

# Slide 1

## The Physics of Light

Why and how do we see  
light?

# Slide 2

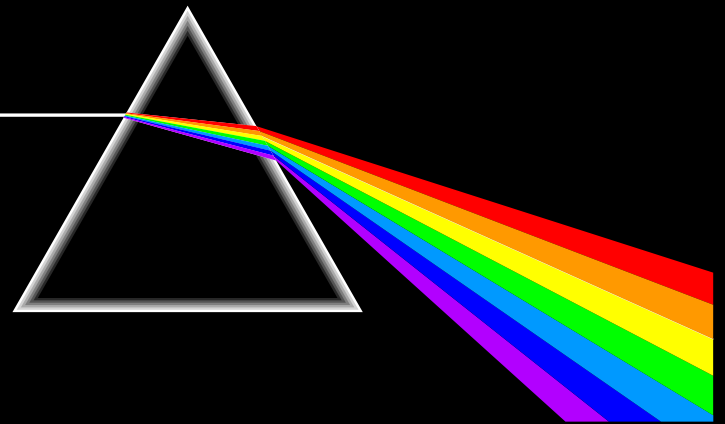
## Section 1: What Is Light?

# Slide 3:

## What Is Light?

In this Powerpoint presentation:

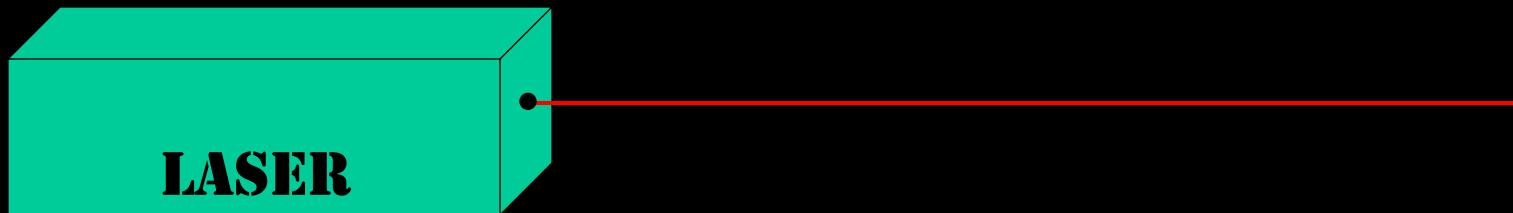
- 1) *Properties of light*
- 2) *Colors*
- 3) *Reflection - Mirrors*
- 4) *Refraction - Lenses*



# Slide 4:

## Properties of Light

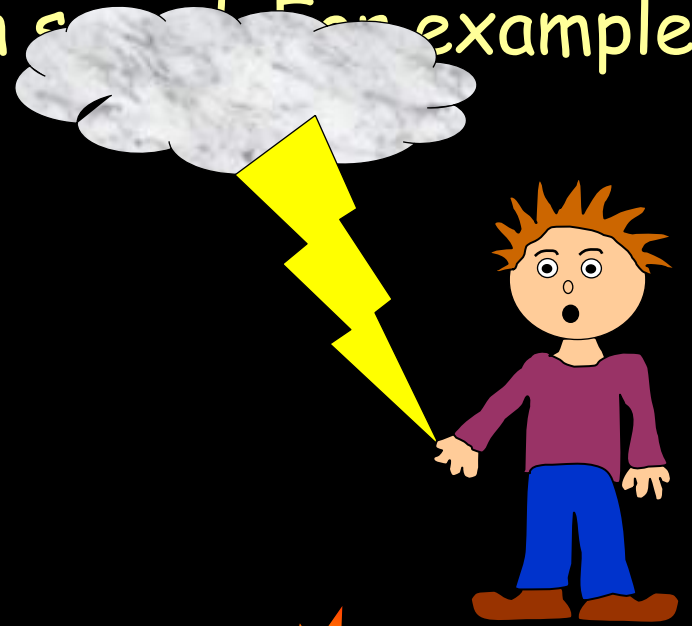
Light travels in straight lines:



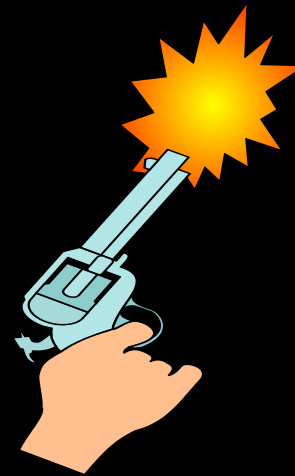
# Slide 5

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.



## Slide 6:

Light travels **VERY FAST** - about 186,000 miles per second.

