What follows is a recap/summary of a few of the original ideas/activities/assignments from this semester's SBI3C and SCH4C classes I used as my platform for experimenting with our TLC project. To set the stage, both of these classes were very small with 10 and 11 students to begin with and there was a fair bit of rotation throughout the first month or so of the semester. As this course was offered through the Alternative Education Department, I needed to make as much of my course applicable to the "real world" as possible to help with engagement. The following are annotated samples of these activities.

SBI3C -

CELL BIOLOGY (UNIT I)
What is in our food?: https://drive.google.com/open?id=0B2qIC1JOEfvtUU52NnVaeWl6WkU
This was a hook activity to reinforce what we had spoken about up to this point in the unit. We had been discussing proper food and nutrition and what students (themselves and their peers) consume on a daily basis. This also worked as a formative version of the summative lab that was the culminating activity for this unit. Students could practice their lab skills and learn what was in their foods at the same time.
Students tested "junk food" for the presence of nutrients (qualitative testing to correspond with the first unit in Chemistry). They they discussed why there was an absence of proteins and nucleic acids but an abundance of fats/lipids and carbohydrates. This activity and discussion was followed by the unit culminating activity that was a "mystery" about how an individual died. The students were the lab technicians that were working to quantitatively analyse the contents of the dead person's stomach in order to trace his path prior to his demise.

MICROBIOLOGY (UNIT II)
Zombie Apocalypse Documentary Assignment:
https://drive.google.com/open?id=1E4CkpBFipKoBN5J0MDn06qTm5yAQzWVAKUgr8_jSg2A
https://drive.google.com/open?id=1T93QfsVBneBH1uTnWH2MFNm6KHhqqllJJpBBiTYuNsY

This assignment was an all-encompassing one that lead the entire unit. The unit was introduced by watching how a viral outbreak could begin, transmit across the world, wreak havoc and be overcome with all of its side-effects through the Hollywood spectacle of Contagion. After many pauses and mini-discussions at every point that related to our curriculum expectations and any and all math (connection to project's math aspect), we reviewed what we saw with special emphasis on the aspects important to our curriculum expectations. Students researched actual microbial diseases, looked at microbe structure and function of organelles (continued and extended from the last unit) and then proceeded to work through the case study (math based) below:

Disease Outbreak Case study: https://drive.google.com/open?id=0B2qIC1JOEfvtcXhfQzRGUlZhekk

Along this exploratory path, students formed ideas about how a microbial infection that caused "zombie-ism" would begin, transmit, wreak havoc and be overcome if it were to happen in our reality. They used this knowledge and their technology skills to write and record documentaries (in groups) that were to convey a world in which this had occurred and they were some of the last survivors who had to start the world again.

The two links at the beginning are the assignment as given to students and the second is a day-by-day account/summary of the unit as it unfolded.

GENETICS (UNIT III)
Introduction to Genetics Activity:
https://drive.google.com/open?id=1xRK0X3Rlh0zfwM20lFMqrOB1_x2ZO3QbyLQ7nY4DCSU
Historical Genetics Case Studies:
https://drive.google.com/open?id=0B2qIC1JOEfvtZFNqTThVTkdjbUU

Ethics of Genetics Case Studies:
https://drive.google.com/open?id=0B2qIC1JOEfvtRDFBQ2Rjb3lSVzg

To introduce students to the importance and historical significance of genetics and the study of genomics in general, I had them work through a self-guided activity or assignment that would allow them to work at their own pace through a series of on-line and paper activities. Through this exploration students were able to explore further ideas and concepts in social-justice as well as genetics that interested them as they worked through short passages that opened their eyes to the significance of genetics and genetic research. We began the class by touching upon the idea that they have genes and medicine has the ability to calculate the probability of a person such as themselves developing a genetic disorder or passing on a particular trait to their offspring. Who has ownership of those genes and of that knowledge? The researchers who discovered it? The doctors that can apply the information? The data analysts that collected the information? The individuals who house the genes? This made them think and consider some of the ethics and power involved in genetics research.

