AJYAL AL MAREFAAH
INTERNATIONAL SCHOOL
مدارس أجيال المعرفة العالمية
ESTABLISHED 1989

Laboratory Handbook

Ajyal AlMarefaah International School

Quality Office

Laboratory Handbook

Contents

1. Welcome Message and Purpose of the Handbook

A warm greeting to all laboratory users (students, teachers, and staff). This handbook serves as a comprehensive guide outlining the procedures, expectations, and safety protocols for effective and safe use of the science laboratory. Its primary goal is to ensure a secure, efficient, and enriching learning environment for both staff and students within the laboratory setting, promoting optimal learning outcomes and fostering a culture of safety.

2. Vision and Mission of the Science Laboratory

Vision: To provide a distinguished global education that nurtures students' full potential, and prepares them to become leaders in their communities.

Mission: To inspire and prepare our students through a genuine international science education, fostering their passion for scientific knowledge, inquiry, and innovation, so they can pursue their dreams.

3. Laboratory Code of Conduct

All individuals using the science laboratory, including teachers, students, and staff, are expected to adhere strictly to the following code of conduct:

- Follow all instructions given by the science teacher or laboratory technician diligently.
- Never work alone in the laboratory.
- No food or drink is allowed in the laboratory.
- Always maintain a clean and organized workspace.
- Report any accidents, spills, or broken equipment immediately to the supervising teacher or laboratory technician.
- Respect all laboratory equipment and materials, using them only as instructed.
- Do not engage in horseplay or disruptive behavior that could compromise safety or learning.
- Wear appropriate attire, including closed-toe shoes, as required by specific experiments.

4. Roles and Responsibilities

4.1 Laboratory Technician:

- Ensure the laboratory is well-maintained, clean, and stocked with necessary equipment and chemicals.
- Assist teachers with the safe and efficient setup and dismantling of practical experiments.

- Maintain a precise chemical inventory and ensure proper storage and environmentally sound disposal of hazardous waste.
- Perform routine maintenance, troubleshooting, and calibration of laboratory equipment.
- Ensure ongoing compliance with all safety guidelines and emergency procedures within the lab.

4.2 Science Teachers:

- Always maintain constant supervision of students while in the laboratory.
- Plan and effectively integrate laboratory work with the Cambridge Curriculum to enhance learning objectives.
- Provide clear, concise instructions and ensure all students understand and adhere to safety protocols before, during, and after experiments.
- Assess students' understanding and performance in lab activities, providing constructive feedback.
- Immediately report any incidents, equipment issues, or safety concerns to relevant school administration.
- Ensure students uphold academic integrity and ethical practices during all experiments and data reporting.

4.3 Students:

- Adhere strictly to all safety rules and follow all instructions given by teachers and lab staff without deviation.
- Wear appropriate Personal Protective Equipment (PPE) as required for each specific lab activity (e.g., safety goggles, lab coats, gloves).
- Report any accidents, spills, or broken equipment immediately to the supervising teacher.
- Clean their workstations and all used equipment thoroughly after completing an activity.
- Demonstrate academic integrity in all laboratory experiments, data recording, and lab reports.
- Come prepared for each lab session by reviewing the experimental procedures beforehand.

5 Laboratory Safety Guidelines

5.1 General Safety Rules:

- Always read and thoroughly understand experimental procedures and potential hazards before beginning any lab activity.
- Never taste or directly smell chemicals; use proper wafting techniques, which involve gently fanning vapors towards your nose to detect odor safely.
- Keep aisles clear of bags, coats, and other obstructions, and maintain a tidy and organized workspace.
- Familiarize yourself with the exact location and proper use of all safety equipment, including eyewash stations, safety showers, fire extinguishers, and first aid kits.
- Wash hands thoroughly with soap and water after handling chemicals or biological materials, and always before leaving the laboratory.

