The Ray Model of Light

- If there is dust in the air, we will see “rays” of sunlight streaming into the room
- In everyday language, “ray” means a narrow stream of light energy

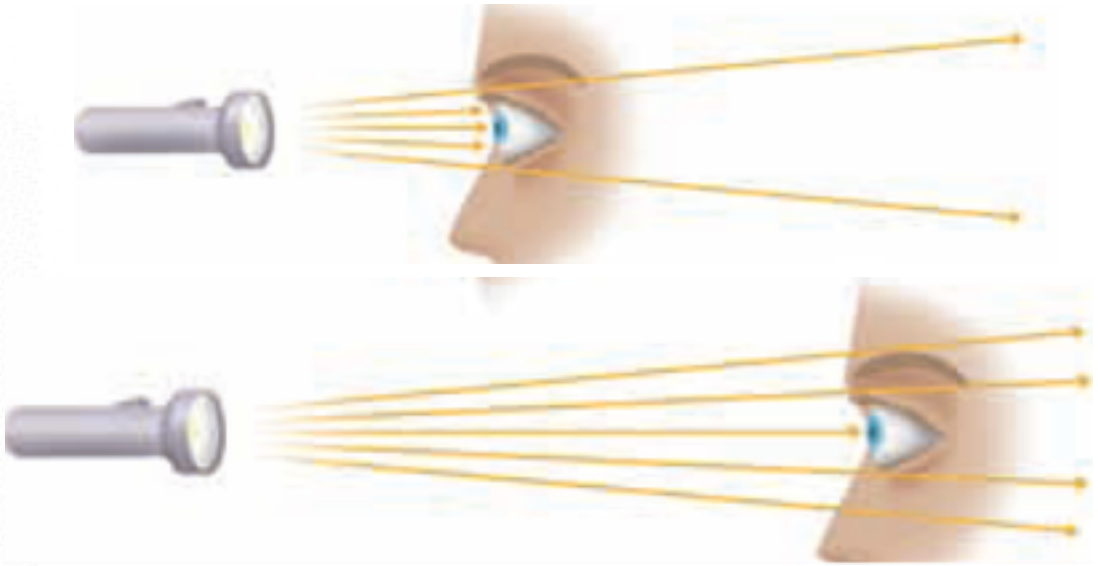
Light rays

- **Light is represented as straight lines called rays.**
- Ray diagrams are drawings that show the path that light takes.
- Each ray ends with an arrow to indicate the direction of travel.

Light and Matter

- Ray diagrams explain brightness.

i.e. **more rays that reach your eyes**, the brighter the object appears



Light and Matter

- Ray diagrams are used to explain what happens when light strikes an object.
- **Light travels in straight lines until it strikes something**.
- Materials have different properties which affects what happens when light strikes them

Light and Matter

- **Transmit** - Light passes through them. Example: Clear glass
- **Absorb** – Light is absorbed by the object and turned into heat
- **Reflect** – Light bounces off the object.

Light and Matter

The properties of materials can then be further classified

- **Transparent** materials, such as clear glass or clear plastic, transmit light freely.
- **Transparent materials absorb and reflect very little light**. Example: a clear window

