CLASS 8

CHAPTER-17 STARS AND THE SOLAR SYSTEM

Main objective: The summary is about the celestial objects, and their significance. It also gives u idea about what are stars? How far are they? How many in numbers? What is their position?

Summary:

When u look at sky on dark, clear night u can see the entire sky dotted with countless stars some bright and some not bright, some twinkle and some not twinkle.

- **The objects which do not twinkle are planets while the objects which twinkle are stars.**
- All the natural objects like the stars, the planets, the moon and many other objects in the sky are called **celestial objects**.
- **Astronomy** is the scientific study of the celestial objects such as stars, planets, comets and galaxies.

Stars

- In the night sky we see a large number of stars. All the stars emit light of their own. Therefore, **the stars are celestial bodies that emit their own light and heat.**
- They appear small like points because they are situated at large distances from the Earth.
- The Sun is also a star. The Sun appears bigger as it is nearer to us than any other stars.
- Although stars are always present in the sky but are not visible during day time because of bright sunlight.

Why stars move from East to West?

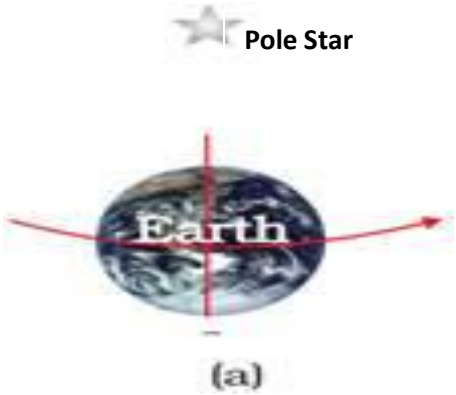
- When we observe some prominent stars or group of stars in the sky for about two hours or more we find change in the positions of stars in the sky.
- Stars appear to move from east to west **because of Earth's rotation from west to east**.
- A star which rises in the east in the evening, sets in the west in the early morning. This is the reason Sun appears to rise in the east and set in the west.

Light year

- The Sun is nearly 150,000,000 km (150 million km) away from the Earth.
- The next nearest star is **Alpha Centauri** which is at a distance of about 40,000,000,000,000 km from the Earth.
- And some stars are even further which is not possible to read the distance conveniently.
- **The distance travelled by light in one year is called a light year. It is a measure of distance for celestial objects.**
- Speed of light = 3×10^8 m/s
- The sun is **8 light minutes** away from earth.
- The distance of **Alpha Centauri** is 4.3 light years away.

Pole star:

- The **Pole star** (or Polaris) is one star whose position seems to be fixed. It does not move.
- It is situated in the direction of the Earth's axis. All other stars seem to move around the Pole Star.
- Pole star does not appear to move because it is nearly situated on Earth's rotational axis over the North Pole.



Activity 17.5(NCERT) explains the reason behind fixed position of Pole star from Earth.

Take an umbrella and open it. Make and paste about 10-15 stars on it. Paste one star at the position of the central rod of umbrella. Now rotate the umbrella by holding central rod on your hand. You will observe that the star located at the axis (central rod) of umbrella do not appear to move. Same reason applies for Pole star.

Constellation:

* The stars forming group that has a recognisable shape is called a **constellation.**

* They were devised by ancient men for navigation purposes.

* Examples: Ursa Major (Great bear), Orion, Leo major, Cassiopeia.

ASSIGNMENT

I. MULTIPLE CHOICE QUESTIONS

1. Sun appears to move from east to west around the Earth. This means that Earth rotates from

(a) east to west
(b) west to east
(c) north to south
(d) west to north

2. Which of the following figures depicts the position of the pole star correctly?

(a)

(b)

(c)

(d)

3. Stars are celestial bodies that emit their own

(a) Light
(b) Heat
(c) Light and heat
(d) None of above

II. <u>State whether the following statements are 'True' or 'False'.</u>

(a) All the stars are at the same distance from us.
(b) The planets keep changing their position with respect to stars.
(c) The planets emit light of their own.
(d) The distance of Alpha Centauri is 4.3 light years away.

III. Fill up:

a) A group of stars that appear to form a pattern in the sky is called _____.
b) The Sun appears bigger as it is _____to us than any other stars.
c) A star which rises in the east in the evening, sets in the _____ in the early morning.
d) The Sun is nearly _____million km away from the Earth.
e) Speed of light is _____.

IV.VERY SHORT ANSWER QUESTIONS

1. Name the star which is nearest to our solar system.

2. Name a star which appears to be fixed as seen from the Earth's surface.

3. What are celestial objects? Give examples.

4. Do stars emit light only during night? If not, why is it not visible during day time?

5. Why all other stars appear small compared to the Sun?

6. What is a light year?

7. What is a constellation? Name any two constellations.

8. Why Pole star not appear to move in the sky?

9. A star is ten light years away from the Earth. Suppose it brightens up suddenly today. After how much time shall we see this change?

NOTE: Answers will be uploaded within 3-4 days.