5.2 Personal Protective Equipment (PPE):

- Always wear approved safety goggles or glasses when instructed, especially when handling chemicals, heating substances, or working with glassware.
- Wear lab coats or aprons to protect clothing and skin from chemical splashes or spills.
- Use appropriate types of gloves (e.g., nitrile, latex) when handling chemicals or biological specimens as specified by the experiment.
- Tie back long hair to prevent it from meeting flames or chemicals and secure any loose clothing or dangling jewelry.
- Closed-toe shoes are mandatory in the laboratory to protect feet from spills or falling objects.

5.3 Emergency Procedures (Fire, Injury, Spills):

- Fire: In case of fire, the fire alarm activates automatically. Immediately alert the teacher. Use a fire extinguisher only if trained, and the fire is small and contained; training on using extinguishers is provided to students and teachers each academic year. Evacuate immediately to the designated assembly point following the evacuation map, which is found in each corridor of the school.

- Injury: All injuries, regardless of their severity (e.g., cuts, burns, chemical splashes), must be reported immediately to the supervising teacher. The teacher is responsible for ensuring the student in need of care is promptly directed to the health coordinator. Where appropriate, trained personnel may administer initial first aid, and further medical attention should be sought as necessary.

- Spills: Inform the teacher immediately. Do not attempt to clean up a chemical spill unless specifically instructed and trained to do so. Follow specific spill cleanup procedures depending on the chemical involved (e.g., using absorbent materials, neutralizing agents).

5.4 First Aid & Incident Reporting:

- Minor cuts, burns, or scrapes should be treated promptly at the designated first aid station in the lab.
- For chemical splashes to the eyes or skin, immediately flush the affected area with copious amounts of water for at least 15-20 minutes using the eyewash station or safety shower and seek immediate medical attention.
- All incidents, accidents, near-misses, and exposures, no matter how seemingly insignificant, must be reported immediately to the supervising teacher and documented thoroughly using the official Incident Report form.

6 Chemical Handling and Storage

6.1 Chemical Inventory Management:

- The laboratory technician is responsible for the following with the help of the science teachers of Ajyal Almarefaah International School:
- Maintain an accurate and up-to-date inventory of all chemicals present in the laboratory, including quantities, dates of receipt, and expiration dates.
- Implement a system to track chemical usage and ensure timely and proper disposal of expired or unneeded chemicals.
- Regularly review the inventory to minimize excess chemicals and ensure necessary stock is available.

6.2 Labelling and Safety Data Sheets (MSDS):

- All chemical containers, including stock bottles and prepared solutions, must be clearly and legibly labeled with the chemical name, concentration (if applicable), date of preparation/receipt, and relevant hazard warnings.
- Safety Data Sheets (MSDS/SDS) for all chemicals used in the laboratory must be readily accessible to all users, providing comprehensive information on hazards, safe handling, storage, first aid measures, and emergency procedures.

6.3 Disposal of Hazardous Waste:

- Strictly follow specific, designated procedures for the segregation and disposal of different categories of hazardous waste (e.g., chemical waste, biological waste, broken glassware, sharps).
- Never pour chemicals down the drain unless explicitly instructed by the teacher or technician, and only if it is determined to be safe and environmentally compliant.
- Use appropriate, clearly labelled waste containers for each type of hazardous waste.

6.4 Common Laboratory Chemicals

- Below is a list of common chemicals typically found and used in our science laboratories. This list is for illustrative purposes, and the full, detailed inventory is maintained by the Laboratory Technician.

Category	Examples of common chemicals
Acids	Hydrochloric acid (HCI), Sulfuric acid (H2SOg), Nitric acid (HNO3), Acetic acid (CHCOOH)
Base	Sodium hydroxide (NaOH), Potassium hydroxide (KOH), Ammonia solution NHLOH)
Salts	Sodium chloride (NaC), Copper (ll) sulfate (CuSO4), Iron(l) sulfate (FeSO4), Potassium iodide (KI), Calcium carbonate (CaCO3) Metals Magnesium ribbon (Mg), Zinc granules (Zn), Copper turnings (Cu), Iron filings (Fe)
Metals	.ribbon (Mg), Zinc

	granules (Zn), Copper turnings (Cu), Iron filings (Fe)
Indicators	Litmus paper, Phenolphthalein, Methyl orange,Universal indicator
Reagents	Distilled water, Ethanol (C2H50H), Hydrogen peroxide (H,02), lodine solution, Glucose (CgH20g)

