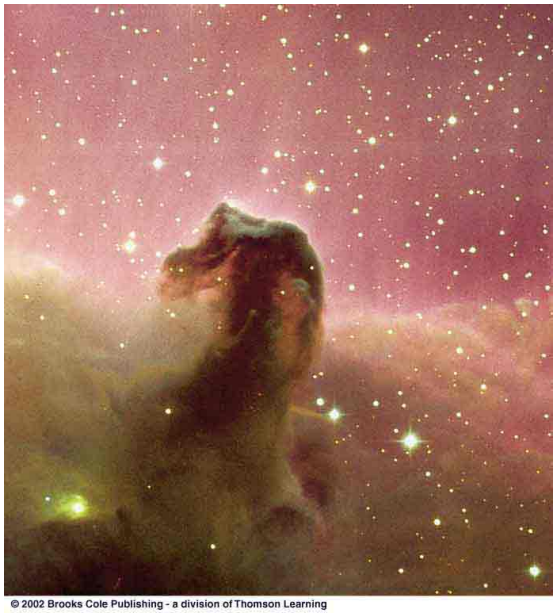
Stellar Birth and Stellar Structure



Dense "cold" clouds in the Interstellar Medium, or the ISM

75% hydrogen
25% helium
and trace amounts of :
carbon, oxygen, nitrogen

A clouds of *gas and dust* is called a nebula.

- Dark nebula
- Emission Nebula
- Reflection Nebula

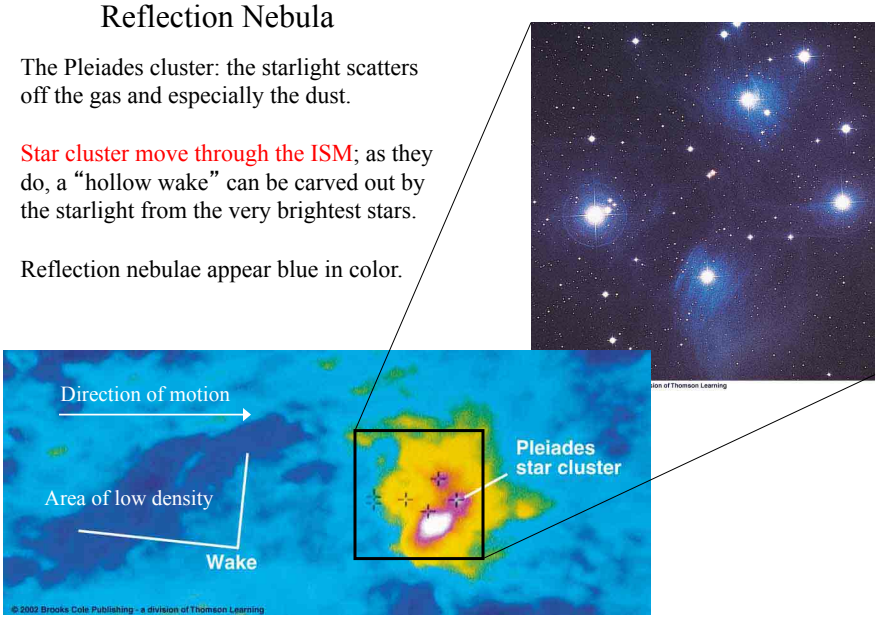
This picture is a dark nebula. Is is called the "Horsehead".

Reflection Nebula

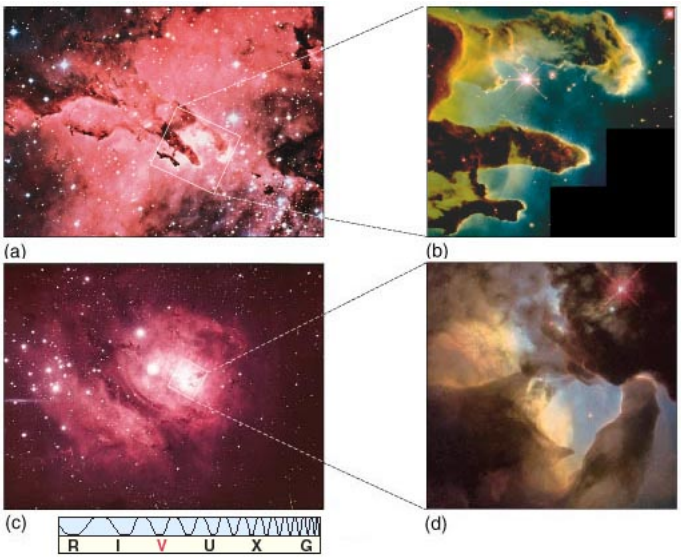
The Pleiades cluster: the starlight scatters off the gas and especially the dust.

Star cluster move through the ISM; as they do, a "hollow wake" can be carved out by the starlight from the very brightest stars.

Reflection nebulae appear blue in color.



