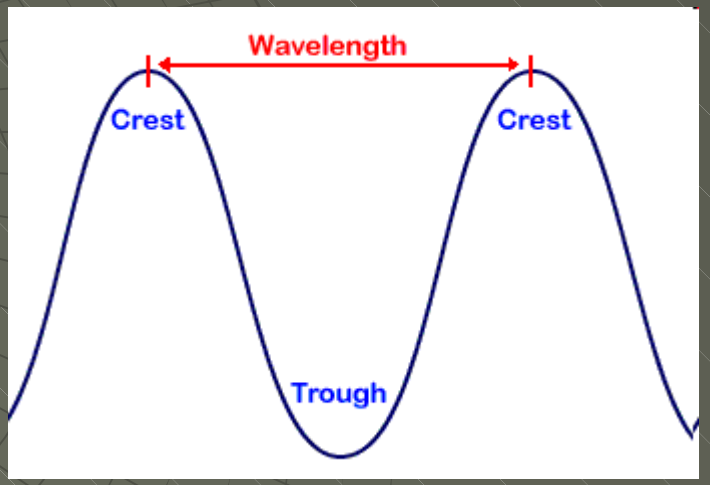
Light Waves

Electromagnetic waves

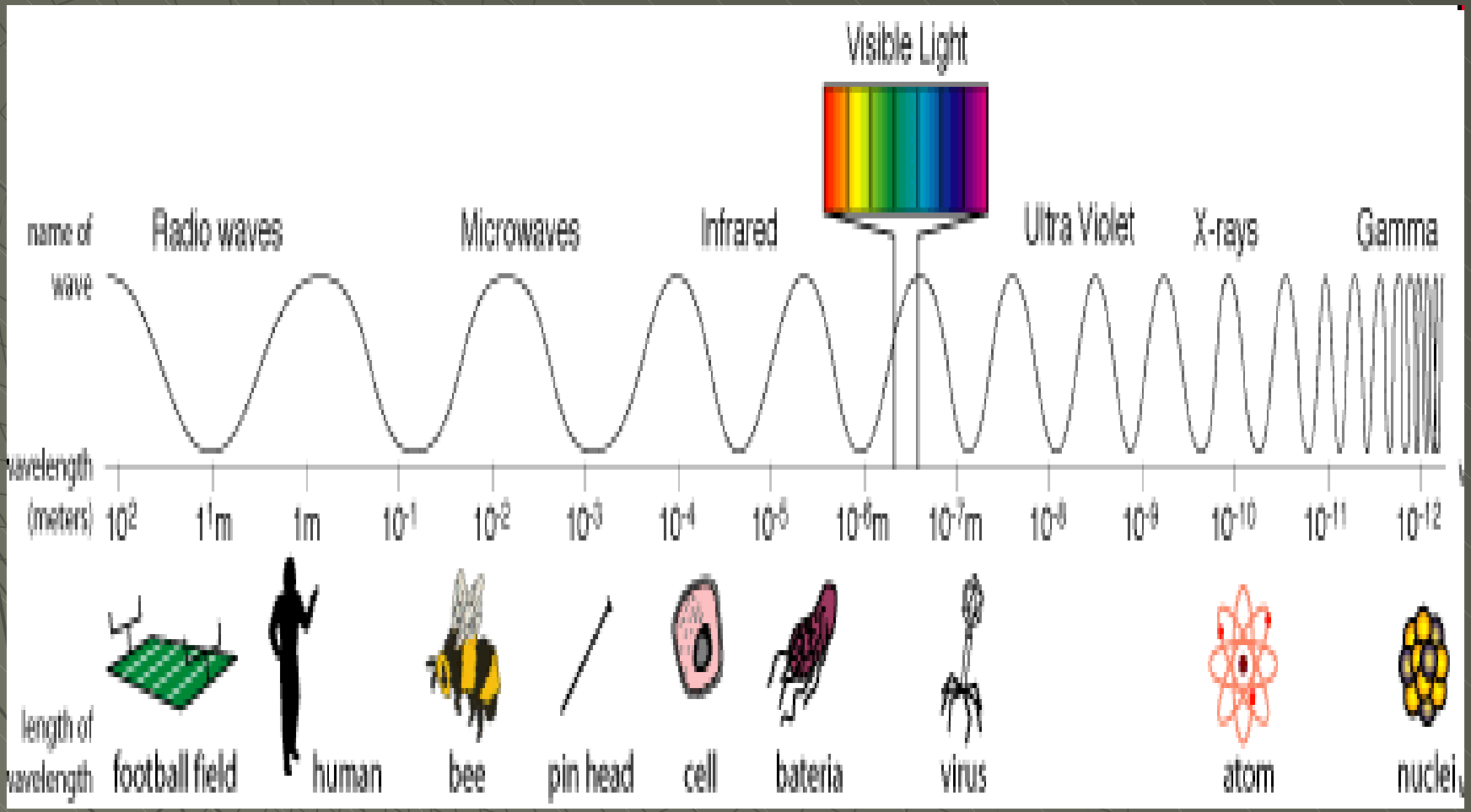
- are transverse waves
- Do not need a medium to travel
  - Can travel through space
  - Can travel in a vacuum