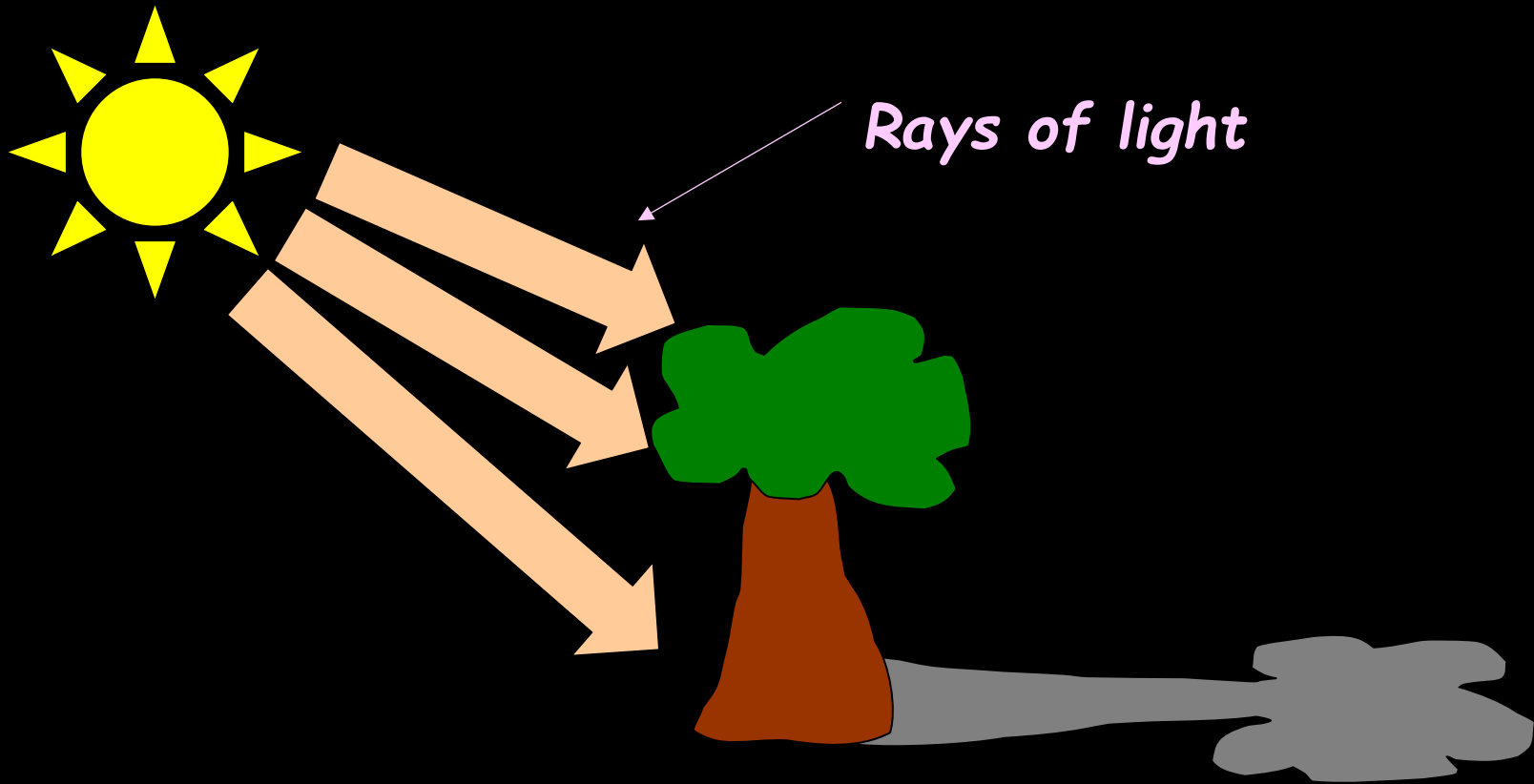
*At this speed light could travel the equivalent of 8 times around the world in one second!*



## Slide 7:

Light can create shadows

Shadows are places where light is "blocked":



# Slide 8:

## Light travels in waves

A WAVE is a disturbance that transfers energy from place to place.



