



## Grade 8 General Physics Term 3 EOT Practice Questions

حظر تصوير أو تداول هذه الوثيقة، وسيتم اتخاذ الإجراءات القانونية اللازمة ضد من يخالف ذلك.

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### Question 1a

Write down the relationship between amplitude (A) of a wave and its energy (E)?

### Question 1b

The table below shows the amplitude of 3 waves X, Y and Z.

| Wave | Amplitude (Units) | Energy (Units) |
|------|-------------------|----------------|
| W    | 1                 |                |
| X    | 2                 |                |
| Y    | 5                 |                |

Determine the missing values of the energy of the waves, given that  $Energy = Amplitude^2$ .

### Question 1c

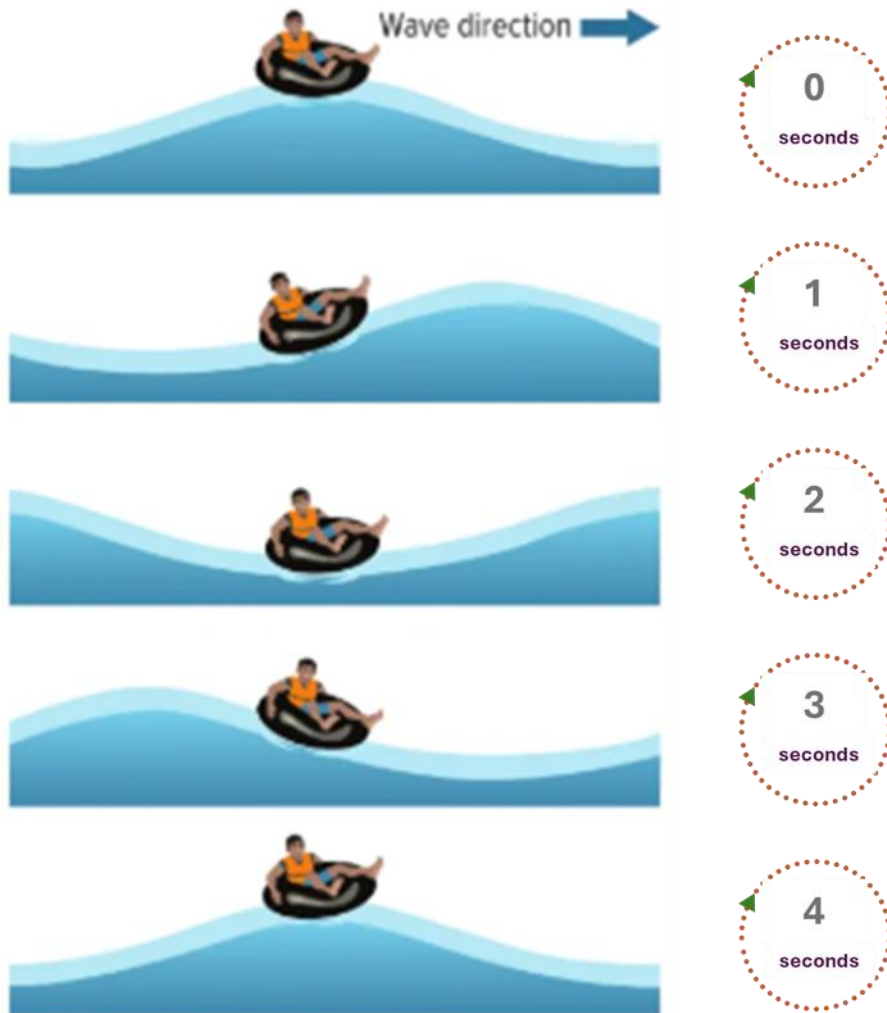
The table below shows the energy of 3 waves X, Y and Z.

| Wave | Amplitude (Units) | Energy (Units) |
|------|-------------------|----------------|
| W    |                   | 1              |
| X    |                   | 36             |
| Y    |                   | 64             |

Determine the missing values of the amplitude of the waves, given that  $Energy = Amplitude^2$ .

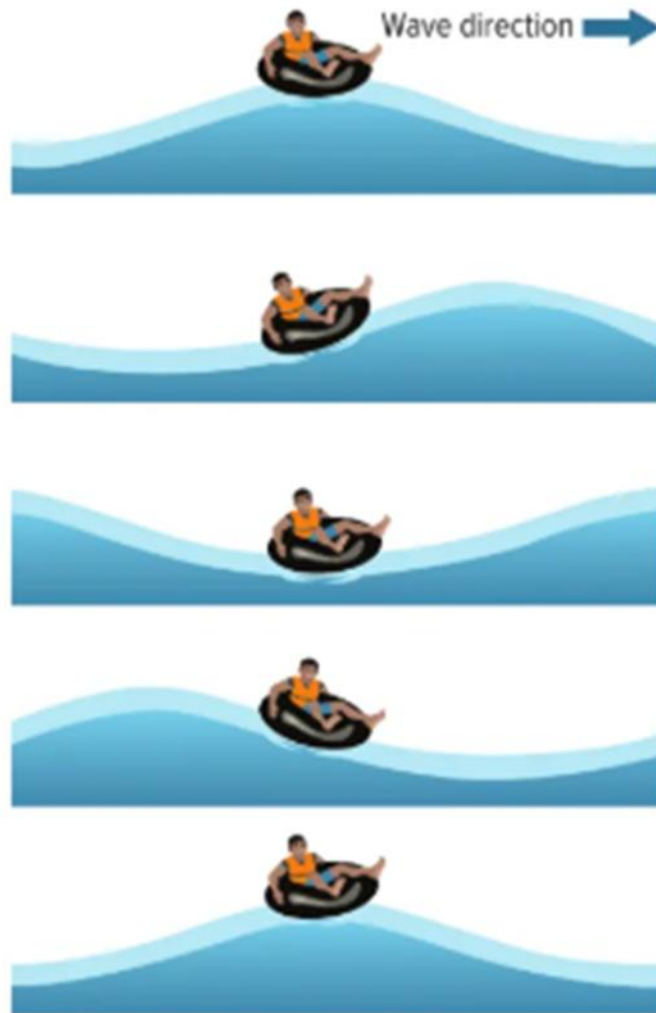
### Question 2a

What is the frequency of the wave shown in the image below?



### Question 2b

What is the frequency of the wave shown in the image below?



