**Semester 1 Standards: Additions to sludge**

**H.1P.1** ***Explain how atomic structure is related to the properties of elements and their position in the Periodic Table.***

Identify your metal/metalloid in your sludge. Draw an atom structure of it. What period/family is it in the period table? What about it atomic structure would make it reactive or stable?

***Explain how the composition of the nucleus is related to isotopes and radioactivity.***

Is there a radioactive compound in your sludge? How could you find out if there was one? What part of the atom makes it radioactive?

**H.1P.2** ***Describe how different types and strengths of bonds affect the physical and chemical properties of compounds.***

Identify the bonds in liquids as ionic, covalent or metallic. Would the compound dissolve in water, conduct electricity if dissolved, shares electrons equally or unequally? Do this compound have a strong or weak bond?

**H.2P.1** ***Explain how chemical reactions result from the making and breaking of bonds in a process that absorbs or releases energy.***

Identify an exothermic or endothermic reaction in sludge. What energy release or absorbed in the reaction?

***Explain how different factors can affect the rate of a chemical reaction.***

Identify a chemical reaction in your sludge, how could you slow down the reaction and speed it up?

**H.2P.2** ***Explain how physical and chemical changes demonstrate the law of conservation of mass.***

Where did a chemical change happen in your sludge? Was mass destroyed or what happened to the mass?

**H.3S.1 *Based on observations and science principles, formulate a question or hypothesis that can be investigated through the collection and analysis of relevant information.***

\*\*\*\*\*\*\*\*Problem Statement or Hypothesis of sludge\*\*\*\*\*\*\*\*\*\*\*\*\*

**H.3S.2** ***Design and conduct a controlled experiment, field study, or other investigation to make systematic observations about the natural world, including the collection of sufficient and appropriate data.***

\*\*\*\*\*\*\*\*\*\*\*\*\* Part 2 of sludge, enough labs to identify substances in sludge\*\*\*\*\*\*\*\*\*\*

**H.3S.3** ***Analyze data and identify uncertainties. Draw a valid conclusion, explain how it is supported by the evidence, and communicate the findings of a scientific investigation.***

\*\*\*\*\*\*\*\*\*\*\*\*\* Part 3 & 4 of sludge \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**H.3S.4** ***Identify examples from the history of science that illustrate modification of scientific knowledge in light of challenges to prevailing explanations.***

Research at home and identify two examples in history where science concepts have changed from a new discovery/knowledge.

**H.3S.5** ***Explain how technological problems and advances create a demand for new scientific knowledge and how new knowledge enables the creation of new technologies.***

Identify a technology that you used in sludge and how that technology lead to understanding.