Project ideas

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- Compare the effect of **different initial** metalicity and helium **content** on the evolution of a star.
- Compare **nuclear reaction rates** between PP and CNO, as well as between stars with different initial conditions (e.g. mass, metalicity)
- Have a star be on the MS **as short as possible**. Have a star skip the RGB and Asymptotic RGB altogether or make it be on them as short as possible.
- Create a **blue dwarf**
- Verify the constancy of a **Cepheid star**.
- Create a **binary star system** in which one of the stars each the other.
- Investigate **many binary star systems** in general.
- Create a **triple star system**. Create an N-stars system.
- Compare (i.e. confirm) the properties of Type II and Type I supernovae.
- Create a **black dwarf**.
- Create a **nova** (and not a supernova).
- Have a star **accrete mass**
- Make a sunlike star become massive enough so that it can fuse.
- Investigate (or confirm) the **types of heat transfer** between different stellar objects. E.g. a **red dwarf** should be fully convective.

Try **various interesting limits**:

- Create a star that is just **not dense enough to become a black hole** instantly, and such that it still has sun-like evolution.
- Test the **Chandrasekhar limit**
- Test the **minimum mass** and other parameters required for a protostar to **become a star** instead of a brown dwarf (failed star)
- Test the **maximum mass** for sun-like behavior.

Further,

- Create a star with vastly different properties from the sun but which could still be used as a substitute for the sun.
- Simulate **objects that aren't stars**, see e.g..
- Investigate **mass loss** through evolution. How much mass can a star lose? What configurations make a star lose as much mass as possible?

Further,

- *Why is the **Sun's corona** (atmosphere layer) so much hotter than the Sun's surface?*
- *How do other solar-like stars **generate their magnetic fields**, and what are the similarities and differences between stellar **activity cycles** and that of the Sun?*
- *What is the **origin of the stellar mass spectrum**? That is, why do astronomers observe the same distribution of stellar masses – the initial mass function – apparently regardless of the initial conditions?*
- ***Supernova**: What is the **exact mechanism** by which an implosion of a dying star becomes an explosion?*