Chemistry 1 (Online)
Time: Tuesdays, 6:00 - 6:45 p.m. ET
Teacher: Elena Zakharova

Contact Information:

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Course Materials:
This class uses materials from the following books:

- Larry Gonick and Craig Criddle, *The Cartoon Guide to Chemistry*
- Manyuilov and Rodionov, *Chemistry for Children and Adults*
- Steve Owen, *Chemistry for the IB Diploma*

Course Content:
The course is structured as follows:

- Atomic structure
- Electron configurations
- The periodic table, with emphasis on electron configuration and variations in properties down a group and across a period
- Chemical bonds, including ionic, covalent, and polar covalent
- Lewis structures
- Electron diagrams
- Valency
- Chemical formulas and oxidation numbers
- Chemical reactions, including an introduction to redox processes
- Stoichiometric relationships, with emphasis on the mole concept, mass-to-mole and volume-to-mole conversions, and the ideal gas law
- Chemical properties of oxygen gas, hydrogen gas, and water
- Solutions and pH
- Chemical properties of oxides, acids, bases, and salts

Major Learning Objectives:

- Understand atomic structure, including how to define mass number and atomic number, and calculate the number of protons, neutrons, and electrons in elements.
- Determine the full electron configuration of elements, understand energy levels, sublevels, and orbitals.

- Understand the arrangement of elements in the periodic table and how electron configuration relates to their position.
- Understand the nature of chemical bonds and how different types of bonds are defined.
- Understand the concept of oxidation numbers and chemical formulas of different compounds.
- Grasp the principles of oxidation and reduction processes.
- Understand the concept of a mole, calculate the number of moles in a given mass or volume, and solve problems involving mass and volume of substances. Understand limiting reactants, reactants in excess, Avogadro's law, and the ideal gas law.
- Understand pH values and their relation to proton concentration.
- Apply knowledge to understand the chemical properties of hydrogen gas, oxygen gas, and water.
- Understand the chemical properties of major inorganic compounds, including metals, oxides, acids, bases, and salts, and be able to define them and know their characteristic reactions.

Classwork and Homework:

- All announcements, classwork, and homework assignments will be posted in Google Classroom.
- **Homework is mandatory.** You are required to submit your homework in Google Classroom. Please ensure you have your homework available during class meetings.

How to Submit Homework: You have several options:

- If you take handwritten notes, please write clearly, take a picture of your notes, and upload them to Google Classroom.
- If you type your answers, upload your documents or PDF files.
- Do **not** use the Kami app.

Promotion to the Next Level:
To be promoted to the next level, you must attend at least 80% of the classes and submit at least 80% of the homework. If you do not submit homework and do not participate in class, you can only be promoted to the next level if you pass the placement test.