0  
seconds

2  
seconds

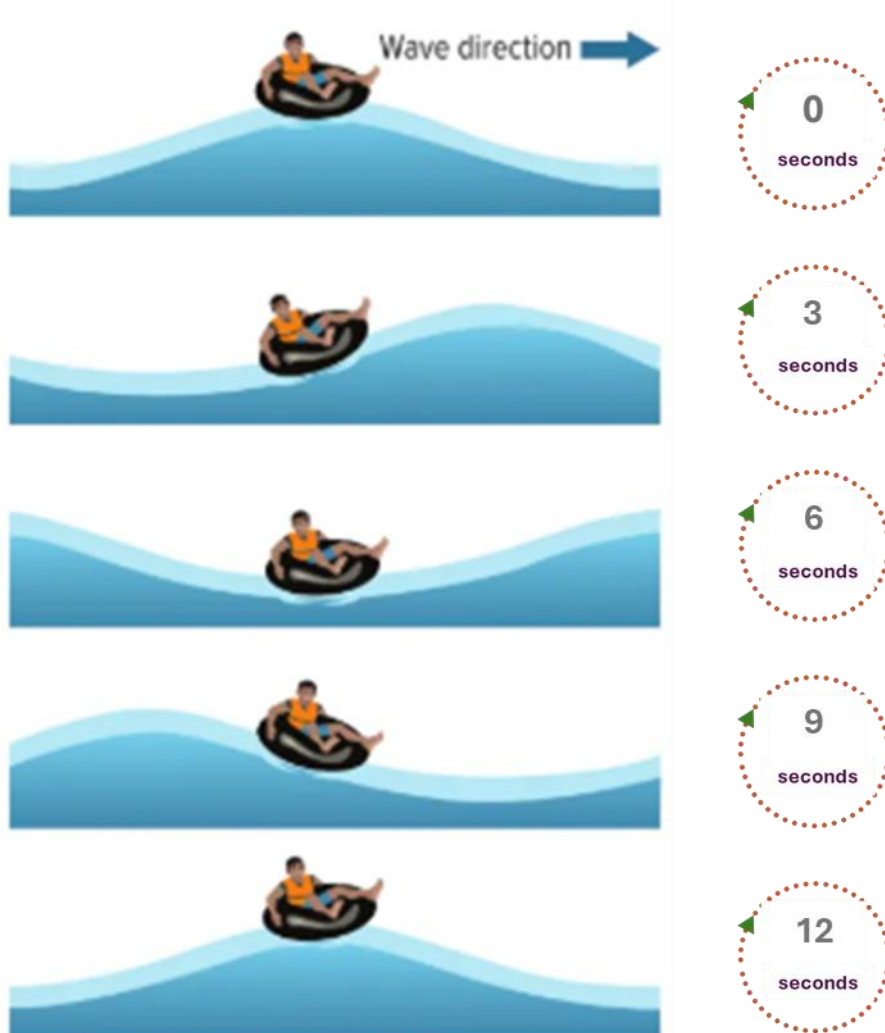
4  
seconds

6  
seconds

8  
seconds

Question 2c

What is the frequency of the wave shown in the image below?



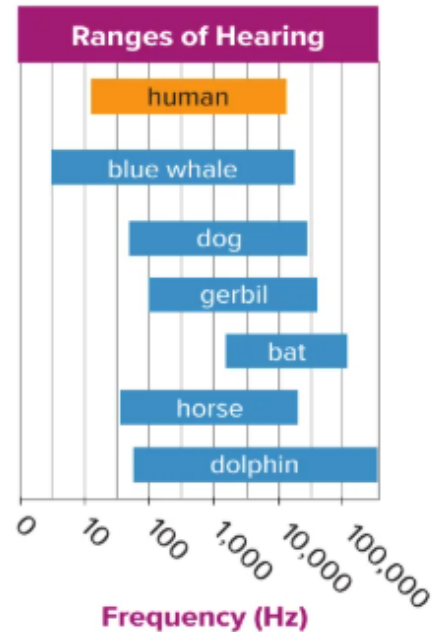


### Question 3

**Pitch** The perception of how high or low a sound seems is **pitch**. In the Lab *Fever Pitch* you determined that the sound changed based on how long the string was and by how much force you applied. The length of the string changed the pitch and the frequency. Recall that frequency is the number of times the pattern repeats in a given amount of time. When talking about sound waves, frequency is often referred to as beats per second.

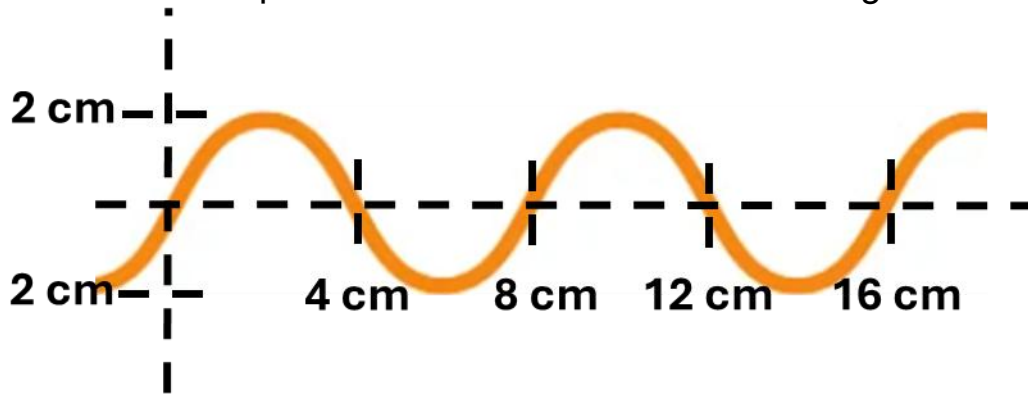
A higher frequency produces a higher pitch. For example, an adult male voice might range from 85 Hz to 155 Hz. An adult female voice might range from about 165 Hz to 255 Hz. Humans can hear thunder frequencies between 20 Hz and 120 Hz.

The human ear can detect sounds with frequencies between about 20 Hz and 20,000 Hz. Frequencies above this range are called ultrasound. The range of sounds heard by various animals is shown in figure to the right.



### Question 4a

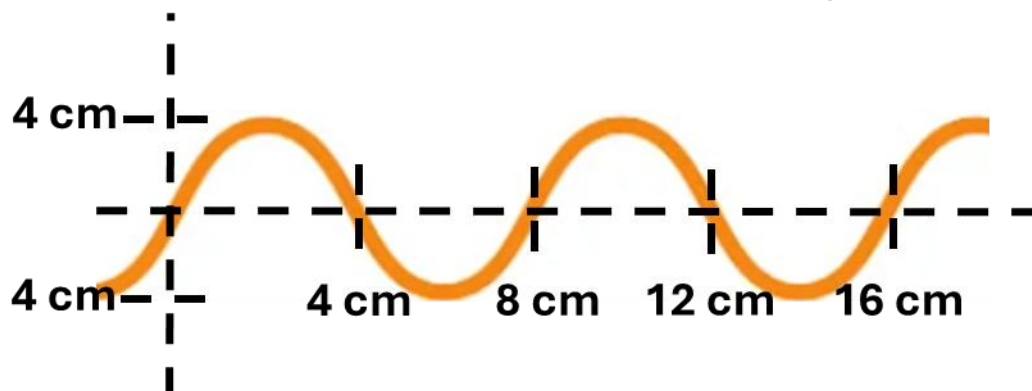
Determine the amplitude of the wave shown in the image below.





