*Below is the first homework for the InTeGrate Activity “The elements and society: how we need them, where do they come from, and the societal and environmental impacts” by Graham B. Baird, Earth & Atmospheric Sciences, University of Northern Colorado*

The elements and society, Homework I

Objectives:

* Learn where elements are extracted from (lithosphere, hydrosphere, atmosphere, biosphere)
* Determine which elements are needed in today’s society.
* Gather information on and understand the relative commonality/scarcity of elements found in the lithosphere.
* Gain an appreciation for the relative cost of obtaining some of these elements.
* Gain an appreciation for the amount that some of these elements are needed in today’s society.

Procedure:

You will be assigned a set of elements in an appreciable concentration within the earth. For each element you will determine:

* 1. Determine where the element is typically extracted from (lithosphere, hydrosphere, atmosphere, biosphere). Use Wikipedia.org as the source.
  2. If the element is at least in part extracted from the lithosphere, determine the crustal abundance, convert all units to ppm. Use education.jlab.org/itselemental/index.html as the source.
  3. If the element is at least in part extracted from the lithosphere, how is the element used in today’s society? (be general, e.g. electronics, medical, high technology, agricultural, manufacturing, etc.). Use Wikipedia.org as the source.
  4. If the element is at least in part extracted from the lithosphere, what is the cost of the element if it were to be bought on the market today, convert all units to USD/kg. Use www.hobart.k12.in.us/ksms/PeriodicTable/abc.htm as the source.
  5. If the element is at least in part extracted from the lithosphere, how much of the element is used/needed in the world per year? There is no set source of info for this question, use whatever resource you can find. For many elements, it maybe listed as the demand for its oxide (e.g. gadolinium oxide or Gd2O3 or whatever the case may be) or it maybe listed as world production (how much is made is different than how much is needed… but they should approximate each other…). Further, if you can’t find info for 2015, anything in the last 10 years is acceptable. You must list the source of information, the year for the number provided, and if the number was production or demand what the material exactly was (pure metal or oxide, etc.). Convert all values to metric tons per year.

Reporting of information:

You should have received a link via email to a google sheet: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For your assigned elements:

Place an X in the column(s) of where extracted.

Enter the crustal abundance in ppm

Place an X in the column(s) of were used in society

Enter cost in USD/kg

Enter use per year in tonnes. Provide the details of the use per year number in the notes column (see #5 above).

Any additional info can be placed in the notes column…

This is due \_\_\_\_\_\_\_\_\_\_\_ by the start of class.

In the next assignment everyone will use the completed spread sheet to learn something about the elements…