**Iona Prep Electronics Robotics Syllabus 2023-2024**

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**Extra Help : Most days 3:00 PM in 117 by appointment**

**Course description:**  **This is a senior elective course involving the construction of electronic circuits, the programming of a microcontroller, and the construction of a robot controlled by the microcontroller. This course will explore the basics of electronics and electronic circuits with an emphasis on their application in sensing the environment and controlling the motion of a robot. Since much digital circuitry is controlled by software, the development and debugging of appropriate software will also be covered in as much detail as time permits.**

**Requirements: Each student must have a properly functioning PC/MAC/Chromebook computer with Internet access and an available, functioning USB port. The computer must be able to run the Parallax software. Each student must have a notebook for the course. They will be allowed to use this notebook on at least some tests and on all projects. The iPad will NOT satisfy this requirement because it cannot run the Parallax software.**

**BIG IDEAS**

**1 –Intro. to programming**

**2 – Electrical Components: resistors, diodes, capacitors, integrated circuits, servos**

**3 – Use of the multimeter**

**4 – The Schematic Diagram**

**5 – More programming concepts**

**6 – Navigating a maze using various sensors.**

**TEXTS & MATERIALS**

**There is no printed text for this course. Tutorials and reference materials are all online. For that reason, each student must have a PC, MAC or Chromebook which can access the Internet and has a USB port available and can run the Parallax software and interface with the projects.**

**Behavior :** Minds are **ON Electronics/Robotics** in the classroom for 42 minutes! This means

Respecting yourself, your peers, and all adults in our classrooms. Always.

Do NOT be distracted by your phone! This kind of mental discipline will be good for you even after graduation.

Follow directions. ASK if you have a question.

ALL Student Handbook rules are expected to be followed including no headphone use in the hallways outside of lunch periods. In addition, Science Department Lab Safety guidelines are in force.

**Curricular Content:**

**Work to achieve your goals**. Do take time to read, take notes, and reflect on the concepts as you study those notes.

| **QUARTER 1** |  |
| --- | --- |
| **The PDP8i an early microcomputer (Binary and octal numbers; programming)** | **Demonstration** |
| **Building and controlling an LED circuit (Schematic Diagram)** | **Project** |
| **Digital control and the use of a servo** | **Demonstration** |
| **The traffic light and variations (Planning a program)** | **Project** |
| **QUARTER 2** |  |
| **Frequency and sound, also 7-segment display** | **Demonstration** |
| **Railroad crossing** | **Project** |
| **Burglar alarm** | **Project** |
| **Fire Alarm** | **Project** |
| **QUARTER 3** |  |
| **Building the Activity Bot and navigation (Dead Reckoning)** | **Project** |
| **Navigation by whiskers and sonar (also scanning sonar)** | **Demonstration/Project** |
| **Use of Infrared headlights (optional topic) Also Remote Operated Vehicle** | **Demonstration/Project** |
| **QUARTER 4** |  |
| **Students choose a project from a list. Alternatively, groups may propose an original project which is not on the list.** | **Project** |

During each quarter the following assessments are planned:

|  | **Assignments and Assessment Opportunities Each Quarter** |
| --- | --- |
| 3 or more | Some evaluations will be written.  Most evaluations will be “performance”  Written evaluations will be scored using the rubric below.  Performance rubrics depend on the project. |

**GRADES** Your grade for the Year is averaged: **20% from each quarter 10% midterm project 10% final project.**

55% is the lowest quarter score but midterm and final projects are the score earned with no minimum. In addition Honors students receive the Honors weighting in their grade average for transcripts.

**RUBRIC Generally, assignments (homework and projects) are graded with three factors: completeness, accuracy, and neatness. An assignment may have a specific, individualized rubric.**

