WAVES

LET'S BEGIN!

A long time ago in a galaxy far, far away....

POW

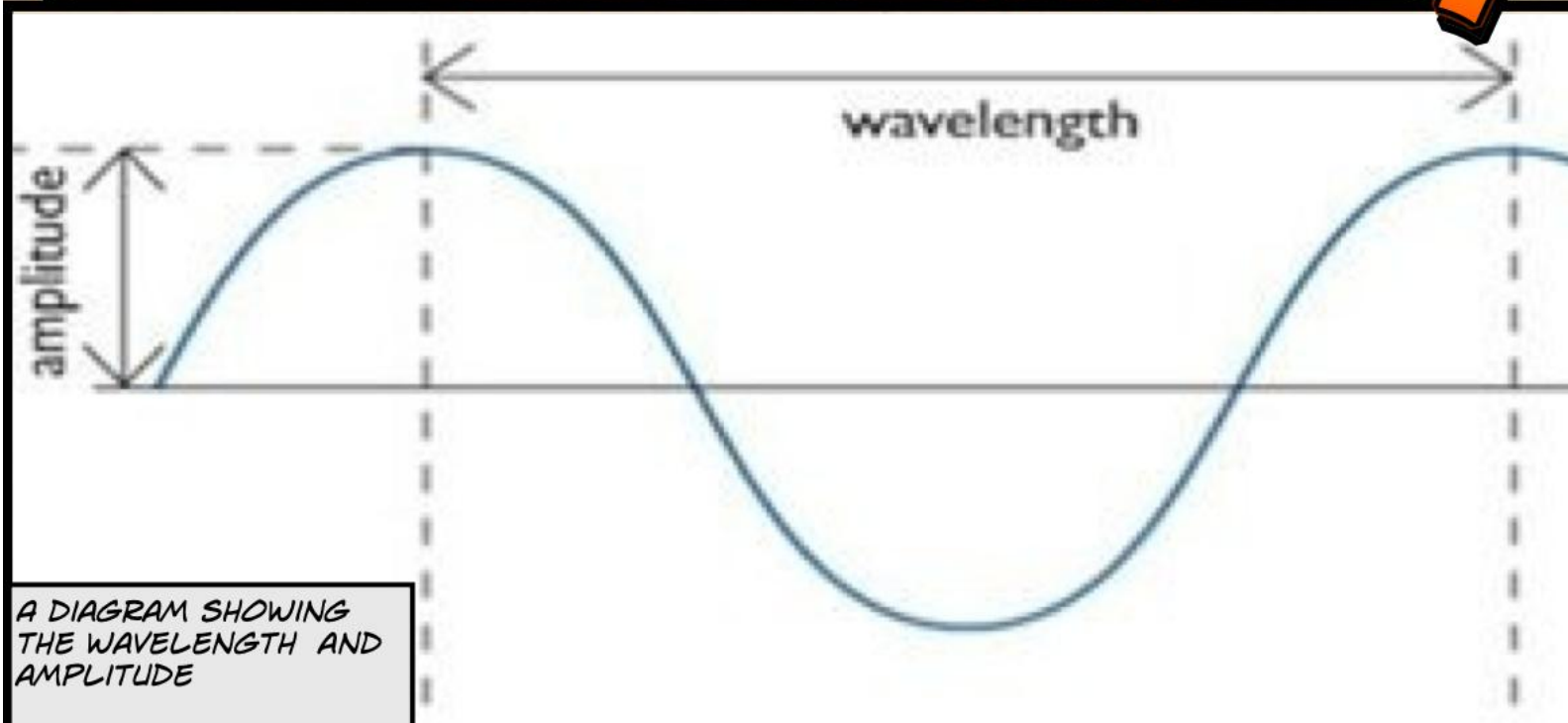
THERE ARE TWO TYPES OF WAVES YOU SEE.

TRANVERSE : THE PARTICLES MOVE AT RIGHT ANGLES TO THE DIRECTION OF THE WAVE, (EG LIGHT).
LONGITUDINAL: THE PARTICLES MOVE ALONG THE DIRECTION OF THE WAVE, (EG SOUND).

AMPLITUDE: THE MAXIMUM DISTANCE OF THE PARTICLE, FROM ITS RESTING POSITION.

WAVELENGTH: THE DISTANCE BETWEEN TWO CORRESPONDING POINTS, IN TWO CONSECUTIVE WAVES.

BOOM!



A DIAGRAM SHOWING THE WAVELENGTH AND AMPLITUDE

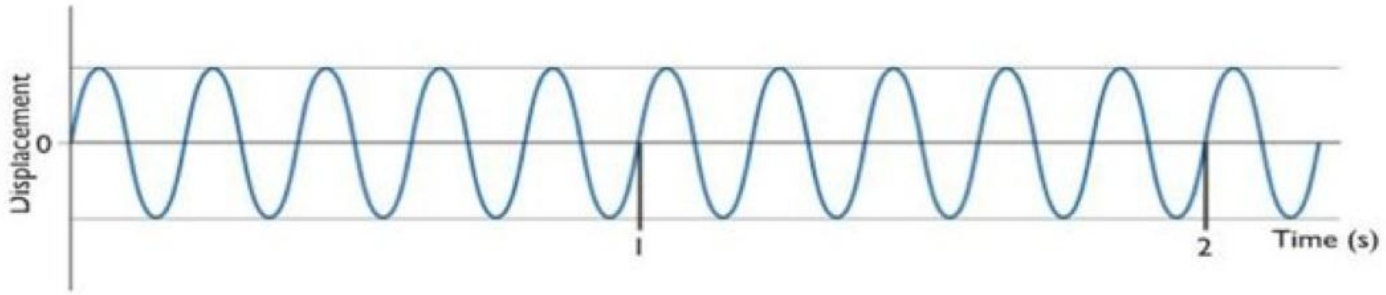
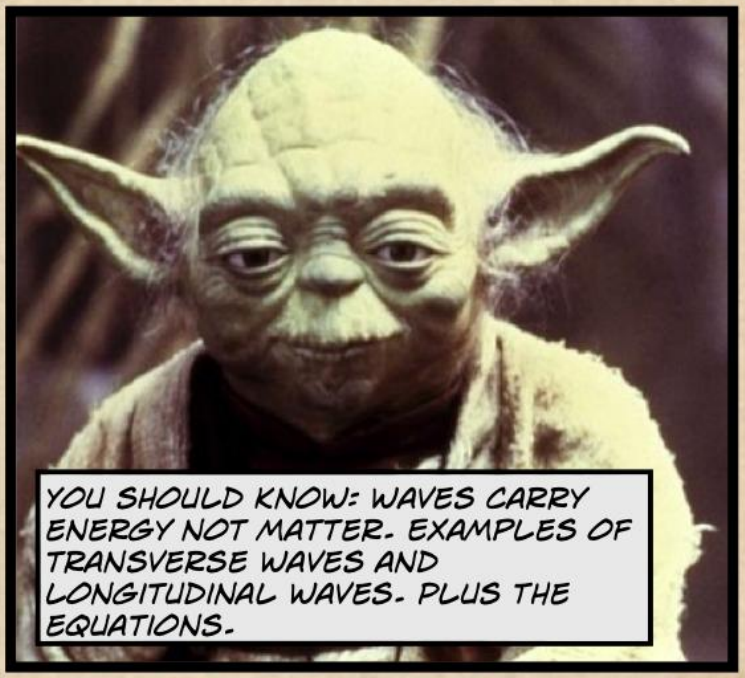


