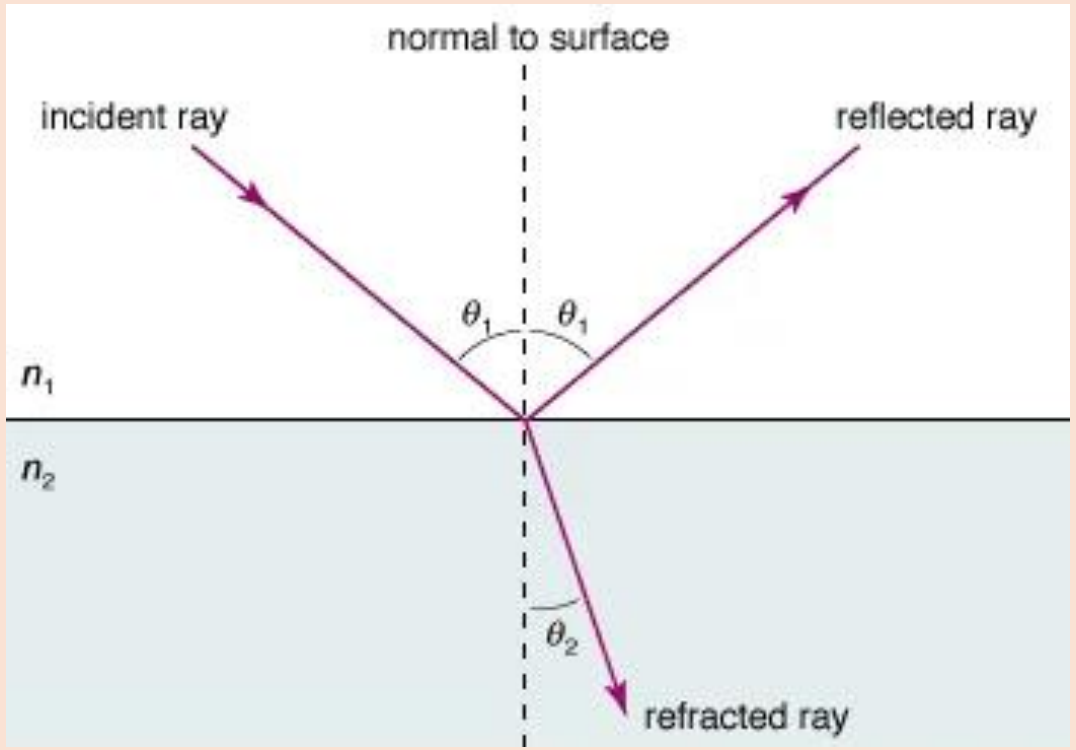

INVISIBILITY OIL

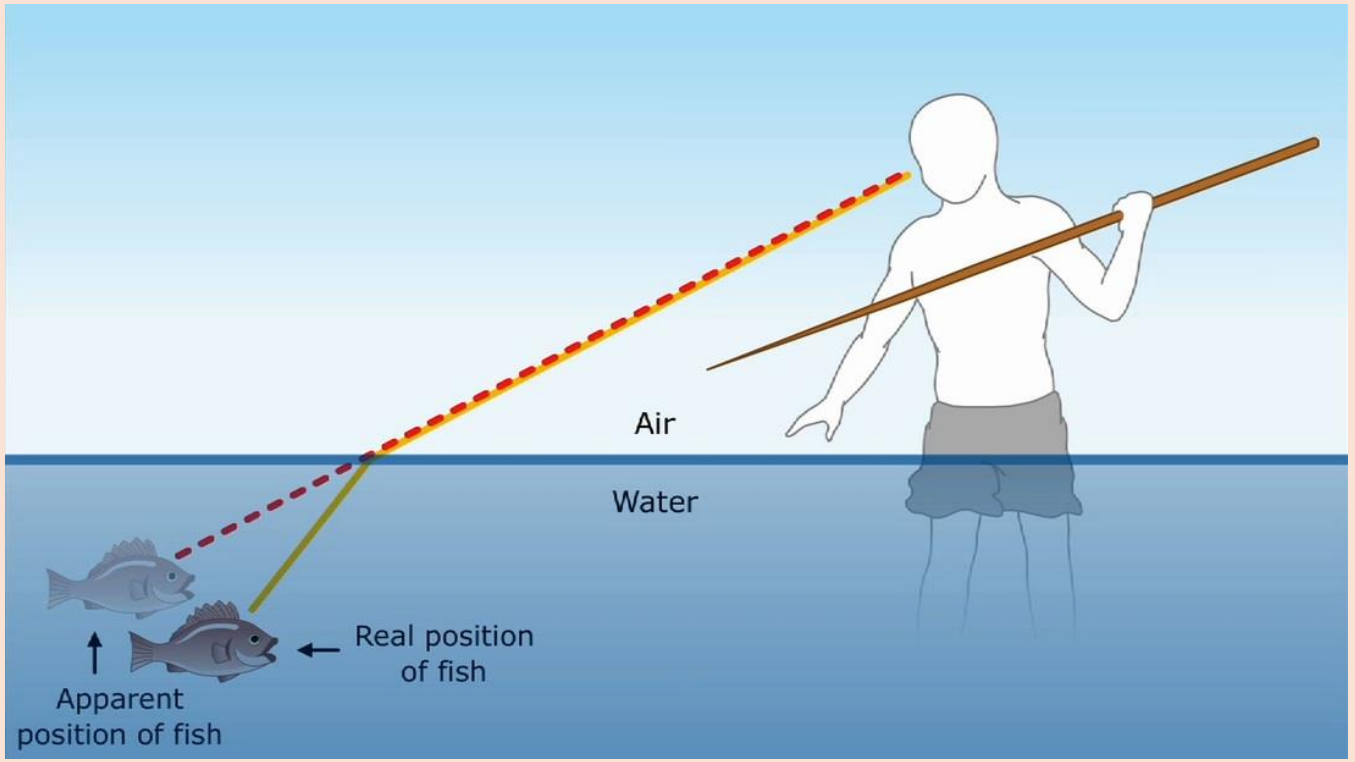
Reflection & Refraction of light



REFRACTION INDEX: $n = \frac{c}{v}$

v: speed of light in a medium

c: speed of light in vacuum ($3 \cdot 10^8 m/s$)