### Question 4b

Determine the amplitude of the wave shown in the image below.



### Question 5a

**Speed of Sound** In the Lab *Echo, Echo* you were able to calculate the speed of sound through air. Recall that for sound to be transmitted energy must pass from particle to particle. The material, or medium, that sound passes through affects how fast the sound moves. Two factors that influence the speed of sound waves are the density and the temperature of the medium.

Gas particles are far apart and collide less often than particles in a liquid or a solid. As shown in the table on the right, a gas takes longer to transfer sound energy between particles. In a solid where the particles are packed very close together, the particles collide and transfer energy very quickly. The more dense a medium, the faster sound will travel through it.

Particles move faster and collide more often as the temperature of a gas increases. This increase in the number of collisions transfers more energy in less time. Temperature has the opposite effect on liquids and solids. As liquids and solids cool, the molecules move closer together. They collide more often and transfer energy faster.

**The Speed of Sound**

| Medium          | Speed (m/s) |
|-----------------|-------------|
| Air (0°C)       | 331         |
| Air (20°C)      | 343         |
| Water (20°C)    | 1,481       |
| Water (0°C)     | 1,500       |
| Seawater (25°C) | 1,533       |
| Ice (0°C)       | 3,500       |
| Iron            | 5,130       |
| Glass           | 5,640       |



### Question 5b

In which of the following, solid, liquid or gas, does sound travel the fastest?

### Question 5c

In which of the following, solid, liquid or gas, does sound travel the slowest?

### Question 5d

In which of the following, air, water or iron, does sound travel the slowest?

### Question 5e

In which of the following, air, water or iron, does sound travel the fastest?

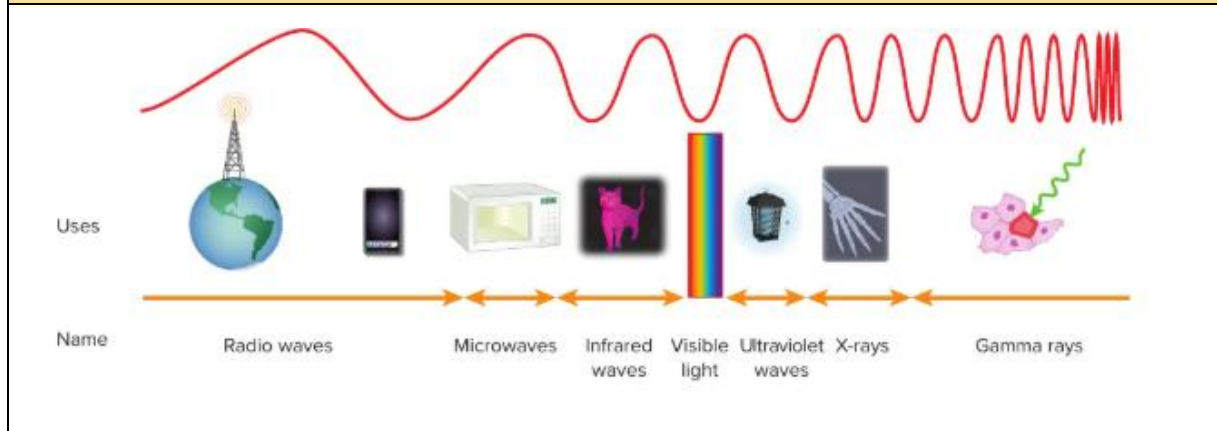
### Question 6a

Light is neither matter nor energy. Light is a type of wave. **Light** is electromagnetic radiation that you can see. Electromagnetic radiation is a type of wave created by vibrating particles. These waves radiate, or spread out, electric and magnetic fields in all directions from a source. You might recall that waves carry energy. The energy carried by an electromagnetic wave is called **radiant energy**.

There are many different types of electromagnetic waves. These waves are classified by their wavelengths and frequencies in the electromagnetic spectrum, as shown below. The groups include radio waves, microwaves, infrared waves, ultraviolet waves, X-rays, and gamma rays along with light. Out of the entire electromagnetic spectrum, light is the only wave that you can see with your eyes.

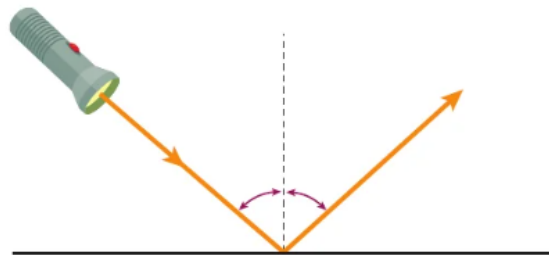
 **Want more information?**  
Go online to read more about how light interacts with matter.

### Question 6b



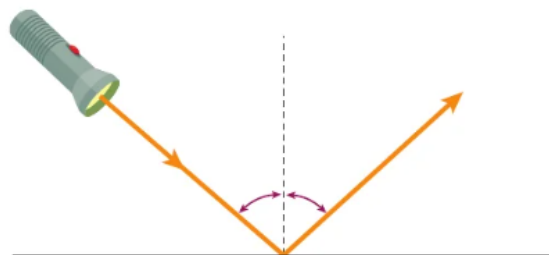
### Question 7a

Identify the incident ray and reflected ray and normal.



### Question 7b

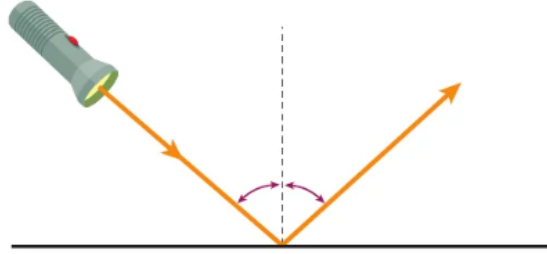
Identify the angle of incidence and angle of reflection ray, and the normal.





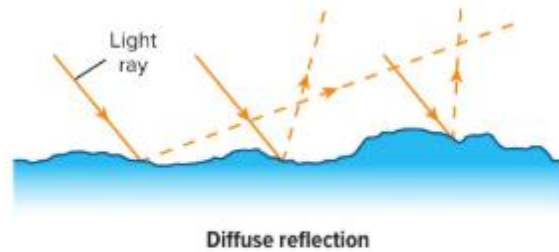
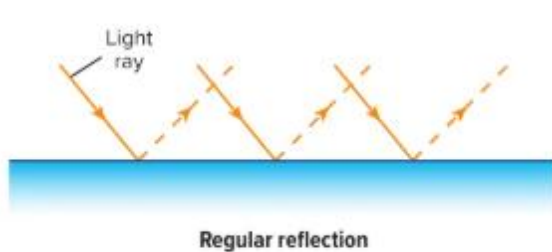
### Question 7c

What is the relationship between the angle of incidence and angle of reflection?

