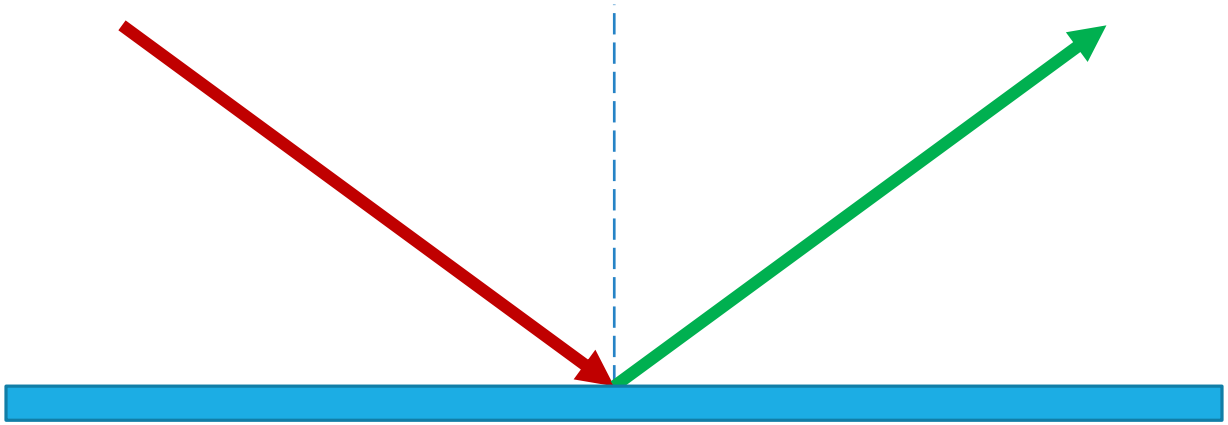
Reflection & Refraction

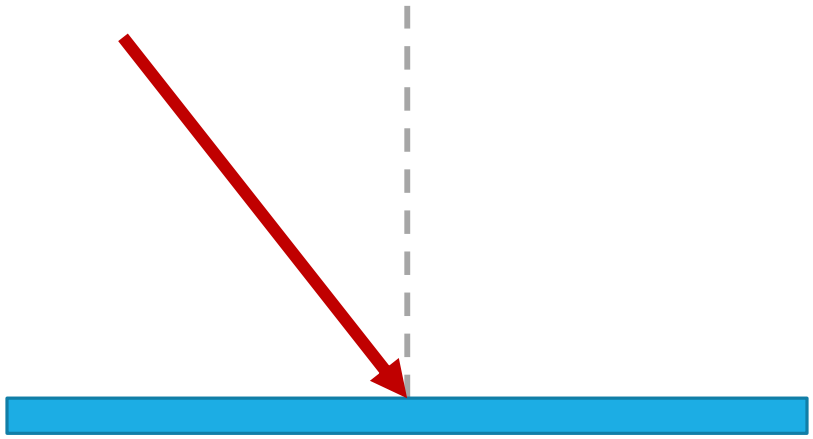
IB PHYSICS | WAVES - LIGHT

