16 Oct '24

→ HW on Mayamalava Gowla & Mohana raagams in different scales

→ Sound wave:

A wave is a disturbance that is moving forwards & backwards in a systematic way.

Eg: (1) Waves in water — when you drop a stone in a still (not moving) pond. If you place paper boat on top of the waves, the boat will only move up and down and not go away with the wave.

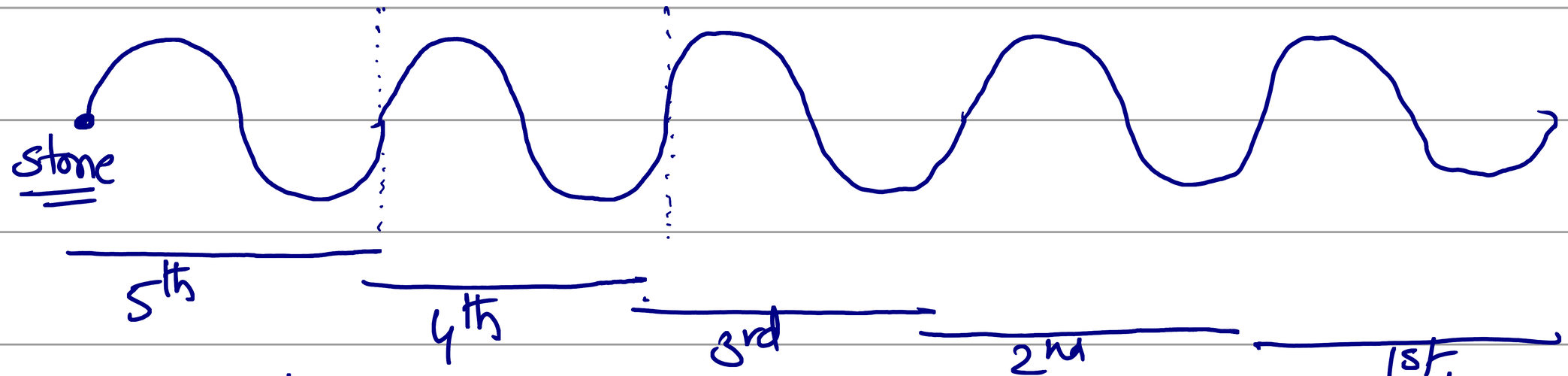
(2) Sound waves — we can't see —
Eg: When we talk, or play piano, flute etc.

(3) Light waves — some light waves when they fall (on our eyes) we can see as different colors.

Some light waves we can not see — like in mobile phones, TV remote, wifi etc.

HW: Place a paper boat in a bucket of water. Drop a small stone to create water waves. And see if the boat is going in the direction of waves or just up & down.

Properties of waves:



Multiple waves are coming from where the stone was dropped in the pond.

→ The length (size) of each wave is called "wave-length" 'λ' (lambda)

→ Number of waves that come out per second is called "frequency" — ν (nu)

→ The total distance travelled by the waves per second is called "velocity / speed" (v).

→ Relation between velocity, wave-length & frequency is

$$V = \upsilon \times \lambda$$

If each wave is $\lambda = 4m$ and we have $\upsilon = 7$ waves coming per second, then $V = 7 \times 4 = 28$ m distance travelled in 1s.

→ Sound velocity in air is fixed - 330 m/s. but its frequency & wave-length can change. If $\upsilon = 1$, $\lambda = 330$;

If $\upsilon = 5$, $\lambda = \frac{330}{5} = 66$

In a flute, from the blowing hole to the first hole that is open — that's the wavelength of your sound wave.

As you can close the holes, you can change the wavelength of sound. Then frequency of sound will also change, but velocity / speed of sound doesn't change.

If wavelength is small, frequency will be higher. If wavelength is big, frequency will be smaller.

λ	x	ν	=	V
1	x	330	=	330
2	x	165	=	330
3	x	110	=	330
5	x	66	=	330

Higher λ means smaller ν

In piano or flute, when we go from 'C3' to 'D3' .... 'B3' ... 'C4', left to right frequency ν is increasing, wavelength is decreasing. Velocity of sound in air doesnot change.