Making Babies Activity: https://drive.google.com/open?id=0B2qIC1JOEfvtcnU2N3Y5eWZPNVU
After looking at the steps and processes involved in mitosis and meiosis, we gave it a whirl and made babies of their own. Through the use and brief discussion of statistics (math connection) they flipped coins in partners (mom and dad) to determine what alleles their baby would inherit and, consequently, what phenotypes and genotypes their child would display. This incorporated statistics, data management, visual art (drew baby portrait), genetics and fun all resulting in comprehension and engagement.

SYSTEMS (UNIT IV)
I had a student teacher who completed this unit so I began with a two-part discussion/analysis of the effects of abusing our digestive/respiratory systems in today's society.
For my part of the planning, the following links were used to prompt thinking and discussion about the costs and benefits to individuals and society with regards to obesity and smoking.
I sparked discussion by showing students The Bold Truth: Powerful anti-obesity advertisement. This was a VERY powerful commercial to make people reflect upon the systemic problem of obesity in our

current society. We compared this phenomenon to Coca Cola's marketing commercial this past year in the fight against obesity: Coca Cola modified commercial vs industrial commercial and compared it to the article and coca cola webpage (mixify.com) ... commercial. We then compared these tactics and messages to those produced in the 1950s and 60s by the same company classic coca cola commercials 1, 2 as well as a cigarette advertising 1950's, Flintstone's,

This discussion interested students in the topic areas and we continued on to learn about the functions and parts of digestive, respiratory and circulatory systems as per the curriculum expectations.

PLANTS (UNIT V)
Discuss. Decide. Complete. Submit Activity:
https://drive.google.com/open?id=15qdBj0UG5dhLPwH5FoWNFyc_v4sonZM0goO3BBgDORw

This unit was laden with articles exploring the importance of plants to nature and humans. The activity above was a plant inspection. Students were to work in pre-designated groups on forms that began with a photo of a plant. They were to discuss the adaptations they saw; decide for which climate this plant was best suited; complete the form as a group. We then discussed their ideas and moved on to other details about plant adaptations from that point onward.

SCH4C -

MATTER (UNIT I)
Explore an Issue - Drug testing: https://drive.google.com/open?id=0B2qIC1JOEfvtbkV4SVNlc2YtaDg
This was the way I chose to introduce this course. I tried to connect it to something that they knew and enjoyed. I began by starting a conversation about the dangers of drugs and the risks involved with such behaviour. I manipulated the discussion onto the t.v. show Border Patrol , a "reality" t.v. show about customs officers and their experiences at the Canada-U.S. border services. This show often has incidences of drug trafficking and drug smuggling in various means. The one I focused on was disguising illicit drugs as common items (eg: baby powder; sugar; flour; etc.). After asking the students to think about how the drugs might be detected or found by chemical means, we watched the video in the linked document to realize that qualitative procedures could be used to identify substances. Qualitative analysis of chemicals was the first of our specific expectations explored. This seemed to get them interested enough to explore other methods of qualitative analysis in the classes that followed.

ORGANIC CHEMISTRY (UNIT II)

Organic Chemistry Research Assignment:
https://docs.google.com/a/gapps.yrdsb.ca/document/d/1W2eE6_9kuOHrSR4-zcZvgl9ERw4jUxEgS6LGF7gUzyc/edit?usp=sharing

After looking at organic molecules and reactions as well as the properties of these molecules, students set out to research different common organic molecules/substances to learn and convey the information to their peers. This worked very well to make what we studied enjoyable and engaging.

CALCULATIONS (UNIT III)

Cupcake/Cake Recipe Conversion Assignment: (hardcopy)

After doing a few in-class exercises and worksheets about the mole and mole conversion methods, students were assigned a mole conversion mini-project where they worked in groups to convert various different measurements in a recipe. Class time was provided to work through the conversions of cups to grams; litres to millilitres; degrees Kelvin to degrees Fahrenheit, etc. The fun part of this assignment was baking. Students would submit the conversions and answers to the accompanying questions with a sample of their cake or cupcakes. If conversions were correct, the baked goods were exquisite. If not, some were salty or too sweet or not sweet enough, etc.