Electromagnetic Spectrum

- All the different types of electromagnetic waves
- They vary by wavelength
  - Therefore, they vary by frequency too

Electromagnetic Spectrum



Electromagnetic Spectrum

- Wave type in order from longest wavelength to shortest wavelength
  - Radio waves
  - Microwave
  - Infrared
  - Visible light
  - Ultra violet
  - X-rays
  - Gamma

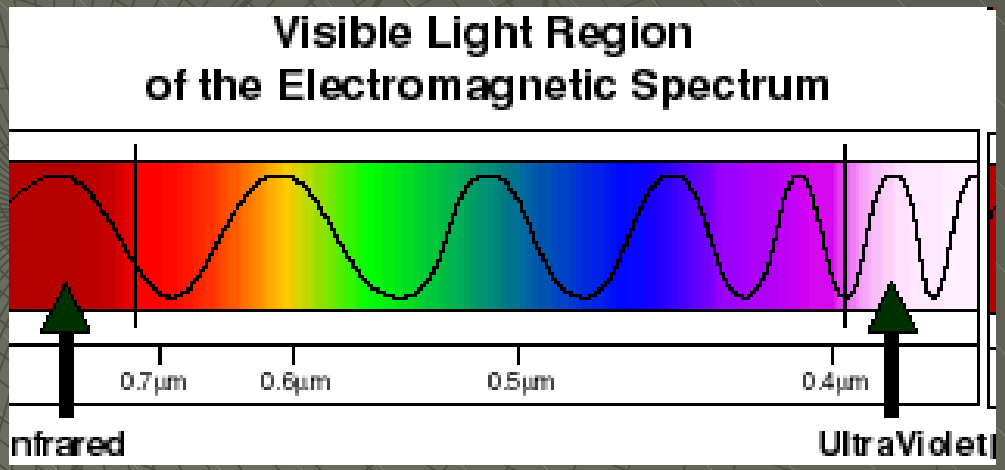
Electromagnetic Spectrum

- In order from lowest frequency to highest frequency
  - Radio waves
  - Microwaves
  - Infrared
  - Visible light
  - Ultra violet
  - X-rays
  - Gamma

Yes, this is the same order as the previous slide. Don't forget the longer the wavelength, the lower the frequency!

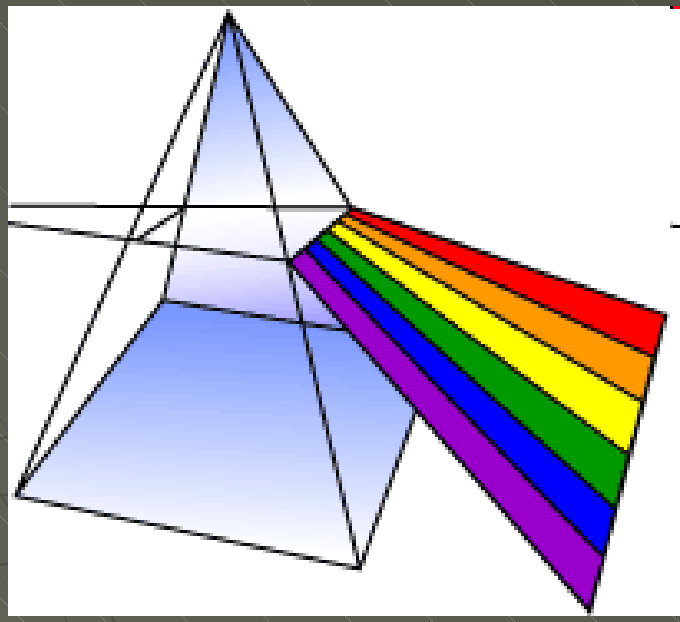
Visible Light

- The **only** electromagnetic waves we can see
- Each color has a different wavelength



Visible Light

- ROY G BiV
  - Red (longest wavelength)
  - Orange
  - Yellow
  - Green
  - Blue
  - Violet (shortest wavelength)



White Light

- All of the colors put together
- Can be broken up using a prism
- Nature breaks it up with water vapor creating a rainbow

Light Travels…..