## Slide 9:

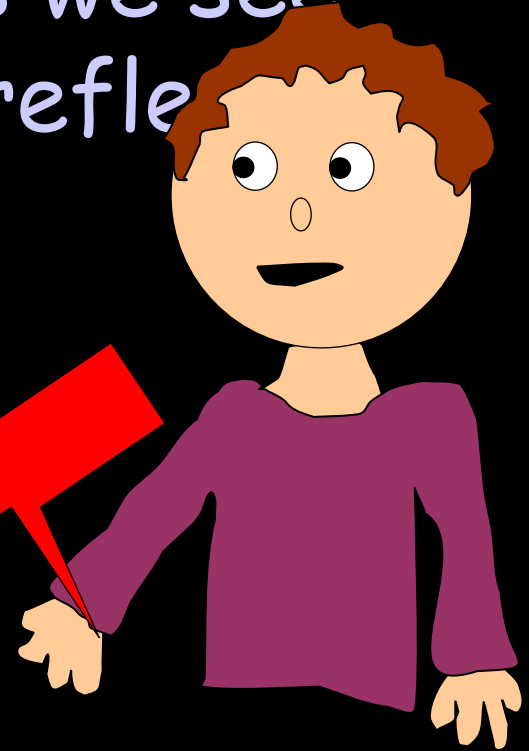
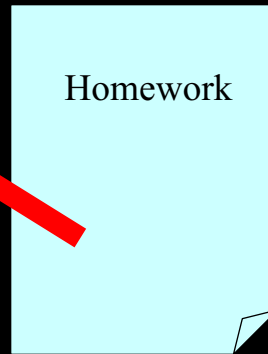
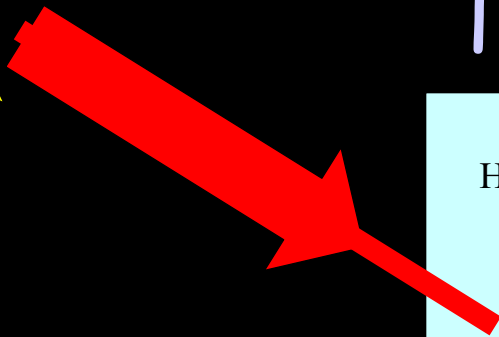
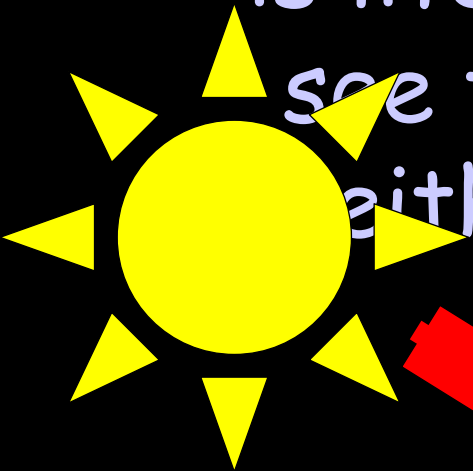
# What characteristics do light waves have?

Light waves are like other kinds of waves.

They have crests, troughs, wavelength, frequency and speed. However, light waves are electromagnetic! Light waves have a component that is electric and magnetic!!

## Slide 10:

We see things because they reflect light into our eyes! This is literally the only way we get to see things! ALL objects we see either create light or reflect light!!



# Slide 11:

## Electromagnetic Radiation

- Light is a form of energy called Electromagnetic Radiation - Electromagnetic Radiation comes from the sun and other sources
- Travels at the speed of light
- Is mostly invisible
- Carries energy
- Is VERY important to society and is something YOU can't be without for many reasons

# Slide 12:

## Properties of Light summary

- 1) *Light travels in straight lines and is a form of energy*
- 2) *Light travels much faster (a million times 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*
- 5) *Visible light is only a small part of the electromagnetic spectrum; the other parts are invisible to the human eye but not necessarily the eyes of other animals.*

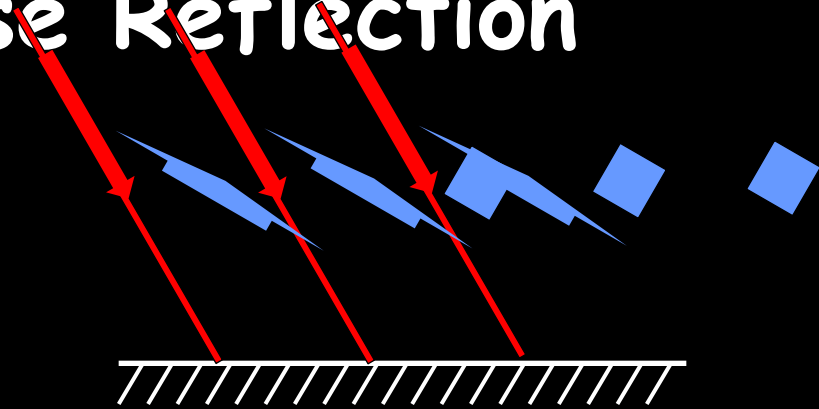
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**Part 2 - Reflection and  
Mirrors**

## Slide 14

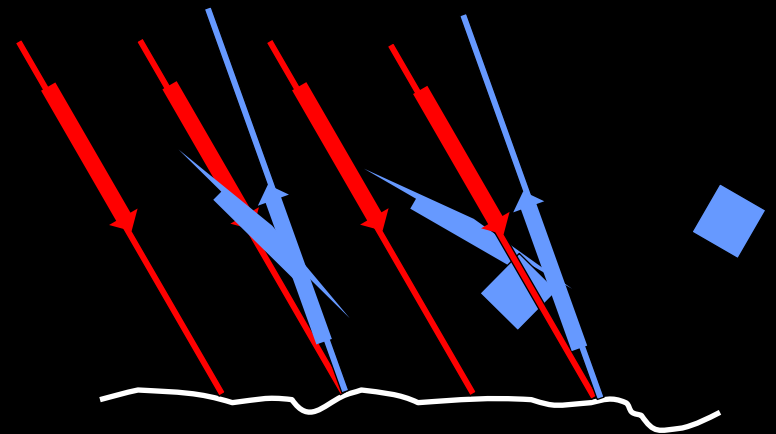
# Regular vs. Diffuse Reflection

Smooth, shiny surfaces  
have a *regular*  
reflection:



Rough, dull surfaces have  
a *diffuse* reflection.