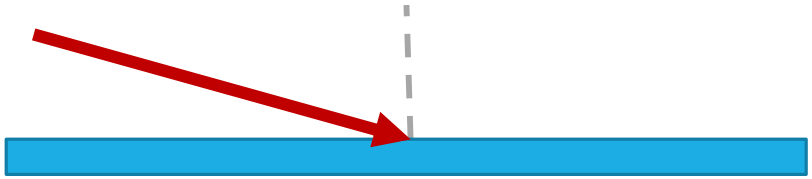
Reflection

Angle of _____ = Angle of _____

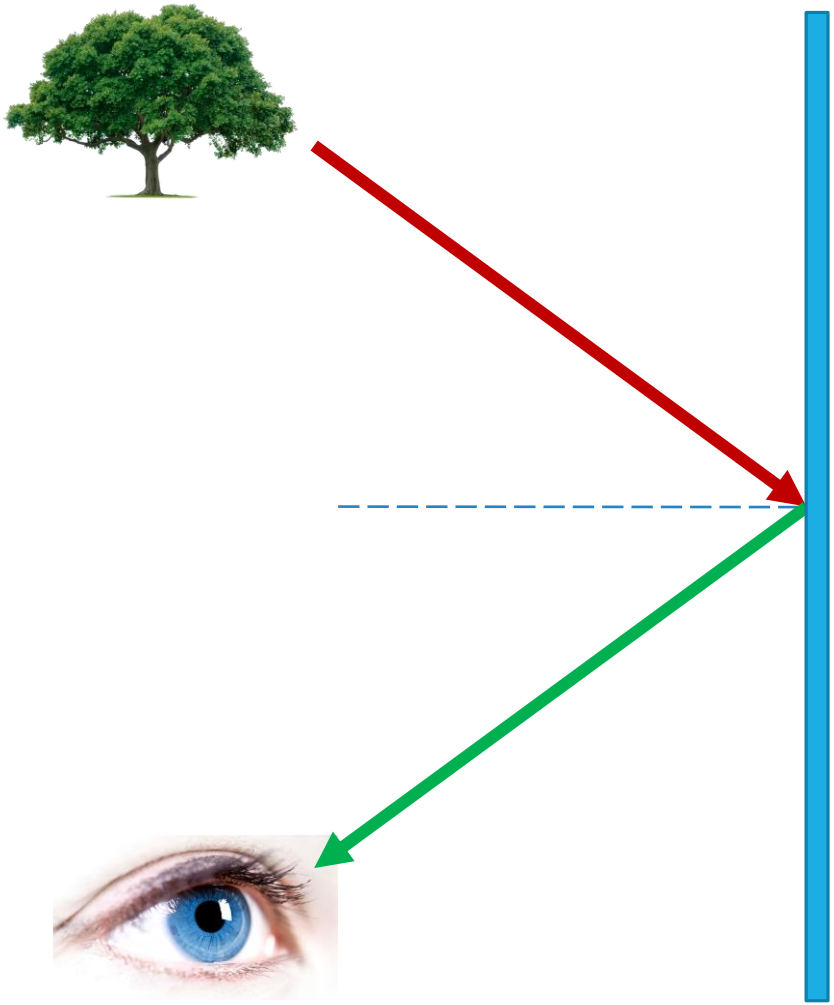


Reflection



