Most of the energy from the CORE of the Sun radiates out towards the surface of the Sun in the RADIATIVE ZONE.

The upper 500 km, the CONVECTIVE ZONE, is where the energy is brought up to the surface of the Sun by convection currents. As the heat energy is released at the surface of the Sun, the gases sink back down creating the characteristic granular pattern of the surface. The sphere of light that we see at the surface is called the PHOTOSPHERE – the temperature is 5,800 K (or just over 5,500°C).

<table>
<thead>
<tr>
<th>CORE</th>
<th>RADIATIVE ZONE</th>
<th>CONVECTIVE ZONE</th>
<th>PHOTOSPHERE</th>
<th>CHROMOSPHERE</th>
<th>CORONA</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 MILLION K</td>
<td>5 MILLION K</td>
<td>2 MILLION K</td>
<td>5800 K</td>
<td>10,000 TO 20,000 K</td>
<td>UP TO 2 MILLION K</td>
</tr>
</tbody>
</table>

Picture credit: © Pedro Ré and SOHO/ESA&NASA
Above the photosphere is the sphere of colour called the **CHROMOSPHERE**, which is a layer of gas about 2,000 km thick. This layer is much fainter than the photosphere and so can only be seen during a total eclipse:

Above the chromosphere is the **CORONA** (crown):

The corona is the Sun’s much more rarified upper atmosphere, extending several million km. This is very faint and is only seen at a total eclipse. The temperature of the corona can rise above 2 million K.
A beautiful view of the magnetic field around the Sun

The magnetic field of the Sun can be clearly seen affecting the shape of the corona, which spreads out an enormous distance from the Sun. The poles show the orientation of the Sun.

A false eclipse or coronagraph view of the corona can be produced when a total eclipse is not occurring. An opaque, circular disc, which blocks out the majority of light from the Sun, allows the appearance of the corona to be seen and the magnetic field of the Sun to be viewed. Charged particles in the corona are drawn on to lines of the magnetic field.

The corona is the source of the SOLAR WIND.

(Details of the solar wind are in Section 1.3I of the course).
The activity of the Sun changes over an 11 year cycle (which is now thought to be half of a full 22 year cycle). As well as sunspot activity altering, the appearance of the corona changes as well. The sequence of images taken by the SOHO Extreme ultraviolet Imaging Telescope (EIT) show the changes in appearance of the corona during the solar cycle:–

### Solar Minimum
Cooler regions of the corona, called coronal holes are caused by weaker regions of the Sun's magnetic field. These are found over the north and south poles. The corona nearer to the equator is much weaker.

### Solar Maximum
At solar maximum, the density and temperature of the corona increases. The shape and detail of the corona becomes more pronounced and much brighter. At the poles are polar plumes, helping to make the corona shine all round the Sun.

Picture credit: NASA GSFC and SOHO EIT