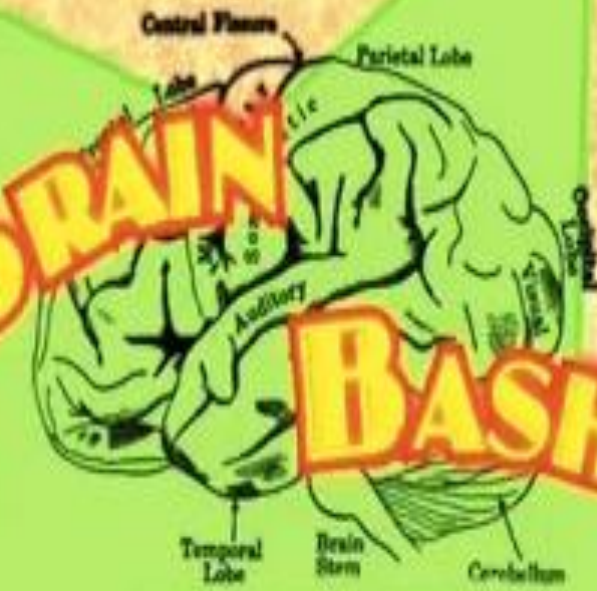


BRAIN BASHERS



Using the letters AAEEIIMPPPTT complete this grid with valid words. The grid reads the same across as down.

L			
	D		
		A	
			E

Using the letters AAEEIIMPPPTT complete this grid with valid words. The grid reads the same across as down.

L			
	D		
		A	
			E

Answer: The words are limp, idea, meat, pate.