- In a straight line until it reaches a new medium
- Faster than sound

Proof that light travels in a straight line……

- Laser pointers point where you aim them
- Making shadows

Light Sources

- Give off/produce/emit their own light
- Examples
  - Sun
  - Stars
  - Light bulbs
  - Televisions
  - Fire
  - Fire fly butts

Light Receivers

- Things we see because they are reflecting light
- Examples
  - Moon
  - Planets
  - Shoes
  - Books
  - Basketballs
  - Pencils
  - Trees
  - Eyes

Remember

- In order to "see" something, it must either emit or reflect light!!!!
- Definition of ***emit:*** to throw or give off or out (as light or heat)

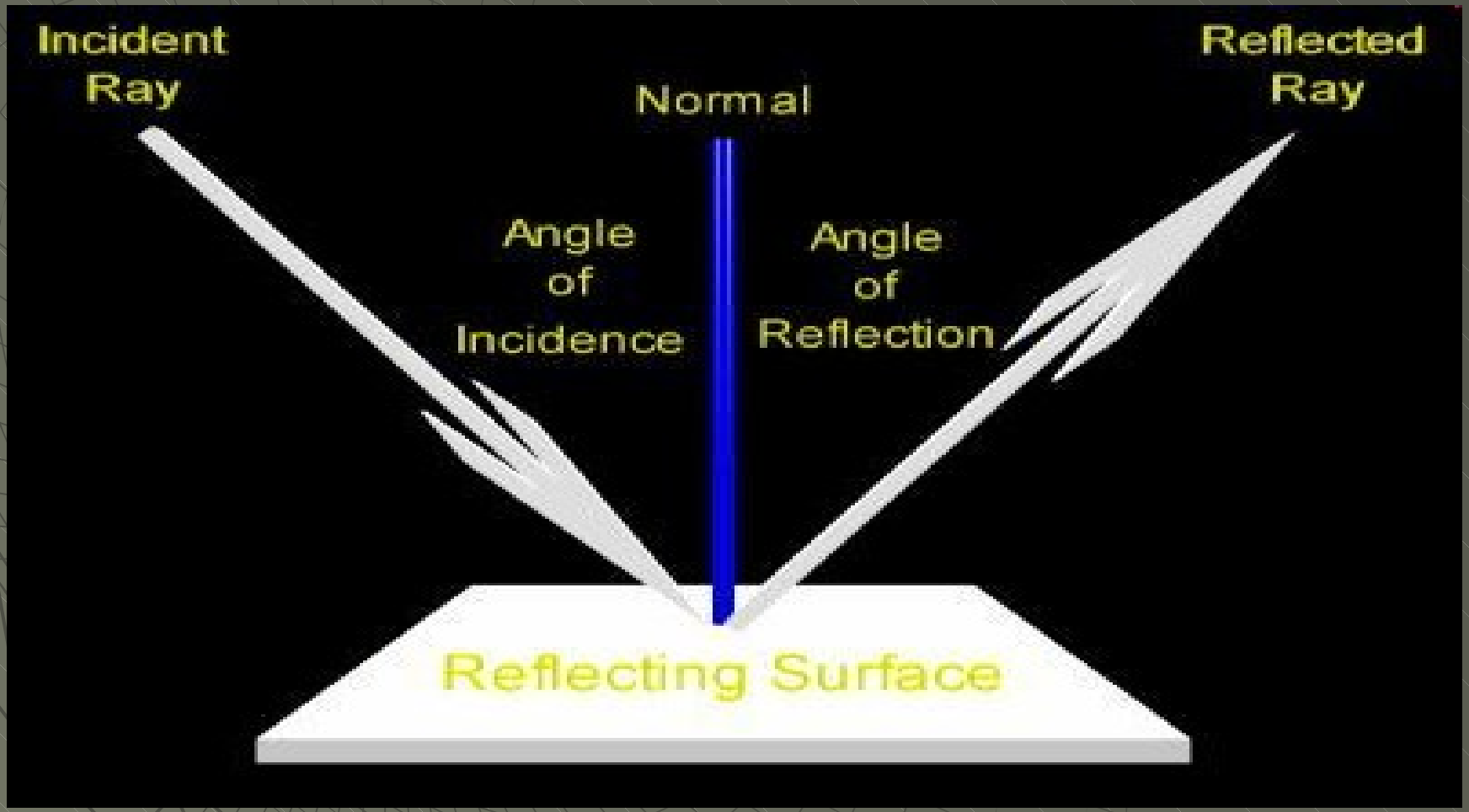
The Sun

- Is the source of almost all of the energy used on Earth
- 3 of the types of energy we get from the sun are
  - Visible light
  - Infrared radiation
  - Ultraviolet radiation