7 laboratory Equipment and Maintenance

7.1 Equipment Use and Training:

- Only use laboratory equipment for its intended purpose and according to its specific operating instructions.
- Receive proper training from the laboratory technician or teacher before operating any complex, specialized, or potentially hazardous equipment.
- Ensure all safety features and guards on equipment are in place and functional before use.

7.2 Routine Maintenance and Reporting

- Perform routine cleaning and basic preventative maintenance of equipment after each use (e.g., wiping down surfaces, cleaning glassware).
- Report any faulty, damaged, or malfunctioning equipment to the laboratory technician immediately; do not attempt to repair it yourself unless qualified.
- Maintain comprehensive equipment logs for each major piece of apparatus, detailing usage, maintenance, and repair records.

7.3 Calibration and Testing

- Regularly calibrate and test sensitive equipment (e.g., electronic balances, pH meters, spectrophotometers) according to manufacturer guidelines or established schedules to ensure accuracy and reliability.

- Maintain meticulous records of all calibration and testing dates and results.

7.4 Common Laboratory Equipment and Materials

- This section outlines the common equipment and materials available in our science laboratories, categorized by discipline. This list serves as a general guide.

7.4.1 General Laboratory Equipment & Glassware

Category	Examples of Equipment and Glassware
Glassware	Beakers, conical flasks (Erlenmeyer flasks), measuring cylinders, test tubes, boiling tubes, burettes, pipettes (various volumes), funnels, watch glasses, reagent bottles, dropping bottles
Heating Equipment	Bunsen burners, tripods, gauze mats, heat-resistant mats, hot plates, spirit lamps, water baths
Measuring Equipment support & Clamping	Electronic balances, thermometers, stopwatches, rulers Retort stands, clamps (boss heads and burette clamps), test tube racks, tongs beaker, crucible)
Other General Equipment	Spatulas, stirring rods, wash bottles, pestle and mortar, crucibles, evaporating dishes,

	desiccators, filter paper, filter funnels

Biology Laboratory Equipment & Materials

Category	Example of Biology Equipment & Materials
Microscopy	Compound microscopes, stereomicroscopes (dissecting microscopes), microscope slides (plain, concavity), cover slips, prepared slides (Various tissues, organisms), stain solutions (e.g., Methylene Blue, iodine solution)
Measurement and Observation	Petri dishes, pipettes (Pasteur, graduated), graduated cylinders, stopwatches, thermometers, light meters, PH meters/indicators, test tube racks relevant to curriculum and
Biological Materials (Examples)	Seeds, plant cuttings, yeast, onion epidermal cells, Elodea plants, pond water samples, various preserved specimens (e.g., small insects)

8 Standard Operating Procedures (SOPs)

8.1 Setting Up Practical Experiments:

- Review the experiment's instructions, required materials, and safety considerations thoroughly before setting up.
- Gather all necessary equipment, chemicals, and supplies in an organized manner.
- Ensure the designated workspace is clean, clear, and prepared for the specific experiment.
- Clearly communicate all safety precautions, procedural steps, and expected outcomes to students before they begin.

8.2 Cleaning and Shutdown Procedures:

- Clean all glassware, equipment, and lab benches thoroughly immediately after use.
- Properly dispose of all experimental waste in designated containers.
- Ensure all gas taps, water faucets, and electrical outlets are turned off at the end of the lab session.
- Verify that all equipment and materials are returned to their correct and safe storage locations.

8.3 Safe Storage of Equipment and Materials:

- Store chemicals according to their compatibility, hazard class, and specific storage requirements (e.g., refrigeration, ventilation, e.g., concentrated acids or alkalis are kept in the chemistry lab in a ventilator).
- Store delicate or expensive equipment in designated, secure areas to prevent damage or theft.
- Label all storage areas, shelves, and cabinets clearly for easy identification and organization.
- Ensure all storage cabinets are locked when the laboratory is not in use.