Figure 11.7 This graph shows a wave with a frequency of 5 Hz.

GREATFUL TO THE VLE YOUNG PADAWANS

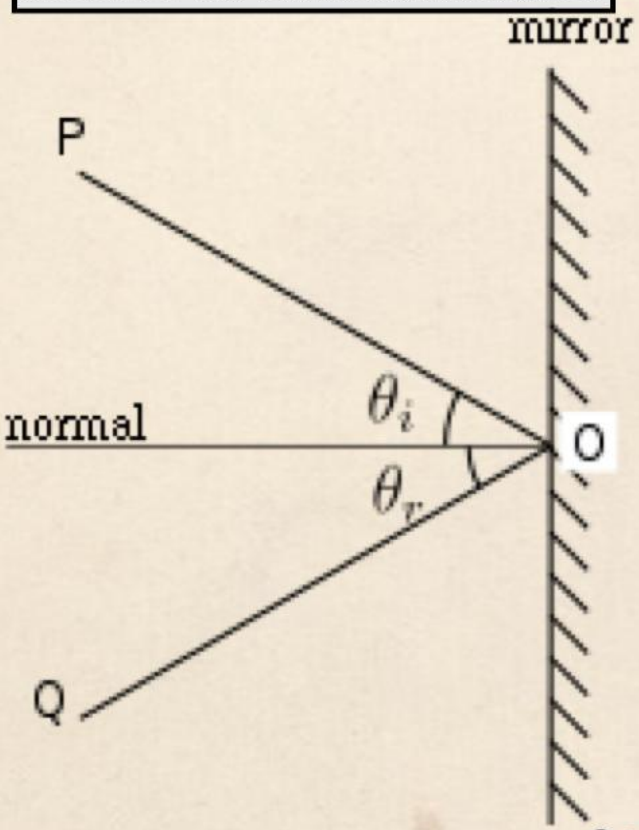
YOU CAN CALCULATE THE PERIOD OF THE WAVE BY THIS EQUATION YOU SHALL. PERIOD= 1/FREQUENCY

ANOTHER EQUATION FOR WAVE SPEED: WAVES SPEED = FREQUENCY X WAVELENGTH. UNDERSTAND YOU WILL!

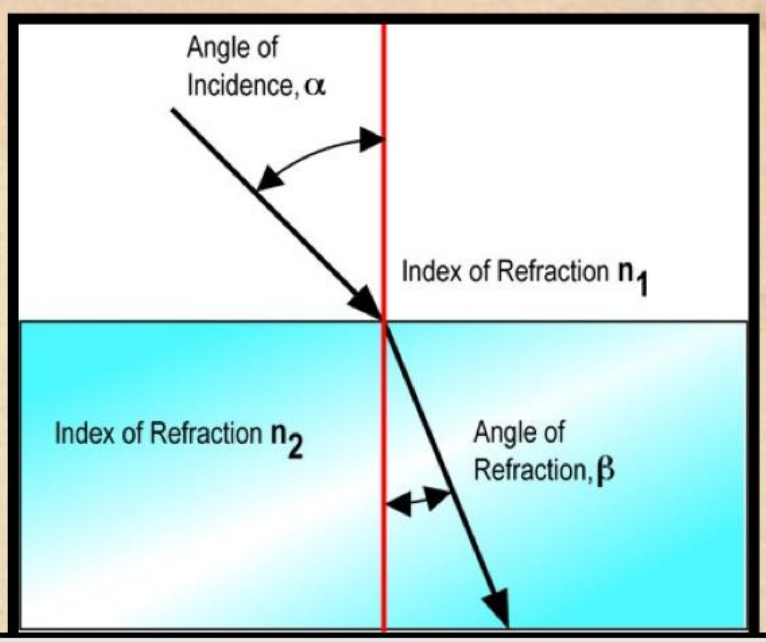


YOU SHOULD KNOW: WAVES CARRY ENERGY NOT MATTER. EXAMPLES OF TRANSVERSE WAVES AND LONGITUDINAL WAVES. PLUS THE EQUATIONS.

TO REFLECTION(ALL WAVES REFLECT,REFRACT AND DIFFRACT). OCCURS WHEN WAVES STRIKE AN OPAQUE SURFACE. WE KNOW THAT THE ANGLE OF INCIDENCE AND THE ANGLE OF REFLECTION ARE EQUAL.



SHOW BY THIS DIAGRAM, SHOWING THE ANGLE OF INCIDENCE AND ANGLE OF REFLECTION PLUS THE NORMAL.