*Diffuse reflection* is when  
light is scattered in  
different directions

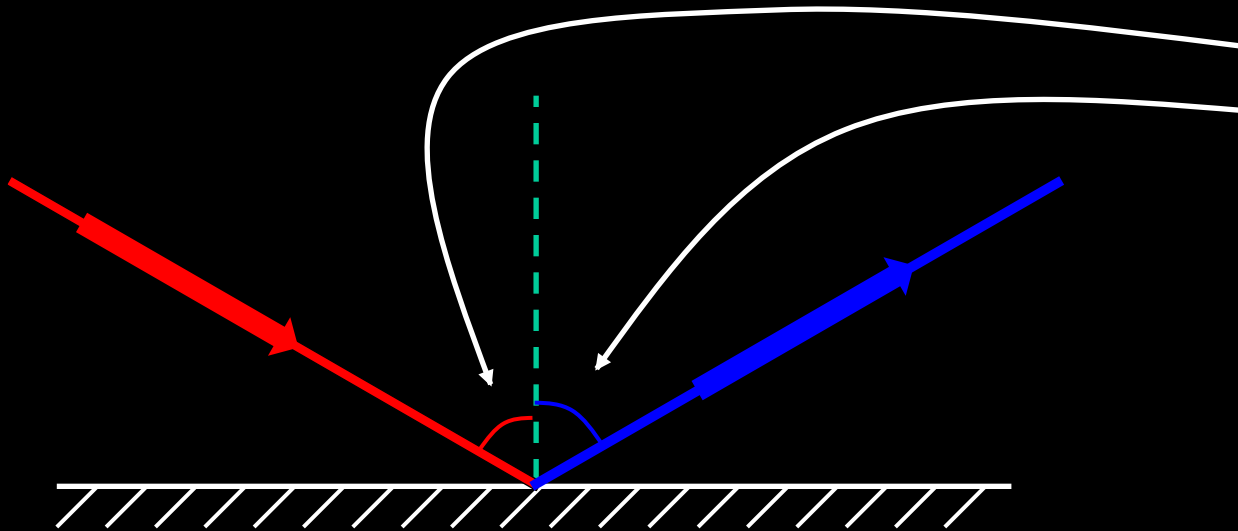


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## The Law of Reflection

*Angle of incidence = Angle of reflection*

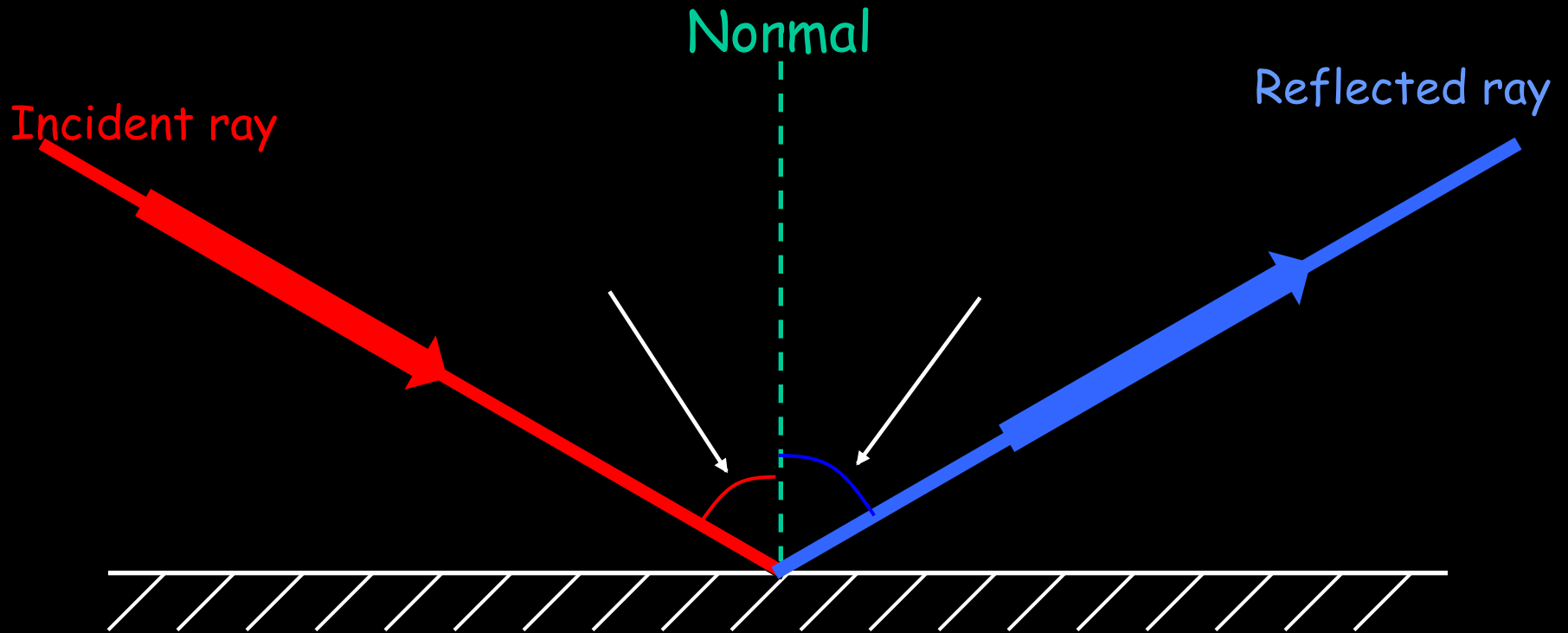
In other words, light gets reflected from a surface at \_\_\_\_\_ angle it hits it.