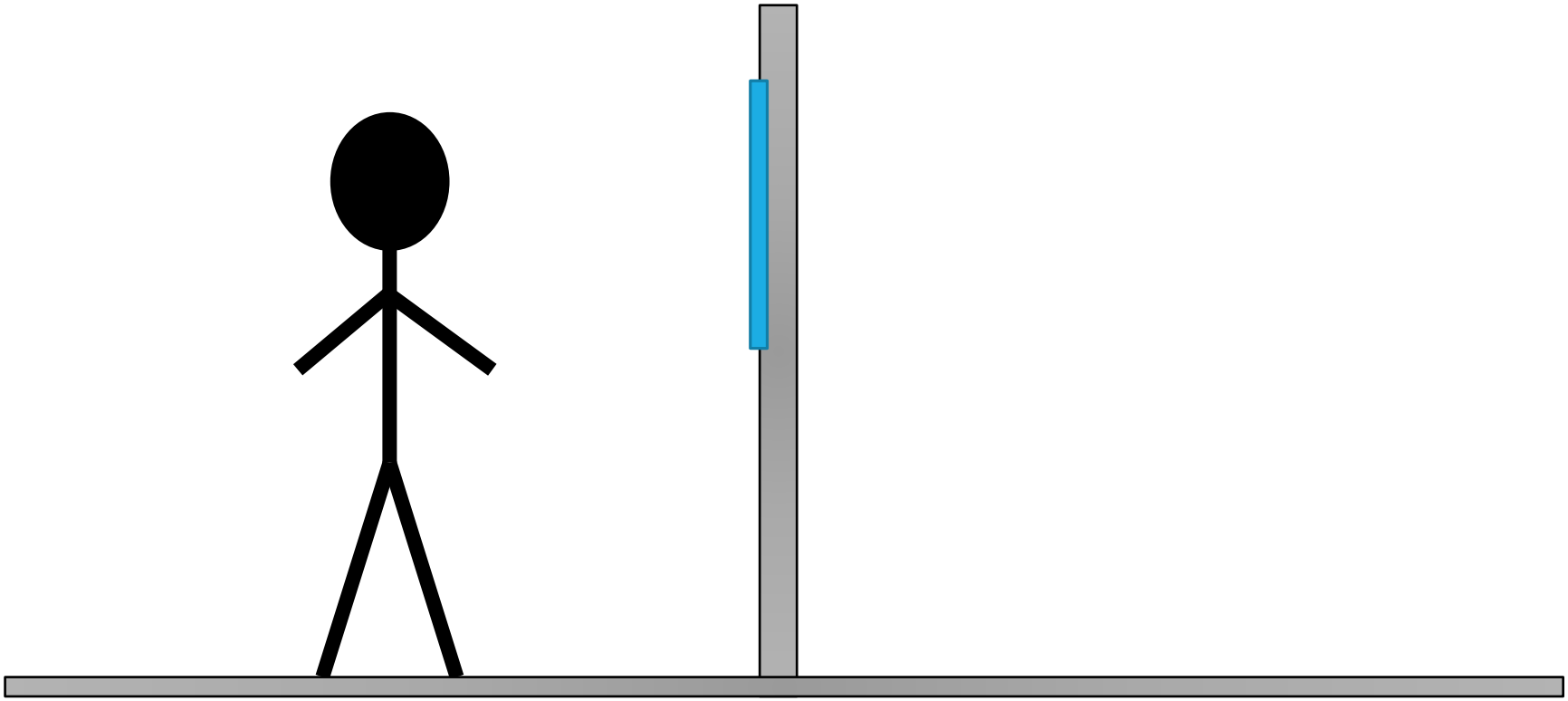


Reflection

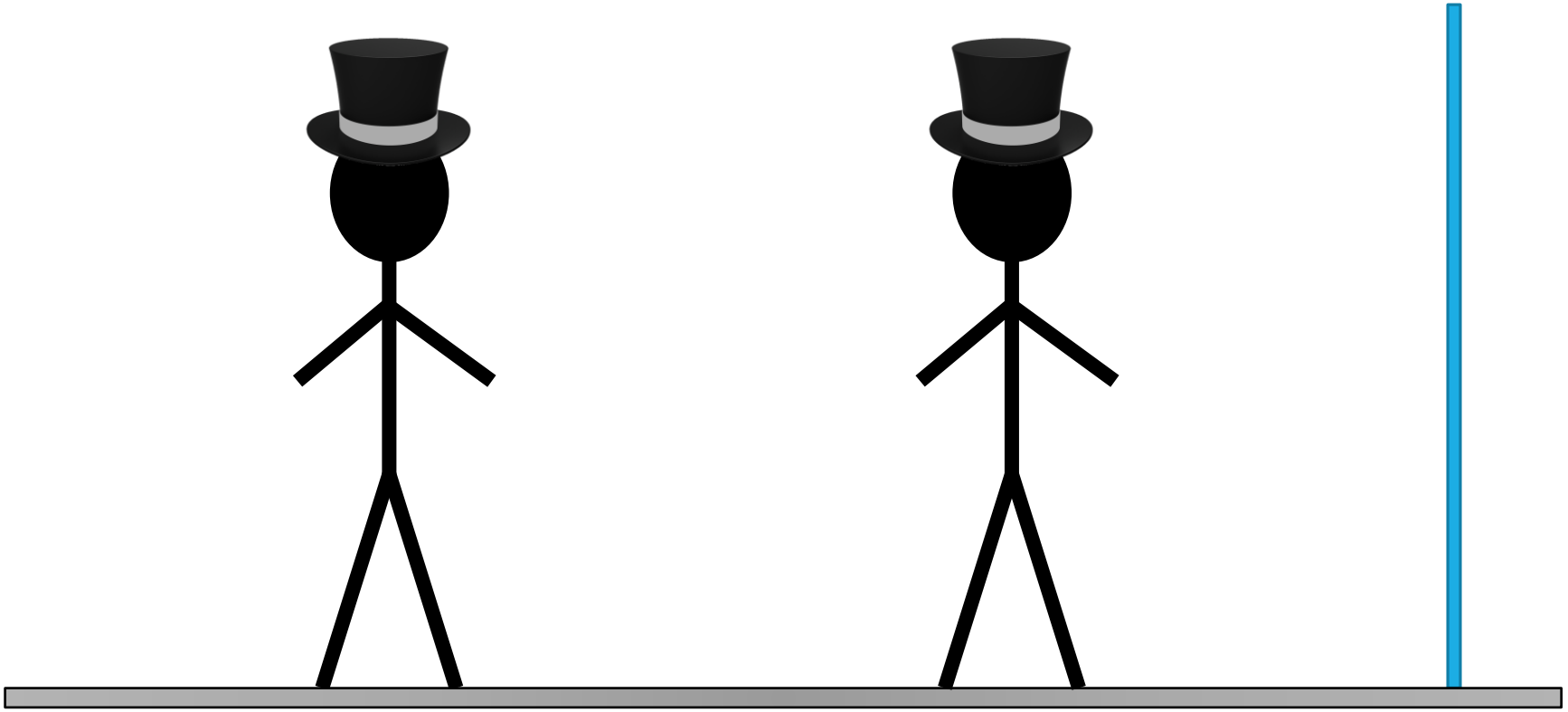


Predict

Can this person see their feet in the mirror?