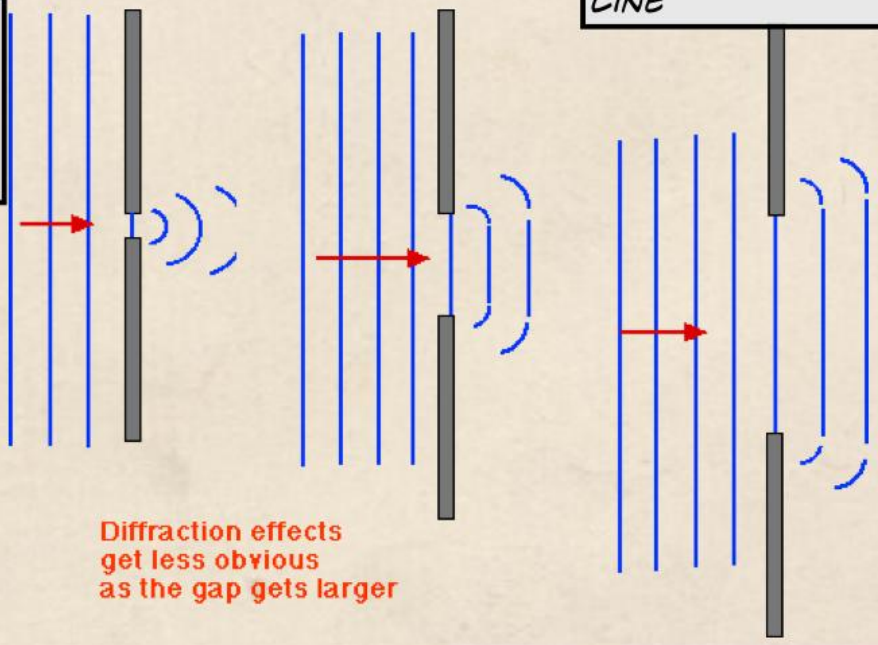
REFRACTION! WHEN WAVES MOVE FROM ONE MEDIUM TO ANOTHER. WHEN TRAVELLING FROM A LESS DENSE TO A MORE DENSE MEDIUM, THE RAY MOVES TOWARDS THE NORMAL. WHEN MOVING FROM A MORE DENSE TO A LESS DENSE MEDIUM THE RAY MOVES AWAY FROM THE NORMAL. THIS OCCURS DUE TO THE WAVELENGTH BECOMES SHORTER AND THE FREQUENCY IS UNALTERED.

ANGLE OF INCIDENCE : ANGLE OF REFLECTION

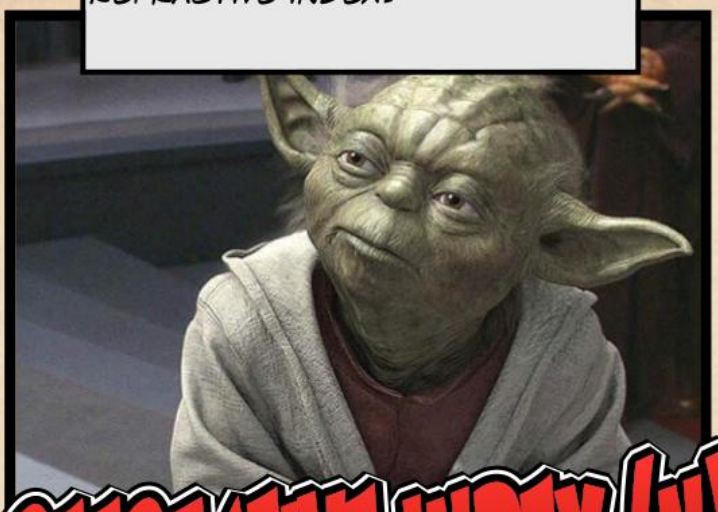
WAVES WILL THEN TRAVEL DIFFERENTLY AND NOT IN A STRAIGHT LINE

DIFFRACTION! WAVES MOVE DUE THE OBSATCLE IN FRONT OF THEM. THE LARGER THE GAP THE WAVES WILL MOSTLY PASS THROUGH IN A STRAIGHT LINE

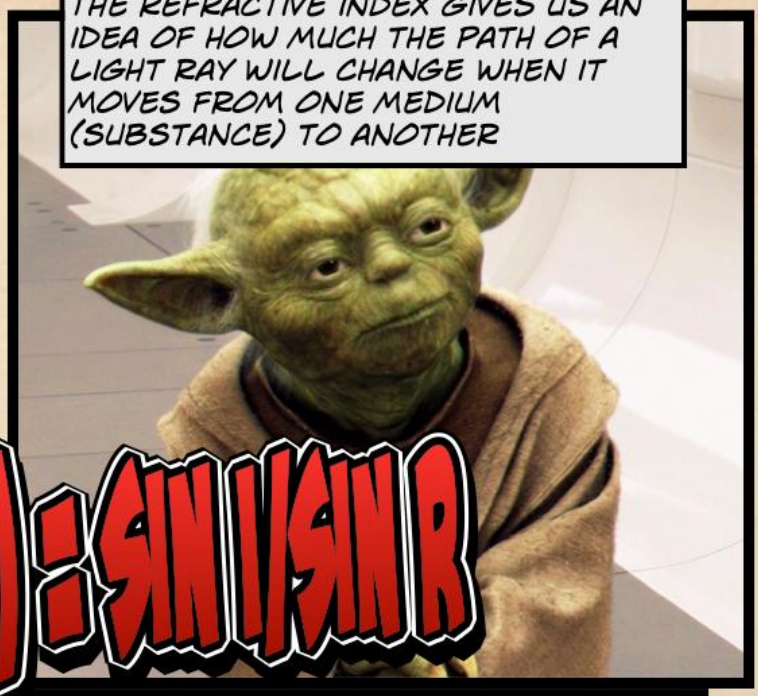
SIZE OF THE GAP IS ADJUSTED UNTIL IT IS EQUAL TO THE WAVELENGTH OF THE WAVE, THEN THE WAVES BEHAVE DIFFERENTLY



REFRACTIVE INDEX!