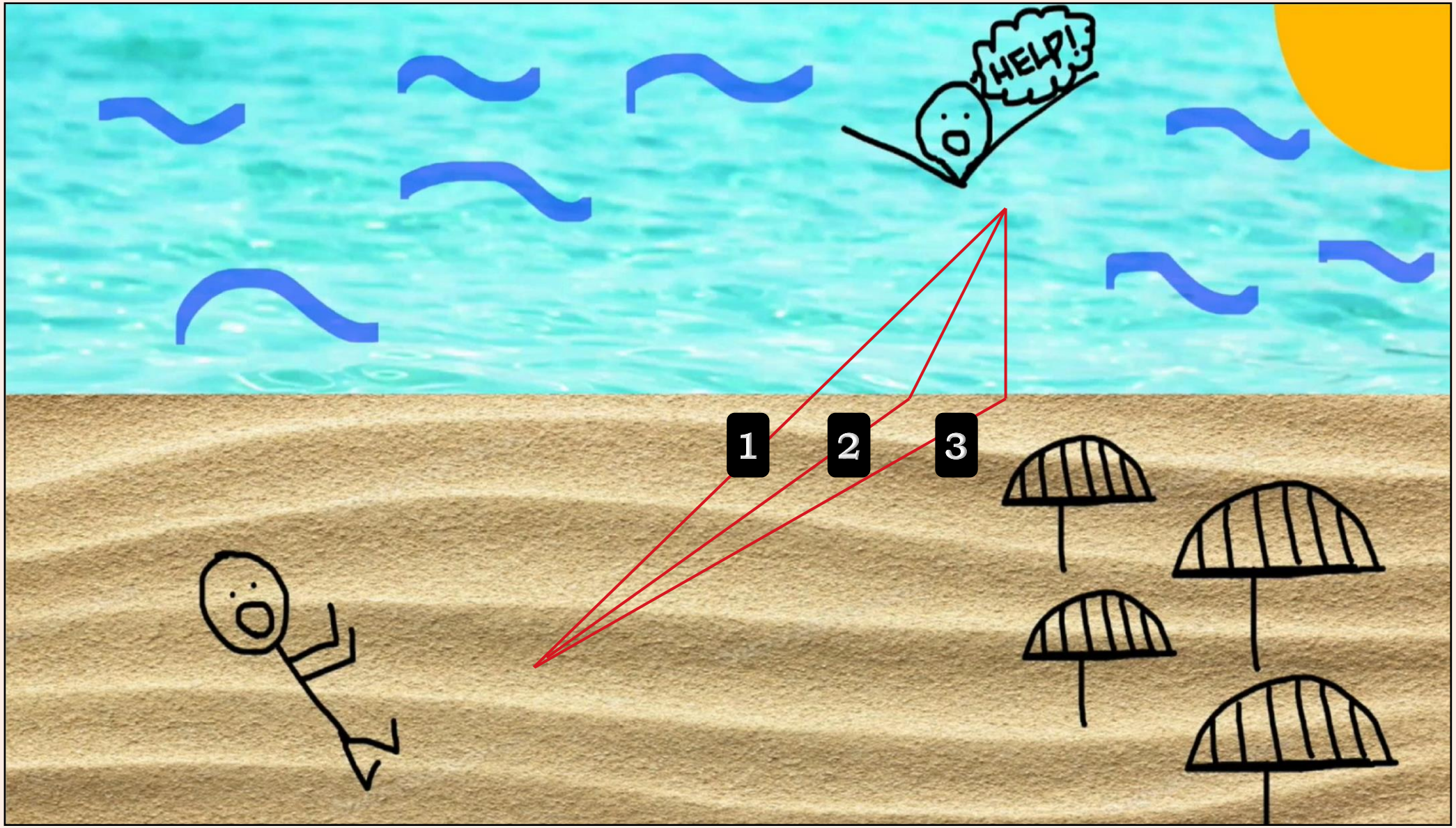


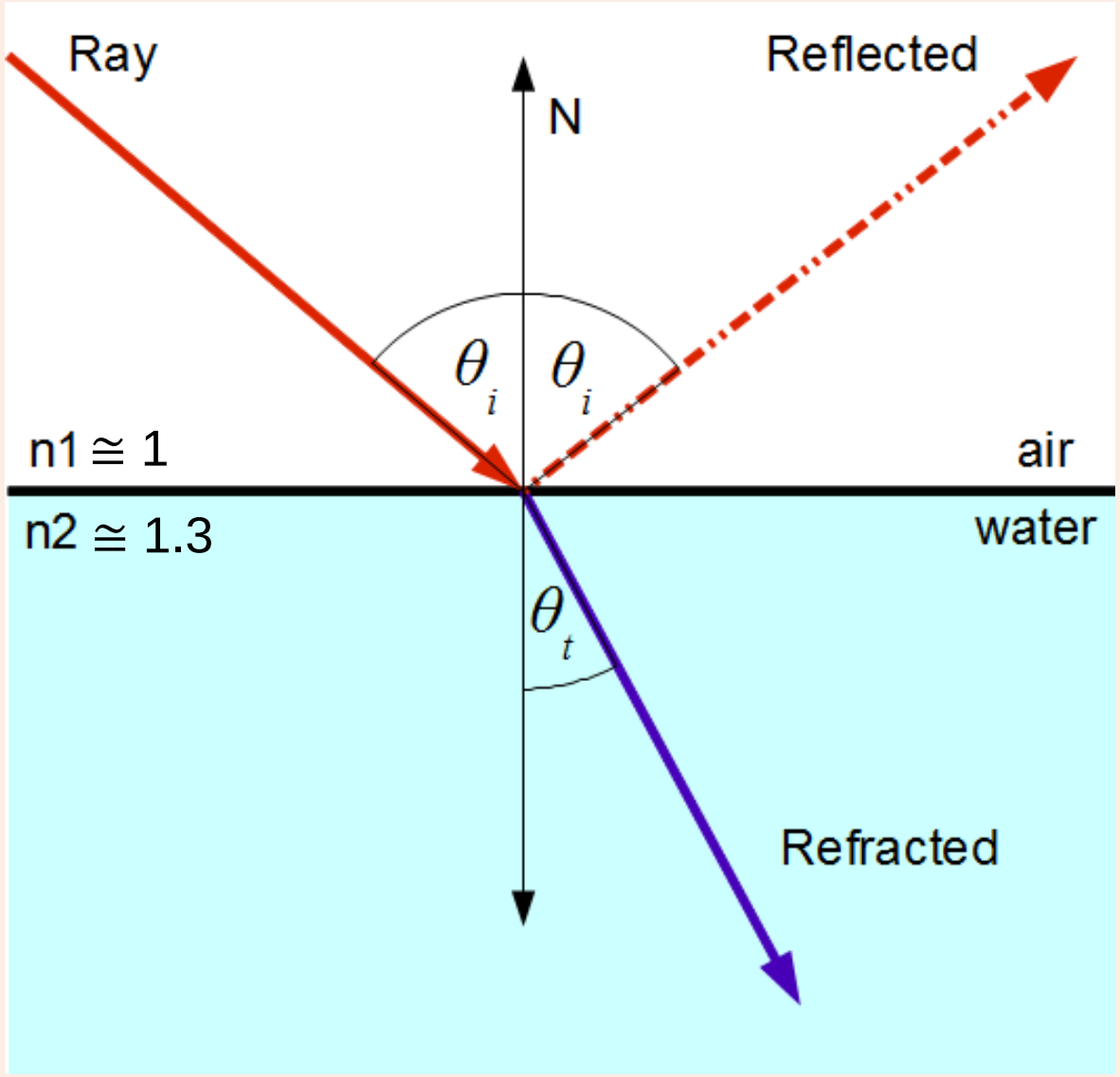
…let's fix the idea…

