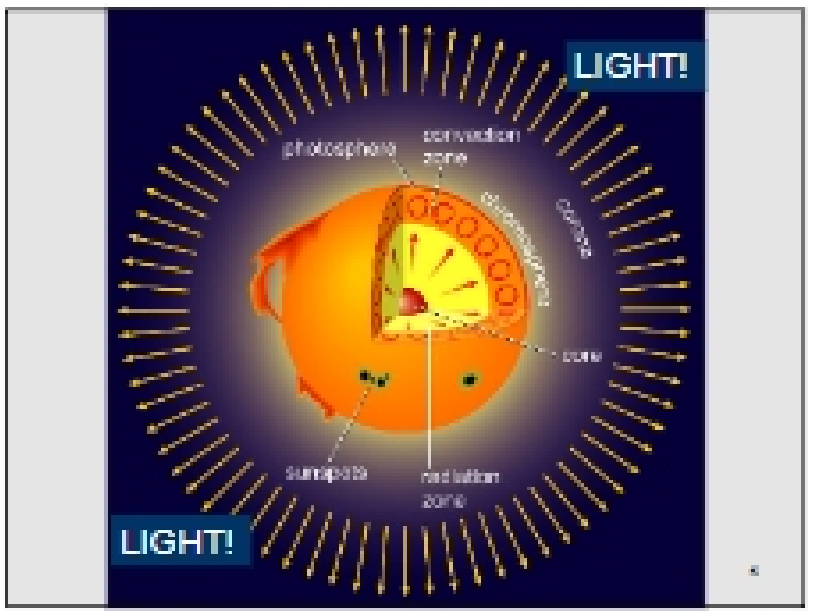
Learning Goals:

- Explain the proton-proton cycle in easy-to-understand language.
- State how radiation is transported through each region of the Sun's interior
- Explain how the Sun maintains a constant balance in its interior (solar thermostat)



Core

Proton-Proton Cycle

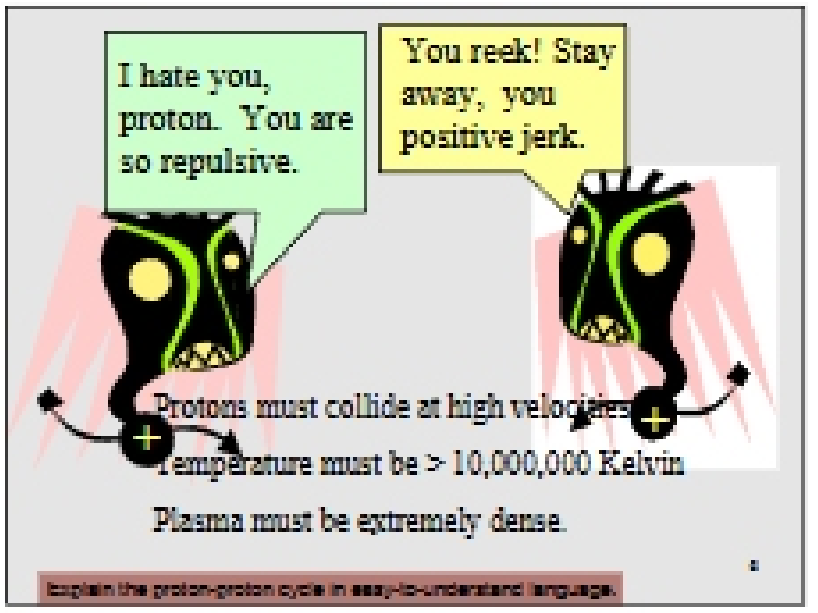
- $^1H + {}^1H \rightarrow {}^2H + e^+ + \text{neutrino}$ (2γ, e^-, ν)
- $^2H + {}^1H \rightarrow {}^3He + \text{gamma ray}$ (γ)

