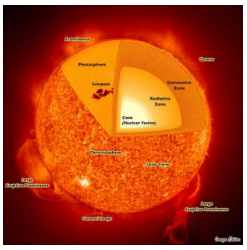
Star Power

Nuclear Fusion

- Stars are made up of hydrogen and helium atoms, which are packed densely to start nuclear fusion reactions.
- The most common nuclear fusion reaction is two hydrogen atoms combining into a helium atom, thus releasing energy.
- In order to counter the force of gravity and prevent a star from collapsing within itself, the energy from a nuclear reaction pushes outwards towards the surface of the star.
- Because of the outward pull of energy, stars shine brightly, releasing energy in the form of electromagnetic radiation.

Study Tip

A thermonuclear bomb reacts in the same way that a star produces energy; think about how much energy is released in both cases.



The sun that we see every day is constantly creating nuclear reactions.

Particle Accelerators

- By propelling subatomic particles towards each other, we can generate a tremendous amount of energy and create new particles, thus simulating the nuclear reactions that happen in the cores of stars.
- A particle accelerator is a device used to achieve nuclear fusion.
- Because particle accelerators simulate nuclear fusion reactions, it gives scientists a better understanding of how the universe works.
- Particle accelerators are often very large: The SLAC National Accelerator Lab in California is over 2 mi (3.2 km) long!

A particle accelerator built by CERN can create enough energy to simulate the amount of energy in the universe before stars were even created!

Concept Check

- How do stars obtain their energy?
- What can we use particle accelerators for?