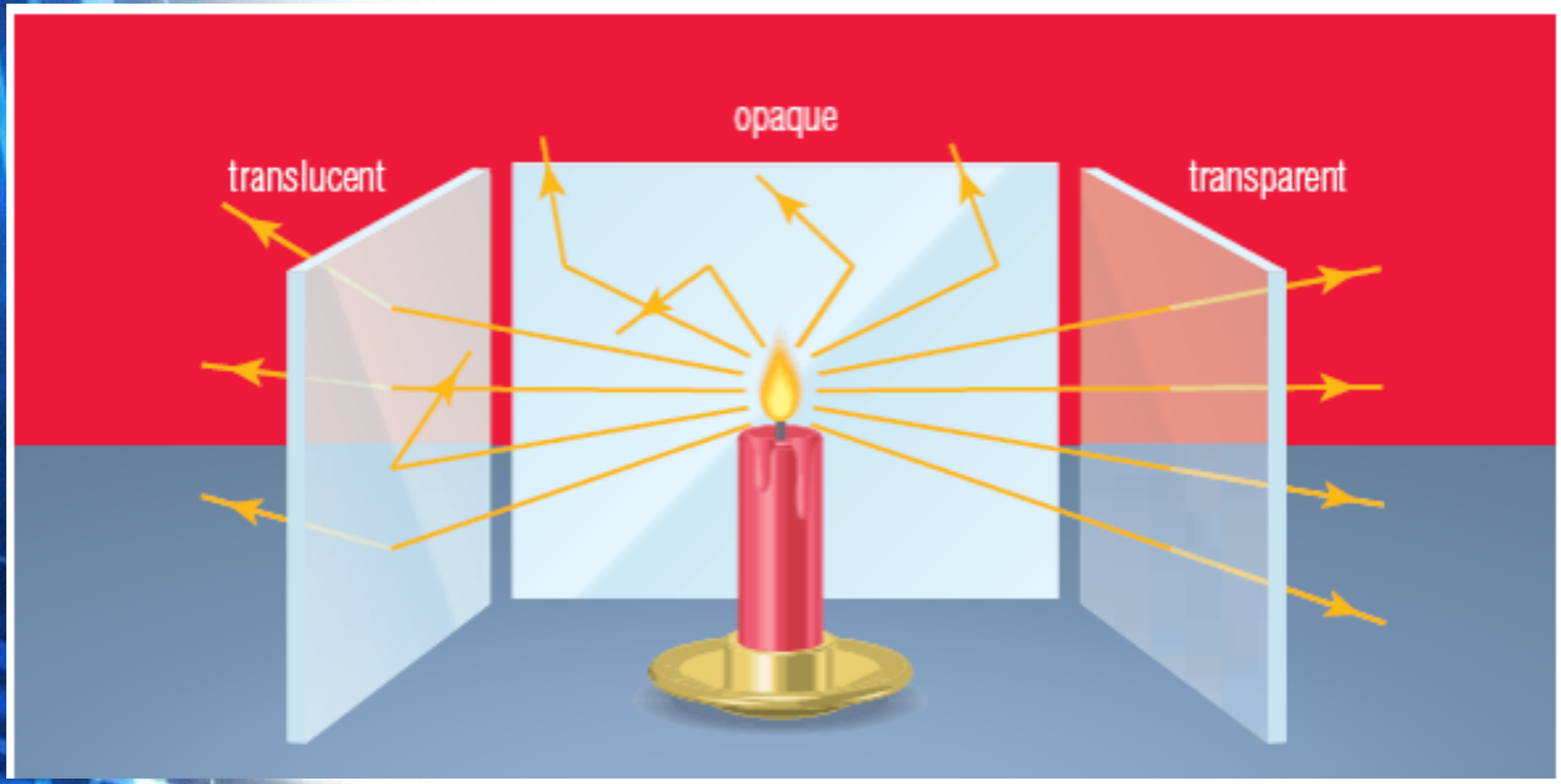
Light and Matter

Translucent materials **transmit some light, but not enough to see through the material clearly.**

Example: A frosted window pane. Some light can pass through.

