Pilot Course Proposal

Submitted by: Lawrence Mosko Building: Lindbergh HS

Proposed Course Title: College in the HS Chemistry (Bellevue College Chem 140)

Grade Level: 9, 10,11,12 Department: Science

PLEASE ATTACH THE FOLLOWING:

Description of course content and how this course will meet current needs not being met by other courses. Description must also include the needs assessment data.

Specifically, what will the student know and be able to do as a result of this course?

This course for LHS students will be teaching Chemistry to students wishing to learn about matter, changes in matter, and how compounds form and bond. There will be a variety of ways students will be learning such as lab investigations, group work, lecture & project-based learning. The following general list of topics will be taught over two trimesters:

- Define chemistry as a scientific study of matter and its transformations and the scientific method as a way to acquire knowledge.
- Apply precision, accuracy, and safe lab practices in taking measurements in support of scientific observation.
- Develop problem-solving skills related to unit conversions, stoichiometric quantification of chemical reactions, and solution chemistry.
- Extract information about an element from the periodic table: for example, the symbol, atomic number, atomic weight, and the number of protons and electrons.
- Identify the relationship between the position of an element on the periodic table and its atomic structure and physical/chemical properties.
- Explain the concept of the mole and molar mass and how they relate balanced chemical reaction equations.
- Write the formulas and names for ionic and covalent compounds using the Periodic Table.
- Describe the structure and properties of matter based on ionic/covalent bonding and intermolecular forces.

Upon completion of this course students will be able to meet the following Washington State K-12 Learning Standards:

Washington State (NGSS) Learning Standards that will be covered in this class include:

Standards related to Structure and Properties of Matter:

HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.

Standards related to Chemical Reactions:

HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

- What are the assessments that will be used to determine student achievement of the goals of this course?

Each trimester class will have a final exam just like the BC 140 class. Along with the final exam there will be other unit assessments which could be tests or projects. There will also be various quizzes, homework assignments and lab experiences that will all be part of the students learning for the course.

Describe how this course will address:

- **Alignment with Common Core State Standards (CCSS) and/or WA State Essential Academic Learning Requirements (EALRs)**
  - The NGSS standards that will be covered are listed above in the course description
- **Integration of technology**
  - Students will be using a variety of lab equipment and technology in this course. There is substantial Vernier Probe-ware and sensors at Lindbergh that will be utilized along with other scientific materials, equipment and supplies.
- **Infusion of diversity/multicultural perspectives**
  - Throughout the class there will be global problems and issues used as well as Anchoring phenomenon for contextual connections to real world and or career topics.
- **Integration with other subject areas**
  - Not anticipated at this time

- **Provision of appropriate experiences for learners of varying abilities**
    - Differentiation will happen in multiple manners depending on the individual lessons and students.

- **Development of higher-level thinking and processing skills**
    - There will be a significant amount of higher-level thinking, discussions and group work in this course.

- **Articulation of scope and sequences across grades K-12. Will this course replace an existing curriculum? If so, which course?**
    - This course will not be replacing any current level science classes. It will be a new two semester course.

- **Statement of impact:**
  The Bellevue College description of this class is below. I would expect that this class at LHS would have the same overall goal. We would describe this class to students interested in post-secondary learning in STEM fields. The LHS class would be preparing our students for science and engineering majors who will be continuing to learn about chemistry topics in college.

  From the Bellevue College web site: Preparatory chemistry for science and engineering majors intending to take the general chemistry series (CHEM 161/CHEM 162/CHEM 163). Topics include: atomic structure, stoichiometry, solutions, bonding, acids-bases, and oxidation-reduction. A quantitative approach and problem solving is emphasized.

- **Instructional materials and cost (include titles, names of publishers and copyright).**

Students will have access to an electronic textbook when they register through Bellevue College. In addition, they will have other BC resources like access to data bases and lab materials at BC. There would is also a request that the students enrolled in the LHS class be given the BC 140 Lab manual/workbook for the two trimesters.

Here is the current link for the lab manual/workbook:
https://store2.van-griner.com/product/chem-140-workbook/

SIGN-OFF FOR PILOT COURSE RECOMMENDATION

	Signature Date
1. Department Head (Secondary) **Accepts ☐ Rejects ☐**	_____
2. Principal **Accepts ☐ Rejects ☐**	_____
3. District Content Facilitator **Accepts ☐ Rejects ☐**	_____
4. Curriculum Director **Accepts ☐ Rejects ☐**	_____

Return original to the Director of Curriculum and Instruction. Copies to Principal and Course Originator.