

# **YILDIZ TECHNICAL UNIVERSITY, FACULTY OF ARTS AND SCIENCES, CHEMISTRY DEPARTMENT**

## **KIM1170 GENERAL CHEMISTRY LABORATORY SAFETY AND WORKING RULES**

### **The General Chemistry Laboratory Rules**

1. It must never be forgotten that the laboratory is a serious working area and not to be disturbed the environment and behaved unsafely.
2. The rules both verbal and written must be read and followed carefully and asked to the laboratory supervisor if any the section(s) is/are unclear.
3. It never be studied or made an experiment alone, without the supervisor or any permission.
4. It must never be touched any experimental setup, chemicals and other materials without permission.
5. To eat/drink something, usage of laboratory equipments and materials for these purpose is strictly forbidden.
6. Experiments are only be made as explained and indicated by the responsible assistant to you and never be followed in a different way.
7. Be sure to read all fire alarm and safety rules related to the experiment before not to do the experiment.
8. It is forbidden to come to the laboratory without white laboratory coat, laboratory goggles, and the individual materials like coat, bag, suitcase etc. brought to experiment areas.
9. It is forbidden to enter/exit to/from the laboratory without permission.
10. It must be used face mask, gloves etc. materials which protect the eye, skin etc. according to experiment features and time.
11. It must be worn closed shoes in the laboratory. Footwear should always cover the foot completely in case of broken glass pieces, pouring chemical substance or etc.
12. It must not be used contact lens in the laboratory in case of no permission of the laboratory responsible.
13. It must not be used large accessory equipments, loose-fitting dresses and not to come to the laboratory with long hair to prevent any danger.
14. Laboratory coat must always be used as closed to prevent any hazard.
15. Hands must be washed with water and soap carefully before touching to face.
16. After the end of the experiment, materials used, experimental apparatus and bench cleaning must be done carefully. Hands must be washed with water, soap and gone out of the laboratory after getting lab supervisor's permission.
17. Out of working hours and at the weekends, it is forbidden to study in the lab without permission. The experiments being followed in these periods of time must be done after precaution and within relevant responsible person's knowledge.

### **Rules To Be Followed When Working With Chemical Substances**

18. The all chemicals in the lab pose danger so that it must never be touched to chemicals with bare hands, not to be smelt. and tasted.

**19.** Unlabelled container including any chemicals mustn't be used and provided in the lab. Before using, the label must be read carefully. It must not be forgotten to label the tube or container when transferred chemicals from the materials to another.

**20.** Chemicals taken from their bottles must not pour back to same stocks and pipets, even if nothing used.

**21.** The pipettes used for a solution must not be used for another one.

**22.** Acids must be added to the water gradually and not vice versa.

**23.** The mouth must never be used when using the pipette. Pipette bulbs must be used instead.

**24.** Flammable liquids must be placed on the experiment test bench in a closed container as far as they will be used and kept away from the heat sources as burner, electric heater, etc.

**25.** Chemical wastes must be treated in accordance with the directives of the laboratory responsible.

**26.** Inhalation of toxic vapors and gases must be avoided. For this purpose, a fume cupboard must be used when working with concentrated acids, bases and volatile solvents.

**27.** Chemicals must not be ever relocated or taken out of the laboratory without the knowledge of the responsible. If it is necessary to remove, it must be transported using a second transport container. When transporting chemicals in the laboratory, the bottles must never be kept from the cover part and must be supported from the bottom.

**28.** The injectors and syringes used in the experiment must be discarded to the injector waste with the caps of the needles closed.

**29.** When using naked fire in the experiments, necessary precautions must be taken by using a fume cupboard.

### **Rules For Working With Glass Materials**

**30.** Broken and cracked glass materials must never be used and must be discarded to the glassware recycling waste in the laboratory instead.

**31.** Thermometer, pipette, glassware and chemical bottles that can be rolled up must be placed on the laboratory bench to prevent them falling down.

**32.** A lubricant should be used before placing the glass pipe, thermometer etc. into the cork. It must be careful against sudden breakage, never apply excessive force and wear gloves definitely.

**33.** A hot glass material must never be placed in a cold surface/area or on the bench to prevent any cracking or breaking. It should be held with woodjack until cooling.

**34.** Since the shapes of cold and hot glasses are the same, heated glassware must never be placed in an arbitrary surface in case of being taken it in hand by someone.

### **Rules For Usage Of The Laboratory Devices**

**35.** The burners or electric heaters must always be switched off during no usage.

**36.** In case of heating or boiling, make sure that the container is not completely closed. It may cause explosion due to the pressure.

**37.** The tube including liquid chemicals must be continuously shaken to prevent splashing when heating liquid in the tube. The mouth of the tube must never be directed to the student or someone else.

