

05/08/2024

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Day: Monday

## General Science and Ability

Q: What is mirage? Describe in detail the creation of mirage.

### Mirage:

A mirage is an optical illusion caused by atmospheric conditions that results in the appearance of distinct objects or scenes that are not actually there. It typically occurs in hot desert environments but can appear in other settings as well.

"The most beautiful thing we can experience is the mysterious. It is the source of all true art and science." (Albert Einstein)



## Creation of a Mirage :

### 1. Temperature Gradient :

A mirage forms when there is a significant temperature differences between the ground and the air above it. For instance, in a desert, the ground can become extremely hot, while the air above it remains cooler.

In desert, the temperature differences between the hot ground and cooler air can be extreme.

For example, surface temperatures can reach up to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ )

### 2. Refraction of Light :

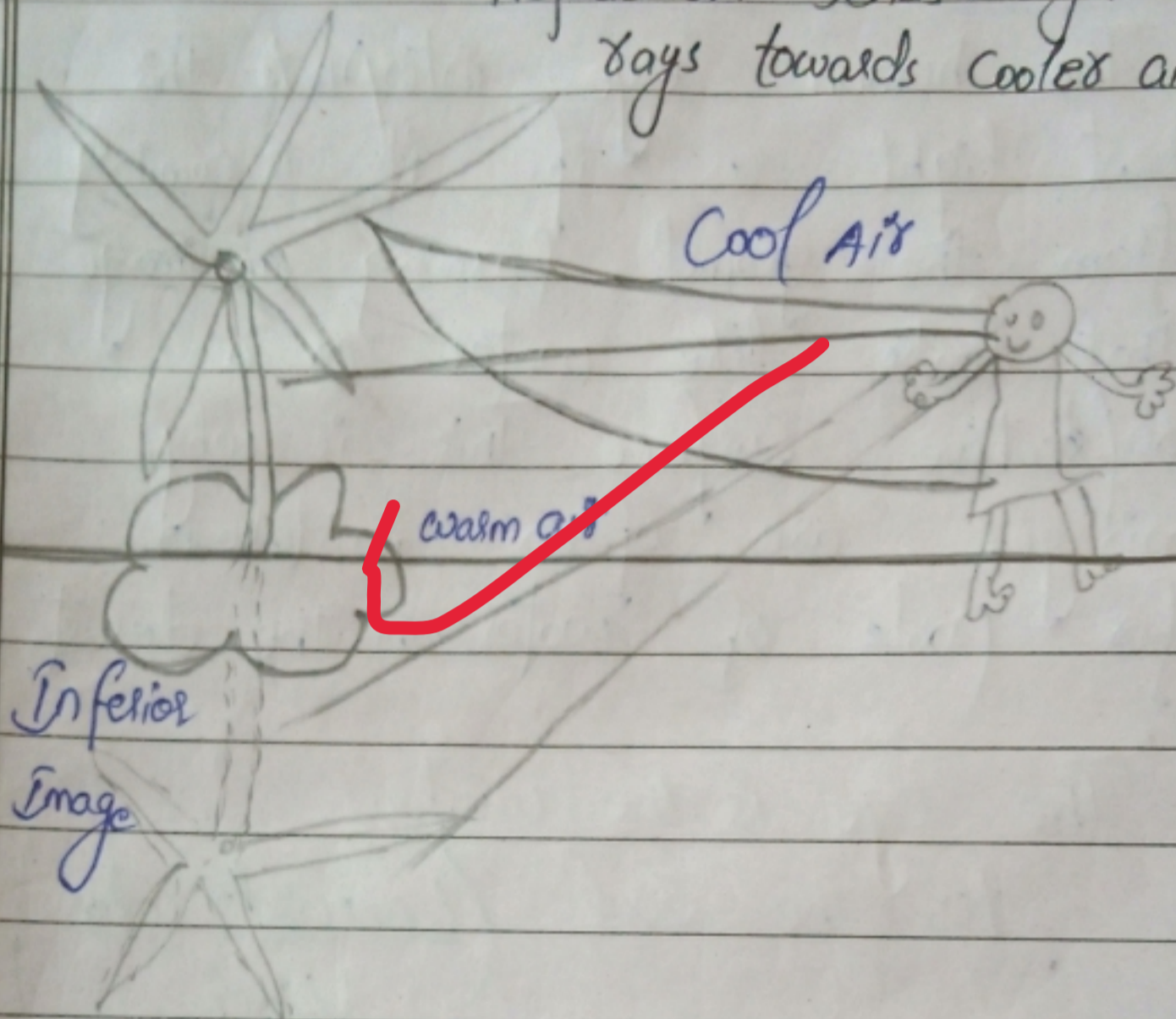
Light travels through air layering of varying temperatures at different speeds. When light passes through air layers of different temperatures, it bends or refracts. This bending is more pronounced when there is a large temperature gradient.

