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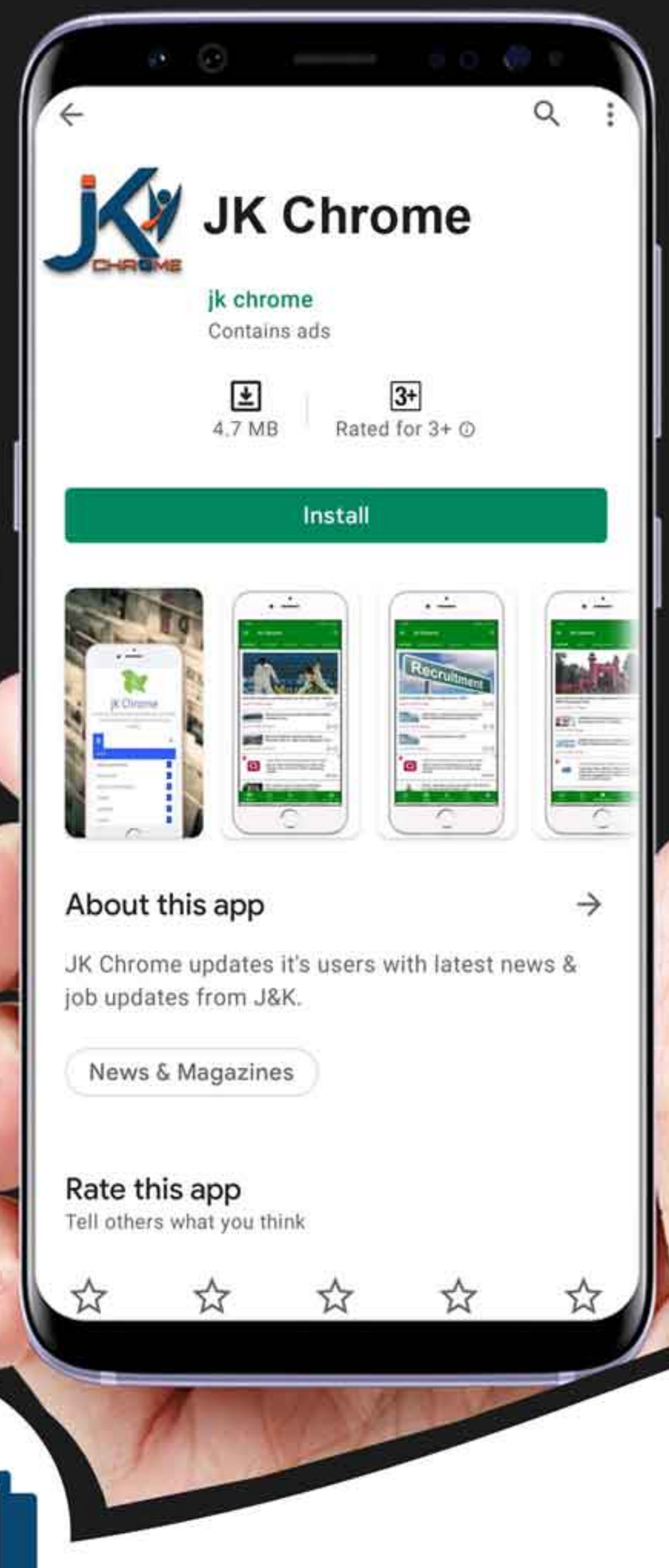

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The Atmosphere (composition and layer of the atmosphere)

Composition of the Atmoshpere

(i) Nitrogen-78% **(ii)** Oxygen-21% **(iii)** Argon-0.93% **(iv)** Carbondioxide- 0.03% **(v)** Neon-0.0018% **(vi)** Helium-0.0005% **(vii)** 0zdne-0.0006%
(viii) Hydrogen-0.00005%.

1. Carbon dioxide is present in small quantity in the atmosphere.

2. It is an important constituent of air because it has the ability to absorb heat and thus keep the atmosphere warm, thereby, balancing the heat of the earth.

