

The Sun and Solar Wind:
A Search for the Beginning

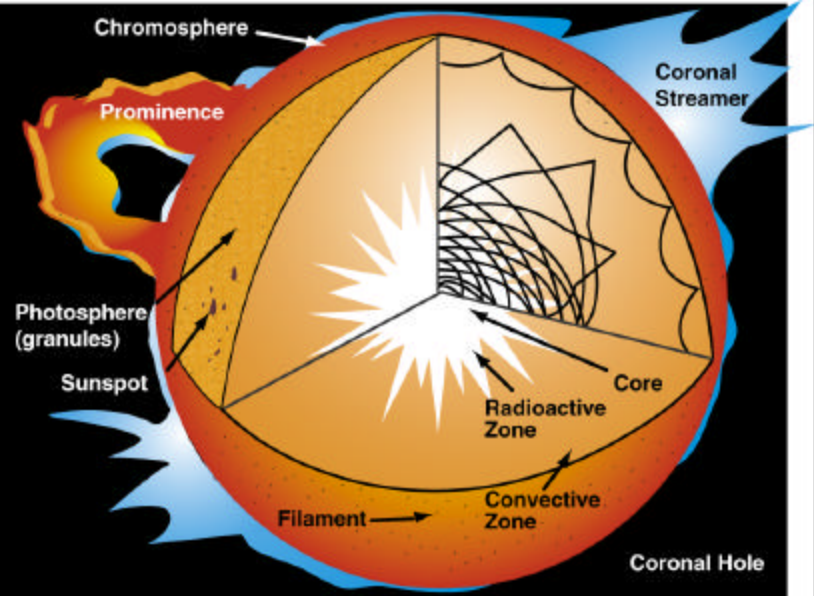
Standard Model of the Sun

STUDENT HANDOUT

INTRODUCTION

Figure 1

Models in science (like the Standard Solar Model) serve a practical function. They allow us to reconstruct items of study so that we can begin to understand our immense solar system. The Standard Model of the Sun (see Figure 1) makes it possible for scientists to estimate the temperature profile of the sun. Data from the sun's profile (see Figure 2) make it possible to make observations, predictions, and to compare these predictions based on the Standard Solar Model.



Standard Model of the Sun

Figure 2

Data Table of Sun's Properties		
Sun		
Radius		6.9598×10^{10} cm
Mass		1.989×10^{33} grams
Luminosity		3.854×10^{33} erg s ⁻¹ (3.854×10^{23} kW)
Age		4.55×10^9 years
Volume		1.412×10^{33} cm ³
Mean density		1.409 g cm ⁻³
Mean distance from Earth		1.4959787×10^{13} cm
Composition	by number	91% H, 9% He, 0.1% other
	by mass	71% H, 27% He, 2% other
Core		
Temperature		1.577×10^7 °Kelvins
Density		151.3 g cm ⁻³
Pressure		2.334×10^{11} bars
Convection zone		
Radius		0.713 x radius of sun
Temperature at base		2.12 to 2.33×10^6 °Kelvins
Photosphere		
Temperature		5780 Kelvins
Pressure		10^{-4} bars
Corona		
Temperature		2 to 3×10^6 °Kelvins