The light of the future will be in the form of

electromagnetic waves" (James Clerk Maxwell)



Refraction bends light rays towards cooler air



### 3. Formation of Image :

As light rays bend due to the temperature gradient, they can curve in such a way that they appear to come from a different location than where they originated. This bending creates an image of the sky or distant objects that appears on the ground or close to the observer.

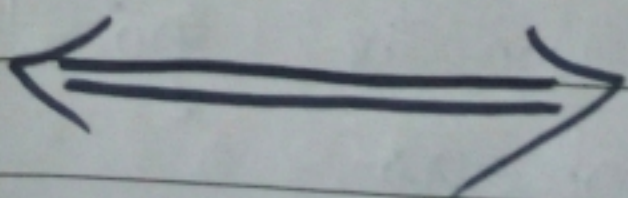


# 4. Visual Perception :

The human eye interprets this bent light as if it is coming from the ground, forming an image that looks like water or a reflective surface. This is why mirages are often mistaken for pools of water in the desert.

"The eye is the window to the soul" (Leonardo da Vinci)

In essence, a mirage results from the reflection of light caused by a temperature gradient between the ground and the air above it, creating a visual distortion that can make distant objects or scenes appear where they do not actually exist.





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# General Science and Ability

Q: Differentiate between the occurrence of Lunar and Solar Eclipse?

The occurrence of Lunar and Solar eclipses involves distinct astronomical alignments and conditions.

## Lunar Eclipse:

i- Lunar Eclipse occurs when the Earth is between the Sun and the Moon. The Earth shadow falls on the Moon, causing the eclipse. It requires a full moon for this event to take place.





ii- The moon passes through the Earth's umbra (the central, darkest part of its shadow) or penumbra (the outer part of its shadow).

Lunar eclipses are visible from anywhere on the night side of the Earth.

iii- These are three types of Lunar eclipse

a. Total Lunar eclipse:

The entire moon is in the Earth's umbra

b. Partial Lunar eclipse:

Only a part of the moon enters the umbra.

c. Penumbral Lunar eclipse:

The moon passes through the Earth's penumbra.

iv- Lunar eclipses occur more frequently and can happen at least twice a year. They are less rare and can be observed more broadly compared to solar eclipses.

v- Typically last longer than a solar eclipse with total lunar eclipses lasting up to several hours.