9 Student Laboratory Behaviour Expectations

9.1 Entry and Exit Procedures:

- Students should enter the laboratory in an orderly fashion, only with the explicit permission and supervision of the teacher.
- Students must remain in their assigned workstations and should not leave the laboratory without the teacher's permission.
- Exit the laboratory in an orderly manner once dismissed by the teacher, ensuring all personal belongings are collected.

9.2 Supervision and Unauthorized Use:

- Students must always remain under the direct and constant supervision of the teacher or laboratory technician while in the lab.
- Unauthorized experiments, handling of chemicals, or use of equipment without direct instruction is strictly prohibited and will result in disciplinary action.

9.3 Academic Integrity in Experiments:

- Students are expected to record accurate and truthful data and observations during experiments.
- Fabrication of results, plagiarism of lab reports, or copying others' work is a serious academic offense and will be dealt with according to school policy.
- Students should collaborate ethically when group work is assigned and submit individual work where required.

10 Lesson Planning and Lab Integration

10.1 Aligning Lab Work with Cambridge Curriculum:

- Ensure all practical experiments and investigations are directly linked to and reinforce the learning objectives of the Cambridge science curriculum.
- Design lab activities that help students understand and apply theoretical concepts learned in the classroom.

10.2 Lab Report Guidelines:

- Provide clear, detailed guidelines for students on the expected structure, content, formatting, and submission requirements of lab reports.
- Emphasize the importance of accurate data collection, systematic analysis, clear interpretation of results, and logical conclusion drawing.

10.3 Formative and Summative Assessment:

- Incorporate both formative assessment strategies (e.g., observation of practical skills, questioning, informal checks) and summative assessments (e.g., grading lab reports, practical exams, formal presentations) to evaluate student learning in the lab.

- Assess students not only on their scientific understanding but also on their practical skills, adherence to Cambridge standards, adherence to safety protocols, and collaborative abilities.

11 Emergency and Evacuation Procedures

11.1 Evacuation Map and Assembly Points:

- All individuals must be familiar with the prominently displayed evacuation map within the laboratory and found in each corridor in the school, identifying primary and secondary escape routes.
- In Ajyal Almaarefaah International School, students are provided with ongoing evacuation training to ensure a smooth escape to the assembly point.

11.2 Safety Drills and Compliance:

- Participate actively and seriously in all scheduled fire drills and other emergency safety drills as directed by the school administration, as the school provides many evacuation training sessions.
- Ensure all students understand and follow evacuation procedures quietly and efficiently during drills.
- Compliance with all emergency procedures is mandatory for all personnel and students in the laboratory.

12 Professional Development and Collaboration

12.1 Training for Lab Staff:

- Regular professional development and training sessions will be provided for laboratory technicians and science teachers on new equipment.
- Teachers are encouraged to attend relevant external workshops, conferences, and webinars to enhance their laboratory skills.

12.2 Involvement in Continuous Improvement:

- Teachers and lab staff are strongly encouraged to provide constructive feedback on laboratory procedures, equipment functionality, resource needs, and overall lab environment.

- Actively participate in discussions and initiatives aimed at continuously improving the laboratory learning and working experience.

12.3 Action Research Opportunities:

- The school supports and encourages science teachers to engage in action research related to optimizing laboratory teaching methodologies, improving student engagement in practical work, or assessing the impact of specific lab activities on student learning outcomes.

13 Inventory, Budget, and Resource Management

13.1 Procurement Procedures:

- Follow established school procedures for requesting and procuring new laboratory chemicals, equipment, consumables, and safety supplies.
- All procurement requests must be submitted through the appropriate channels with sufficient lead time.

13.2 Equipment Request Forms:

- Utilize the official equipment request forms for all new equipment purchases or significant replacements.
- Provide detailed specifications, justification for the need, and potential impact on learning for each request.