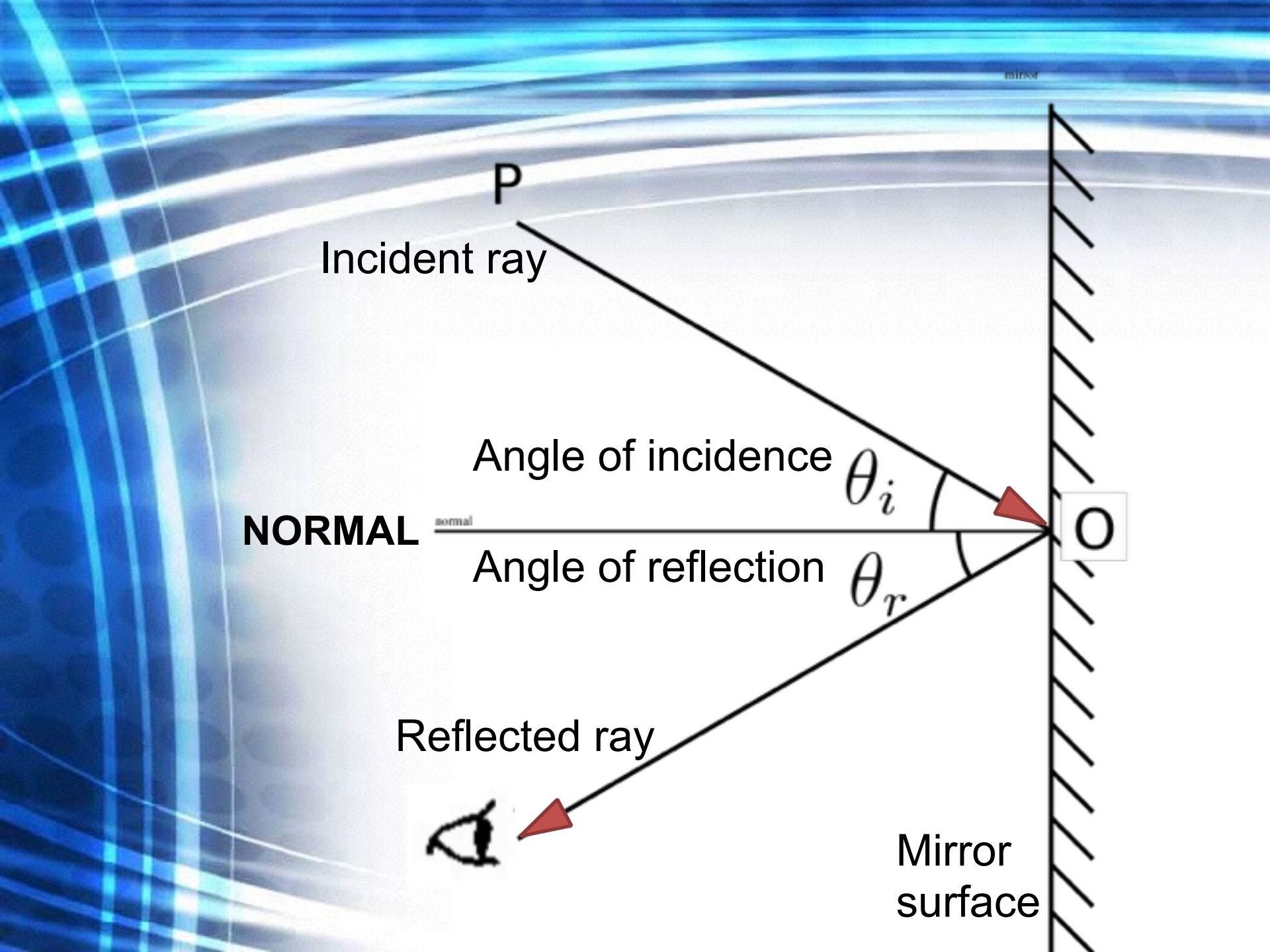
Light and Matter

- **Opaque** objects absorb and reflect light, but they do not transmit it



Flat Mirrors and Reflections

- **Mirrors**- smooth surfaces of glass with a thin reflective film


P
Incident ray
Angle of incidence
θ_i
NORMAL
normal
O
Angle of reflection
θ_r
Reflected ray
Mirror
surface

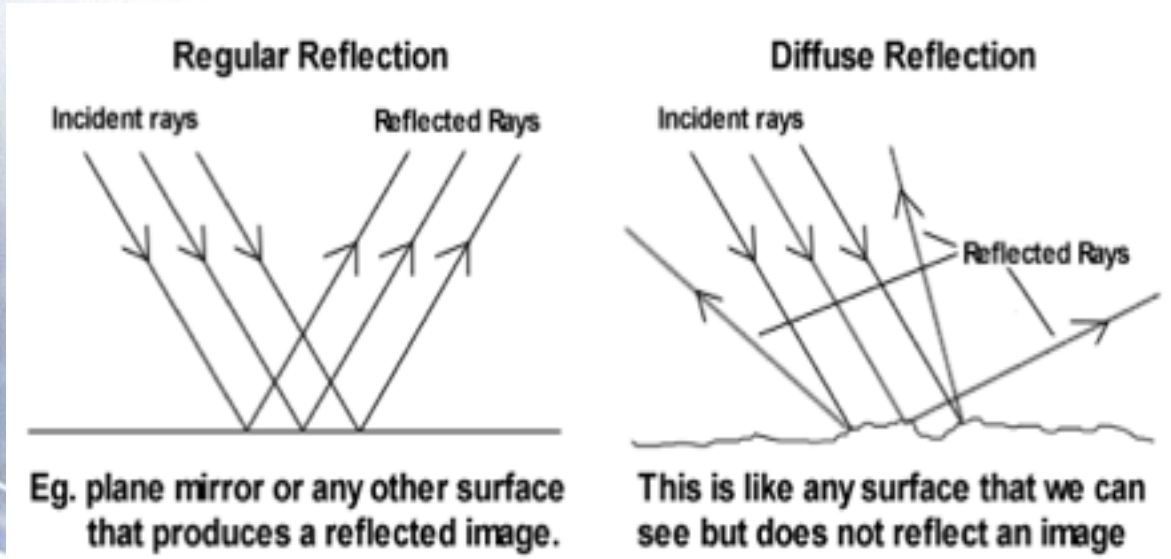
Reflection terms

- original ray of light that strikes a mirror plane is called the **incident ray**
- the ray that bounces and strikes your eye is the **reflected ray**
- the **normal** is the line perpendicular to the mirrors surface