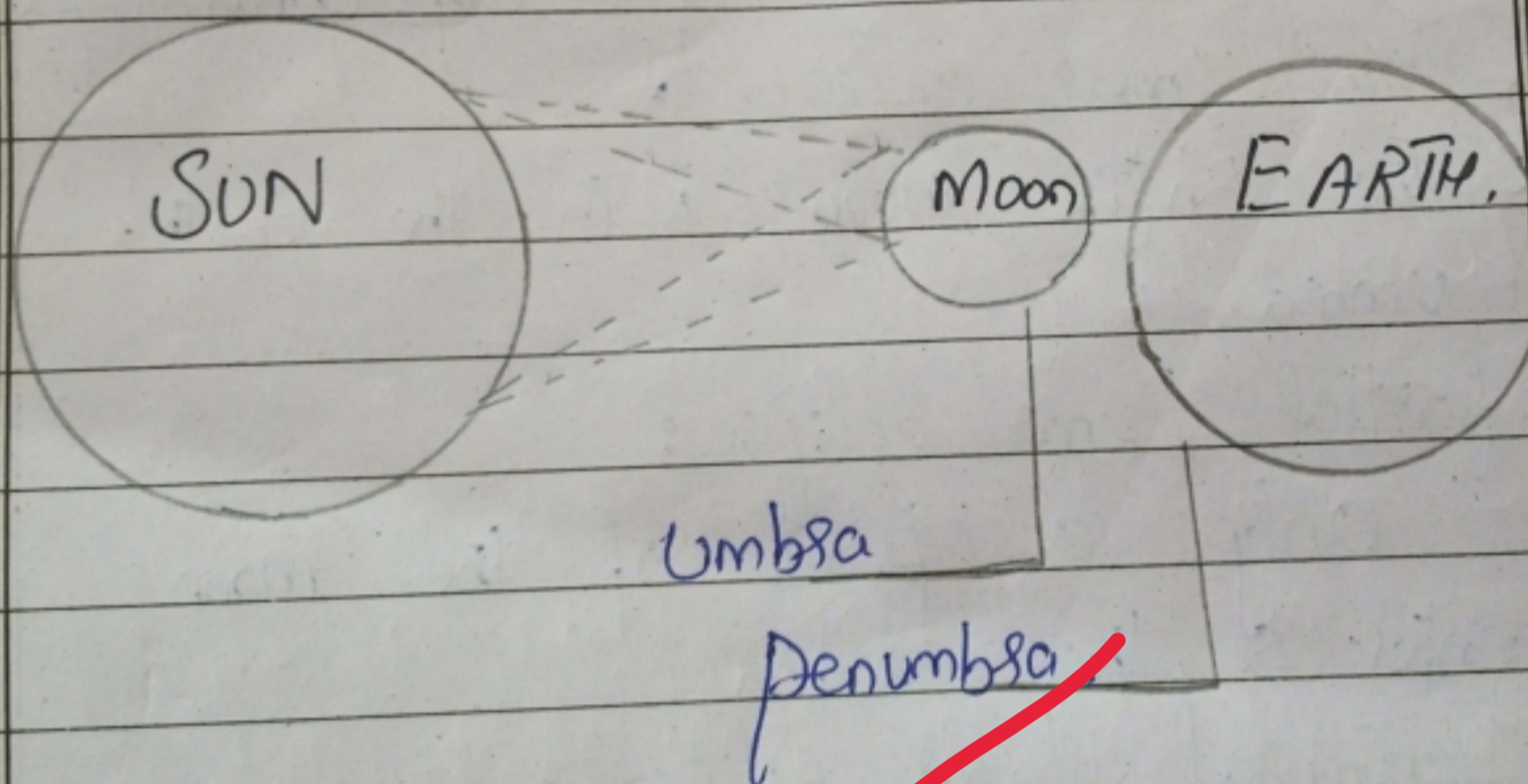


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## Solar Eclipse:

- i- Solar Eclipse occurs when the Moon is between the Earth and the Sun. The Moon's shadow falls on the Earth, causing the eclipse. It requires a new moon for this event to occur.



- ii- The Moon casts a shadow on a specific area of the Earth, creating a total, partial or lunar solar eclipse. The visibility of a solar eclipse is limited to the areas within the path of the Moon's shadow.



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iii-

These are three types of solar eclipse.

a.

Total solar eclipse:

The moon completely covers the sun.

b.

Partial solar eclipse:

Only part of the sun is obscured by moon.

c.

Annular solar eclipse:

The moon is too far from Earth to cover the sun completely,

leaving a ring-like appearance.

iv-

Solar Eclipses are less frequently

at any given location and occur approximately 2 to 5 times per year

globally, but any specific location might only experience one solar

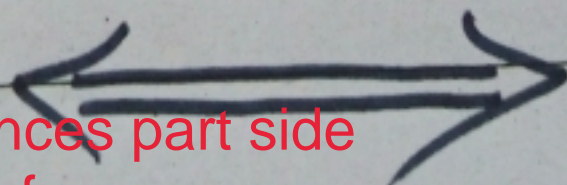
eclipse every 18 months to 2 years.

v.

Total solar eclipses last only a few minutes at most, with the

entire event (from start to end)

lasting about 2 to 3 hours.



Attempt the differences part side by side in a tabular form

THE END