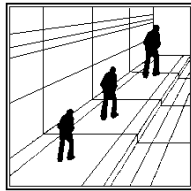
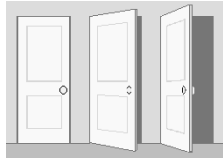
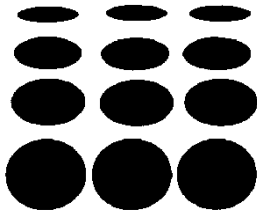
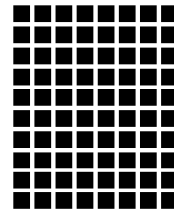




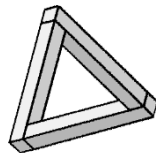
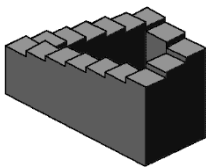
How do we see depth?



What do illusions tell us about the functioning of the brain?



Why are these images impossible?



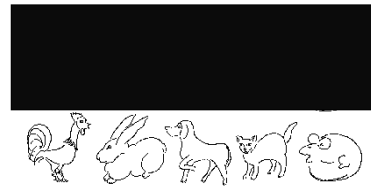
Does attention help vision?



Does our knowledge influence what we see?

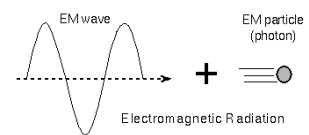


Does our knowledge influence what we see?



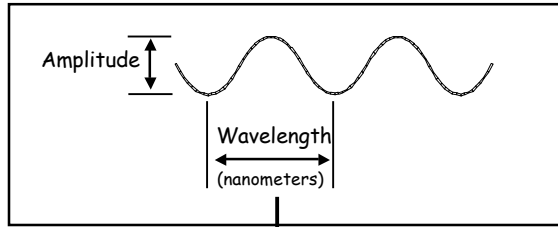
## Light

- electromagnetic radiation
- photons



- amplitude, wavelength & complexity

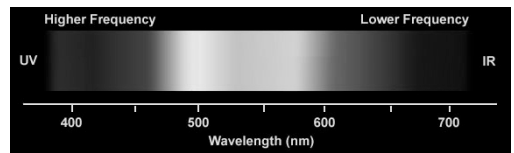
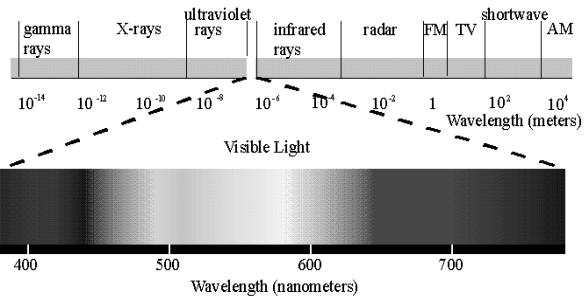
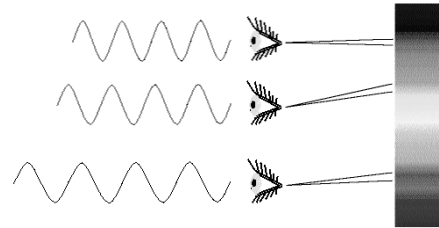
# Light: an electromagnetic wave



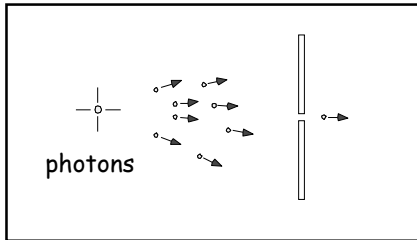
Visible:  
700 to 400 nm



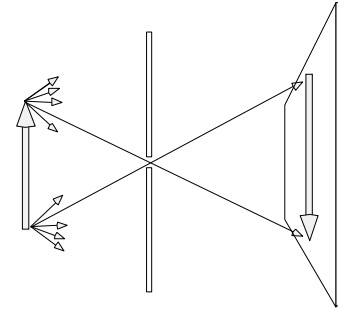
# Different wavelengths = different colours



## Light travels in a straight line



## Pinhole Optics



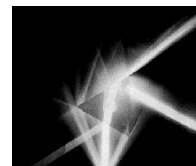
## Properties of Light

- Transparent & translucent media
  - absorption *...more for longer wavelength*
  - diffraction *...more for shorter wavelength*
  - refraction
- Opaque media
  - absorption & reflection