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## Part 2 - Reflection and Mirrors

Reflection from a mirror:

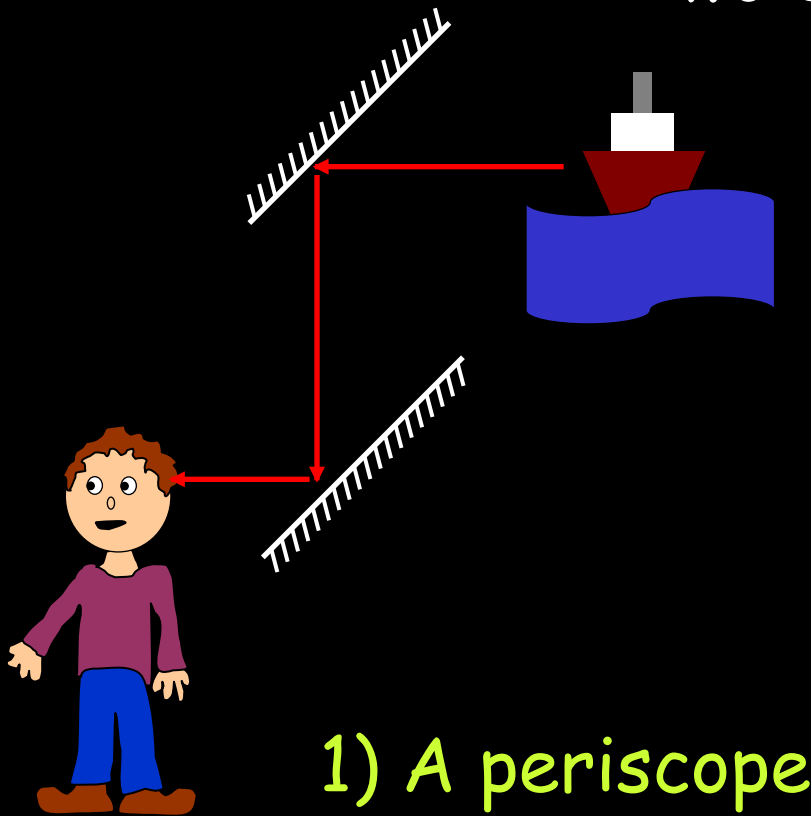




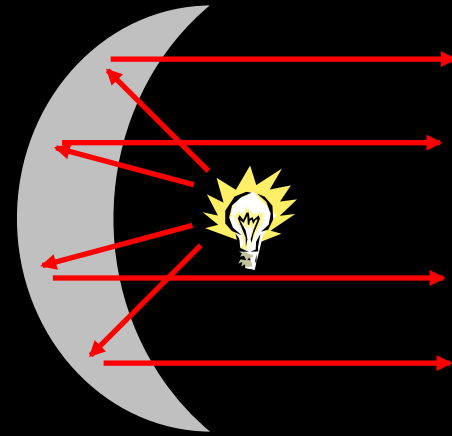
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## Using mirrors

Two examples:

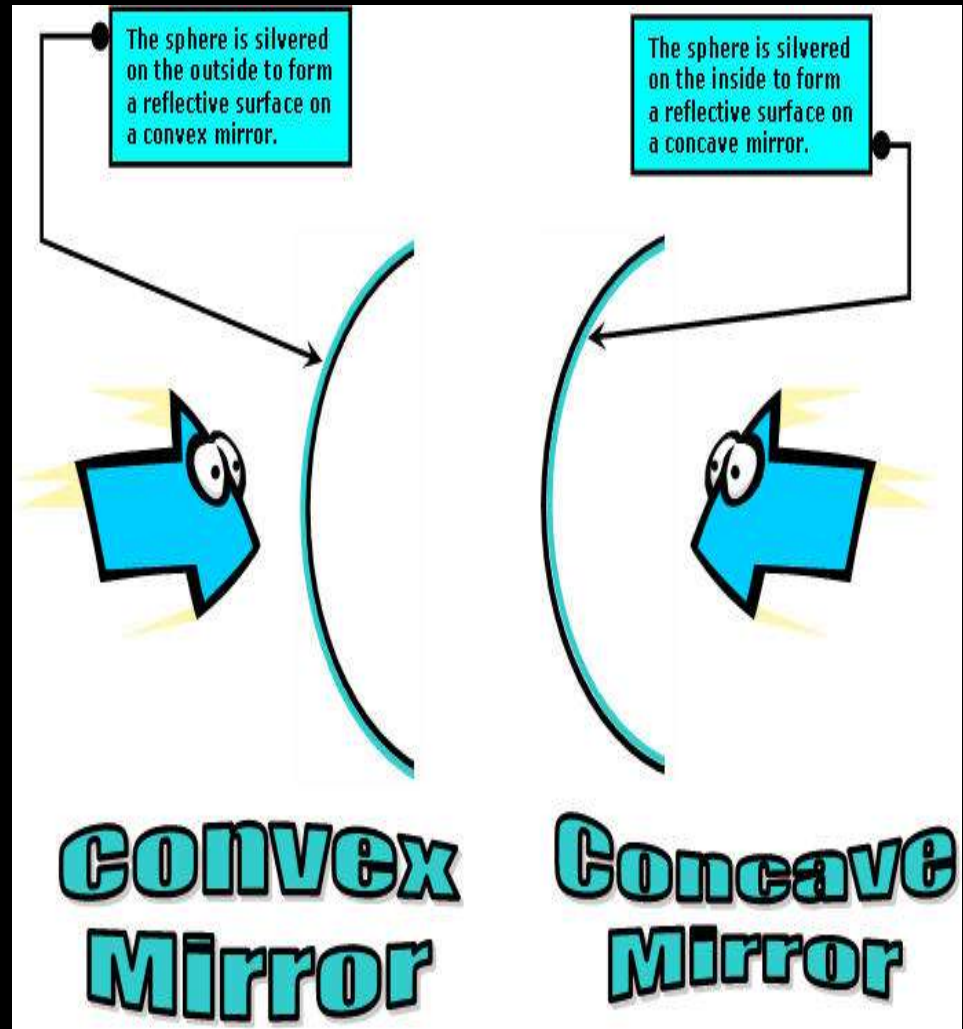


1) A periscope



2) A car headlight

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# Slide 19

# Slide 20

## Review of Reflection

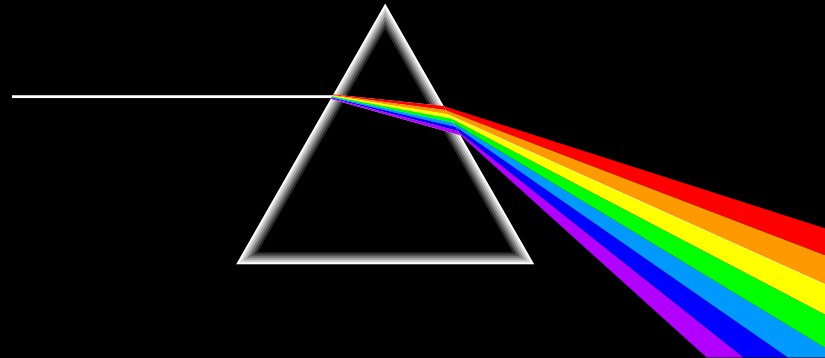
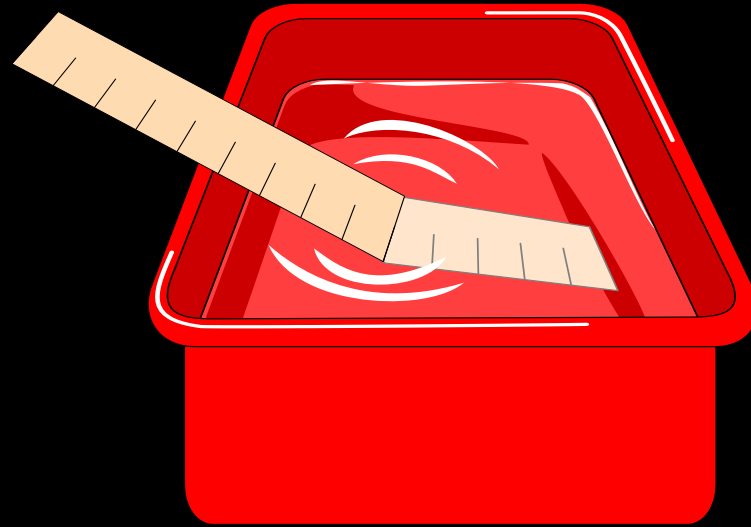
1. Two types of reflection, regular and diffuse
2. Mirrors come in 3 types: plane, convex and concave. Each has a distinct shape and use
3. Mirrors can make virtual images or real images depending on their type
4. Virtual images - light rays do not meet and the image is always upright or right-side-up