13.3 Sustainability Practices (e.g., reduce waste):

- Implement and promote sustainability practices within the laboratory, such as minimizing chemical waste, proper recycling of lab materials, and conserving water and energy.
- Encourage responsible consumption and resource management among all lab users.

14 Documentation and Recordkeeping

14.1 Equipment Logs:

- Maintain detailed and up-to-date logs for all major laboratory equipment, documenting usage, routine maintenance performed, and any repairs or servicing.

14.2 Maintenance Schedules:

- Adhere to established maintenance schedules for all laboratory infrastructure (e.g., ventilation systems, plumbing, electrical) and major equipment to ensure their safe and efficient operation.

14.3 Incident Reports:

- Complete and submit official incident reports promptly for any accidents, injuries, chemical spills, equipment malfunctions, or near-misses that occur in the laboratory.
- Ensure all necessary details, including dates, times, individuals involved, nature of the incident, and actions taken, are accurately recorded.

15 Student Inclusion and Accessibility in Labs

15.1 Differentiation for Special Needs:

- Implement strategies to differentiate laboratory activities and provide necessary accommodations for students with diverse learning styles, special educational needs, or physical impairments.
- Ensure instructions are clear and adaptable, and provide additional support, modified procedures, or adaptive equipment as required.

15.2 Language Support (if needed):

- Provide appropriate language support for students who are not native English speakers or who require assistance with scientific terminology and concepts presented in the lab.
- Utilize visual aids, simplified language, and opportunities for peer support to enhance comprehension.

15.3 Equity and Engagement for All Learners:

- Ensure all students have equitable opportunities to participate actively and meaningfully in laboratory activities, regardless of their background, gender, or perceived ability.
- Ajyal Almaarefah International School teachers foster a collaborative, supportive, and inclusive learning environment that encourages confidence, curiosity, and active engagement from every learner.

Appendices

- A. Glossary of Lab Safety Symbols

B. MSDS Templates

Safety Data Sheet (SDS)

1. Chemical Product and Company Identification

- Product Name…….
- Chemical Formula…….

- Recommended Use: …
- Manufacturer/Supplier: ……
- Emergency Contact……

2. Hazards Identification
- Classification: …
- Signal Word……
- Hazard Statements: …….
- Precautionary Statements…….

3. Composition / Information on Ingredients
- Chemical Name……
- Concentration…….
- CAS Number…….

4. First Aid Measures
- Inhalation: …...
- Skin Contact …...
- Emergency Number: 998
- Eye Contact: ……
- Ingestion: ……

5. Firefighting Measures
- Suitable Extinguishing Media: ……
- Special Protective Equipment: ……
- Hazards: ……

6. Accidental Release Measures
- Personal Precautions: ……
- Cleanup Methods: ……

7. Handling and Storage
- Handling: ……
- Storage: ……

8. Exposure Controls / Personal Protection
- PPE Required: ……
- Ventilation: ……

9. Physical and Chemical Properties
- Appearance: ……
- Odor: ……
- pH: ……

10. Stability and Reactivity
- Stability: ……
- Reactivity: ……
- Hazardous Decomposition: ……

11. Toxicological Information

- Routes of Exposure: ……
- Symptoms: ……
- Acute Effects: ……
- Chronic Effects: ……

12. Ecological Information

- Environmental Impact:

13. Disposal Considerations

- Disposal Methods: ……

14. Transport Information

- UN Number: ……
- Hazard Class: ……
- Packing Group: ……

15. Regulatory Information

- Applicable Regulations: ……

16. Other Information

- Prepared by: ……
- Date Prepared: ……
- Review Date: ……

C. Emergency Contacts:

Saudi Civil Defence-Emergency Number: 998
Saudi police Number -999
Saudi ambulance Number 997