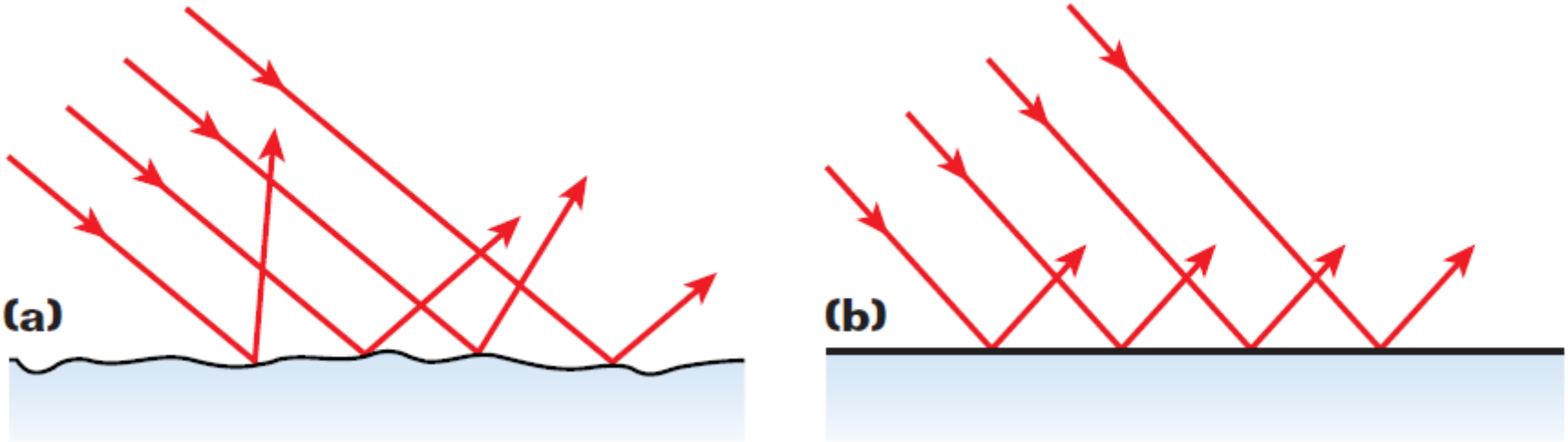


“Full Length” Mirrors

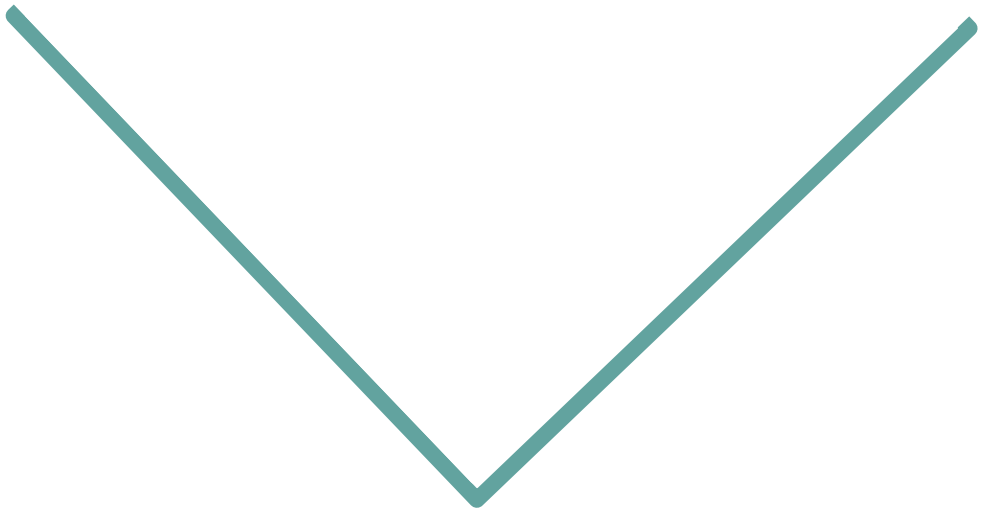