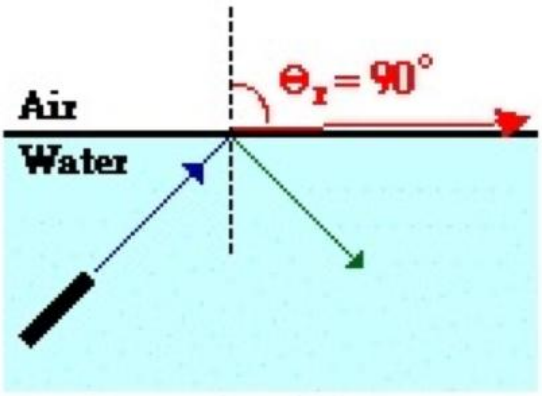


THE REFRACTIVE INDEX GIVES US AN IDEA OF HOW MUCH THE PATH OF A LIGHT RAY WILL CHANGE WHEN IT MOVES FROM ONE MEDIUM (SUBSTANCE) TO ANOTHER



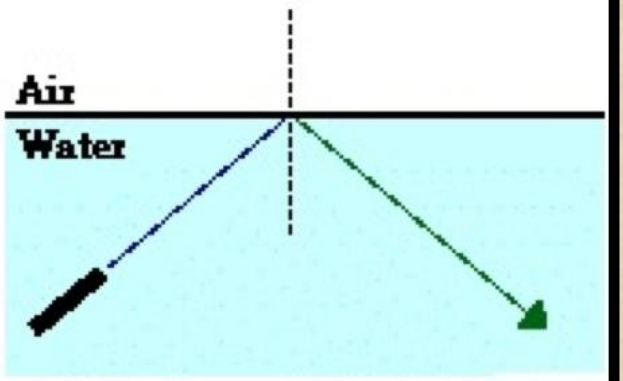
REFRACTIVE INDEX (N) : SIN I/SIN R

Reflection and Refraction



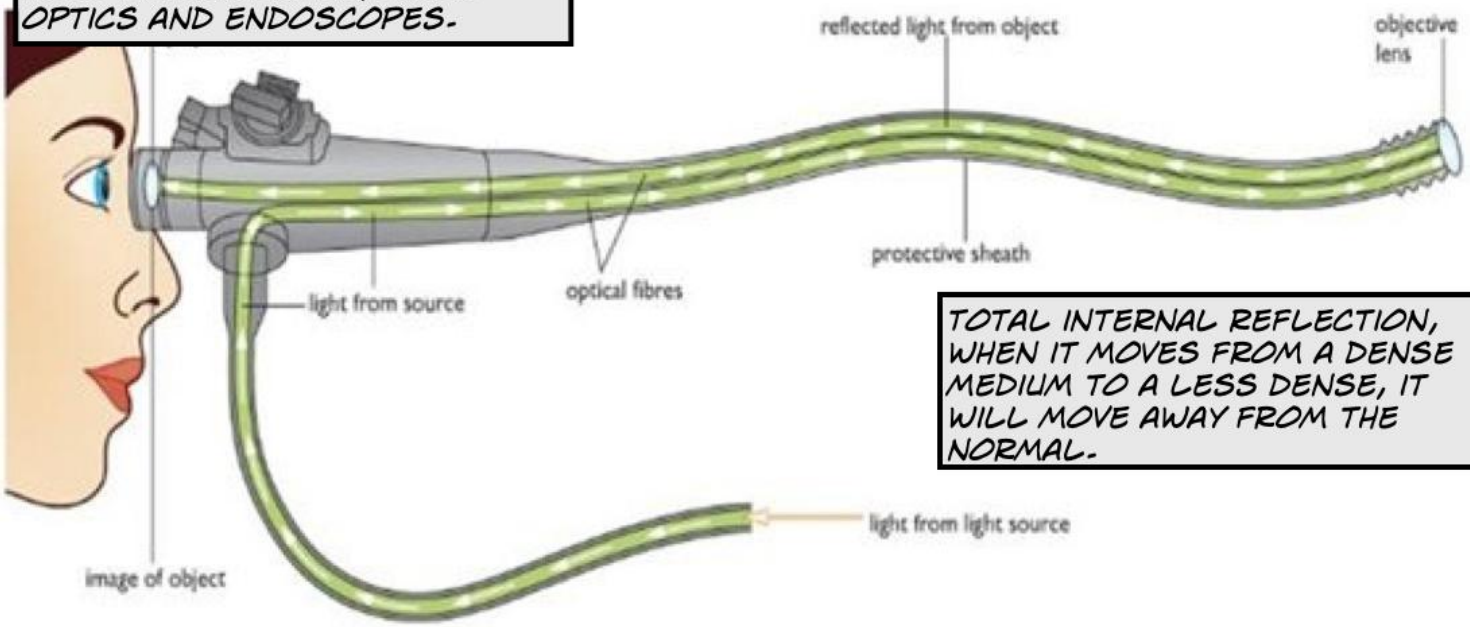
When the angle of incidence equal the critical angle, the angle of refraction is 90-degrees.

Total Internal Reflection



When the angle of incidence is greater than the critical angle, all the light undergoes reflection.

USES OF TIR
USED IN PERISCOPES, FIBRE OPTICS AND ENDOSCOPES.



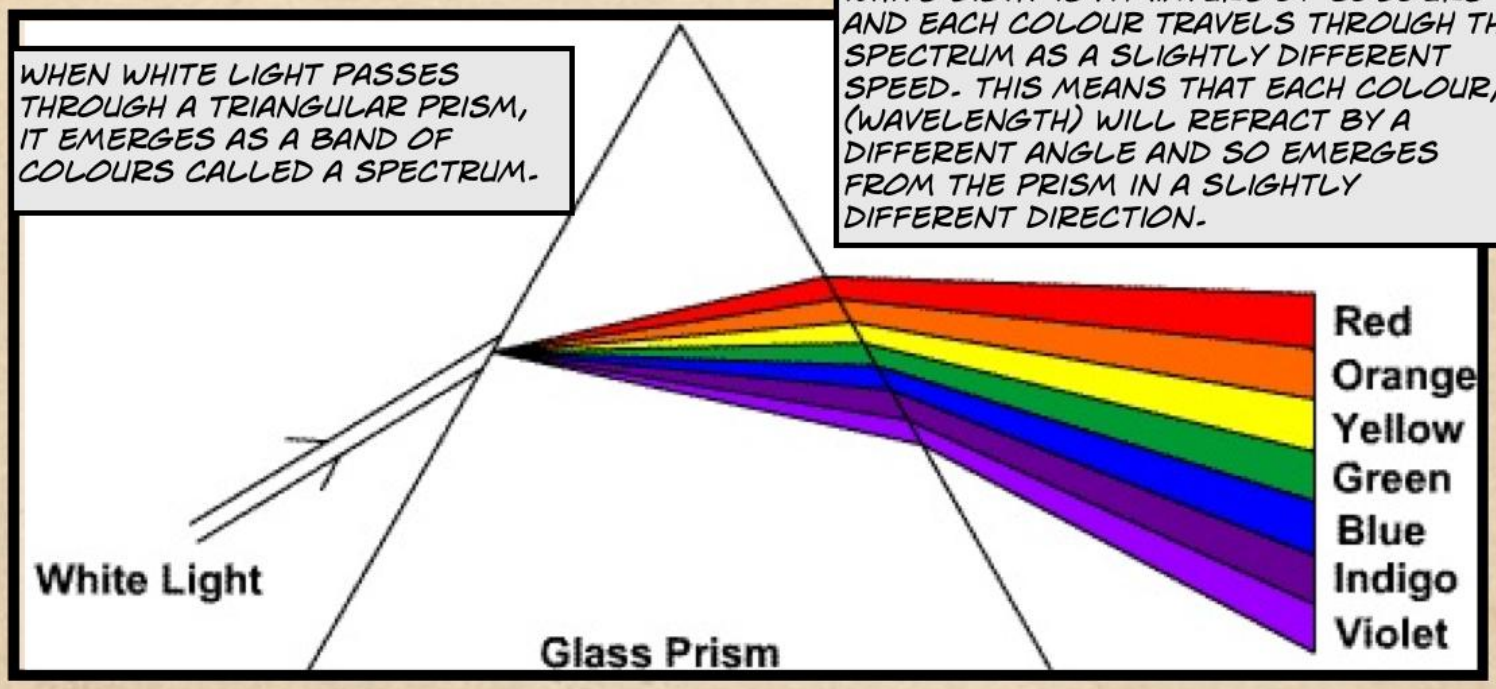
TOTAL INTERNAL REFLECTION, WHEN IT MOVES FROM A DENSE MEDIUM TO A LESS DENSE, IT WILL MOVE AWAY FROM THE NORMAL.