Light and Sound

- **In this unit:**

1) *Properties of light*

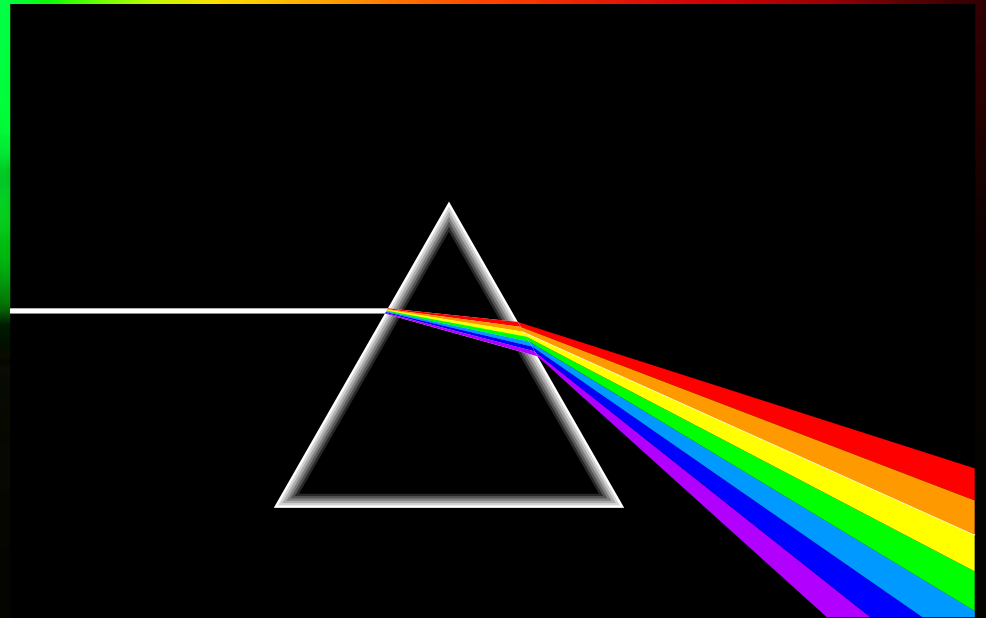
2) *Reflection*

3) *Colours*

4) *Refraction*

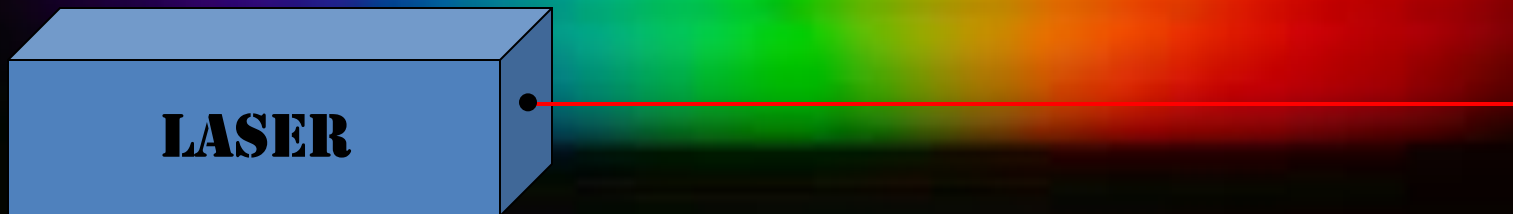
5) *Properties of sound*

6) *Hearing*



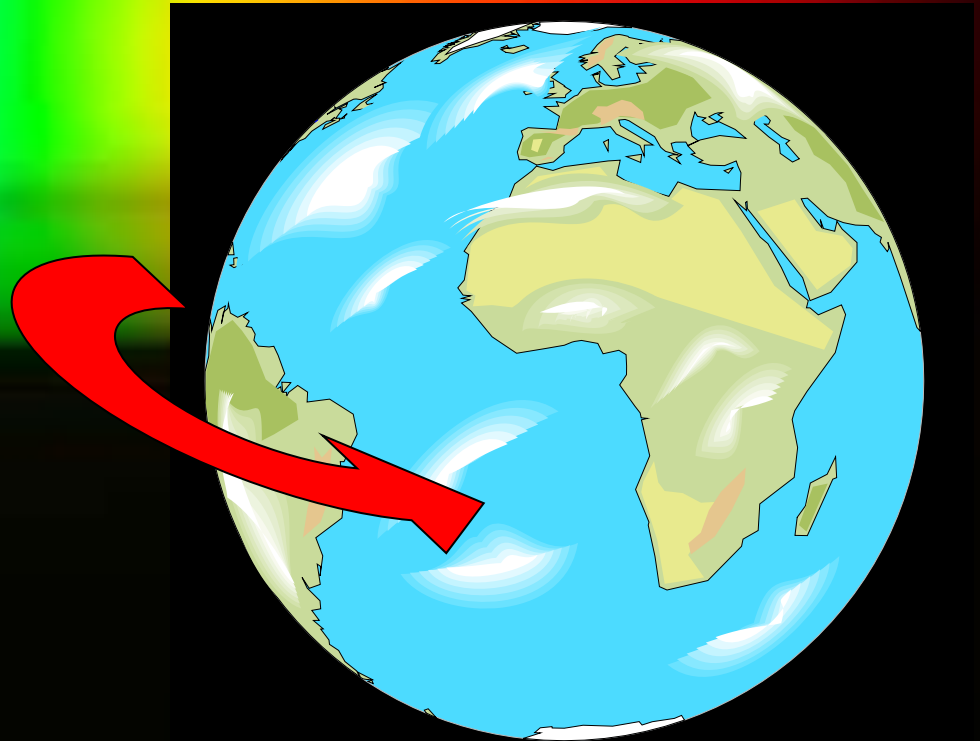
Part 1 – Properties of Light

- Light travels in straight lines:



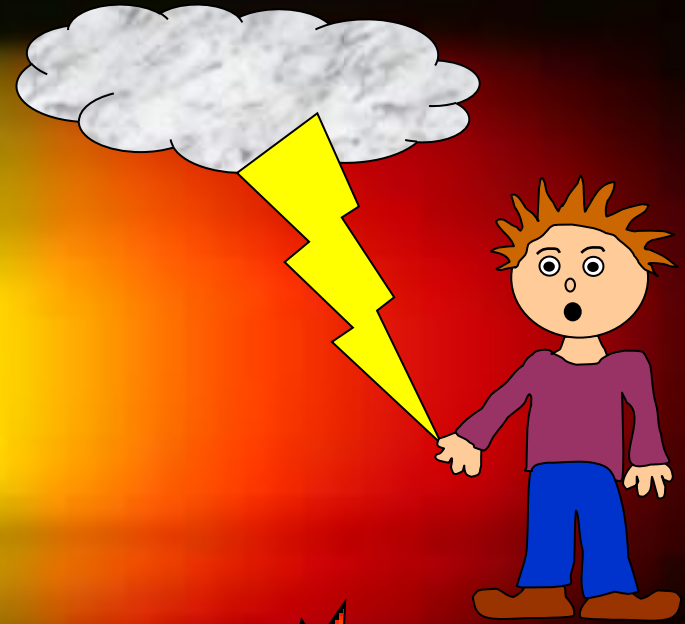
- Light travels VERY FAST – around 300,000 kilometres per second.

At this speed it can go around the world 8 times in one second.

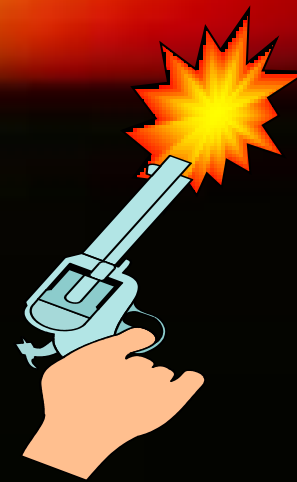


- Light travels much faster than sound. For example:

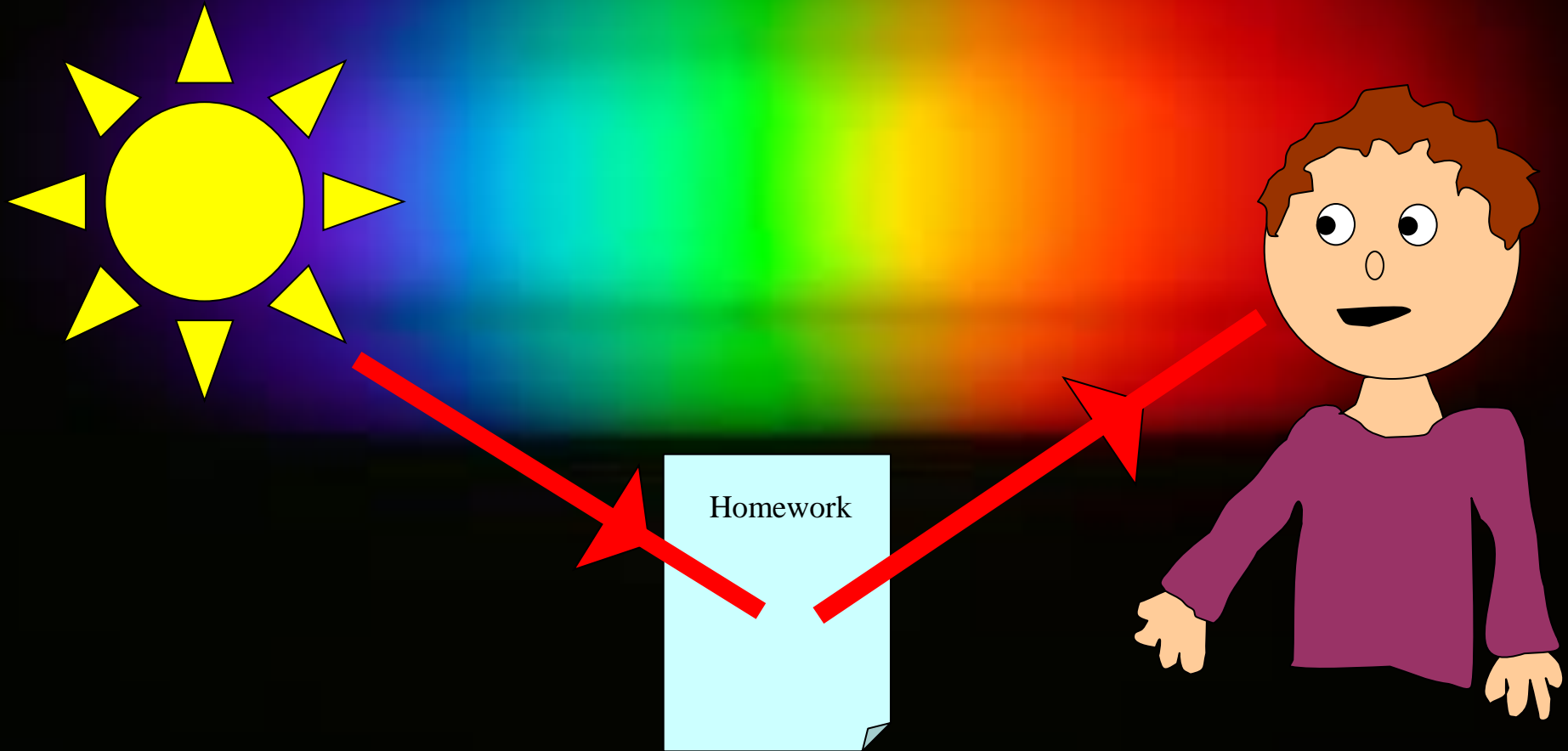
1) Thunder and lightning start at the same time, but we will see the lightning first.