Not every surface is a flat mirror

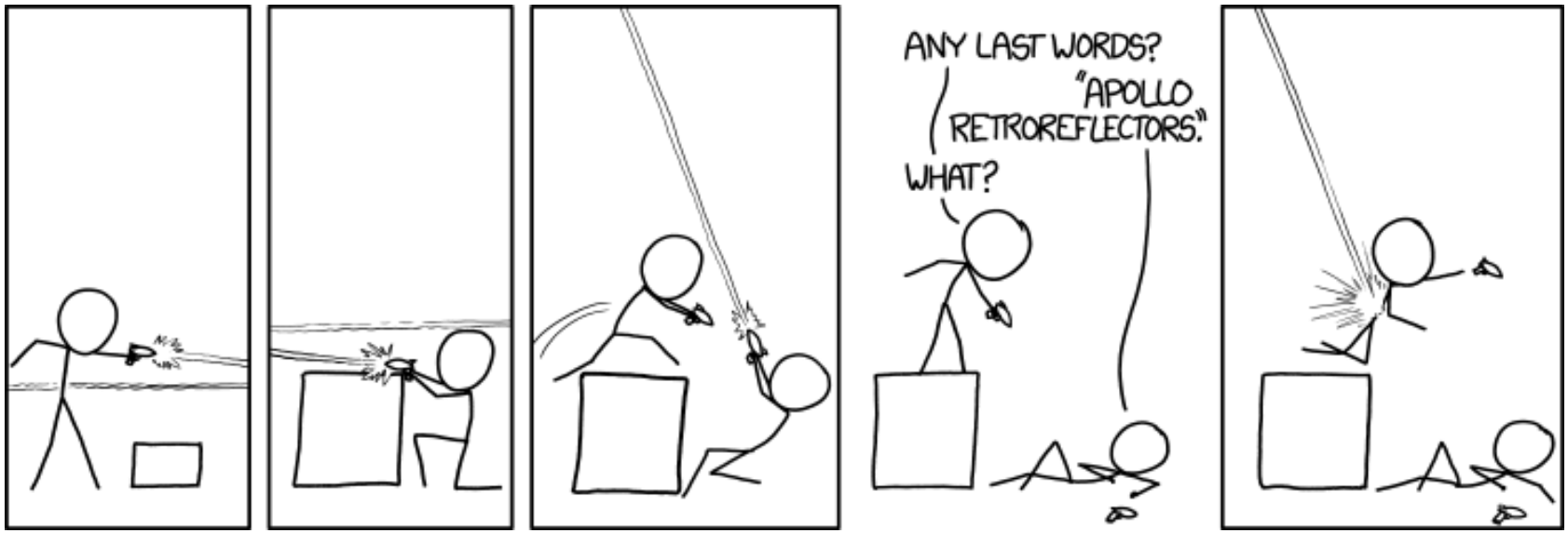
Even surfaces that seem nice and flat are often textured

