Department of Materials and Metallurgical Engineering
South Dakota School of Mines and Technology

MET 321 **Homework #1**

1. Each Wednesday starting Jan 26 select the next paragraph topic in the below list and write **one** well-constructed **paragraph** of 150 or fewer words. The italicized words must be focal points in each paragraph. Use your own sentences: not mine.

Paragraph 1

- Introduce to the reader that the ***cost*** (price) of a metal depends on factors related to metal ***production*** as well as to metal ***consumption***. Factors faced by the metal ***producers*** when ***supplying*** metals include
    a. ***concentration*** and the ***scarcity*** of the mineral from which the metal is produced,
    b. the ***creativity*** of engineers and other professionals producing the ore body containing the metal (i.e. – technology), and
    c. the ***chemical complexity*** required to reduce the metal.
- Explain that the ***consumers*** of metals affect the cost by their
    a. ***demand*** for the metal,
    b. use of ***substitution*** (replacement) of other materials when cost is too high, and
    c. ***conservation*** (recycling).

Paragraph 2

Provide examples of ***concentration*** and the ***scarcity***. Use actual data or specific examples: not generalities. For example some metals are very scarce and very expensive. Others are appear in fairly low concentrations but are relatively cheap.

Paragraph 3

Provide examples of ***creativity***. Use a specific example where technology has worked to mitigate price increases likely from declining grade, etc.

Paragraph 4

Provide examples of ***chemical complexity***. Use specific examples of at least two metals: one cheap and one expensive because of their chemical (reduction) complexity or simplicity.

Paragraph 5

Describe how ***supply-demand*** sets the price. (This is fundamental economics.) Use a supply-demand plot.

Paragraph 6

Describe ***substitution*** affects price referring to your earlier supply-demand curve. Provide at least one actual example of substitution for a lower-cost material.

Paragraph 7

Describe what is meant by ***conservation*** and how it more realistically means keeping the concentration of a metal high (as opposed to mixing metals into a landfill). Include a realistic discussion that balances the economics of recycling and the presumed public perception for recycling. Include an example of economic recycling and non-economic recycling.

Paragraph 8

Summarize the above writing in one cohesive conclusion. It is alright, indeed necessary, to repeat (very succinctly) some of the above ideas.