, making the sun visible before actual sunrise and after sunset.

Pop Quiz! Test Your Knowledge

1. Myopia is corrected using:

- (a) Convex
- (b) Concave
- (c) Bifocal
- (d) None

Answer:
(b) Concave!

2. Hypermetropia affects:

- (a) Near vision
- (b) Far vision
- (c) Both
- (d) None

Answer:
(a) Near vision!

3. Presbyopia occurs due to:

- (a) Age
- (b) Injury
- (c) Infection
- (d) Diet

Answer:
(a) Age!



4. A prism splits light into:

- (a) 5 colours
- (b) 6 colours
- (c) 7 colours
- (d) 8 colours

Answer:
(c) 7 colours
(VIBGYOR)!



5. The Retina contains:

- (a) Muscles
- (b) Nerves
- (c) Rods & cones
- (d) Blood cells

Answer:
(c) Rods & cones!