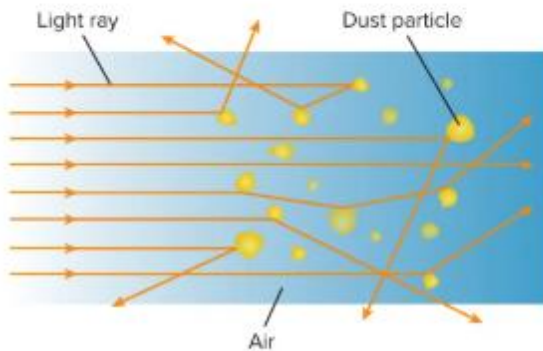


## Question 8

**Regular and Diffuse Reflection** You see objects when light reflects off them into your eyes. Why can you see your reflection in smooth, shiny surfaces but not in a piece of paper or a painted wall? The law of reflection applies whether the surface is smooth or rough. Reflection of light from a smooth, shiny surface is called **regular reflection**. Look at the figure on the left below. The three incident rays and the three reflected rays all are parallel. You see a sharp image when parallel rays reflect into your eyes. When light strikes an uneven surface, as shown on the right below, the angle of reflection still equals the angle of incidence at each point. However, rays reflect in different directions. Reflection of light from a rough surface is called **diffuse reflection**.



**Scattering** When a beam of sunlight shines through a window, you might notice tiny particles of dust. You see the dust particles because they reflect light waves. As the figure below shows, dust particles reflect light waves in many different directions because they have different shapes. This is an example of scattering.



Scattering occurs when light waves traveling in one direction are made to travel in many directions. The dust particles scatter the light waves in a sunbeam. If there are enough particles in the air, all of the light will be scattered. When this happens, no light will be transmitted. This is why clouds and fog are opaque. The water particles in the air reflect light. All the Sun's light is scattered, so the cloud appears opaque.

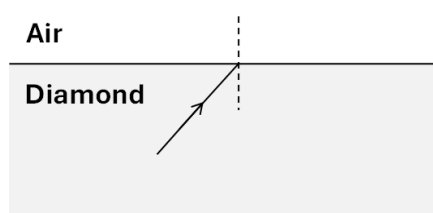


### Question 9a

The table below lists the index of refraction for air, water and diamond.

| Medium  | Index of Refraction |
|---------|---------------------|
| Air     | 1.0003              |
| Water   | 1.33                |
| Diamond | 2.47                |

Complete the path taken by the ray of light as it passes from diamond to air.



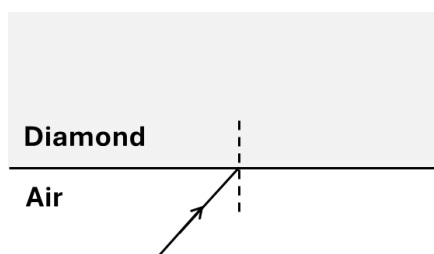
(Tip: Write the index of refraction next to the medium and predict if the ray bends towards or away from the normal.)

### Question 9b

The table below lists the index of refraction for air, water and diamond.

| Medium  | Index of Refraction |
|---------|---------------------|
| Air     | 1.0003              |
| Water   | 1.33                |
| Diamond | 2.47                |

Complete the path taken by the ray of light as it passes from air to diamond.



(Tip: Write the index of refraction next to the medium and predict if the ray bends towards or away from the normal.)

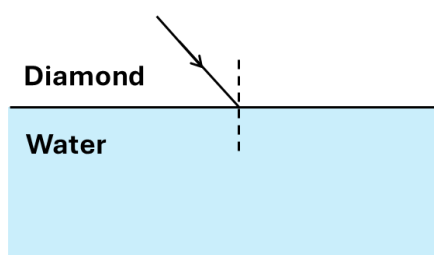


### Question 9c

The table below lists the index of refraction for air, water and diamond.

| Medium  | Index of Refraction |
|---------|---------------------|
| Air     | 1.0003              |
| Water   | 1.33                |
| Diamond | 2.47                |

Complete the path taken by the ray of light as it passes from air to diamond.



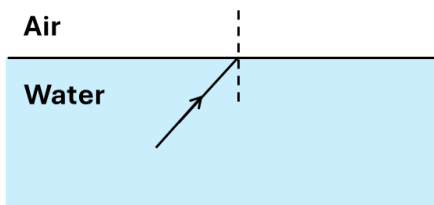
(Tip: Write the index of refraction next to the medium and predict if the ray bends towards or away from the normal.)

### Question 9d

The table below lists the index of refraction for air, water and diamond.

| Medium  | Index of Refraction |
|---------|---------------------|
| Air     | 1.0003              |
| Water   | 1.33                |
| Diamond | 2.47                |

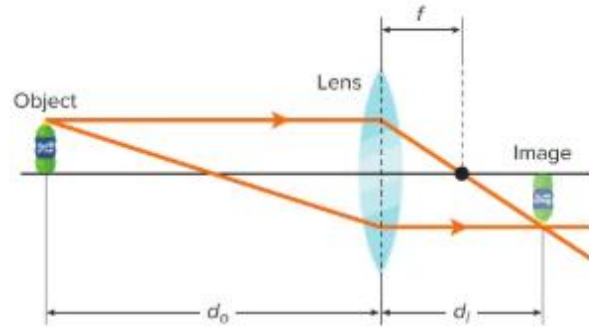
Complete the path taken by the ray of light as it passes from air to diamond.



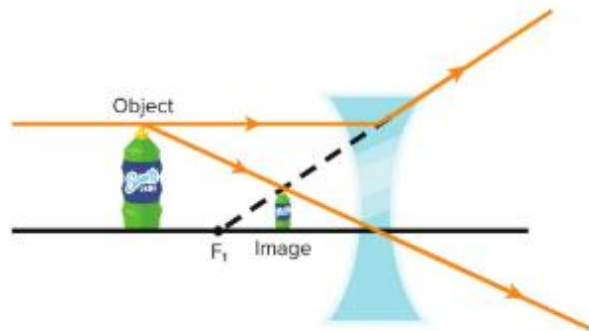
(Tip: Write the index of refraction next to the medium and predict if the ray bends towards or away from the normal.)

## Question 10

**Focal Point and Focal Length** Similar to a mirror, the point where rays parallel to the optical axis converge after passing through a lens is the focal point. The distance along the optical axis between the lens and the focal point is the focal length of the lens. Because you can look through a lens from either side, a focal point is on both sides of the lens. For a lens with the same curve on both sides, the lens's two focal points are the same distance from it.