TIME IT IS FOR DISPERSION IT IS!

Colourful it is!

WHEN WHITE LIGHT PASSES THROUGH A TRIANGULAR PRISM, IT EMERGES AS A BAND OF COLOURS CALLED A SPECTRUM.

WHITE LIGHT IS A MIXTURE OF COLOURS AND EACH COLOUR TRAVELS THROUGH THE SPECTRUM AS A SLIGHTLY DIFFERENT SPEED. THIS MEANS THAT EACH COLOUR, (WAVELENGTH) WILL REFRACT BY A DIFFERENT ANGLE AND SO EMERGES FROM THE PRISM IN A SLIGHTLY DIFFERENT DIRECTION.



NOW TO A DIFFICULT TOPIC YOU SEE BUT WE CAN MASTER IT YOU SEE!

BEGIN WE SHALL, PREVAIL WE WILL!

long wavelength, low frequency

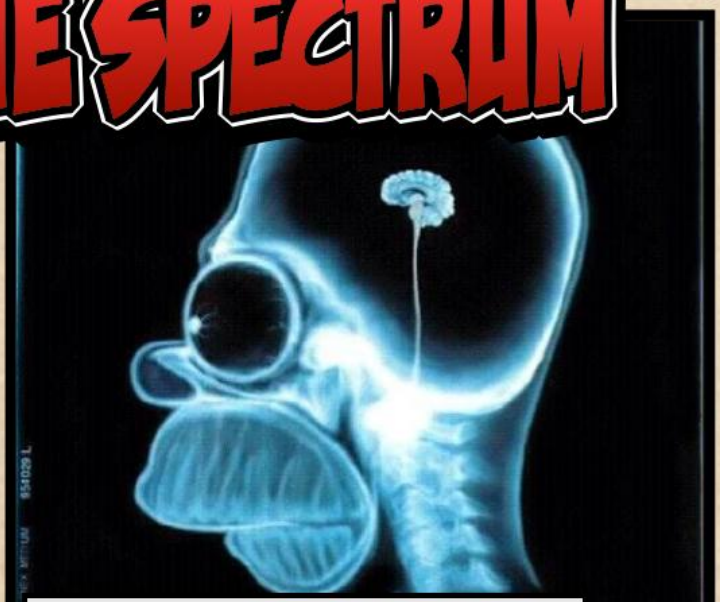
ELECTROMAGNETIC SPECTRUM! YOU WILL LEARN YOU SHALL. THEY HAVE THESE PROPERTIES:
THEY ALL TRANSFER ENERGY
THEY ARE ALL TRANSVERSE WAVES
THEY ALL TRAVEL AT THE SPEED OF LIGHT
THEY CAM BE REFLECTED, REFRACTED AND DIFFRACTED.

short wavelength, high frequency

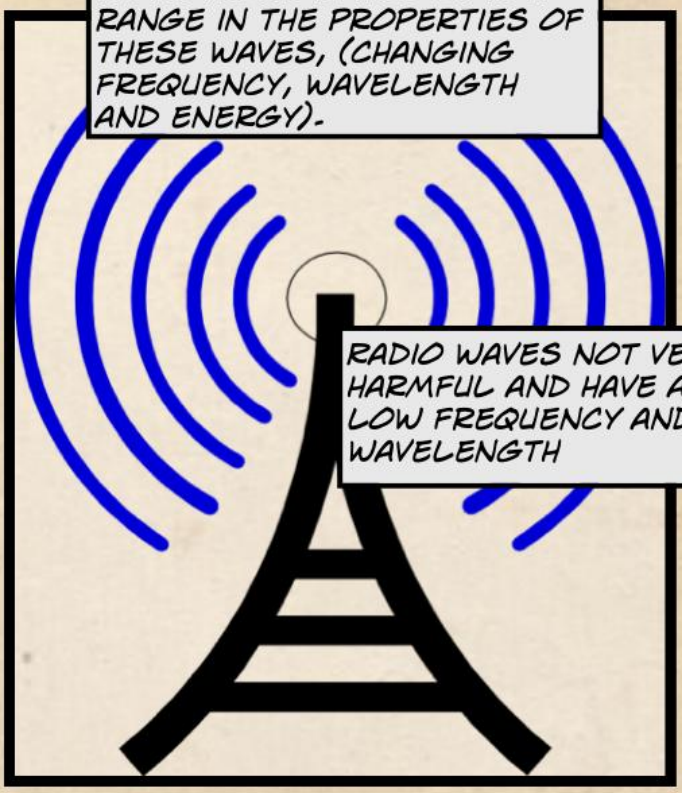
Radio waves
Microwaves
Infra-red
Visible Light
Ultra-violet
X-rays
Gamma rays