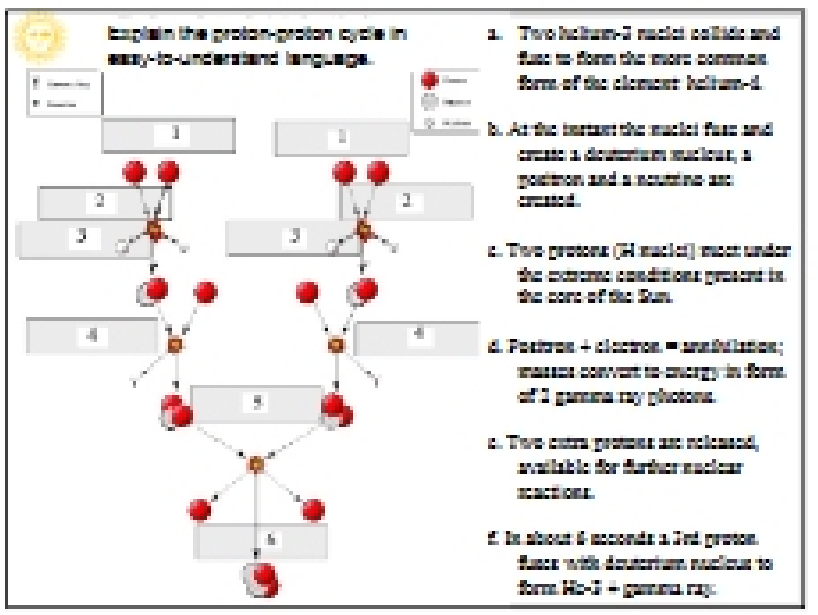
Must occur twice

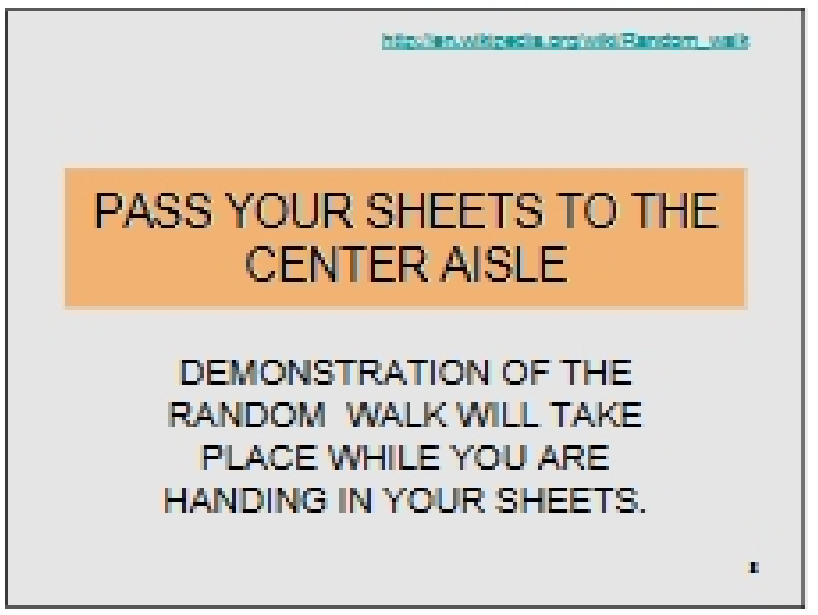
- $^3He + {}^3He \rightarrow {}^4He + {}^1H + {}^1H$

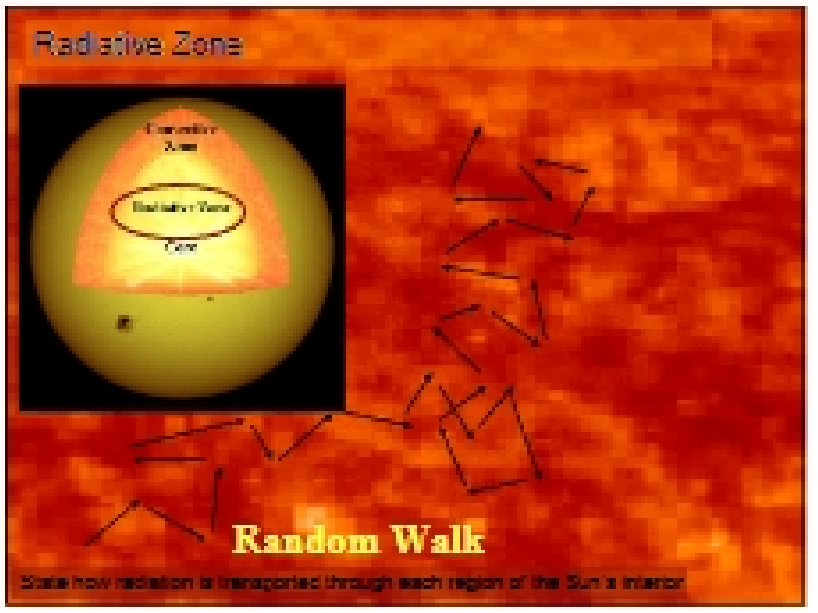
0.007 of original mass is converted to energy

Explain the proton-proton cycle in easy-to-understand language.




Explain the proton-proton cycle in easy-to-understand language.
a. Two helium-3 nuclei collide and fuse to form the more common form of the element helium-4.
b. At the instant the nuclei fuse and create a deuterium nucleus, a positron and a neutrino are created.
c. Two protons (H nuclei) meet under the extreme conditions present in the core of the Sun.
d. Positron + electron = annihilation; masses convert to energy in form of 2 gamma ray photons.
e. Two core protons are released, available for further nuclear reactions.
f. In about 6 seconds a 3rd proton fuses with deuterium nucleus to form He-3 + gamma ray.


PASS YOUR SHEETS TO THE CENTER AISLE
DEMONSTRATION OF THE RANDOM WALK WILL TAKE PLACE WHILE YOU ARE HANDING IN YOUR SHEETS.


Radiative Zone
Random Walk
State how radiation is transported through each region of the Sun's interior