Reflection

- Light “bounces off” ie. reflects off different surfaces
- Light that hits a flat and smooth surface at a 15 degree angle will bounce off at a 15 degree angle

Light Hitting a Flat/smooth surface



Light hitting a concave mirror

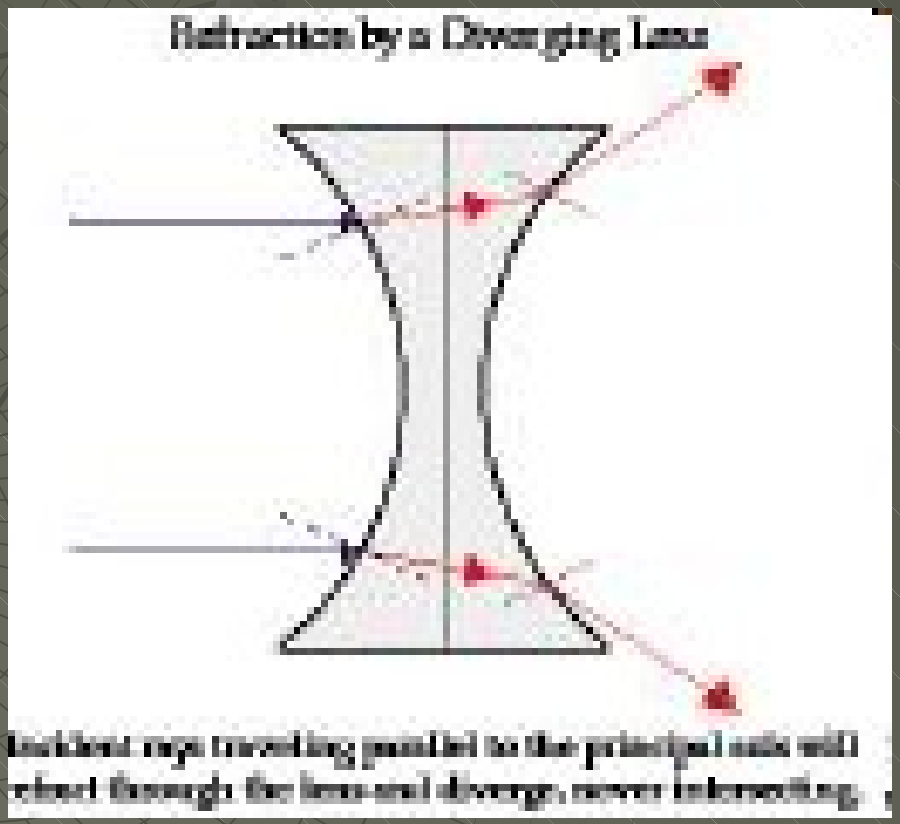
- Like the inside of a spoon
- Light waves will change directions and cross each other causing your image to appear upside down in the spoon
- If you get real close to mirror, the image will appear right side up.

Light hitting a convex mirror

- Like the outside of a spoon
- Your image will appear right side up and small
- Useful for security purposes