Predator, 1987

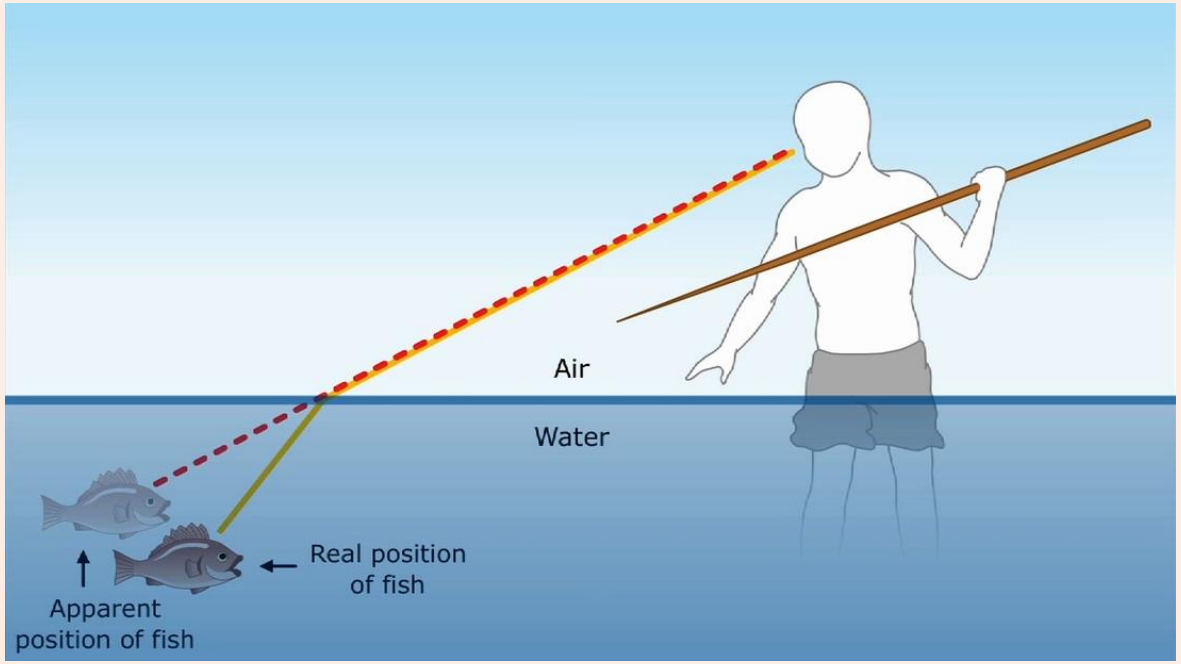
Perfect example of *refraction* with *no reflection*: we can't see well defined contours (no reflection), but we can distinguish a disturbance of the background (refraction).