THE SPECTRUM

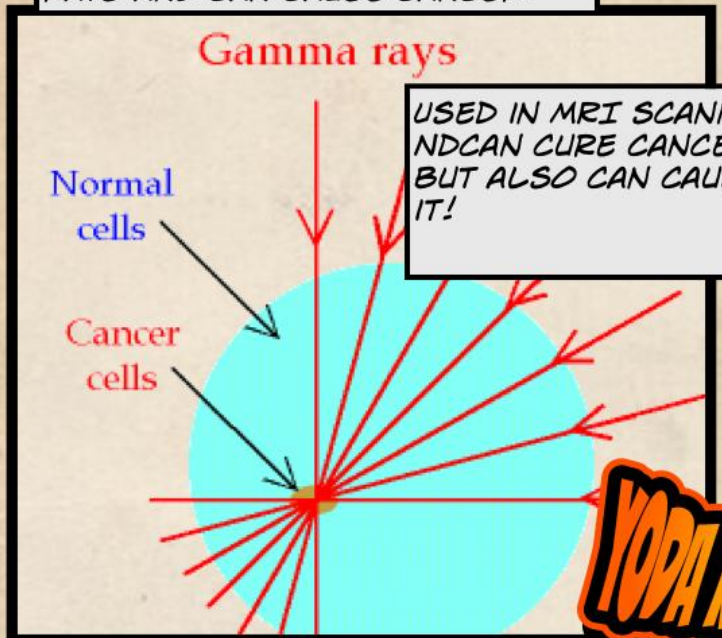
IT IS MADE UP OF TRANSVERSE WAVES. IT IS A RANGE IN THE PROPERTIES OF THESE WAVES, (CHANGING FREQUENCY, WAVELENGTH AND ENERGY).



X-RAYS, USED TO SEE OUR BONES AND CAN BE DANGEROUS WITH LOTS OF EXPOSURE TO THE RAYS AND CAN CAUSE CANCER.



RADIO WAVES NOT VERY HARMFUL AND HAVE A LOW FREQUENCY AND WAVELENGTH



USED IN MRI SCANNERS NDCAN CURE CANCER BUT ALSO CAN CAUSE IT!

INFRA RED WAVES MAINLY USED FOR HEATING(SUN) AND CAN CAUSE SERIOUS BURNS.

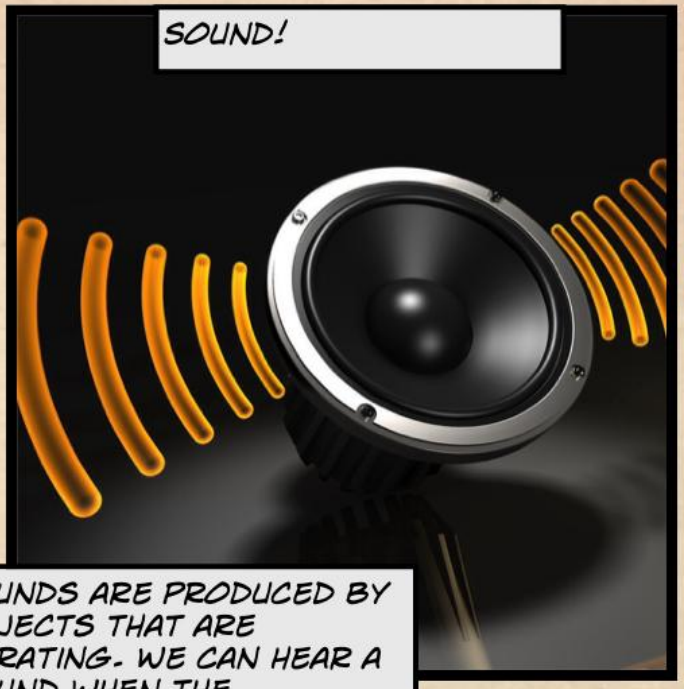
YODA KNOWS BEST

NEARLY FINISHED IT IS PATIENCE YOU MUST HAVE.

CALM YOU SHALL KEEP AND CARRY ON YOU MUST

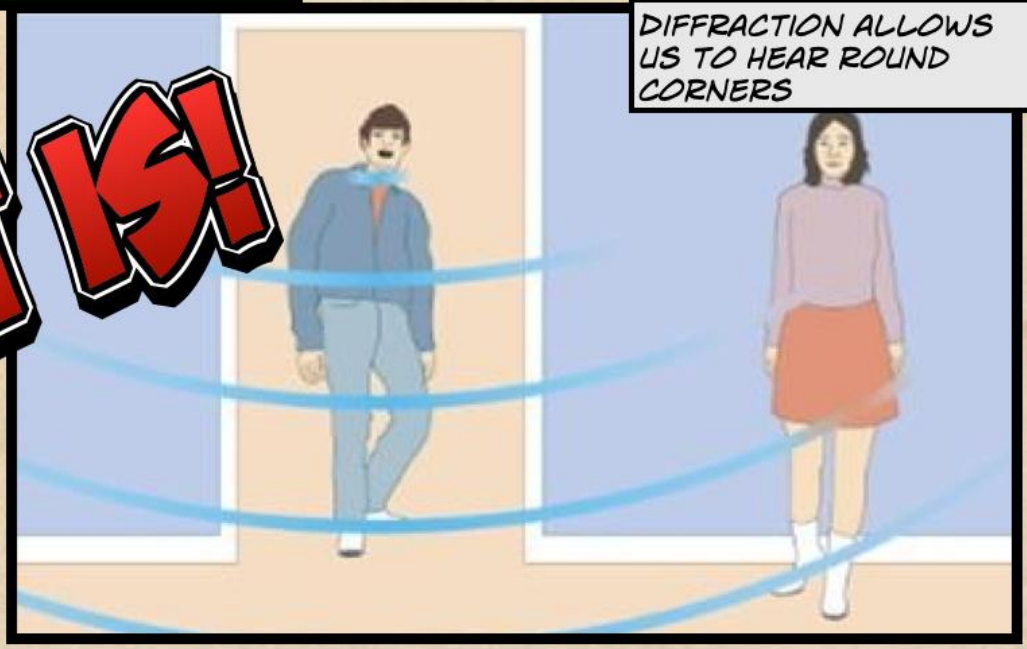
YES, HMMMM

SOUND!