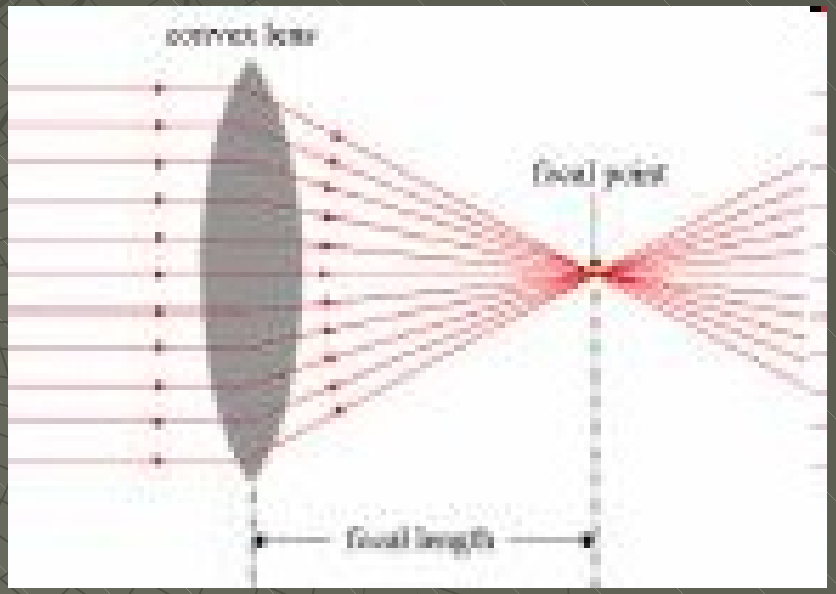
Concave Lenses

- Make thing appear small and further away

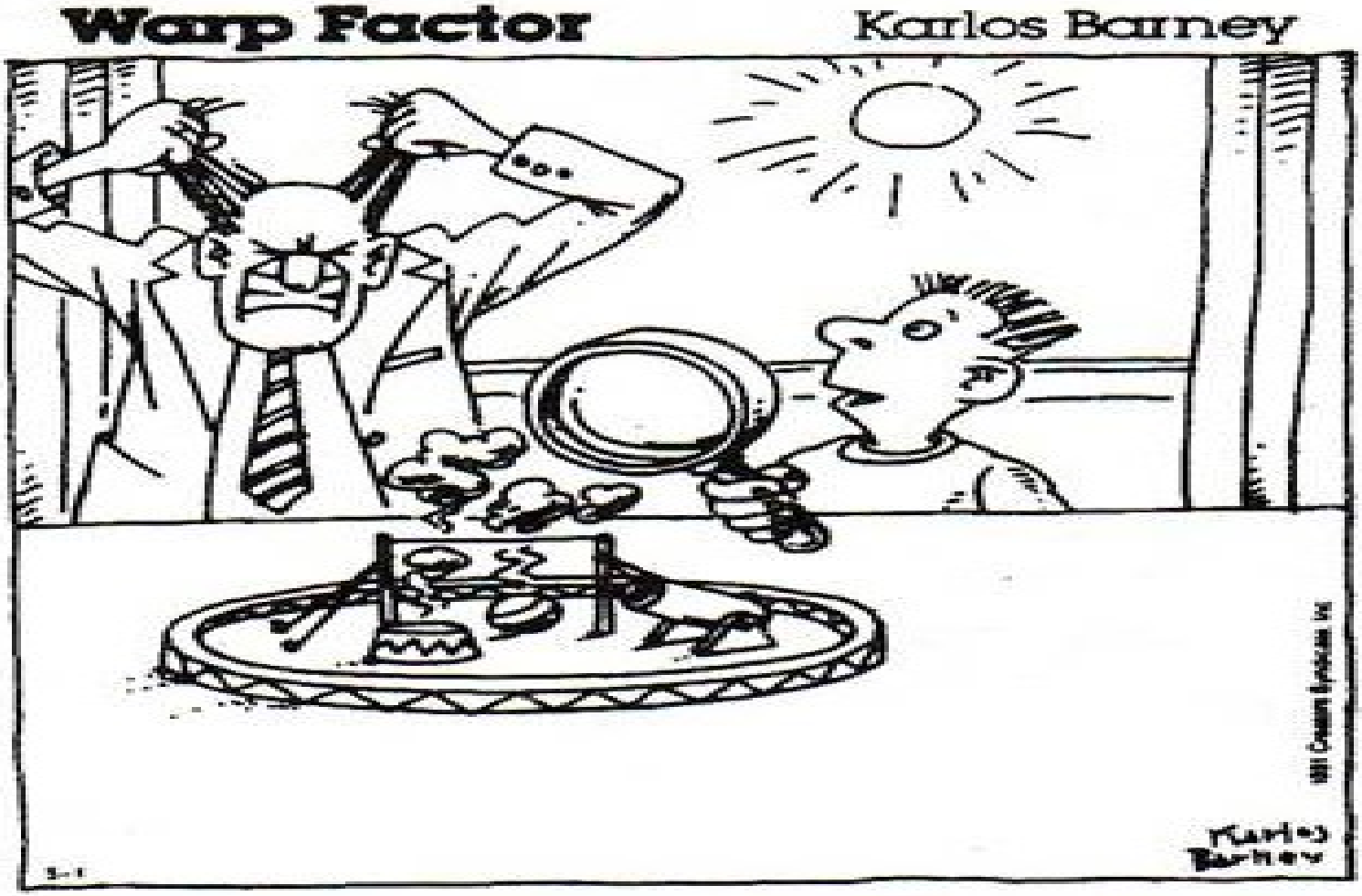


Convex Lenses

- Make things appear bigger
- Can flip the image if used from a further distance



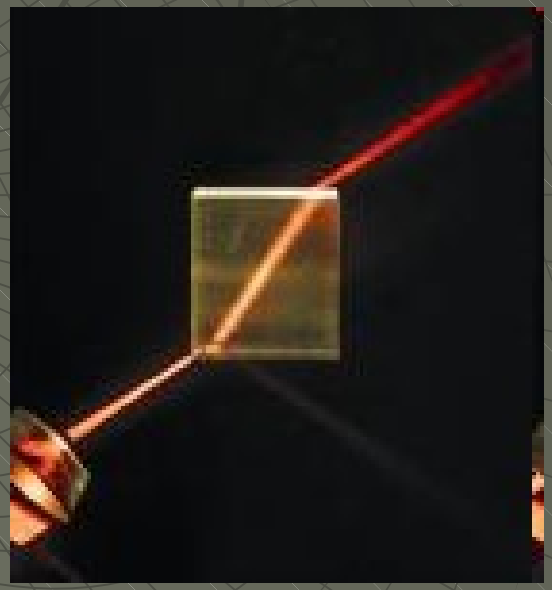
Joke of the day ☺



"Gosh, professor, I was watching your flea circus when 'POOF' they all just sorta went up in smoke."

Refraction

- When light passes through a new medium (substance) it will bend.
- This is why items in water appear to be in slightly different locations than they truly are



Transparent VS Translucent

- Transparent: matter that allows light to pass through with little interference. Allows you to clearly see the object
- Translucent: matter that transmits light, but does not transmit an image. Does not allow you to see a clear image. Image is blurry.