2) When a starting pistol is fired we see the smoke first and then hear the bang.



- We see things because they reflect light into our eyes:



Luminous and non-luminous objects

A luminous object is one that produces light.

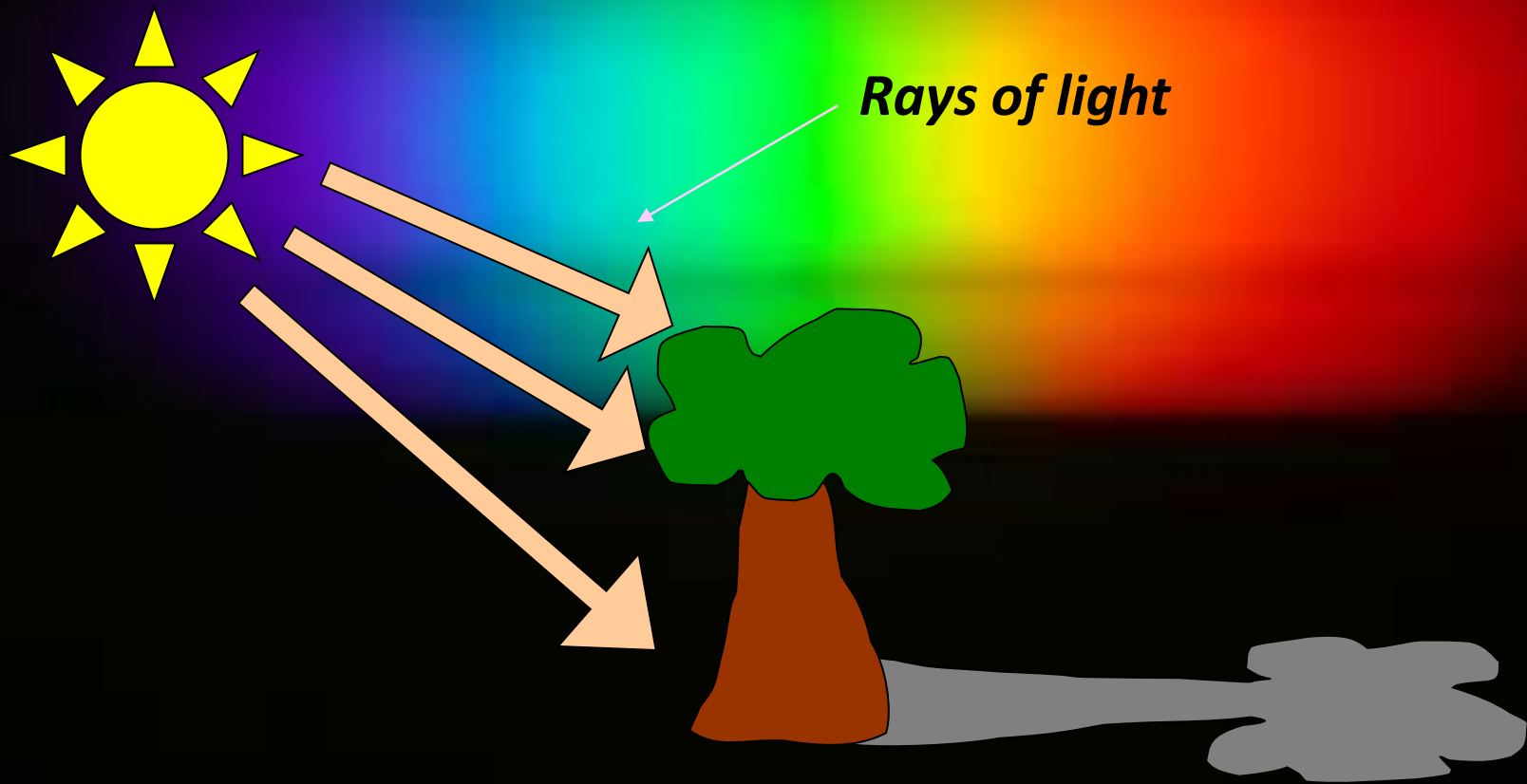
A non-luminous object is one that reflects light.

Luminous objects

Reflectors

Shadows

Shadows are places where light is “blocked”:

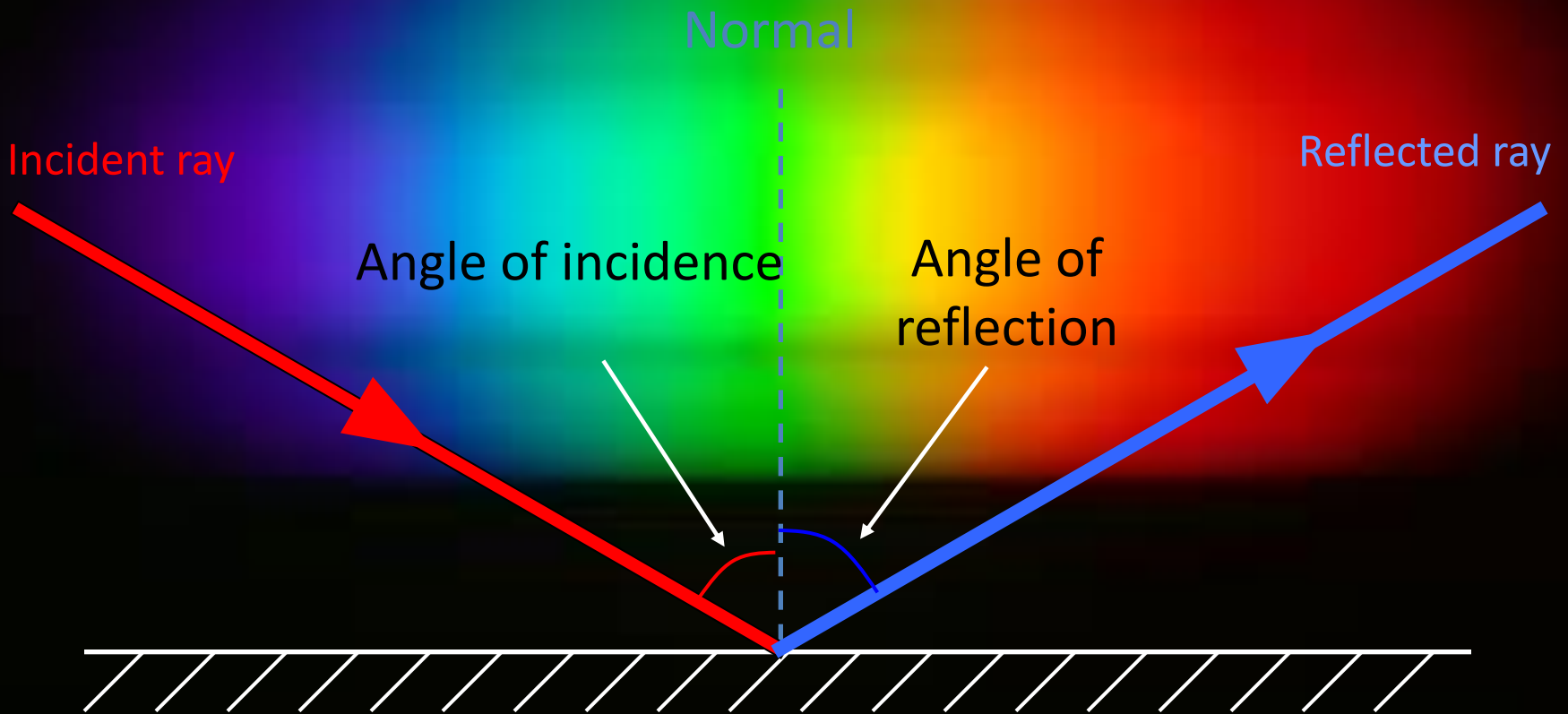


Properties of Light summary

- 1) *Light travels in straight lines*
- 2) *Light travels much faster than sound*
- 3) *We see things because they reflect light into our eyes*
- 4) *Shadows are formed when light is blocked by an object*

Part 2 - Reflection

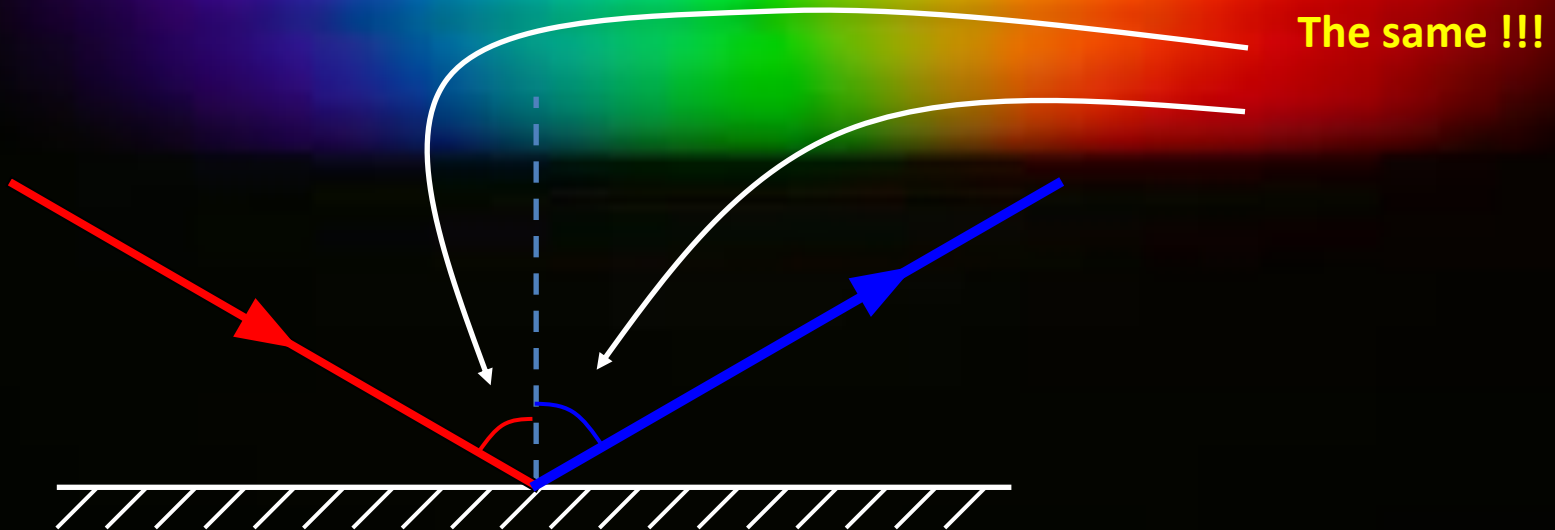
- Reflection from a mirror:



• The Law of Reflection

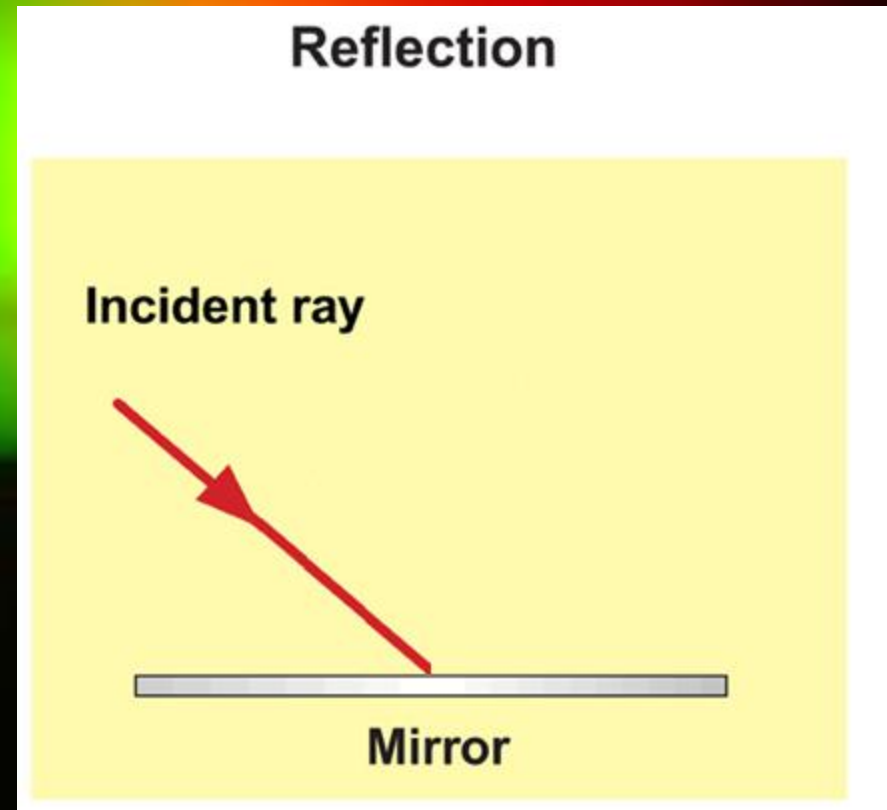
Angle of incidence = Angle of reflection

In other words, light gets reflected from a surface at _____ angle it hits it.



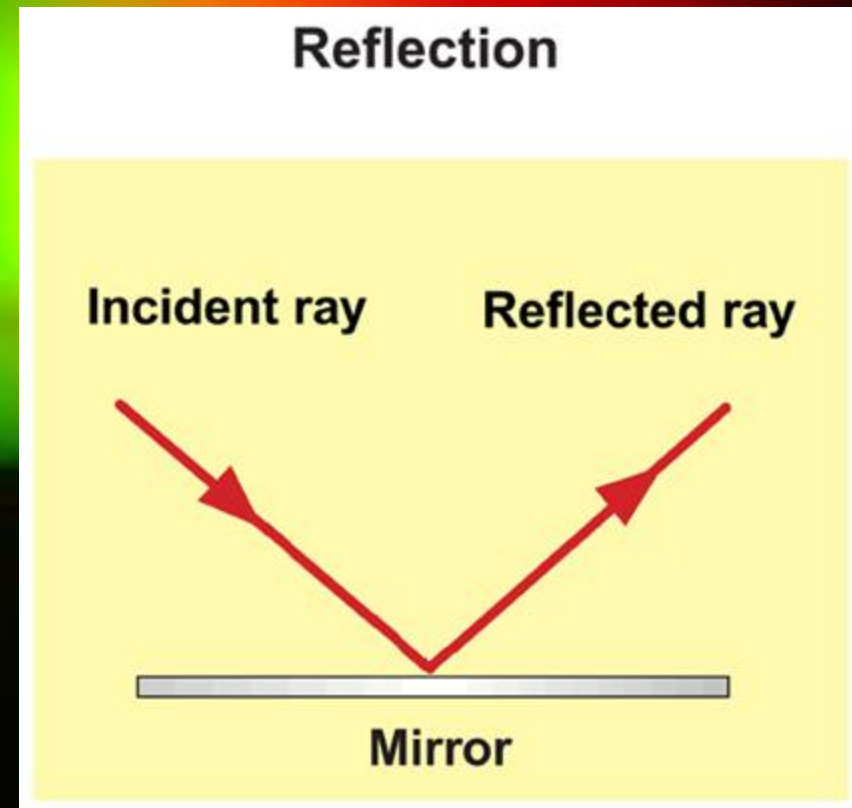
The Law of Reflection

1. Place the mirror on its side so the laser can shine onto it.
2. Trace a line at the bottom of the mirror so you can remove it from the paper and then replace it in the same place.
3. Shine the laser at the mirror at an angle.



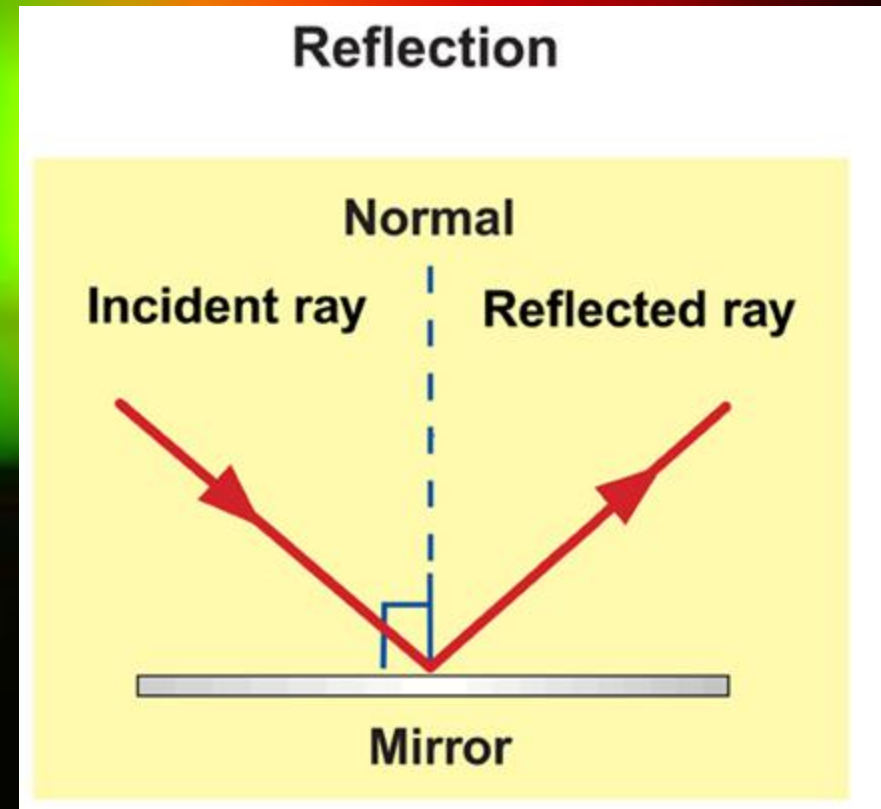
The Law of Reflection

1. Trace the incoming beam before it hits the mirror.
2. Label this beam the “Incident ray”.
3. Trace the outgoing beam after it reflects off the mirror.
4. Label this beam the “reflected ray”.



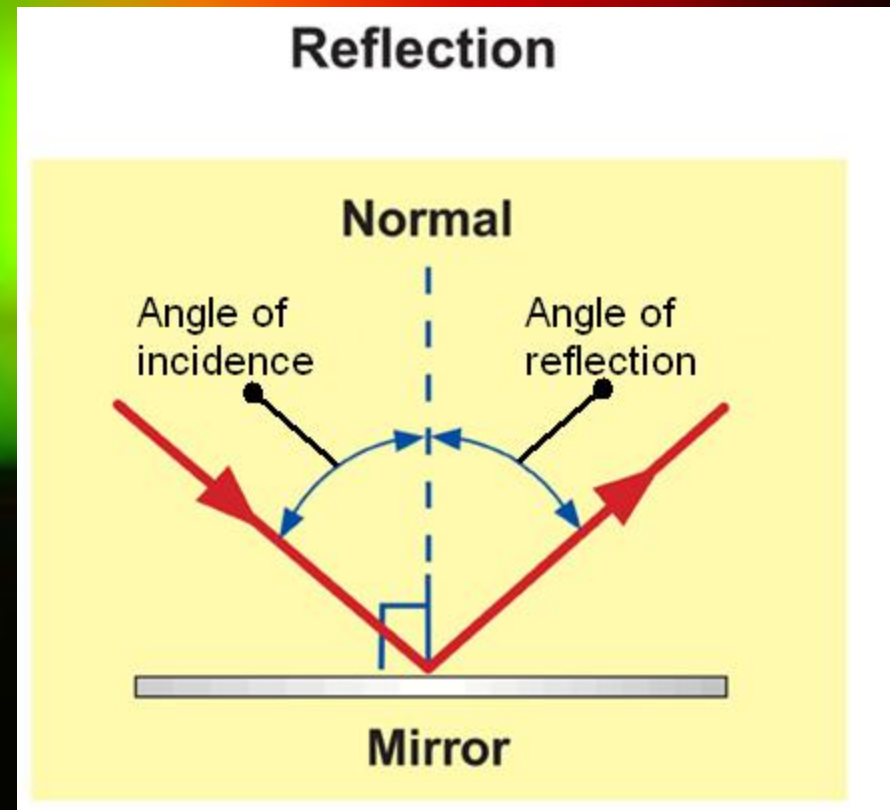
The Law of Reflection

1. Draw a dotted line perpendicular to the mirror at the point on the mirror where the beam reflects.
2. Label this dotted line the “normal”.
3. This line is used as a reference to measure the angles of the incident and reflected rays.



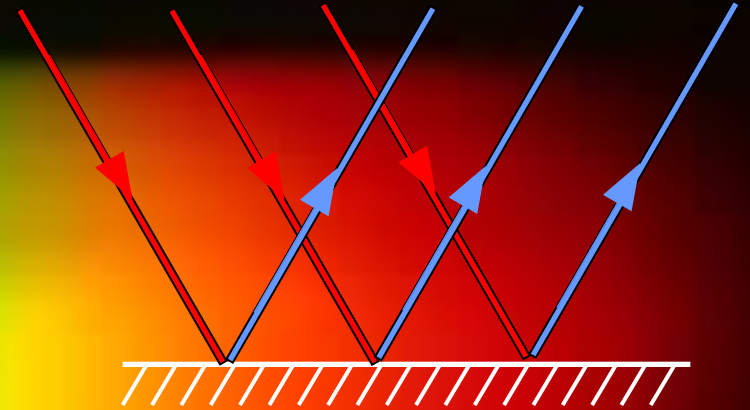
The Law of Reflection

1. This line is used as a reference to measure the angles of the incident and reflected rays.
2. Measure the angle at which the incident ray hits the mirror.
3. Label this angle the “angle of incidence”.
4. Measure the angle at which the reflected ray reflects off the surface of the mirror.
5. Label this angle the “angle of reflection”



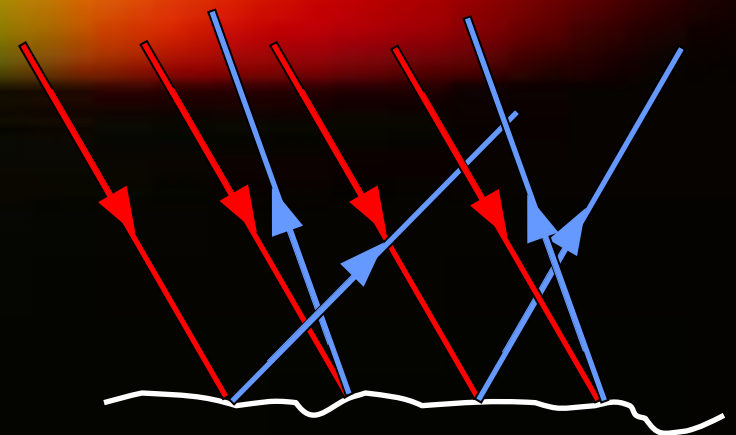
Clear vs. Diffuse Reflection

- Smooth, shiny surfaces have a *clear* reflection:



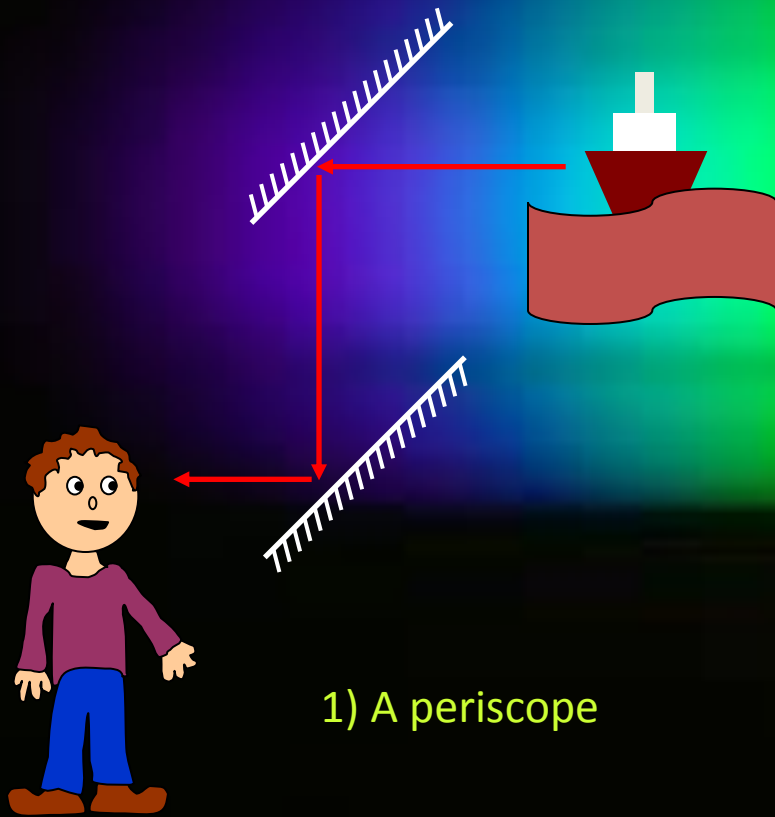
Rough, dull surfaces have a *diffuse* reflection.

Diffuse reflection is when light is scattered in different directions

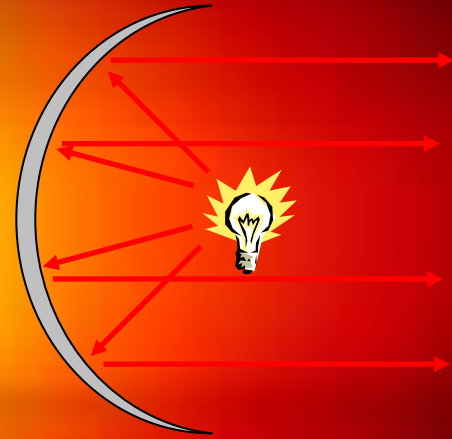


Using mirrors

- Two examples:



1) A periscope



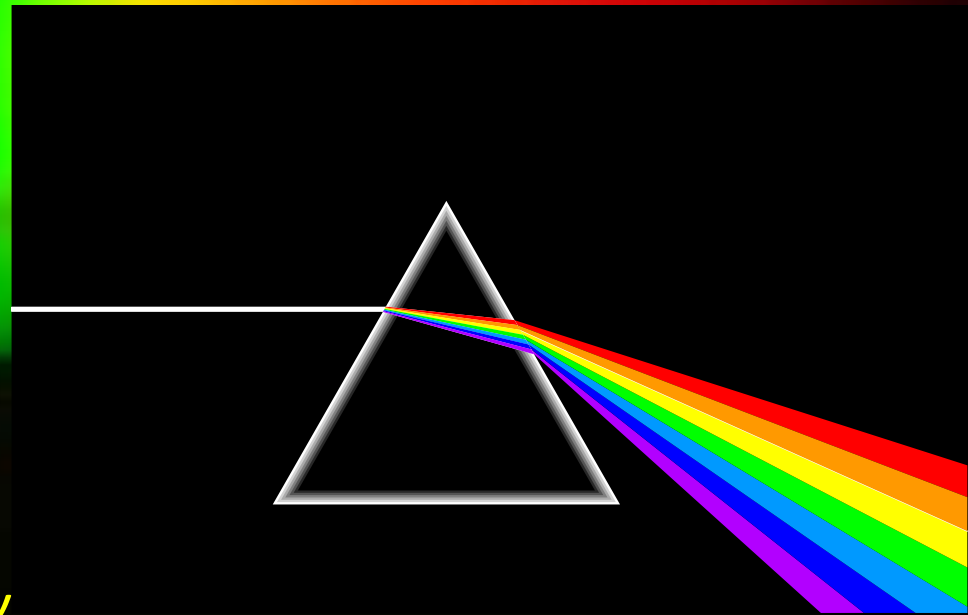
2) A car headlight

Colour

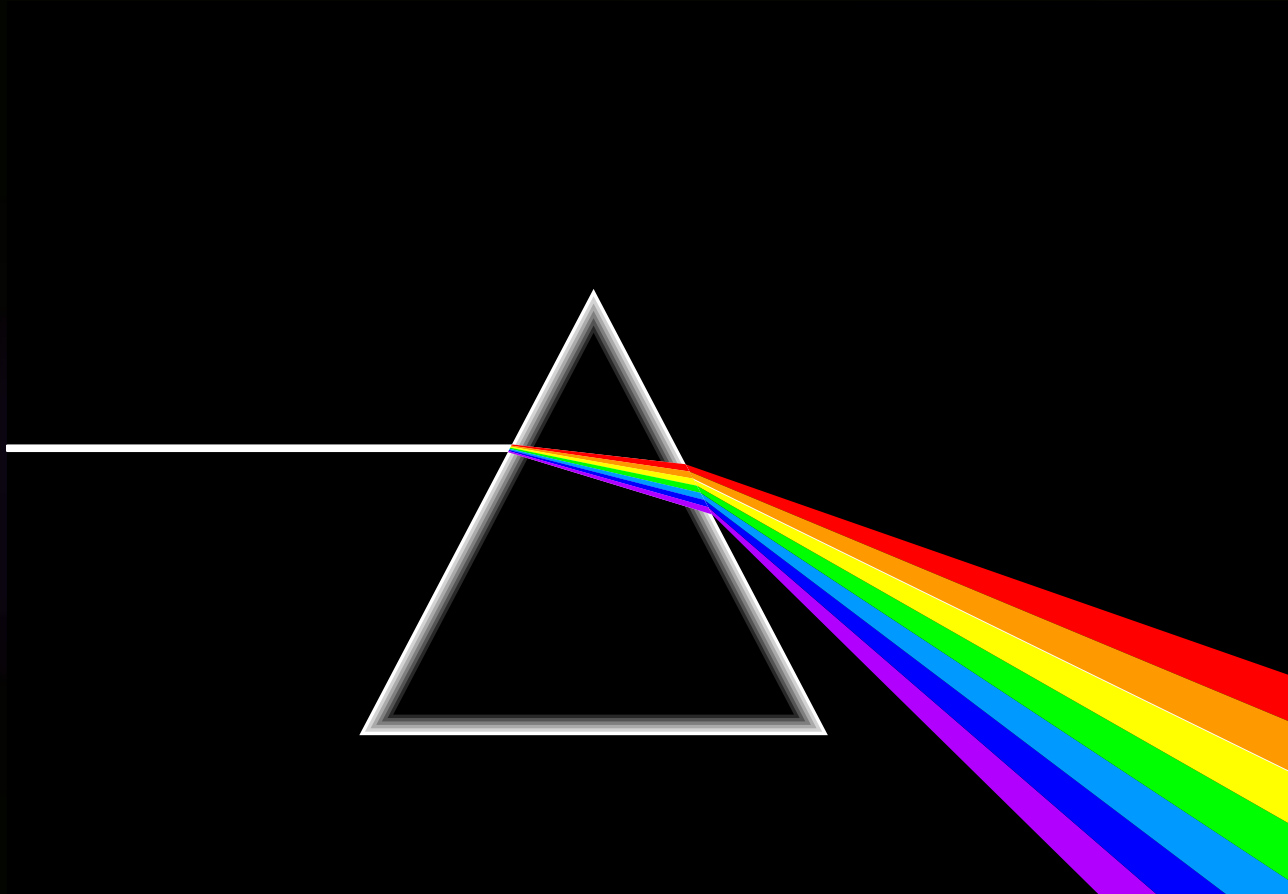
- White light is not a single colour; it is made up of a mixture of the seven colours of the rainbow.