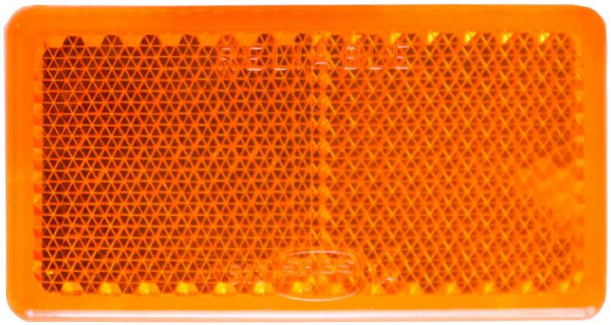


Retro-reflective Mirrors

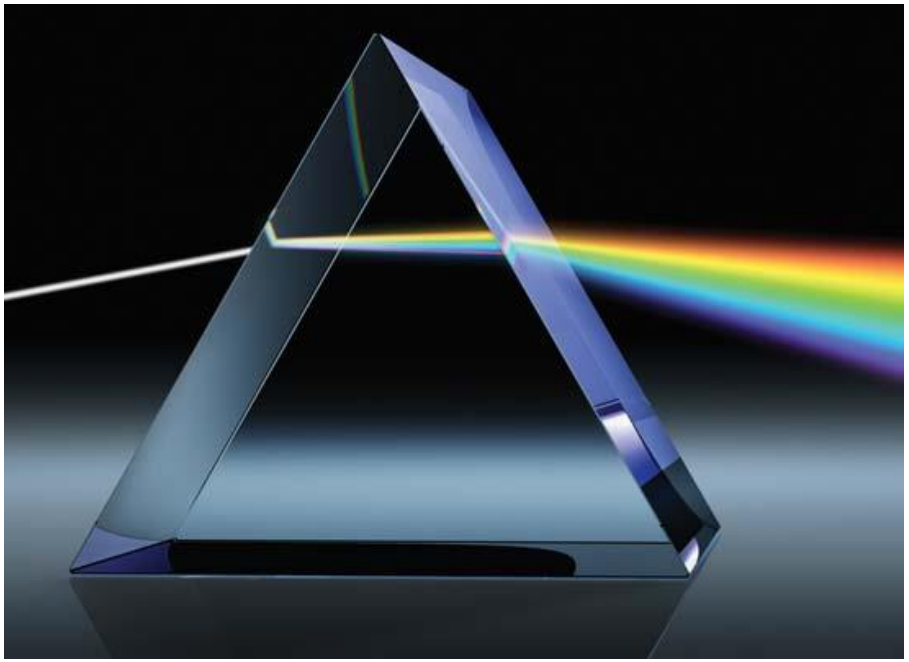


Retro-reflective Mirrors





Refraction



Speed of Light

In a vacuum all electromagnetic waves travel at:

$c = 299{,}792{,}458\ m/s = 3.00 \times 10^8\ m/s$

Light slows down when it travels through different mediums

Air	$2.999 \times 10^8\ m\ s^{-1}$
Water	$2.256 \times 10^8\ m\ s^{-1}$
Glass	$1.974 \times 10^8\ m\ s^{-1}$