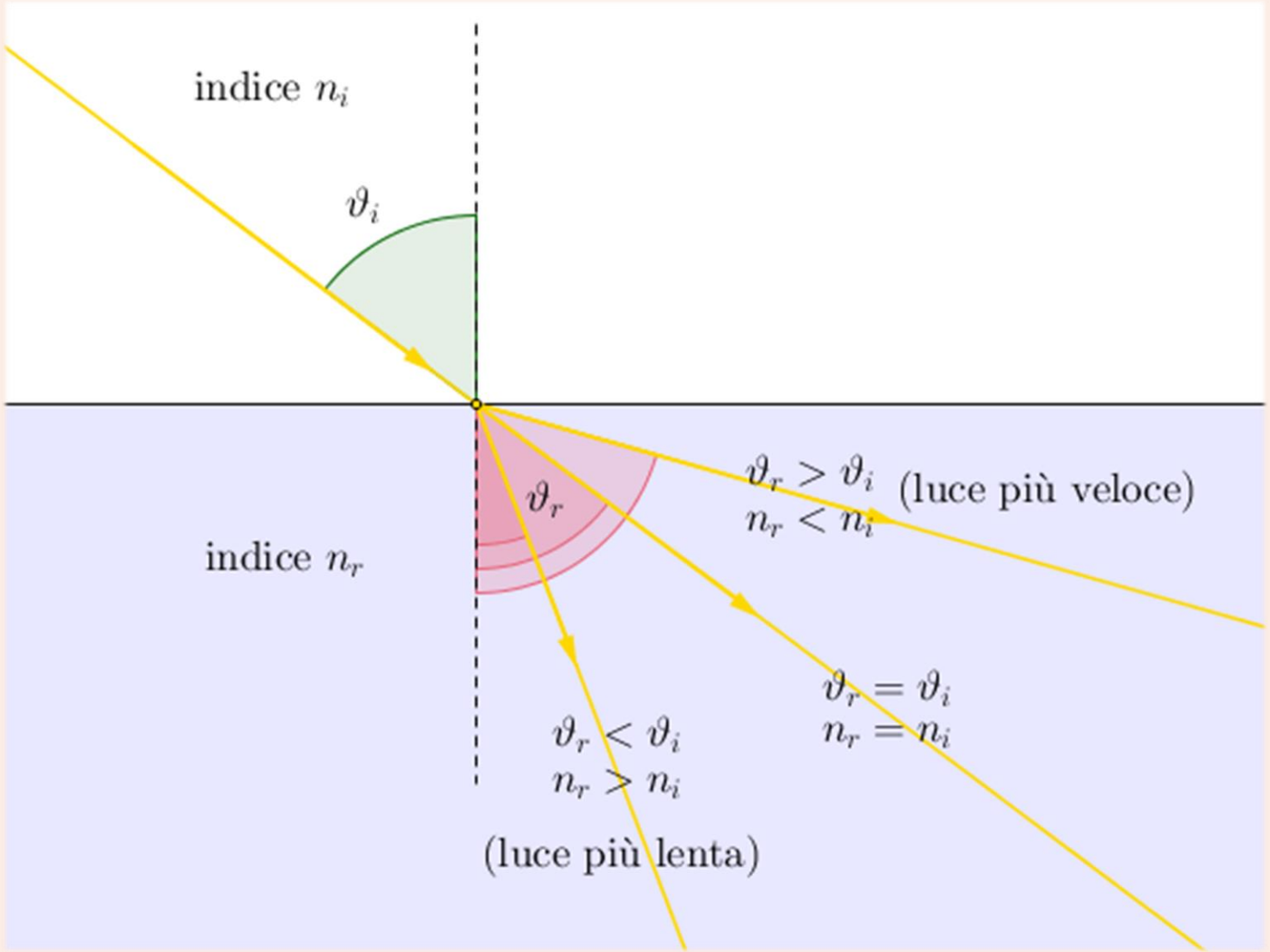
Fermat's principle – Feynmann explanation




Ray
Reflected
N
θ_i
θ_i
n1 ≅ 1
air
n2 ≅ 1.3
water
θ_t
Refracted

$$v = \frac{c}{n}$$


Air
Water
Real position of fish
Apparent position of fish



SNELL'S LAW

$$n_i sin\vartheta_i = n_r sin\vartheta_r$$

A particular case: $n_r = n_i$

Tools:

-Two glass jars of different sizes

-Soybean oil

Result: