**Astronomy 122 Fifth Homework Submission Template**

1**. In the class notes we make use of the Drake equation as providing a statistical estimate of the number of civilizations that might exist in our Galaxy and are capable of communication. Recently, however, some scientists have argued that the Drake equation is an inaccurate description. This new theory is known as the "Rare Earth Theory" (by Ward and Brownlee). Do some research on this new theory and identify what the key components of this theory are that suggests planets like the Earth are much rarer than we think they are**.

Your response here:

**2**. **A dramatic new view of the geologic history of the Earth has arisen in the last few years. This view is quite controversial and is known as "Snowball Earth." Summarize what this theory is and what is some of the evidence for and against this hypothesis**.

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| Your response here: |

**3. Do some research on hydrothermal vents and their associated biological communities. Provide an argument that it is this environment that is most responsible for the existence of life on Earth**.

These last two questions are related to Climate Change Tipping points. Why am I asking them?

a) student should know more about this, b) its relevant to the maintenance of intelligent life on planetary surfaces.

**4. Do some research on the rate at which Greenland is Melting and provide evidence that we are nearing a point of return where the ice sheet can not recover.**

5. **Do some research on the warming in the arctic and the thawing of Arctic permafrost which releases Methane as part of the thawing process. Discuss whether or not you think we are now heading towards a climate catastrophe**.