SOUNDS ARE PRODUCED BY OBJECTS THAT ARE VIBRATING. WE CAN HEAR A SOUND WHEN THE VIBRATIONS, TRAVELLING AS SOUND WAVES REACH OUR EARS.

EASY IT IS!



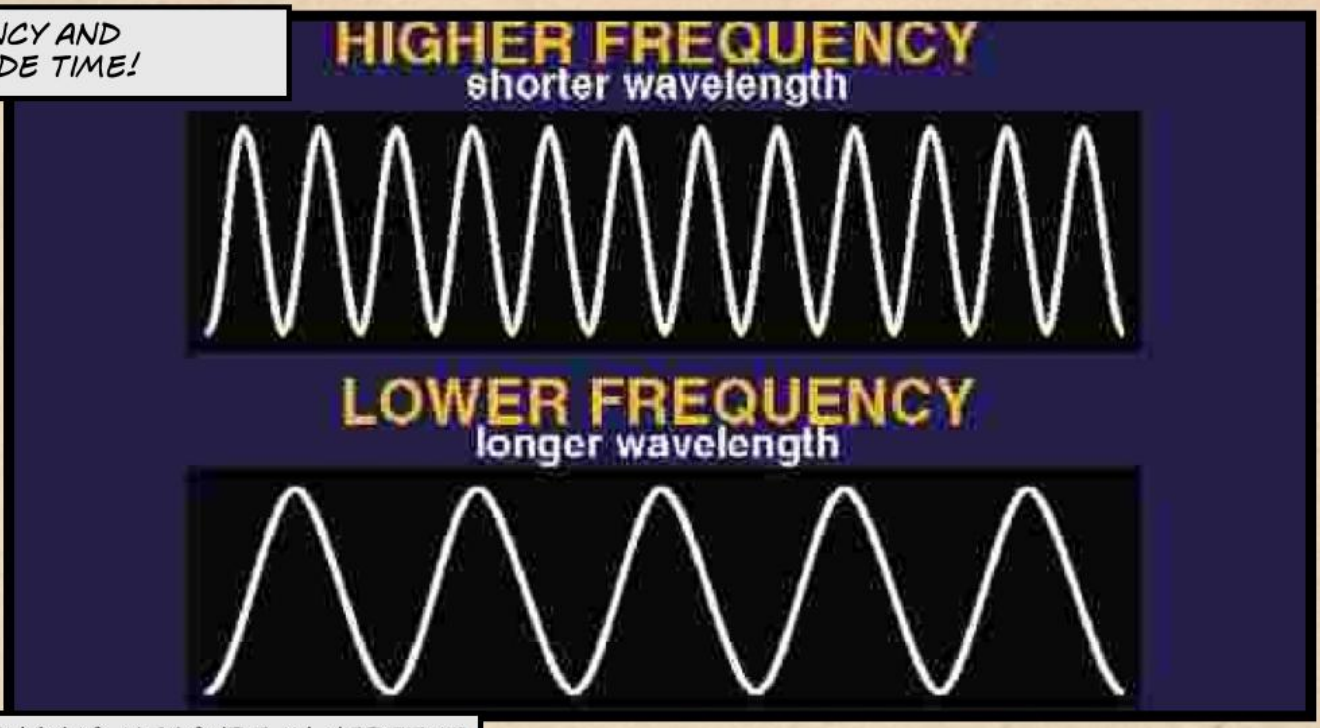
DIFFRACTION ALLOWS US TO HEAR ROUND CORNERS

AWESOME WE ARE CARRY ON WE WILL!

