K. Sweet *PAN 2013 Lesson Plan*

Course: IB Physics

Topic: Option E - Astrophysics, Stellar radiation and stellar types

Assessment Statements:

E.2.1 State that fusion is the main energy source of stars.
Students should know that the basic process is one in which hydrogen is converted into helium. They do not need to know about the fusion of elements with higher proton numbers.

E.2.2 Explain that, in a stable star (for example, our Sun), there is an equilibrium between radiation pressure and gravitational pressure.

Lesson Questions: How do stars generate energy?

Objectives:

- Students will be able to explain and draw the proton-proton chain process
- Students will be able to explain and draw the CNO (carbon-nitrogen-oxygen) cycle of nuclear fusion

Bring:

- Per student – periodic chart of elements, four protons (magnetic marbles), one die
- Per group – set of CNO cards
- Extra Classroom Equipment – extra proton and neutron marbles

Students will have previously:

- Learned about the general structure of the solar system.

Introduction:

- Define the term "star", see "What is a Star" slide

Body:

- Notes on proton-proton chain
- Students play "Stellar Fusion" game
- Notes on CNO cycle
- Students play "CNO Cycle Card Game"

Closure:

- Students work in groups to create a poster explaining the two types of energy production occurring in stars based on rubric.