Index of Refraction → **n**

$$\frac{n_1}{n_2} = \frac{v_2}{v_1}$$

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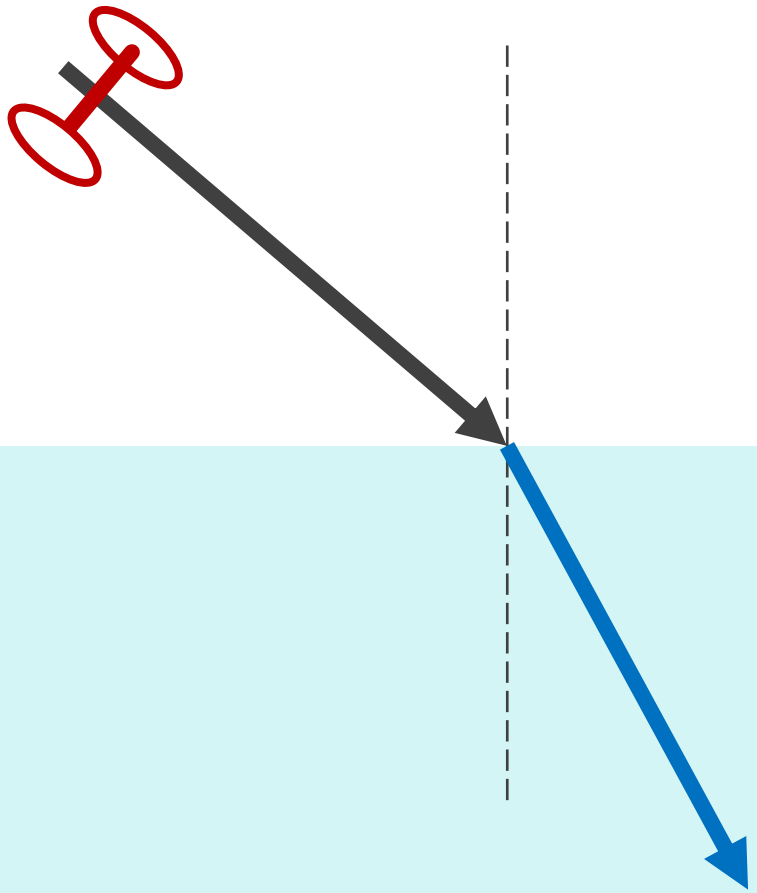
Vacuum	3.00×10^8 m s^{-1}	1
Air	2.999×10^8 m s^{-1}	
Water	2.256×10^8 m s^{-1}	
Glass	1.974×10^8 m s^{-1}	

Try This

How fast does light travel through cubic zirconia (n = 2.15)?