- the angle of incidence lies between the **incident ray** and the **normal**
- the angle of reflection lies between the **reflected ray** and the **normal**

Reflection of light

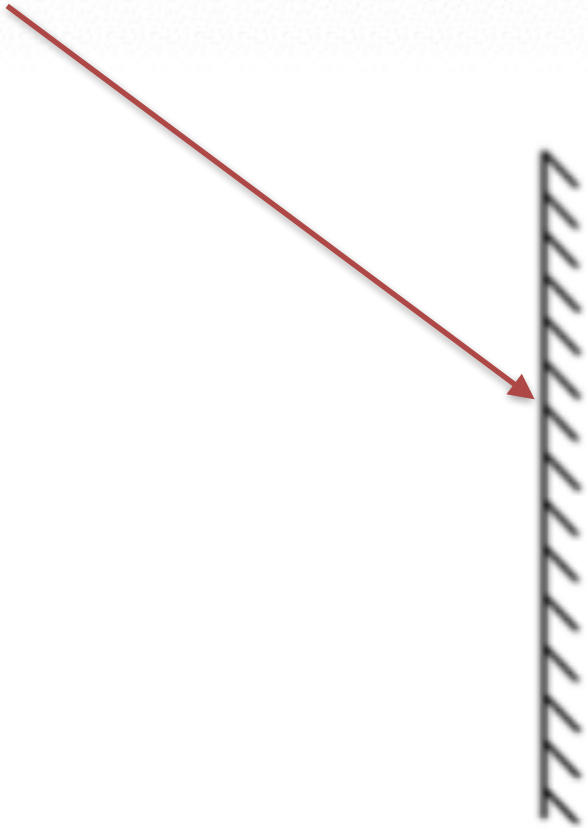
- all objects that do not reflect an image still reflect light.
- Everything you can see is reflecting light.



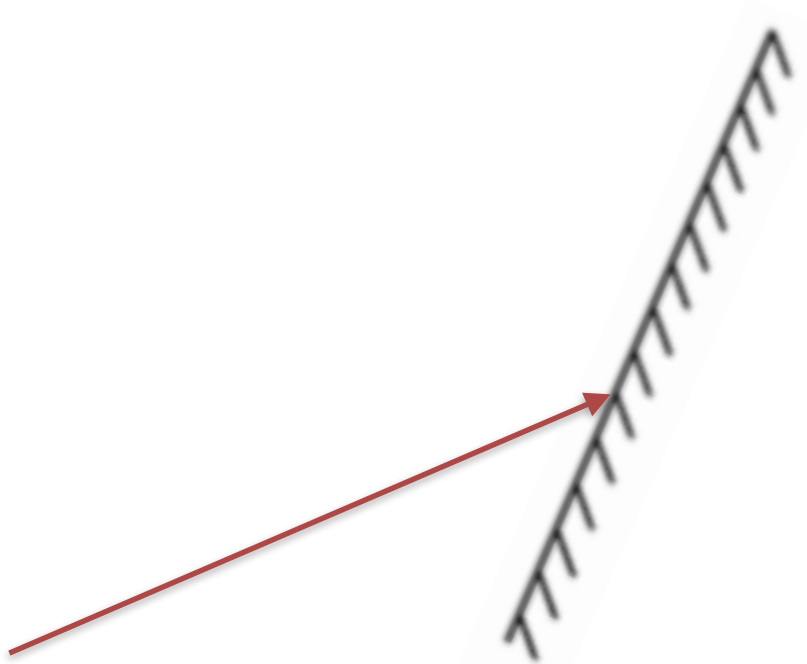
Reflection of light

- light rays reflect on an uneven surface are scattered in different directions (**diffuse reflection)**
- results in no bright spots or flashing reflections

Complete the reflection



Complete the reflection



Complete the reflection