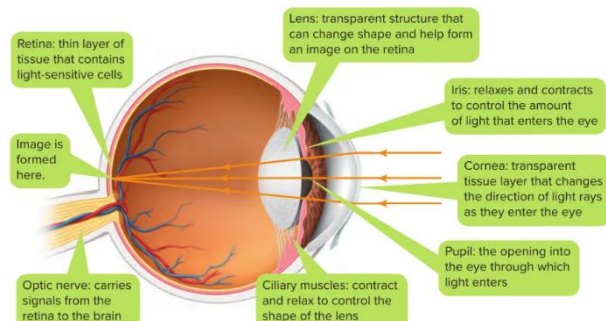
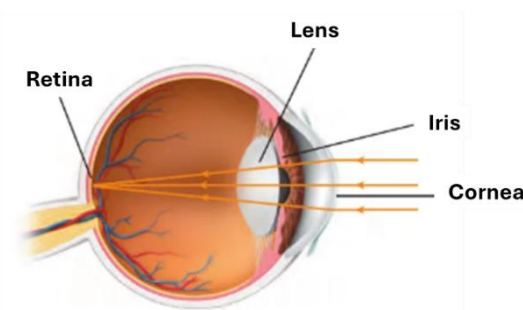
**Types of Images** Like a concave mirror, the type of image a convex lens forms depends on the location of the object. A convex lens can form both real and virtual images. The diagrams show only two rays, but remember that in reality, there are an infinite number of rays.



If you look through a magnifying lens at an object more than one focal length from the lens, the image you see is inverted and smaller. If you look at an object less than one focal length from the lens, the image you see is upright and larger. The image is virtual because your brain interprets the rays as moving in a straight line.

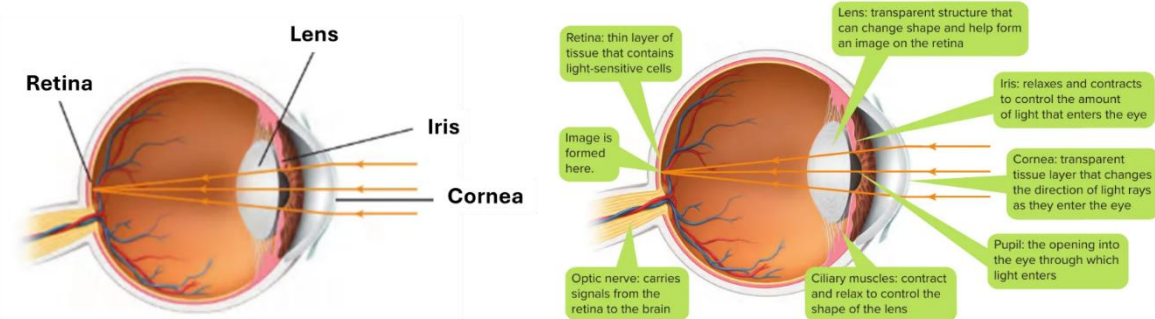
## Question 11a

Which part of the eye can change its structure to form a focused image?



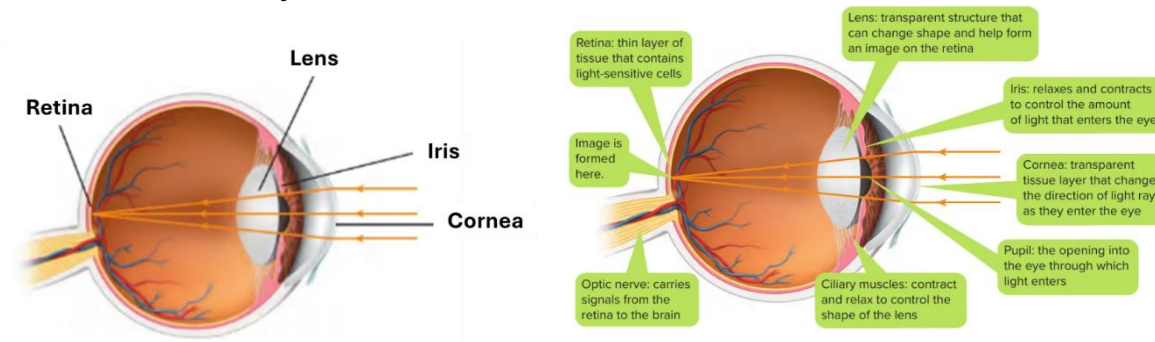
### Question 11b

On which part of the eye is an image formed?



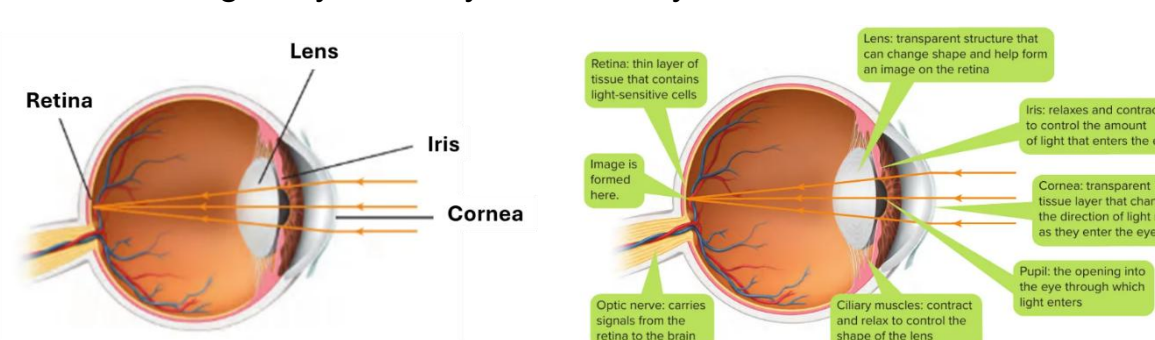
### Question 11c

Which part of the eye relaxes and contracts to control the amount of light that enters the eye?



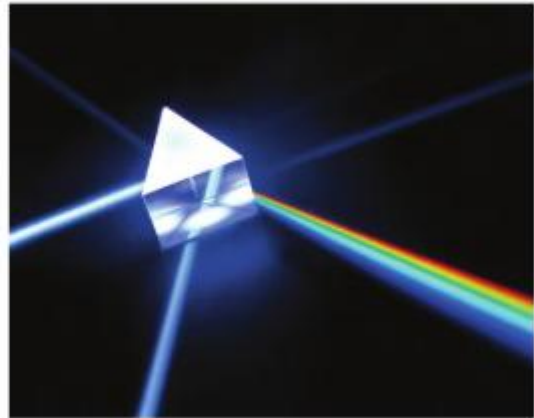
### Question 11d

Which part of the eye is a transparent tissue layer that changes the direction of light rays as they enter the eye?