$$\frac{n_1}{n_2} = \frac{v_2}{v_1}$$

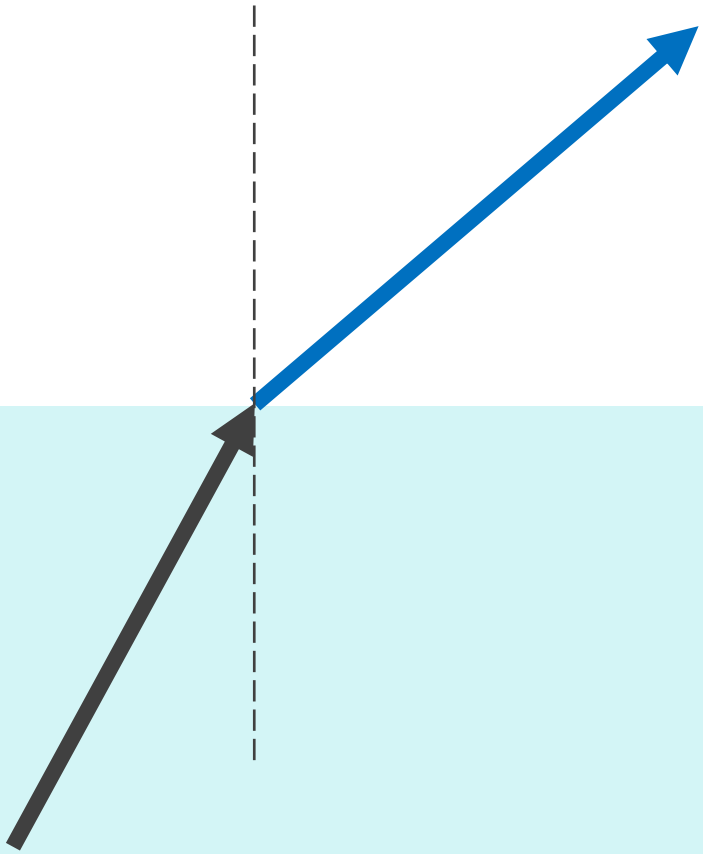
Predicting the Bend



n = 1

n = 1.33

Predicting the Bend

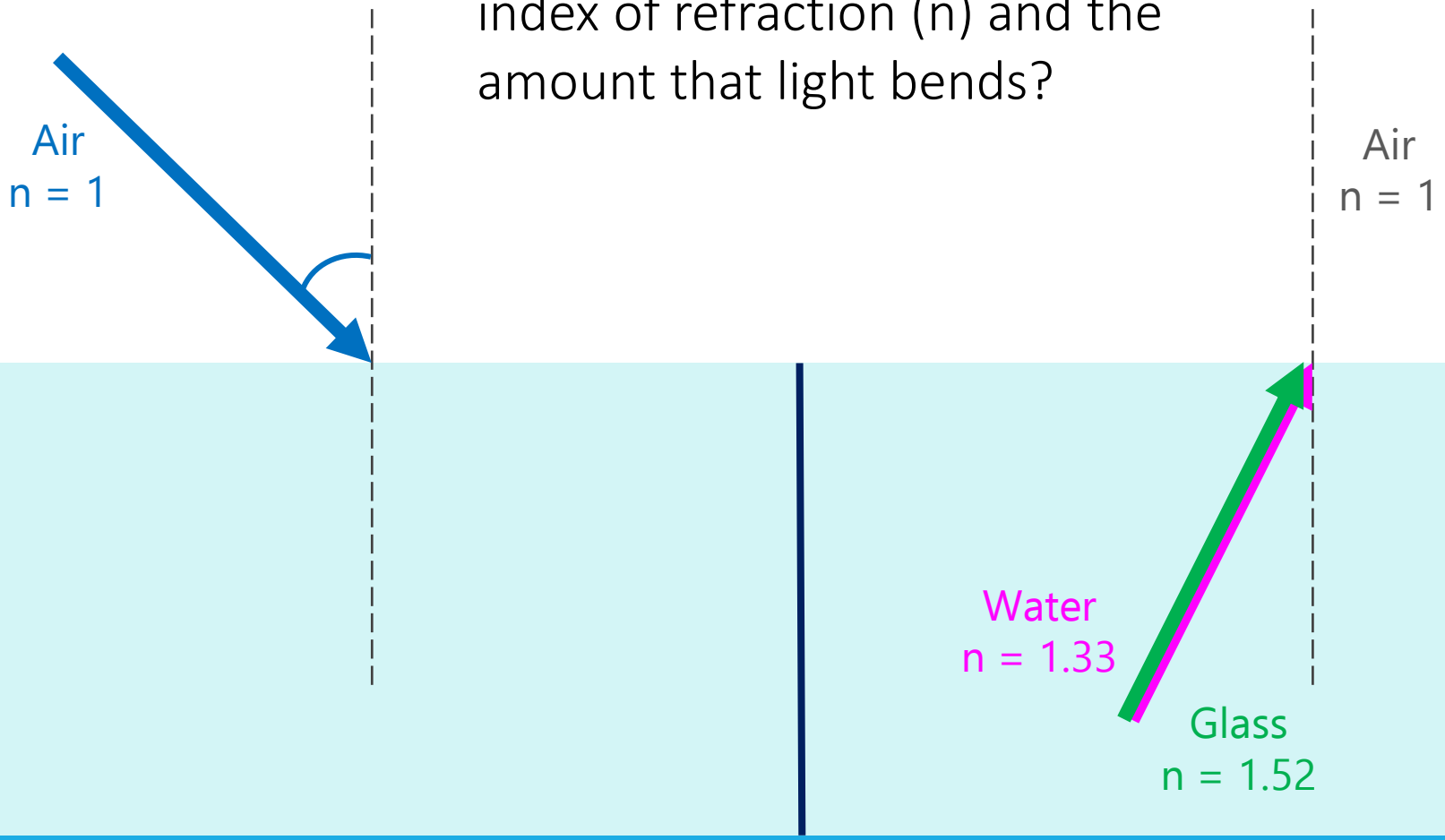


n = 1

n = 1.33

How Much Bend?

What's the relationship between index of refraction (n) and the amount that light bends?



Lesson Takeaways

- ❑ I can identify the angle of incidence and angle of reflection for a reflected wave ray
- ❑ I can use the law of reflection to predict the way light bounces off of a plane mirror
- ❑ I can relate the index of refraction of a material to the speed of light as it travels through
- ❑ I can qualitatively predict how light bends when transitioning between boundaries