Properties of light and interaction with materials

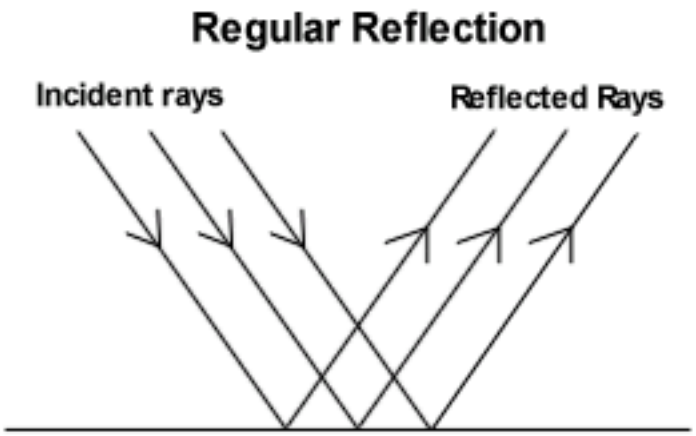
Light behavior

When light hits an object it can:

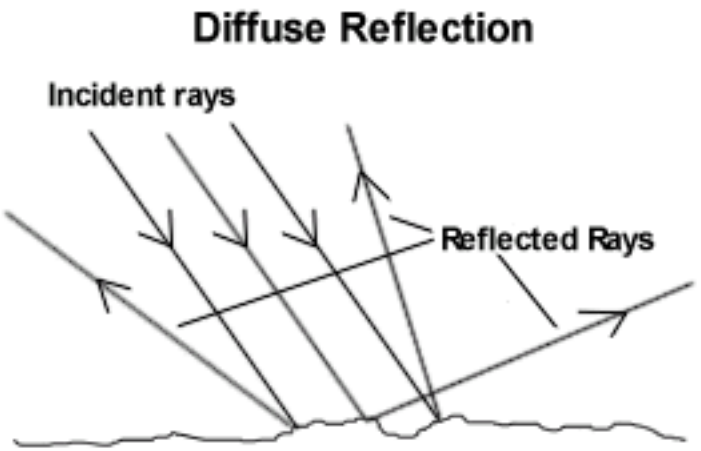
- Be reflected
- Be refracted
- Be absorbed
- Be transmitted
- OR a combination of these!

Reflective surfaces

Surfaces can bounce light back – Reflection
If the surface is not smooth it will results in diffuse reflection



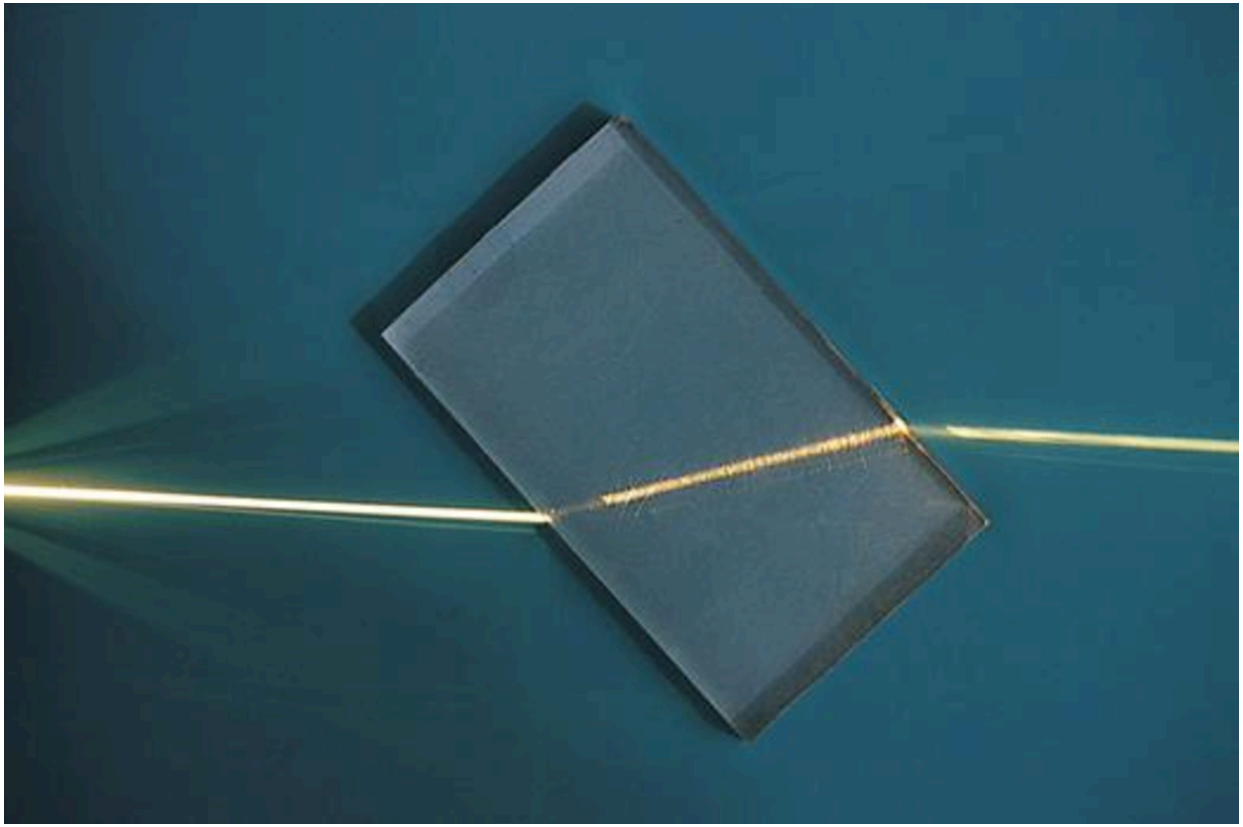
Eg. plane mirror or any other surface that produces a reflected image.