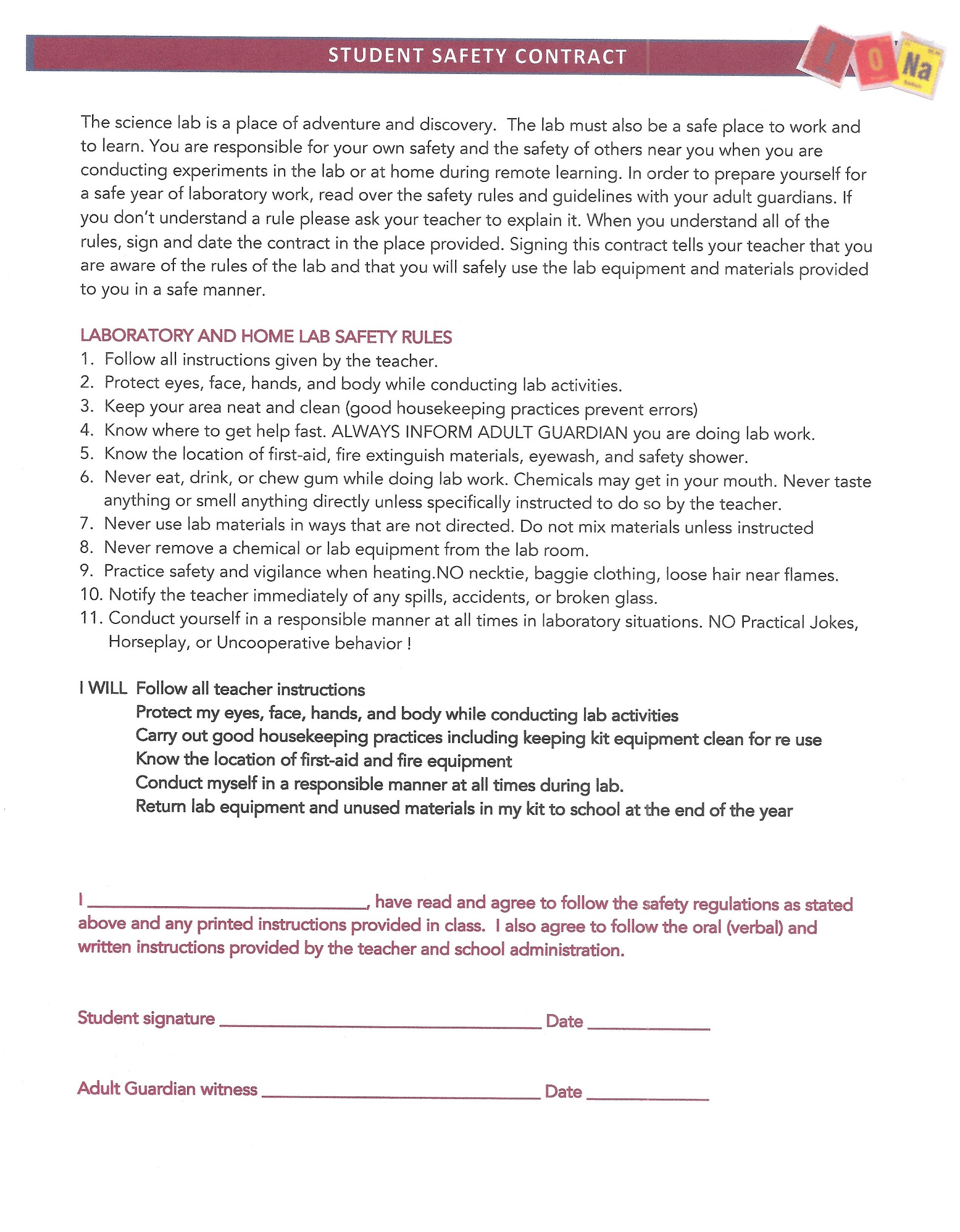
|  | **Beginning 1** | **Developing 2** | **Accomplished 3** | **Exemplary 4** |
| --- | --- | --- | --- | --- |
| **Completeness** | **Most tasks were not completed** | **Less than 50% of lab tasks/writeup completed** | **Most of tasks completed** | **All tasks completed; no omissions.** |
| **Accuracy** | **Presents illogical explanation of findings** | **Presents an illogical explanation of findings and addresses few questions** | **Most tasks completed** | **All tasks completed and properly explained** |
| **Neatness** | **Illegible writing, loose items** | **Legible, but had many typos** | **Legible, few typos, all units specified correctly** | **Extreme care taken. All elements correctly placed and well thought out all units are correct** |

Students at Iona Prep are to be prepared for academic work each and every day. Formative assessments take place and may include a quiz, classwork assignment, the collection of homework, and homework quizzes. In addition, each quarter includes summative assessments, which will include unit tests, projects, and presentations. Throughout the year collaboration is necessary and group work will happen but **students are evaluated on *individual* work**.

**ABSENCES AND LATE WORK Consult the Student Handbook for All School Absence Policies**

This course moves quickly. Check google classroom page for assignments to complete; and submit all work on time. In case of an absence, keep in touch with the teacher and/or classmates. Tests and quizzes are completed the day the student returns to school. Absences on test days are especially discouraged.