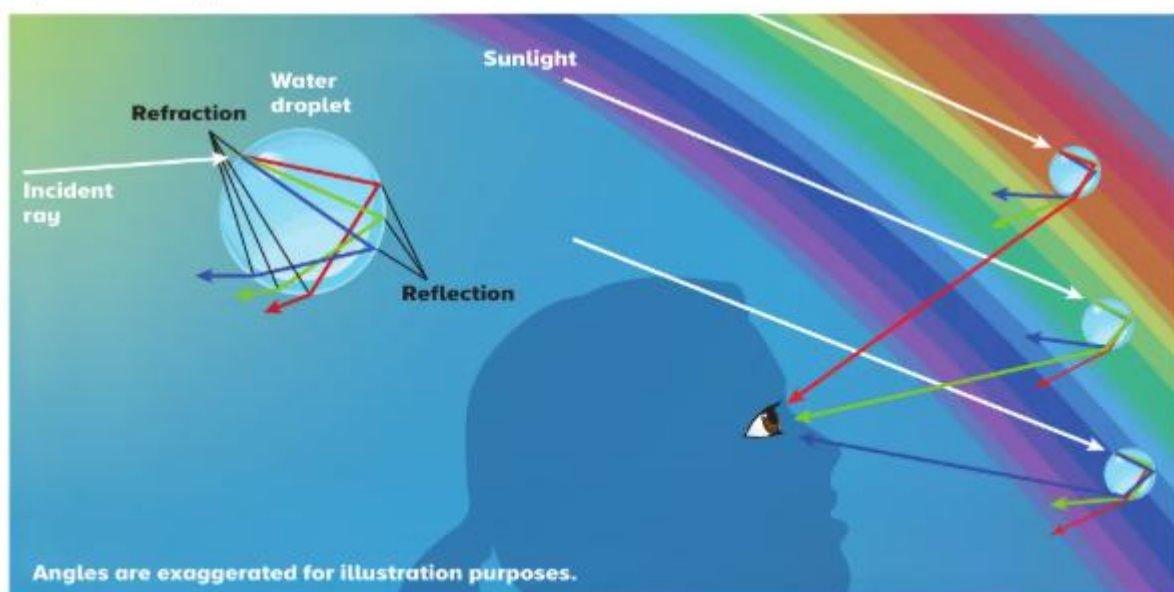
### Question 12a

**Separating Colors of Light** In the Lab *Rainbow Bright*, you learned that white light is made up of different colors. Recall that each color has a different range of wavelengths and frequencies. Waves with longer wavelengths and higher frequencies travel at greater speeds in a medium than waves with shorter wavelengths and lower frequencies. Therefore, when entering a medium, light with lower frequencies travels faster and refracts less than light with higher frequencies. Violet wavelengths refract the most because their frequencies are the highest. Red wavelengths have the lowest frequencies and refract the least. This causes the colors of light to spread out when they are refracted through a prism.



### Question 12b

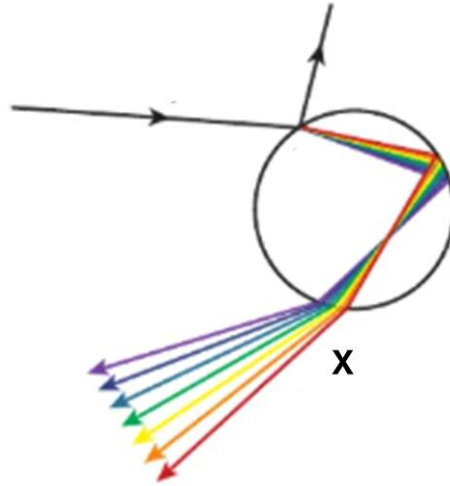
**EARTH SCIENCE Connection** You may have noticed that when a prism refracts the colors of light, they appear in the same order as in a rainbow. Do rainbows in nature come from a prism? You may have seen a rainbow appear in the sky during or after a rain shower. Rainbows form when water droplets in the air function like prisms and refract light. Each wavelength of light refracts as it enters the droplet, reflects back into the droplet, and refracts again when it leaves the droplet. Notice in the figure below that wavelengths of light near the blue end of the spectrum refract more than wavelengths near the red end of the spectrum. This effect produces the separate colors you see in a rainbow.





Question 12c

What causes the spread of colors at point X?



Question 13a

What color of light does the ball reflect so that it appears red?



Question 13b

What color of light does the ball reflect so that it appears blue?



### Question 13c

What color of light does the ball reflect so that it appears green?



### Question 14

How fast is the population growing?

You are part of a population of humans. The other species in your area, such as birds or trees, each make up a separate population. A **population** is all the members of a species living in a given area. How has human population changed over time? Let's investigate.



### Question 15

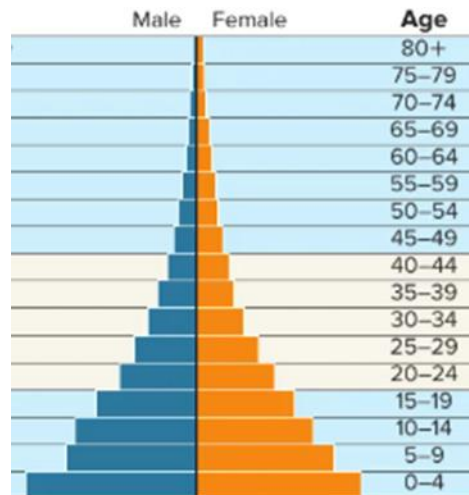
Population explosion refers to the \_\_\_\_\_.

- ☐ **A)** estimated world population in 2025
- ☐ **B)** number of people who live in poverty
- ☐ **C)** world population in 1810
- ☐ **D)** increased rate at which the population is growing



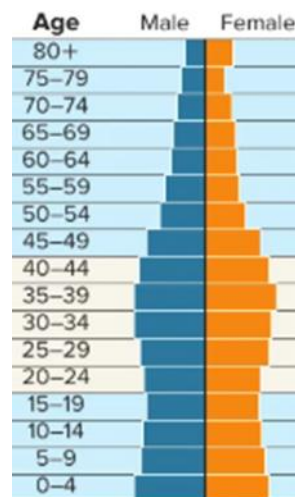
### Question 16a

What type of human population growth, rapid, slow or negative, does the age structure below represent?



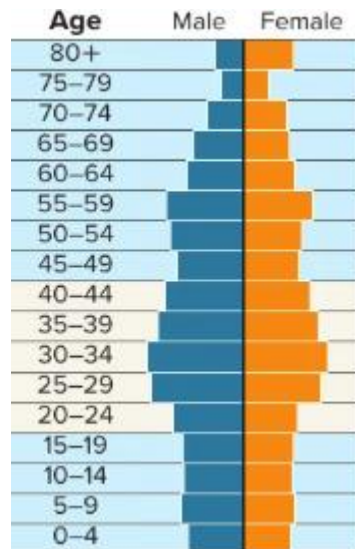
### Question 16b

What type of human population growth, rapid, slow or negative, does the age structure below represent?



### Question 16c

What type of human population growth, rapid, slow or negative, does the age structure below represent?