AWESOMENESS

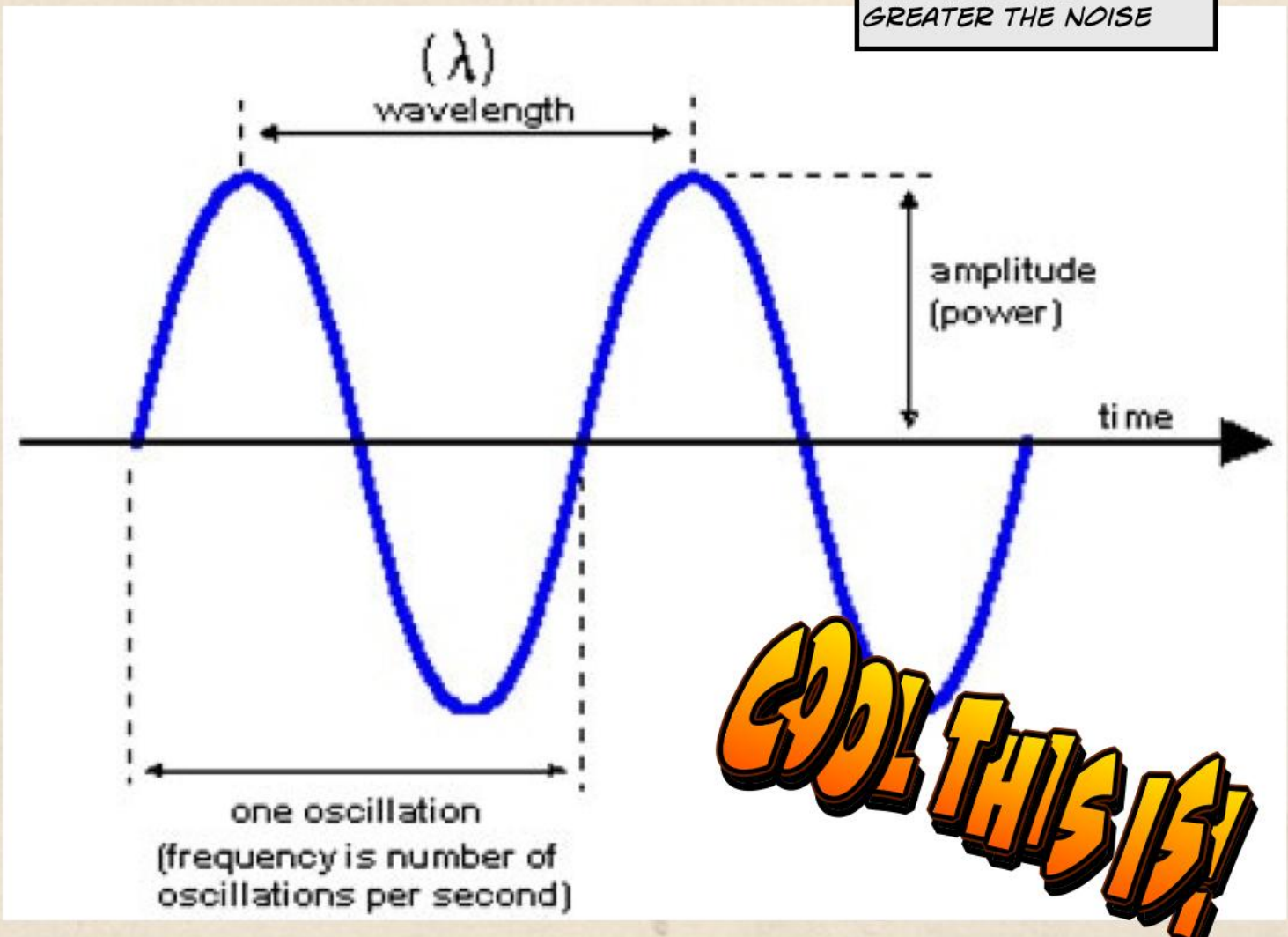
WHEN I GET SAD, I STOP BEING SAD AND BE AWESOME AGAIN. TRUE STORY

FREQUENCY AND AMPLITUDE TIME!

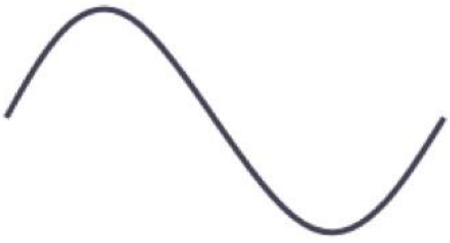


FREQUENCY IS MEASURE IN HERTZ IT IS AND IS THE NUMBER OF COMPLETE VIBRATIONS IT MAKES EACH SECOND

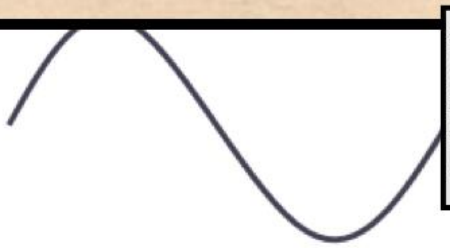
THE GREATER THE AMPLITUDE THE GREATER THE NOISE



NEARLY FINISHED WE ARE! ANOLOGUE AND DIGITAL

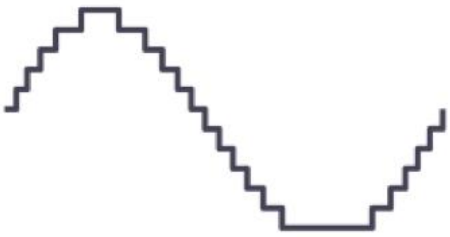


ORIGINAL SOUND WAVE



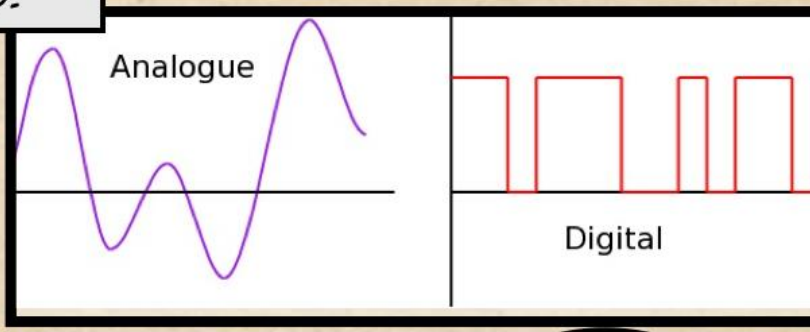
ANALOG SOUND WAVE

SIGNALS CAN BE EITHER ANALOGUE OR DIGITAL TO COMMUNICATE OVER LONG DISTANCES



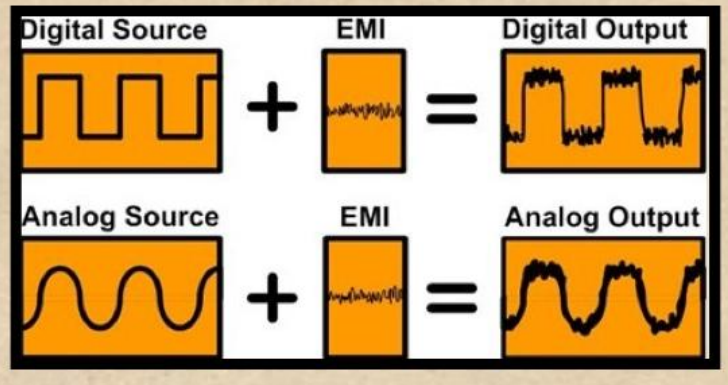
DIGITAL SOUND WAVE

THE FUNDAMENTAL DIFFERENCE BETWEEN THE TWO IS:
ANALOGUE SIGNALS CAN TAKE ANY VALUE WITHIN A CERTAIN RANGE - THE AMPLITUDE AND FREQUENCY OF THE SIGNAL CAN VARY CONTINUOUSLY.
DIGITAL SIGNALS CAN ONLY TAKE TWO VALUES: ON OR OFF, SOMETIMES REFERRED TO AS 1 AND 0.



WHENEVER YOU AMPLIFY AN ANALOGUE SIGNAL, THE NOISE IS AMPLIFIED AS WELL SO THE SIGNAL WILL LOSE QUALITY EVERY TIME THIS HAPPENS. HOWEVER, WITH A DIGITAL SIGNAL, THE NOISE CAN BE IGNORED SO THE SIGNAL REMAINS HIGH QUALITY AT THE RECEIVER.

THIS DIAGRAM SHOWS THE DIFFERENCES BETWEEN THE TWO. THE SIGNAL CAN BE INTERRUPTED BY OTHER SOUNDS AND INTERFERENCE




UNDERSTAND YOU. USE TO SURVIVE MR EASTMENTS WRATH YOU CAN.


MAY THE FORCE BE WITH YOU MY YOUNG APPRENTICE