Transparent

- Cellophane (Saran wrap)
- Regular windows
- Clear plastic

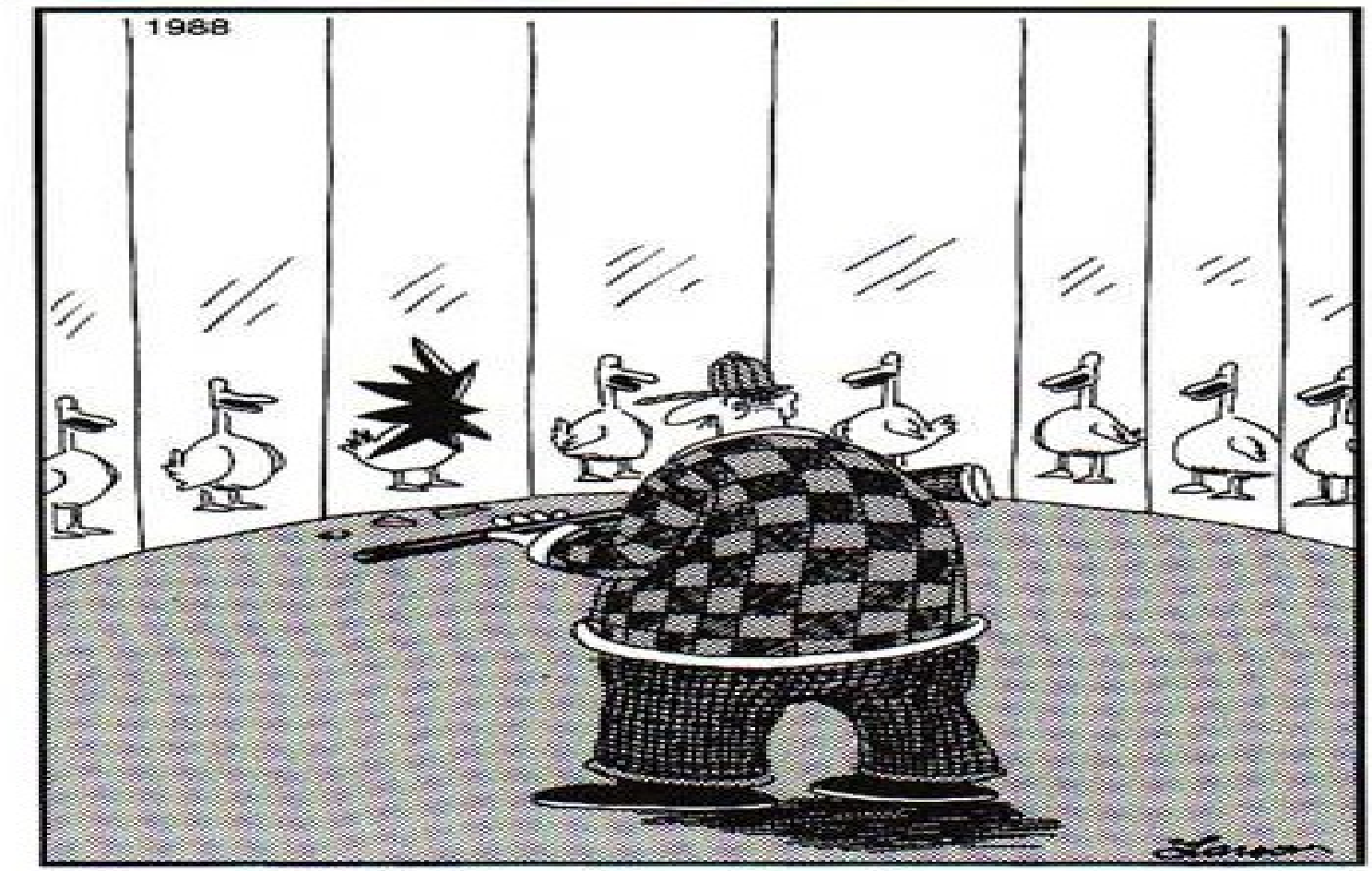
Translucent

- Waxed paper