**CHEATING OR PLAGIARISM ON EXAMS, Projects - Iona Prep’s Academic Integrity Policy as detailed in the student Handbook is clear. The consequences there will be followed and the Dean of Academics will be involved.**



**I UNDERSTAND That I must conduct myself in a responsible manner at all times in the lab.**

**That if I am playing around, are inattentive, or unsafe I will have to stop work.**

**That I may receive a zero on the project, my parents contacted, and/or**

**My lab privileges may be revoked for the remainder of the school year.**

**I WILL Follow all teacher instructions by**

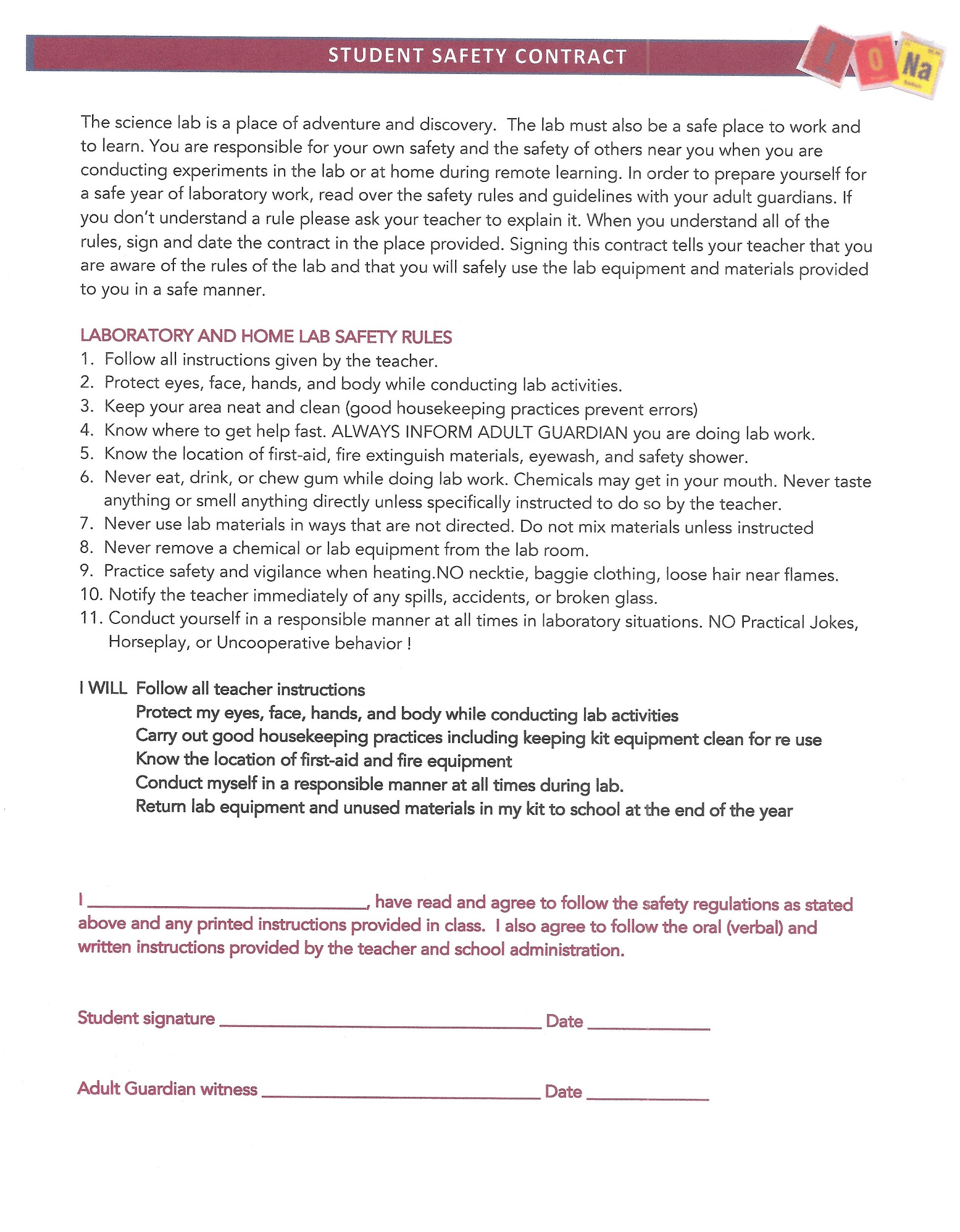
**Behaving appropriately and carefully in order to safeguard myself and my fellow students.**

**Protecting my eyes, face, hands, and body while using tools, especially power tools.**

**Keeping equipment and the surroundings neat, clean, and in good order.**

**Leaving all lab materials, and equipment in the lab.**

**Learning the location of all first aid and fire equipment.**

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