This is like any surface that we can see but does not reflect an image

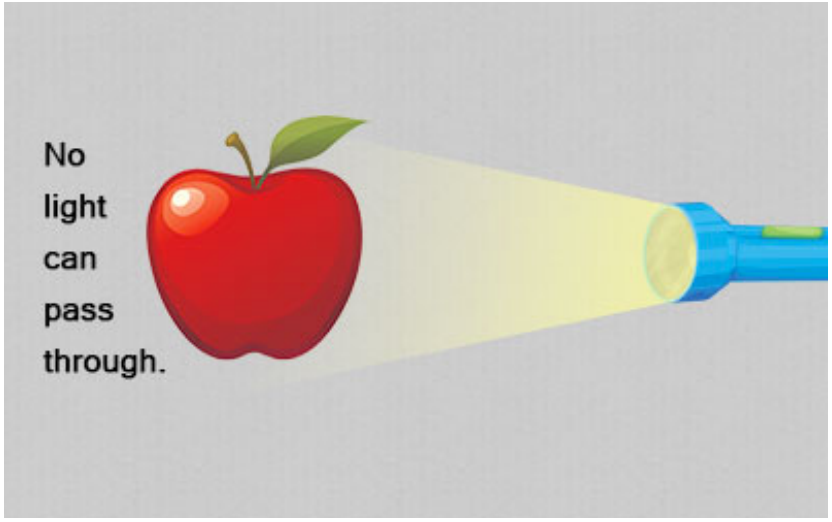
Refractive surface

Passes through, but light is slowed and thus direction changes slightly



Opaque surfaces

Opaque matter is matter that does not let any light pass through it. Matter may be opaque because it absorbs light, reflects light, or does some combination of both.