- Frosted glass

What is this picture showing an example of?

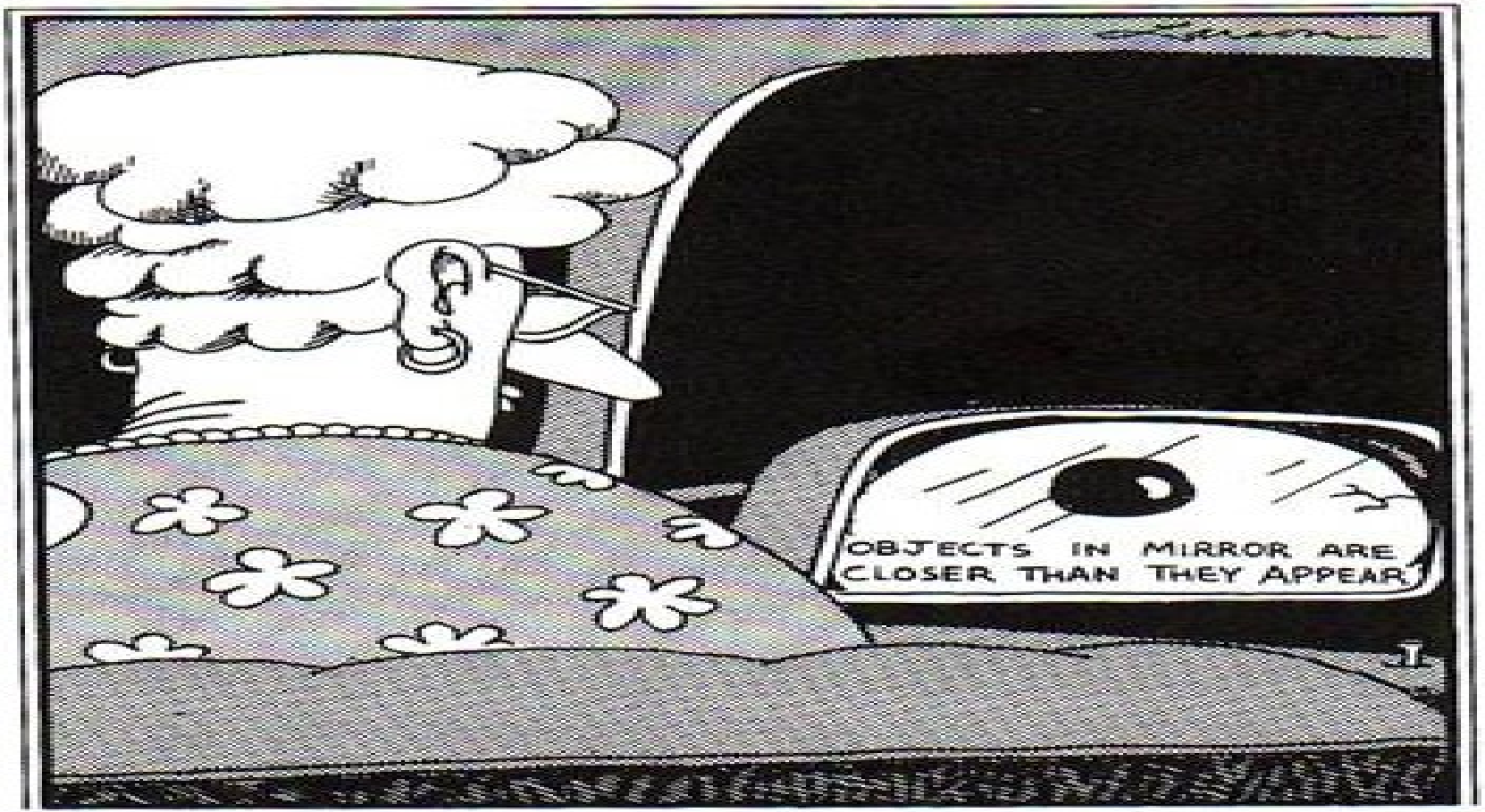
- If you said refraction, you are correct!