Class 9

Sound

Sound

(i)The sensation felt by our ears is called sound.

(ii) Sound is a form of energy which makes us hear.

(iii) Sound travels in form of wave.

Production of Sound

Sound is produced when object vibrates or sound is produced by vibrating objects

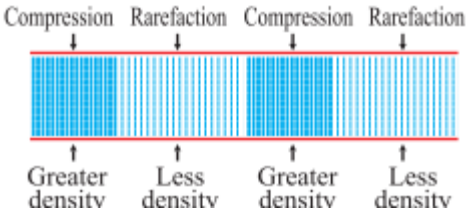
- The energy required to make an object vibrate and produce sound is provided by some outside source (like our hand, wind etc.).
- Example : Sound of our voice is produced by vibration of two vocal cords in our throat .
- Sound of a drum or tabla is produced by vibration of its membrane when struck .

Propogation of Sound

- The substance through which sound travels is called a medium.
- The medium may be solid, liquid or gas.
- When an object vibrates, then the air particles around it also start vibrating in exactly the same way and displaced from their stable position.
- These vibrating air particles exert a force on nearby air particles so they are also displaced from their rest position and start to vibrate.
- This process is continued in the medium till sound reaches our ears.
- The disturbance produced by sound travels through the medium (not the particles of the medium).
- Wave is a disturbance which travels through a medium and carries energy.
- So sound travels in wave form known as mechanical waves

Sound Waves are Longitudinal Waves

- When a body vibrates then it compresses the air surrounding it and form a area of high density called compression (C).
- Compression is the part of wave in which particles of the medium are closer to one another forming high pressure.
- This compression move away from the vibrating body.
- When vibrating body vibrates back a area of low pressure is formed called rarefaction (R).
- Rarefaction is the area of wave in which particles of the medium are further apart from one another forming a low pressure or low density area.
- When body vibrates back and forth, a series of compression and rarefaction is formed in air resulting in sound wave.
- Propogation of sound wave is propogation of density change.

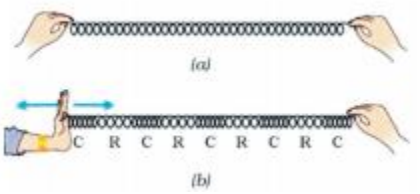


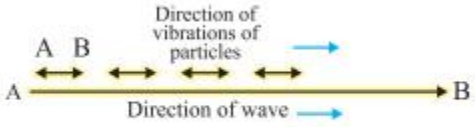
Sound needs Medium for Propogation

- Sound waves are mechanical waves.
- It needs material medium for propogation like air, water, steel etc.
- It cannot travel in vaccum. • An electric bell is suspended in airtight bell jar connected with vacuum pump.
- When bell jar is full of air, we hear the sound but when air is pumped out from the bell jar by vacuum pump and we ring the bell, no sound is heard.
- So medium is necessary for propagation of sound.

Sound Waves are Longitudinal Waves

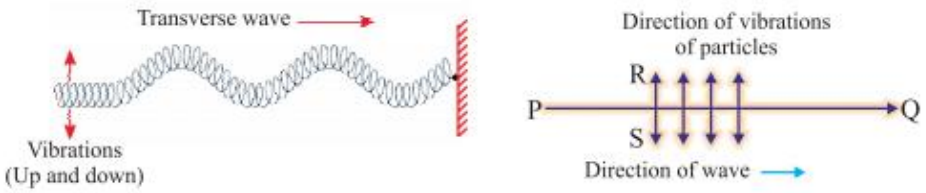
- A wave in which the particles of the medium vibrate back and forth in the same direction in which the wave is moving, is called a **longitudinal wave.**
- When we push and pull the slinky compression (number of turns are more or closer) and rarefaction (number of turns are less or farther)are formed.
- When a wave travels along with slinky, its each turn moves back and forth by only a small distance in the direction of wave. So the wave is longitudinal.
- The direction of vibrations of the particles is parallel to the direction of wave.





(ii) When one end of a slinky is moved up and down rapidly whose other end is fixed, it produces **transverse wave**.

- This wave possess along the slinky in horizontal direction, while turns of slinky (particles) vibrate up and down at right angle to the direction of wave.
- Thus in transverse wave particles of the medium vibrate up and down at right angles to the direction of wave.
- Light waves are transverse waves but they don't need a material medium for propagation.



Q. Answer the following.

1. Define Wave.
2. Why sound waves are called mechanical waves?
3. Give one example each for Transverse and Longitudinal wave.
4. What is the frequency of a sound wave whose time period is 0.05 seconds?
5. What is the audible range of human being?
6. What are compressions and rarefactions?
7. Draw a diagram showing density or pressure variation in sound waves.
8. Explain an activity with labelled diagram, to prove that sound needs a material medium for propagation.
9. Explain how sound is produced by your school bell.
10. Why light is not a mechanical wave?
11. Give the difference between Transverse wave and longitudinal Wave.

Note: Answers will be uploaded within 3 – 4 days.