We can demonstrate this by splitting white light with a prism:

This is how rainbows are formed: sunlight is “split up” by raindrops.



The colours of the rainbow:



- Red
- Orange
- Yellow
- Green
- Blue
- Indigo
- Violet

Adding colours

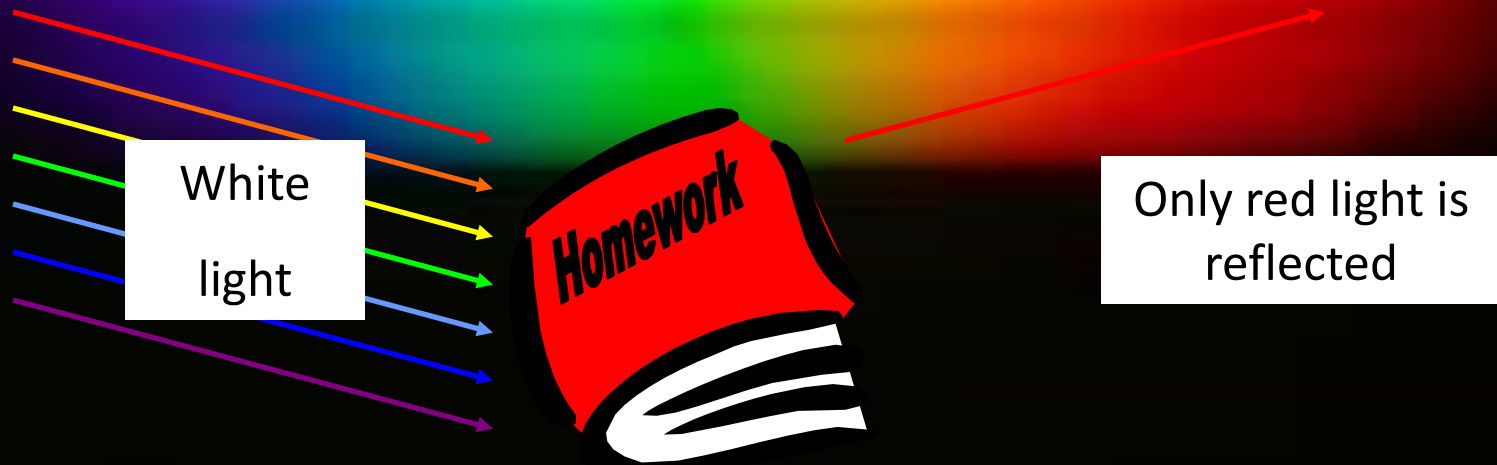
- **White light can be split up to make separate colours. These colours can be added together again.**
- **The primary colours of light are red, blue and green:**



Seeing colour

- The colour an object appears depends on the colours of light it reflects.

For example, a red book only reflects red light:



A pair of purple trousers would reflect purple light (and red and blue, as purple is made up of red and blue):



A white hat would reflect all seven colours:



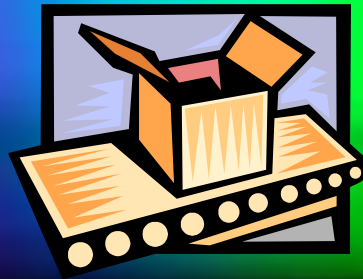
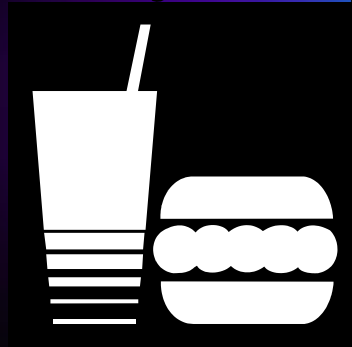
“Just Passing Through:”

What happens when light strikes glass? Or waxed paper? Or a book?



- If light travels through an object it is =transparent
- If light is blocked by an object and a dark shadow is cast it is= opaque.
- If some light passes through but not all and a light shadow is present it is=translucent.

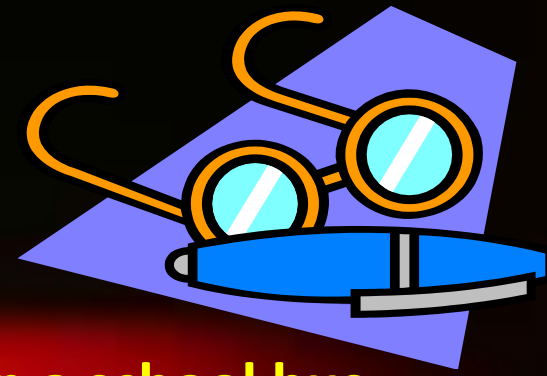
What happens when light hits these objects?



- Glass of water
- School bus window
- Notebook paper
- Waxed paper
- Plastic wrap
- Tissue paper
- Cardboard
- Textbook
- Hand lens...



Transparent objects:



- The windows on a school bus,
- A clear empty glass,
- A clear window pane,
- The lenses of some eyeglasses,
- Clear plastic wrap,
- The glass on a clock,
- A hand lens,
- Colored glass...
- **ALL of these are transparent. Yes, we can see through them because light passes through each of them**



Translucent objects

- **Thin tissue paper,**
- **Waxed paper,**
- **Tinted car windows,**
- **Frosted glass,**
- **Clouds,**
- **All of these materials are translucent and allow some light to pass but the light cannot be clearly seen through.**



Opaque objects:



- Heavy weight paper,
- Cardboard
- Aluminum foil,
- Mirror, bricks, buildings,
- Your eyelids and hands,
- Solid wood door,
- All of these objects are opaque because light cannot pass through them at all.
- They cast a dark shadow.