# Slide 21

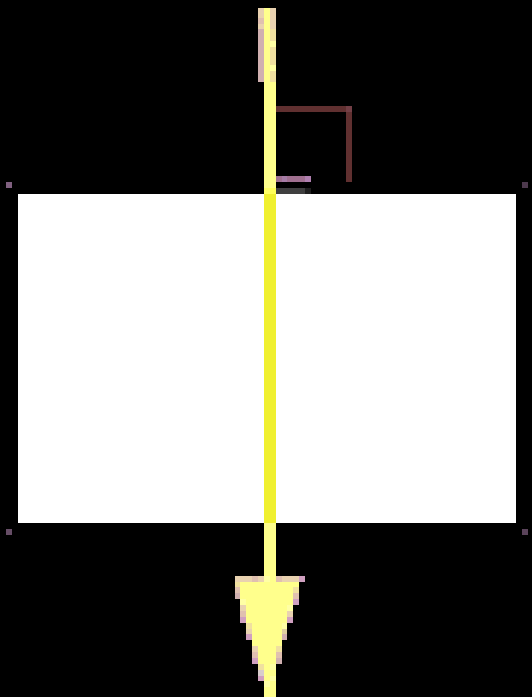
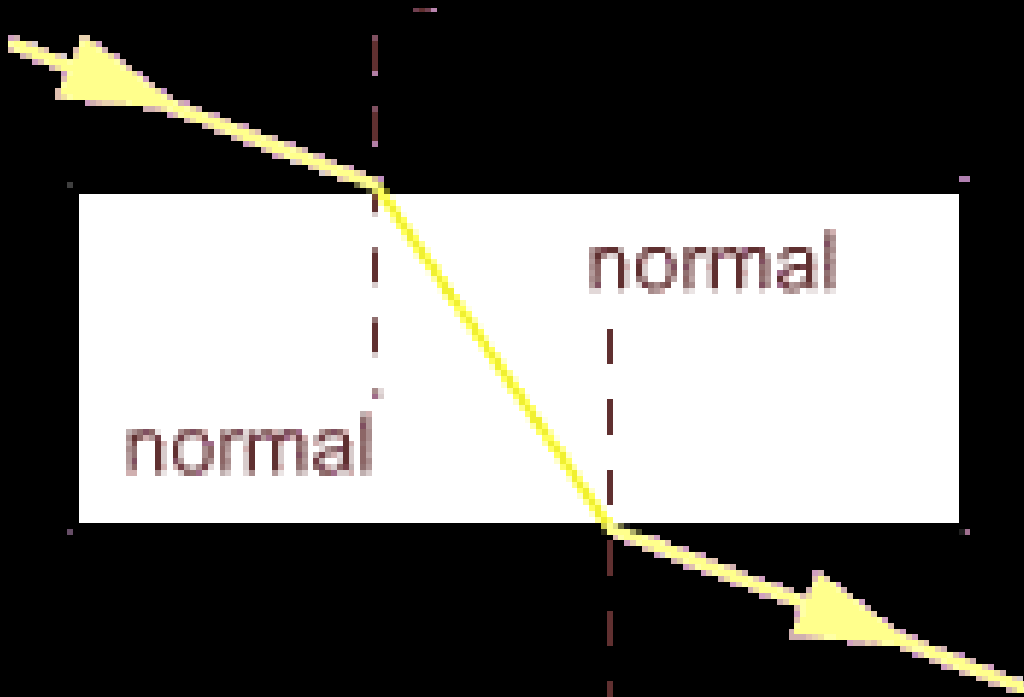
## Refraction

- Refraction is when waves speed up or slow down due to travelling in a different medium
- A medium is something that light waves will travel through
- Light rays are slowed down when they pass through different mediums.
- Causes the ruler to look bent at the surface
- The mediums in this example are water and air

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# Slide 23



# Slide 24



Plano-Convex  
Lens



Double-Convex  
Lens



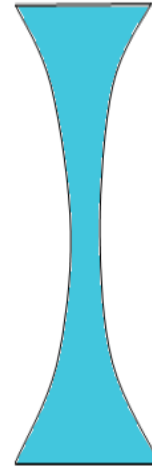
Concavo-Convex  
Lens



# Slide 25



Plano-Concave  
Lens



Double-Concave  
Lens



Convexo-Concave  
Lens

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## Review of Refraction

1. Light rays slow down when they enter a new medium
2. Refraction can cause light rays to change their direction
3. All transparent materials have their own "index of refraction"
4. Light is refracted when it passes through lenses and this creates images

# Slide 27

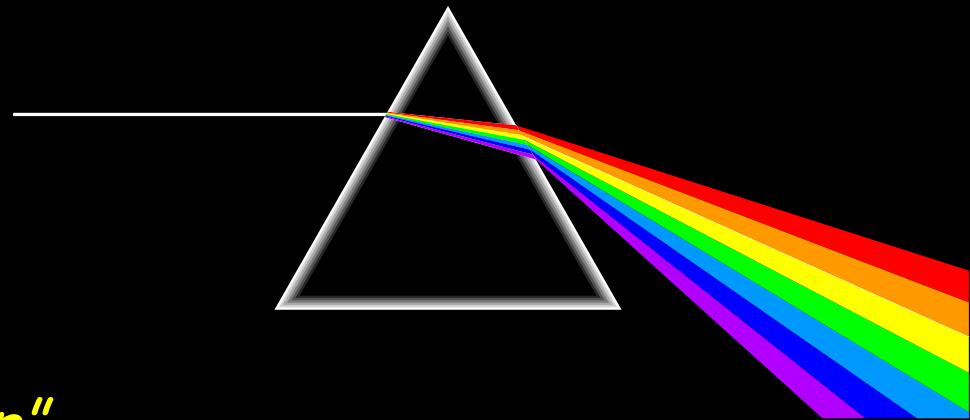
## Color

Part 3 - Color In this section of the Powerpoint you will learn about color. We will also learn how light helps us to see various colors around us.