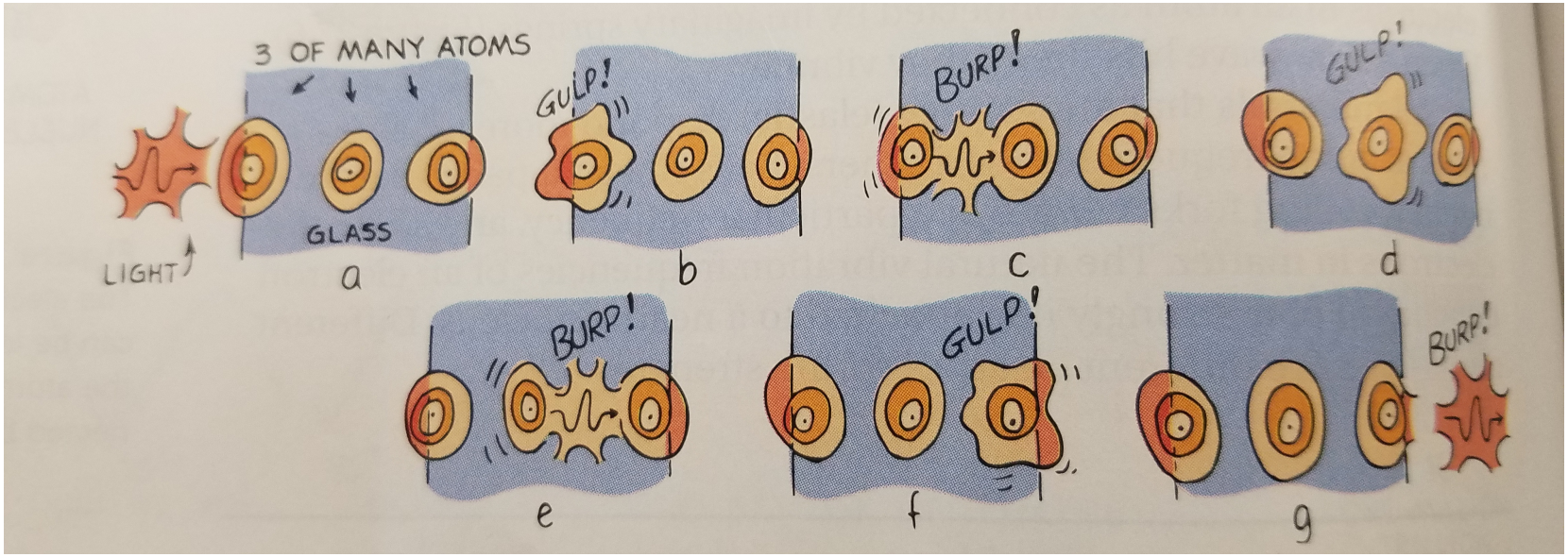


Transparent

Transparent matter is matter that transmits light without scattering it. Examples of transparent matter include air, pure water, and clear glass. You can see clearly through transparent objects.

Transmission of light

When light is transmitted through an object the light causes electrons of the atoms to begin vibrating. The vibrations of the electrons are passed on to neighboring atoms through the bulk of the material and reemitted on the opposite side of the object



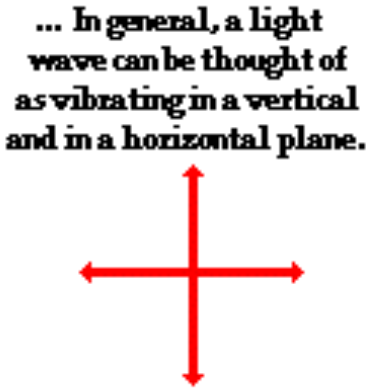
Translucent

Translucent matter is matter that transmits light but scatters the light as it passes through.

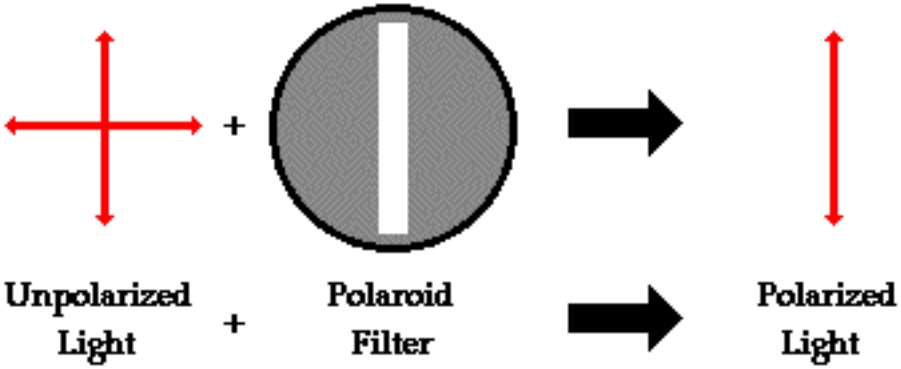
Light passes through translucent objects but you cannot see clearly through them because the light is scattered in all directions.

Polarization

Remember EM waves are TRANSVERSE and Normal light vibrates in all directions



Polarization separates out the components of light that vibrate in different directions



Polarization