3. Water vapour is the most significant component of the atmosphere as far as its effect on weather is concerned although its quantity varies considerably from practically none (0) to up to about 4% by volume.

4. Water vapour is the source of all clouds and precipitation (rain, hail storm etc.). Water vapour, like carbon dioxide, has the ability to absorb heat energy. It also regulates the hydrological cycle.

5. Dust intercepts and reflect incoming insolation.

6. The polluted particles present in the air not only absorb larger amount of insolation but also greatly absorb the terrestrial radiation.

7. Dust in the atmosphere contributes to the red and orange colour of sunrise and sunset.

Layers of the Atmosphere

There are five distinct layers of the atmosphere-(a) Troposphere (b) Stratosphere (c) Mesosphere (d) Thermosphere and (e) Exosphere.

Troposphere

1. This is the first layer of the atmosphere. It extends to a height of 18 km at the equator and 8 km at the poles.

2. In this layer temperature decreases with height. This is due to the fact that the density of air decreases with height and so the heat absorbed is less. It contains more than 90% of gases in the atmosphere.

3. Since most of the water vapour form clouds in this layer, all weather changes occur in the troposphere ("tropo" means 'change').

4. The height at which the temperature stops decreasing is called tropopause. Here the temperature may be as low as-58° C.

Stratosphere

1. This the second layer of the atmosphere. It extends from the tropopause to about 50 km.

2. Temperature increases due to the absorption of the ultraviolet radiation of the Sun by ozone present in this layer. The temperature slowly increases to 4°C.

3. This layer is free from clouds and associated weather phenomena. Hence, it provides ideal flying conditions for large jet planes.

4. At about 50 km the temperature begins to fall again. This marks the end of the stratosphere. The end of the stratosphere is called the stratopause.

Mesosphere

1. Above the stratosphere lies the mesosphere.

2. The mesosphere extends to a height of 80 km.

3. Here the temperature decreases again, falling as low as -90°C.

4. The end of this layer is known as the mesopause.

Thermosphere

1. The thermosphere lies above the mesosphere.

2. This layer extends to a height of about640 km.

3. **I**n this layer temperature rises dramatically, reaching upto 1480°C.

4. This increase in temperature is due to the fact that the gas molecules in this layer absorb the X-rays and ultraviolet radiation of the Sun.

5. This results in the break up of the gas molecules into positively and negatively charged particles or ions. Thus, this layer is also known as the ionosphere.

6. The electrically charged gas molecules of the thermosphere reflect radio waves from the Earth back into space. Thus, this layer also helps in long distance communications.

7. The thermosphere also protects us from meteors and obsolete satellites, because its high temperature bums up nearly all the debris coming towards the Earth.

Exosphere

1. This layer lies above the thermosphere.

2. The exosphere extends beyond the thermosphere upto 960 km.

3. **I**t gradually merges with interplanetary space.

4. The temperatures in this layer range from about 300°C to 1650°C.

5. This layer contains only traces of gases like oxygen, nitrogen, argon and helium because the lack of gravity allows the gas molecules to escape easily into space.

How the Sun Creates Energy

1. Hydrogen and helium are the predominant gases that constitute the Sun. The proportion of hydrogen to helium is 3 :1.

2. The core of the Sun acts like a gigantic nuclear reactor and converts huge quantity of hydrogen into helium. In this process of nuclear fusion, the Sun releases tremendous amount of energy in all directions.

3. The Sun radiates energy (both heat and light) in all directions.

4. Because of its small size in relation to the Sun, the Earth intercepts only a small part of the Sun's radiant energy.

5. Solar radiations are the primary source of heat and light to the Earth.

Insolation

1. The incoming solar radiation (energy intercepted by the Earth) is known as insolation and it is received in the form of short waves.

Terrestrial Radiation

2. The Sun's energy absorbed by the Earth's surface when radiated out into space is called terrestrial radiation.