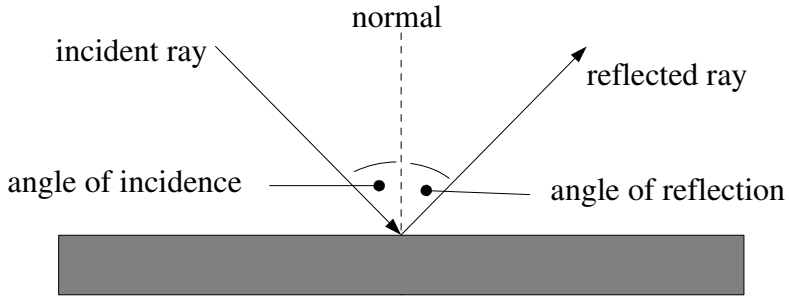
Reflection

The law of reflection states that the angle of the *incident* (incoming) ray is equal to the angle of the reflected (outgoing) ray, measured from the *normal* (right angles to the surface).

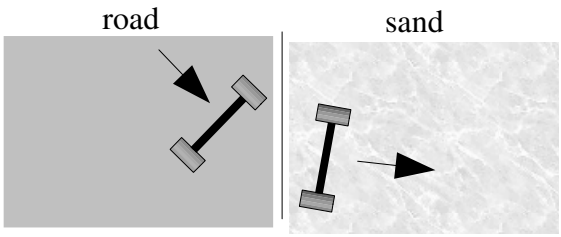


This law even holds for microscopically rough surfaces, but it doesn't look like it to our eyes. This is because the colours mix together, and is called diffuse reflection (shiny reflection is called specular reflection).

Refraction

Objects can be opaque, transparent, or a combination of both.
Opaque objects reflect or absorb all visible light, so none passes through.
Transparent objects transmit visible light; it passes through by being re-emitted by atoms it collides with. These collisions slow down the average speed of light in that medium, leading to refraction.

An axle (with wheels) rolled on an angle from a road onto something which slows it down (e.g. sand) would change its course, because one wheel slows down first and the axle turns.



Waves, including light and sound, experience this effect. Part of the *wave front* slows down more than the other, and the direction of travel changes.

Snell's Law

Every material has an *index of refraction* which compares its speed of light to that of a vacuum. Snell's law relates the refractive indices to the angle of refraction:

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$