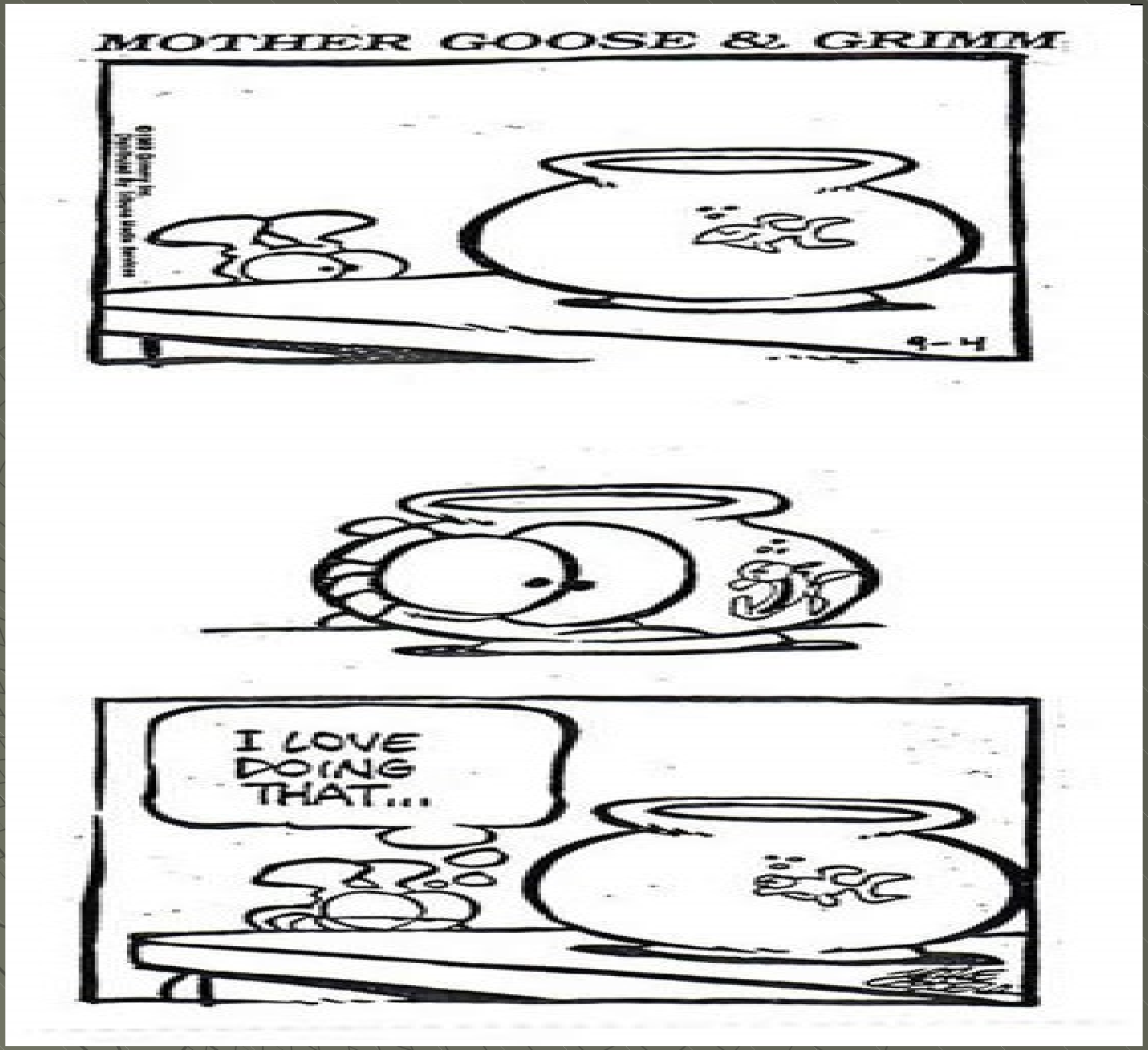
A Far Side Comic



"Ah, yes, Mr. Frischberg, I thought you'd come . . . but which of us is the *real* duck, Mr. Frischberg, and not just an illusion?"

Another Far Side




MOTHER GOOSE & GRIMM
9-4
I LOVE DOING THAT...