### Question 17

Refer to Exam Coverage Document

### Question 18

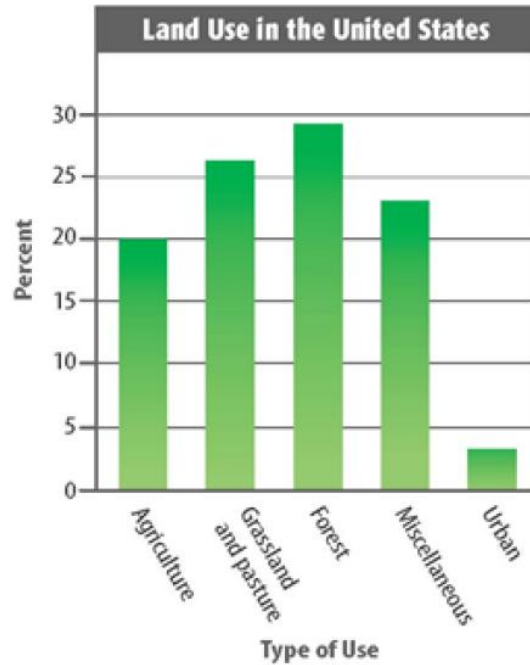
**Population Limits** As the human population grows larger and larger, cities become crowded with people, using space and depleting resources. Earth has limited resources. It cannot support a population of any species in a given environment beyond its carrying capacity. **Carrying capacity** is the largest number of individuals of a given species that Earth's resources can support and maintain for a long period of time. Let's explore carrying capacity.





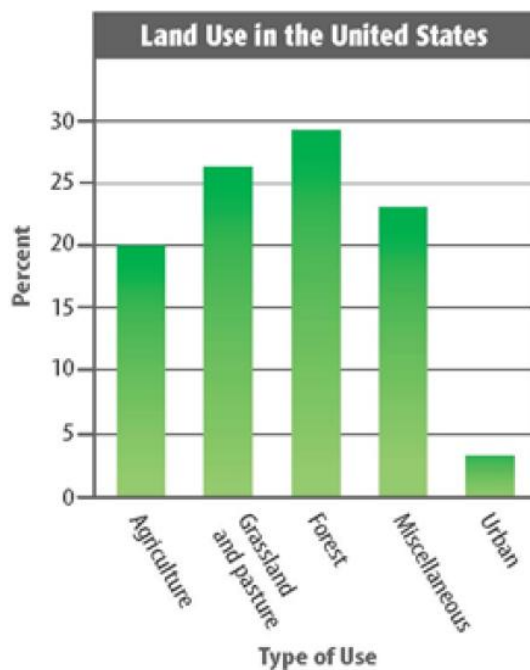
### Question 19a

Which category had the highest land use?



### Question 19b

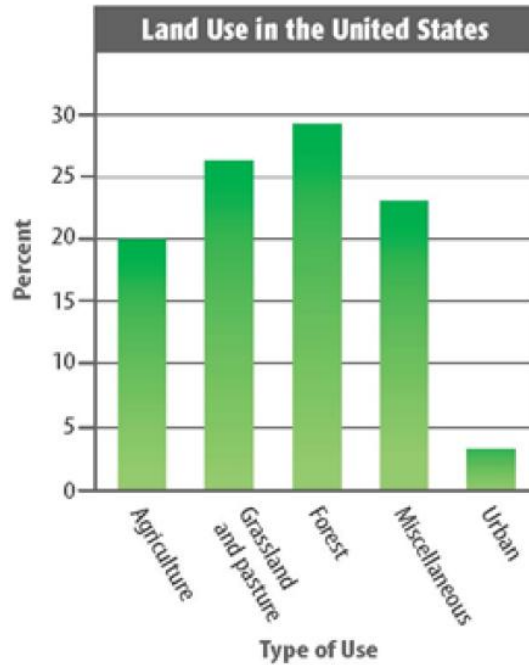
Which types of land use were 20% or lower?





### Question 19c

Which category had the lowest percentage of land use?



### Question 20

The size of the Amazon rainforest in 1970 was around 5.8 million km<sup>2</sup>. In 2020, the size of the rainforest was around 5.2 million km<sup>2</sup>. What is the percent decrease of the rainforest between 1970 and 2020?



### Question 21

**Changes in Earth's Systems** The consumption of natural resources, like trees and land, has environmental effects of global importance. Forest clearing for cropland and pasture diminishes habitat. Habitat loss is often the greatest extinction threat for the biosphere.

Clearing forests can also affect the geosphere and hydrosphere. Plant roots hold soil in place. Without these natural anchors, soil erodes away. Drought can also follow deforestation. Cleared land dries rapidly and stores little moisture.

And finally, deforestation also impacts the atmosphere. Trees remove carbon dioxide from the atmosphere during photosynthesis. Rates of photosynthesis decrease when large areas of trees are cut down, and more carbon dioxide remains in the atmosphere.



### Question 22a

Give two examples which help decrease our ecological footprint on the environment?

### Question 22b

Give two examples in which we increase our ecological footprint on the environment?

## Question 23

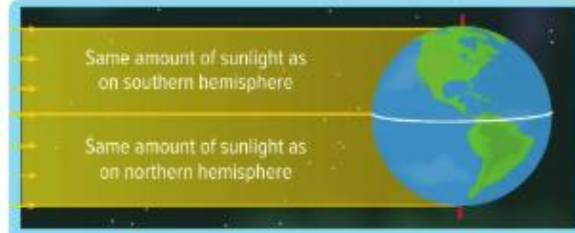


### December Solstice

The December solstice is on December 21 or 22.

On this day

- the north end of Earth's rotation axis is away from the Sun;
- days in the northern hemisphere are shortest and nights are longest; winter begins;
- days in the southern hemisphere are longest and nights are shortest; summer begins.

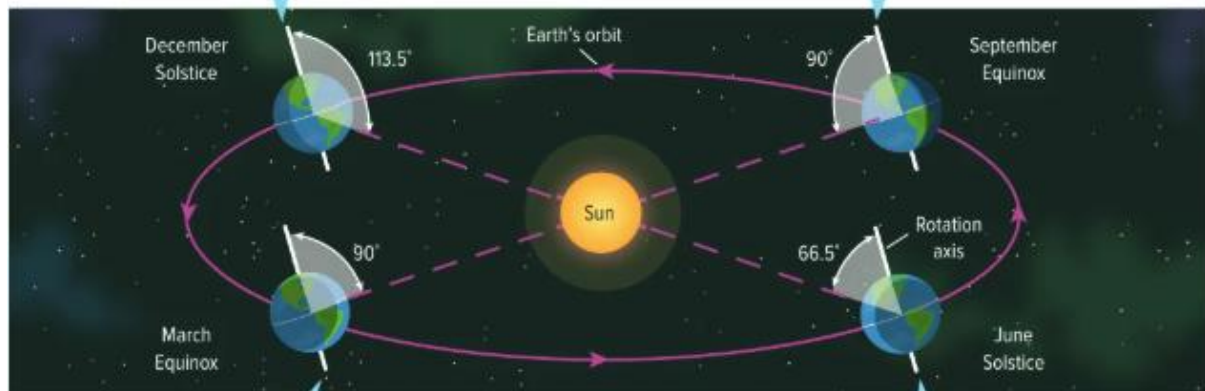


### September Equinox

The September equinox is on September 22 or 23.

On this day

- the north end of Earth's rotation axis leans along Earth's orbit;
- there are about 12 hours of daylight and 12 hours of darkness everywhere on Earth;
- autumn begins in the northern hemisphere;
- spring begins in the southern hemisphere.