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## Color

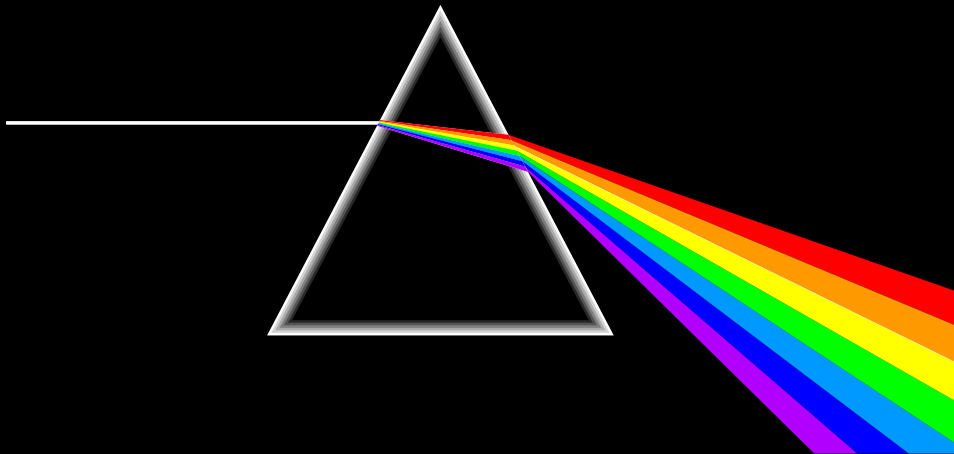
White light is not a single color; it is made up of a mixture of the seven colors of the rainbow.



*This is how rainbows are formed: sunlight is "split up" by raindrops.*

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The colors of the rainbow:



Red

Orange

Yellow

Green

Blue

Indigo

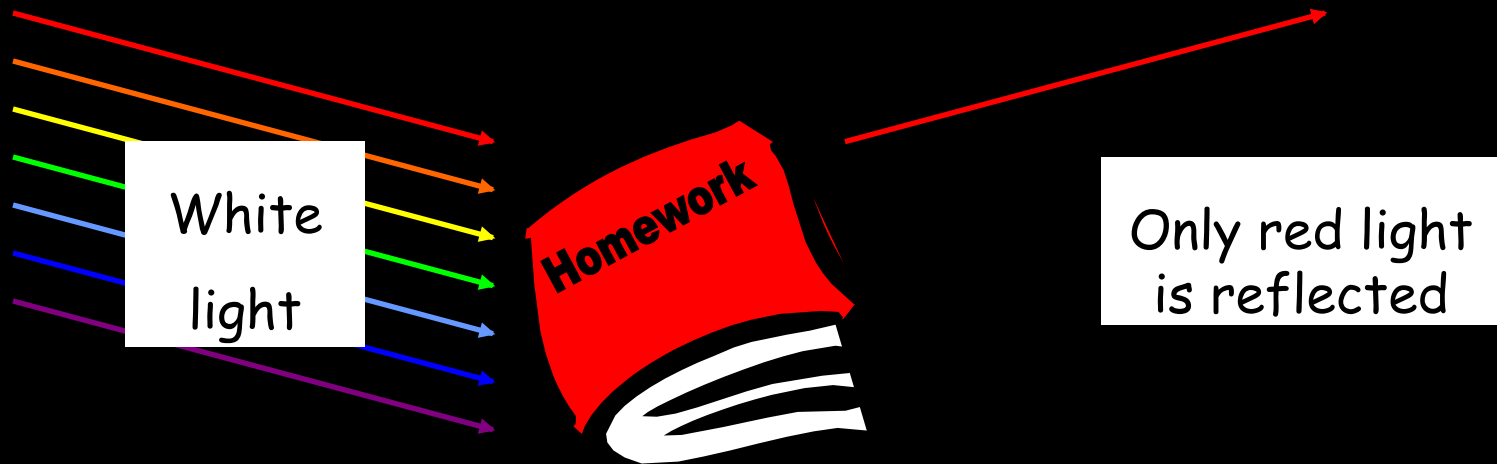
Violet

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## Seeing color

The color an object appears depends on the color of light it reflects.

For example, a red book only reflects red light:



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Transparent, Translucent, and Opaque



# Slide 32

Transparent: a transparent object is one that lets light pass through completely.  
Examples are:

clear window , transparent glass





# Slide 33

Translucent: Translucent materials transmit some light but cause it to spread in all directions.

Ex.: Bathroom windows, waxed paper



# Slide 34

Opaque: Opaque materials do not allow any light to pass through them.