## Refraction:

Speed of light  
is different in different materials

$$\text{Refractive Index} = \frac{\text{speed of light in material 1}}{\text{speed of light in material 2}}$$



### Refraction:

Speed of light is different in different materials

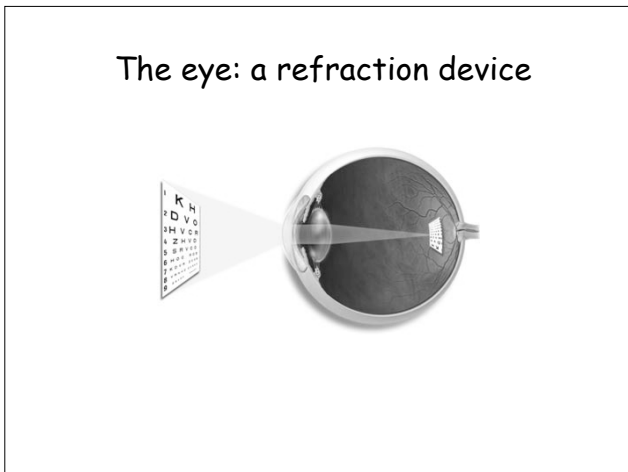
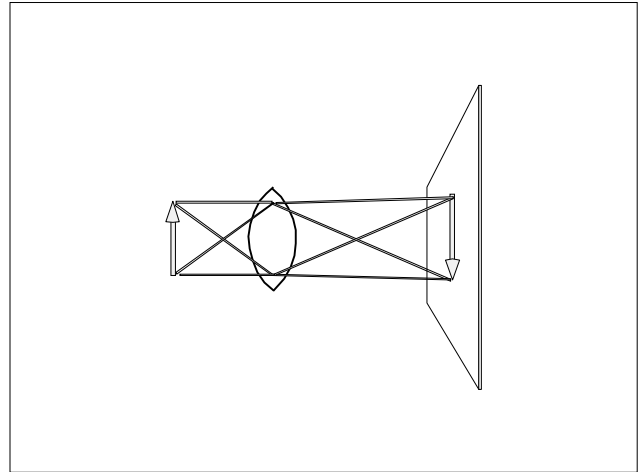
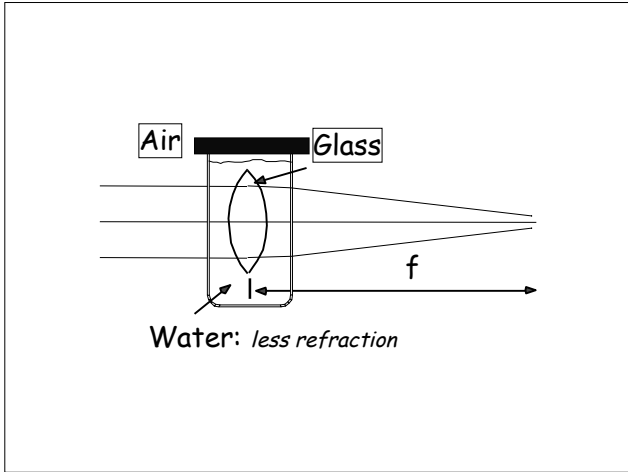
### Refractive index

### Lenses

$$\text{Diopters} = \frac{1}{f(\text{meters})}$$

### Convex lens: converging

### Concave lens: diverging



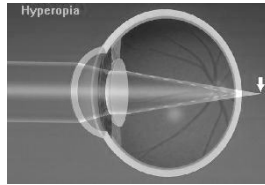
### Problems of Accomodation

- Hypermetropia (hyperopia)
  - farsightedness
  - > 45 years old: presbyopia
- Myopia
  - nearsightedness

1	K	H						
2	D	V	O					
3	H	V	C	R				
4	Z	H	V	D				
5	S	R	V	C	O			
6	H	O	C	R	D	S		
7	K	D	V	R	Z	C	O	S
8	V	A	N	Z	D	C	K	O
9	E	V	E	X	H	A	R	E

## Problems of accommodation

Farsightedness:  
Hypermetropia



Nearsightedness: Myopia



## Properties of Light

- Transparent & translucent media
  - absorption *...more for longer wavelength*
  - diffraction *...more for shorter wavelength*
  - refraction *...less for shorter wavelength*
- Opaque media
  - absorption & reflection