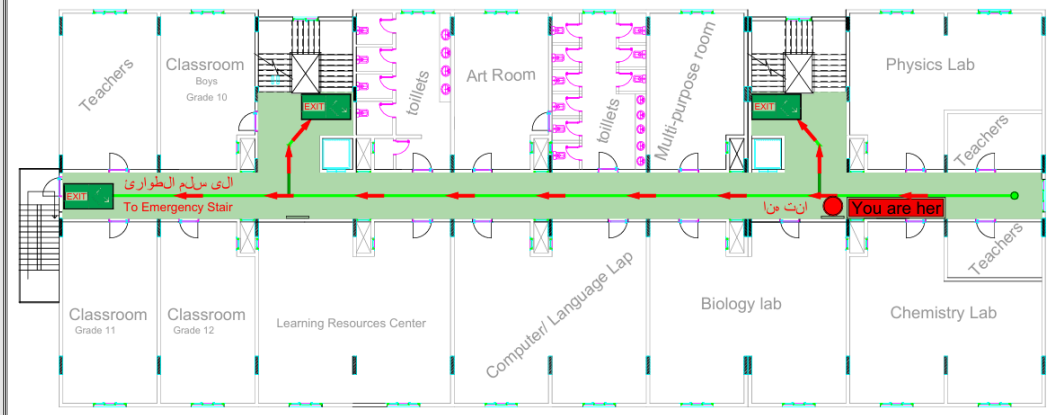
D. Lab Agreement Form (Signature Required)

- I, [Student's Full Name], acknowledge that I have read, understood, and agree to abide by all the rules, procedures, and safety guidelines outlined in the Ajyal Almareefah International School Laboratory Handbook. I understand that failure to comply with these guidelines may result in disciplinary action.
- Student Signature: _____
- Date: _____
- Parent/Guardian Signature: _____
- Date: _____


Laboratory safety guidelines rules
1 Know the rules
2
3
4 Proper handling of chemicals
5
6 Keep work areas clean:
7 Dispose waste properly:
8 Avoid horseplay:
9 Use equipment safely:
By adhering to these guidelines, students can help in ensuring a safe learning environment in the laboratory
Management


AJYAL ALMAARIFAH INTERNATIONAL SCHOOL
Security and Safety Management
أرقام الطوارئ
في السعودية
Emergency Services Numbers in Saudi
999
998
997
Safty Drill Coordinator
Ms : Mariam Dokyani


Mangemnt
Mangemnt
toillets
Home economics
toillets
General Science Lab
Learning Resources Center
You are her
انت هنا
To Emergency Stair
Mangemnt
Principal
Classroom
Elementary Grade 1
Girls
Art Room+ Sewing
Classroom
Elementary Grade 1
Girls
Classroom
Elementary Grade 1
Girls
Teachers
General Science Lab
Computer/ Language Lab
Legend
You are her
انت هنا
سلم طوارئ
EXIT
اتجاة الهروب
Precautions that must be followed in the event of a fire
- Click on the nearest fire alarm
- The evacuation plan must be followed in the event of a fire
- You must call 998
- Elevators must not be used in the event of a fire
تنبيهات يجب اتباعها حال الحريق
- اضغط على اقرب كاسر انذار للحريق
- يجب اتباع خطة الاخلاء في حال الحريق
- يجب الاتصال على رقم 998
- يجب عدم استخدام المصاعد في حال الحريق
الدور الأول
خطة الاخلاء
مبنى البنات
AJYAL AL MAREFAAH
First floor plan
Evacuation plan
Girl's Building



Legend		Precautions that must be followed in the event of a fire	تدابير يجب اتباعها في حال الحريق
You are her	انت هنا	- Click on the nearest fire alarm	- اضغط على اقرب جرس انذار للحريق
EXIT	سلم طوارئ	- The evacuation plan must be followed in the event of a fire	- يجب اتباع خطة الاخلاء في حال الحريق
EXIT	ممر الخروج	- You must call 998	- يجب الاتصال على رقم 998
		- Elevators must not be used in the event of a fire	- يجب عدم استخدام المصاعد في حال الحريق

الدور الثالث
خطة الاخلاء
مبنى البنين الاول

Third floor plan
Evacuation plan
Boys's Building