Safe Drinking Water Assignment:
https://drive.google.com/open?id=14CZSCR9fw8Z-F8c1C7DdaWUlnpu7YVZbU5gvMcdmotA

This unit was a lot of notes and socratic information. The students were very engaged and ready for this style of half-period lesson followed by half-period work time to do practice questions. Since many of them were also in the Biology course above, they were ready to sit and absorb information a little after the work they had put into the documentaries.
This assignment came at the end of the unit. It was to give life or application to all of the molecules that they had looked at and see where organic substances could cause danger or harm to humans and animals. This activity allowed students to read short excerpts and interpret their meaning and impact socially, environmentally, organically and biologically through the eyes of individuals looking at ideas through a social - justice lense.

ENVIRONMENTAL (UNIT IV)

1. Titration Practice Lab ,
2. equipment practice,
3. summative titration lab

This unit began as the others in trying to connect the students to the curriculum. We started from 'where they were' and led them to 'where they needed to be.' We discussed their experiences with water pollution, examples of causes and effects of water pollution, and we referenced information learned in the water project in a previous unit.
The largest part/biggest concept of this unit had to be titration. This is the laboratory skill that accompanies the theoretical concept of stoichiometry, another key aspect of senior chemistry courses. In order to best prepare students for success with this, often, challenging activity, they were introduced to it in stages. They had already practiced the concept of stoichiometry so I began this topic by asking them to complete practice questions in stoichiometry. After this, I explained that what they were about

to embark on were the skills required to obtain some of the key information required to do stoichiometry. Usually students are provided with 'givens' and the stoichiometry proceeds from there. They were now given the opportunity to discover a 'given' in the lab!
This process took place over four periods. The first period was the ***titration practice lab*** *where students used eye droppers and test tubes to witness the concept of end-point using phenolphthalein (indicator), acid and base. Day two was entitled* ***equipment practice*** *and it involved use of actual burettes and Erlenmeyer flasks along with the acid (vinegar), base and indicator to perform a titration. Finally, The third and fourth periods involved authentic titration equipment and a worksheet with questions in the form of a lab report where students could perform the titration they had almost unwittingly become well versed in and then complete their findings in a lab report for summative marks.*

ELECTROCHEMISTRY (UNIT V)
Demo: Corrosion with pop and nails:
https://drive.google.com/open?id=0B2qIC1JOEfvtRjZMd3VpSVpneDA

Lab: Electroplating: https://drive.google.com/open?id=0B2qIC1JOEfvtQkY1MGE5TzM4djA

CASE STUDY: Piercing Problems: https://drive.google.com/open?id=0B2qIC1JOEfvtMmtMR3hvVmVQdlU

Demo: Cleaning Silver at home (did not use a link but here is a video https://www.youtube.com/watch?v=CsKLcc13WBo)

In the hopes of keeping students interested in the last few weeks of classes, I tried to make the unit of electrochemistry as user-friendly and relatable as possible. For almost every note, webquest, and information mining activity, there was a lab or demonstration to accompany it. We began by talking about how food goes bad and why food in a can has a longer shelf life. Students were led to the conclusion that there is something about the can that allows food NOT to react with the metal and if that coating were damaged, the food would go bad. The demo on corrosion with pop and nails above was useful in allowing them to see that while reiterating why pop is so corrosive to their teeth and body in general.

The electroplating lab was placed in line with the topics of electroplating and jewelry allergies so students could see how easy it is to coat jewelry and give the illusion of a more expensive piece of metal while still maintaining low cost and low weight. This proved very interesting for this particular group of girls who gained a few piercings themselves over the course of the semester.

Finally, the silver cleaning demo proved somewhat interesting to the students as they were aware of the distinct odour involved in this process with baking soda and boiling water but I will improve this demo/activity by having students attempt to clean the silver 'the old fashioned way' by rubbing the silver oxide off of the intricate designs with a cloth and purchased cleaner prior to using this chemical method. I think that this would give them more of an appreciation for the wonders of chemistry in their own lives.