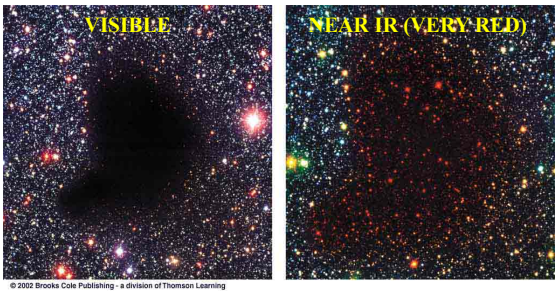
Examples of Emission Nebulae



Dark Nebula and Interstellar Reddening

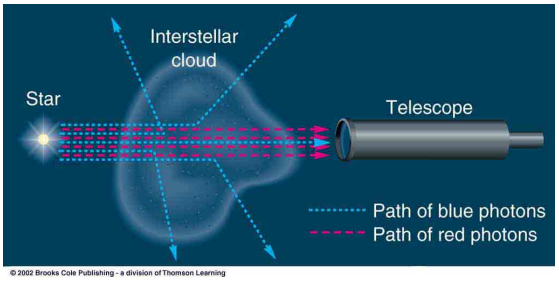
The "Dark Cloud" blocks out starlight in the visible.

However, observed in the very very red, the starlight does make it through the cold, dense, dusty cloud.

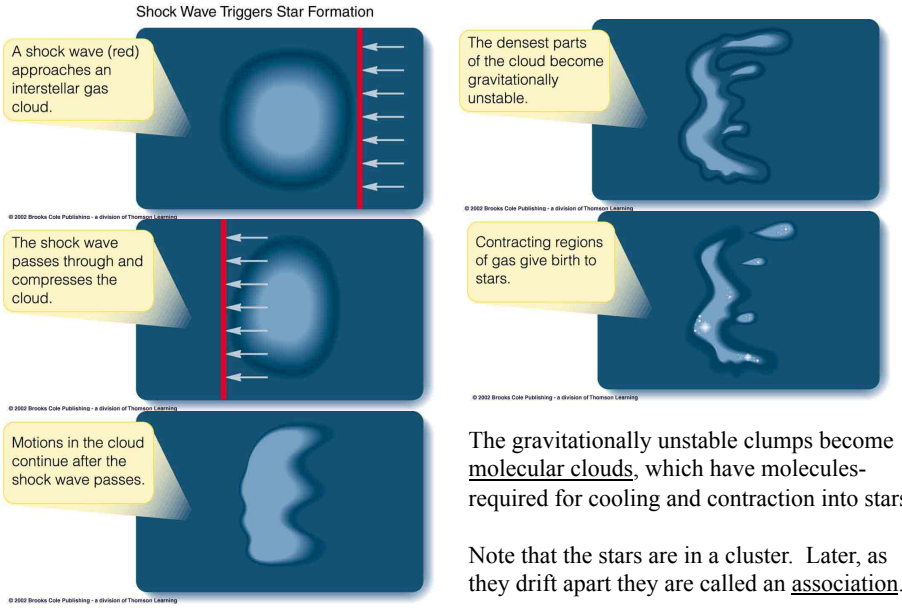


Interstellar Reddening occurs because blue light scatters more efficiently than does red light.

This is why reflection nebulae appear blue and sunsets appear red.



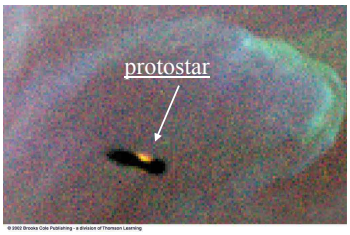
Formation of Stars From the Interstellar Medium

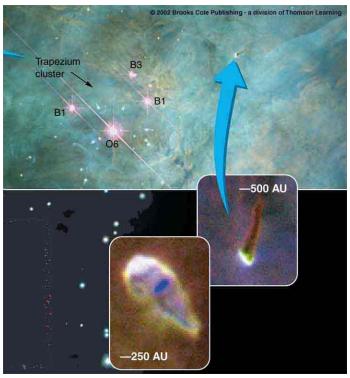


The gravitationally unstable clumps become molecular clouds, which have molecules- required for cooling and contraction into stars.

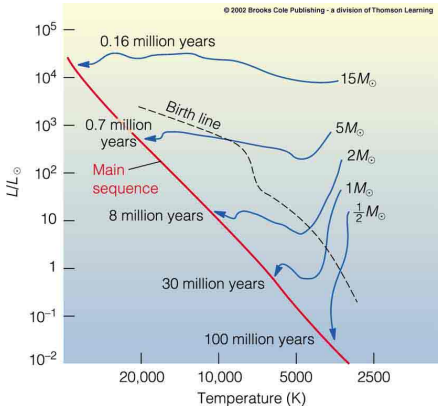
Note that the stars are in a cluster. Later, as they drift apart they are called an association.

Examples of Stars Forming



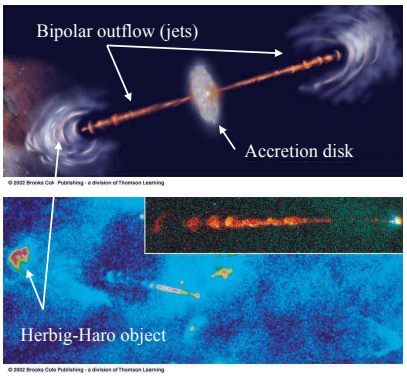


Stellar Birth and the Birth Line



The time it takes for a protostar to contract to a main-sequence star depends upon **mass**.

The larger the mass, the shorter the birthing process.



These protostars are in the bipolar outflow phase of their birth. Forming stars have accretion disks that focus material and energize it into these Herbig-Haro objects.