### March Equinox

The March equinox is on March 20 or 21.

On this day

- the north end of Earth's rotation axis leans along Earth's orbit;
- there are about 12 hours of daylight and 12 hours of darkness everywhere on Earth;
- spring begins in the northern hemisphere;
- autumn begins in the southern hemisphere.



### June Solstice

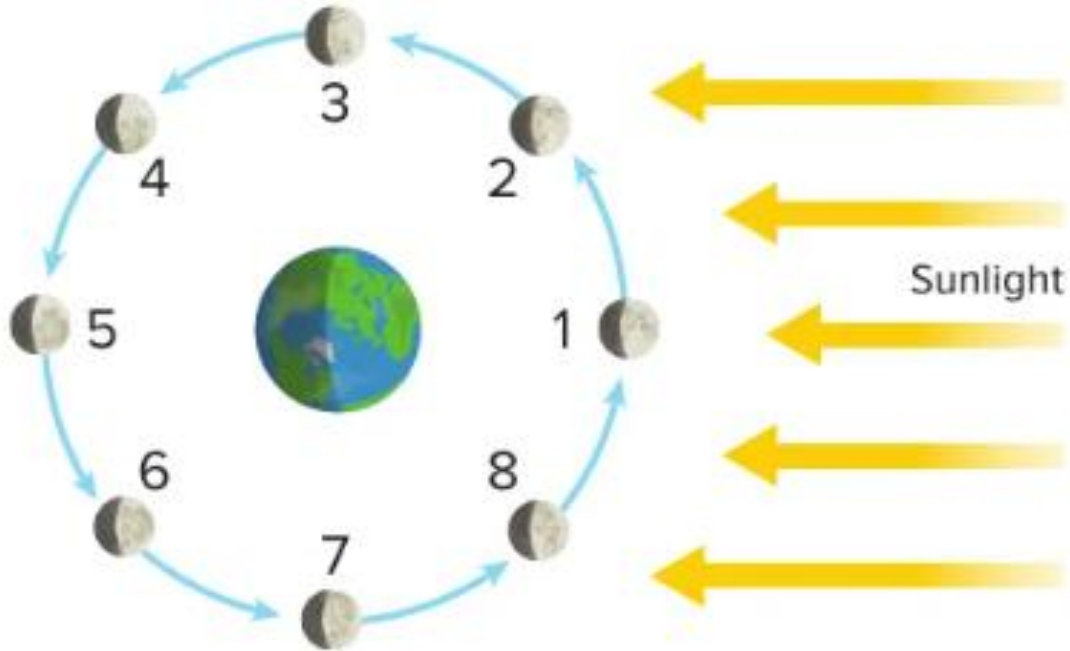
The June solstice is on June 20 or 21.

On this day

- the north end of Earth's rotation axis is toward the Sun;
- days in the northern hemisphere are longest and nights are shortest; summer begins;
- days in the southern hemisphere are shortest and nights are longest; winter begins.

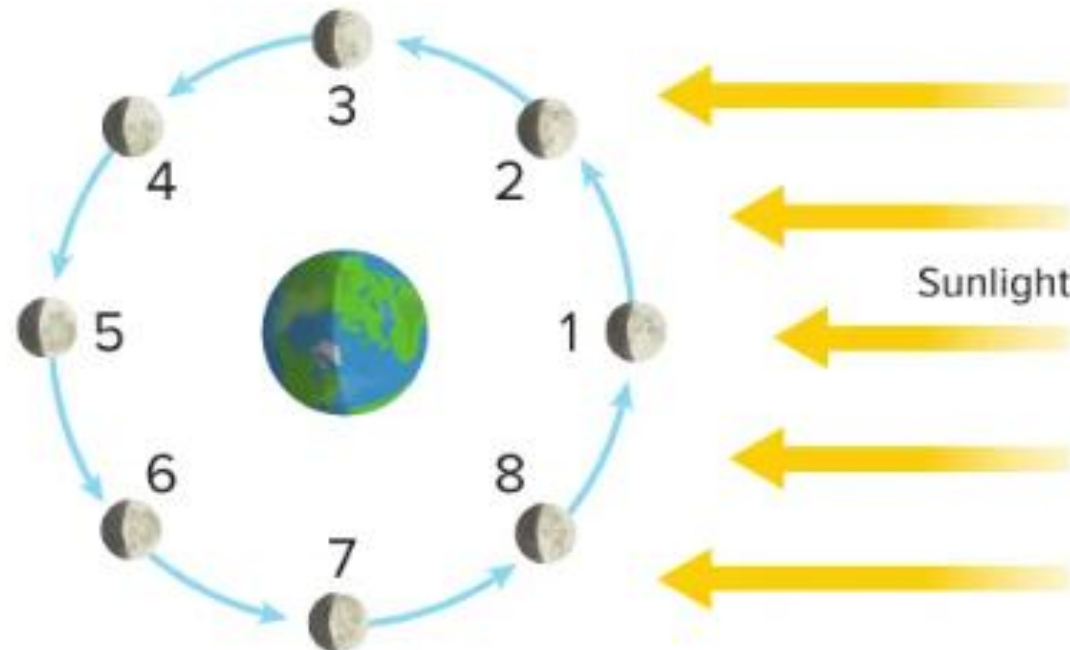
Question 24a

Predict the locations when the moon is in a waxing phase?



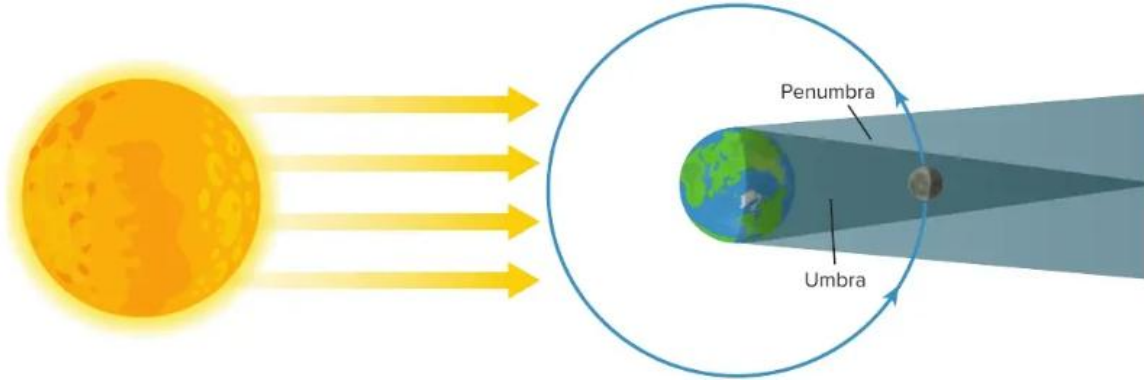
Question 24b

Predict the locations when the moon is in a waning phase?



Question 25a

What type of eclipse is shown in the image below?



Question 25b

What type of eclipse is shown in the image below?