**38.** The temperature of the heat devices must never be controlled by hands.

**39.** The temperature setting of an oven or incubator must not be changed and the responsible person must be informed if necessary.

**40.** Oven and incubator must never be used with plastic gloves. Tongs must be used when working at high temperatures.

**41.** Care should be taken not to touch sample cups and tongs on the oven or incubator wall.

**42.** The analytical balance must be closed and unloaded when not in use.

**43.** It must be controlled the equilibrium of the analytical balance. The bubble in the water scale must be centered. Otherwise, contact with the laboratory responsible.

**44.** Care must be taken not to spill chemicals on or around the analytical balance. Spilled chemicals must be cleaned with a brush.

**45.** The ventilation system must be operated before the fume cupboards are used. When working on a fume cupboard, the chemical materials must be placed at least 15 cm inwards from its frontal side and the glass cover of the fume cupboard must be kept closed as much as possible.

**46.** The electrical connection of all devices must be done in advance when working on a fume cupboard with explosive or flammable chemicals.

**47.** Care must be taken to keep hands completely dry when connecting electrical appliances, cables must be kept away from wet surfaces and the devices not used must be unplugged.

**48.** Devices that are not fully known must never be used.

### **Rules For Accidents**

**49.** It must be wiped with water immediately after neutralizing acid spilled area with base or vice versa.

**50.** Skin or eyes must be washed with plenty of water in case of chemical splashes onto/into them and taken action according to the first aid rules.

**51.** It must never be run in case of clothes catch fire, tried to extinguish the flame by rolling on the ground and asked for help.

**52.** Chemical burns in the laboratory must be washed with plenty of water at firstly, cleaned cold water or applied ice indirectly until the pain decreases and acted under the first aid rules according to the situation of the case.

**53.** The first thing to do when a fire comes out must be informed the fire. In order to prevent the spread of the fire, the door must be closed and asked for help. As for help, fire must be interfered with tubes. If a person is on fire, the fire blanket must be used to prevent contact with air.

#### **First Aid**

**54.** In cuts or bleeding, the wound and its area must be cleaned and covered with gauze bandage. According to the severity of bleeding, pressurize buffer loosely or tightly.

**55.** The sufferer is prevented from entering the shock and germs at burn injuries. The first thing to be done at ignited burns is to prevent the contact of the burning part with air. The part of our body which is exposed to chemical substances burning like acid must be washed with plenty of water. If the burned area is under the clothes, the clothes must never be attempted to remove and touched the burner by hand.

**56.** When any fracture is happened, the clothes should be removed by cutting and the person must never be moved or any bleeding, it must be stopped and cushion must be done.

**57.** Since chemical used, an electric shock due to the substance or by closing the mouth can not be provided with sufficient amounts of oxygen. Firstly, put the factor causing drowning away and drown people should be removed from the environment, if necessary. The unconscious sufferer's tongue must be prevented to move back, if necessary this process must be done with a clamp.

Immediately artificial respiration must be started. One of the methods of "Artificial Breathing Practice; The substances such as chewing gum must be removed from his/her mouth of the patient lying on his/her side and cleaned the mouth. The feet are slightly raised and the head is held bent backwards. The jaw is pulled down. A wipe or a thin cloth is covered. In the event of electric shock the mouth may be locked. In this case, instead of mouth, the nose is treated. The nostrils are closed with two fingers (mouth in an electric shock). This prevents the air escaping from the nostrils.

#### **Burns Originating From Chemicals**

The person doing first aid person must be taken precaution for himself/herself to use protective apparatus as glasses, gloves, mask, protective clothing etc.

#### **Skin Burns**

**58.** The chemical substance smeared clothing must be removed by opening the dress buttons and shoes must be taken off immediately; skin must be washed with plenty of water for at least 15 minutes.

**59.** An application such as the wound ointment / spray etc. must never be done.

**60.** Sterile bandage must be covered on the burner without being suppressed quite (if not any sterile bandage is presence, use a clean cloth).

**61.** Emergency assistance must be called if the size of the burn is oversize.

#### **Irritation of the eyes**

**62.** Healthy eye should be protected immediately; other eyelid must be opened with water or eye cleaner at least 15 minutes with liquid.

**63.** It must be supplied to not affected of the other eye and not to come to the eye to chemicals that the washing process must be done from the top of the nose to the ears.

**64.** Contact lenses must be removed immediately for the effectiveness of the washing.

**65.** Both eyes must be closed with a sterile or a clean wound gland.

**66.** Health facilities must be contacted.

#### **Chemical Swallowing**

**67.** If the person is conscious and can swallow, drink water or milk (if it tends to vomit, no continue).

**68.** If he/she is unconscious, his/her body must be turned to the left side.

**69.** A person exposed to any hazard, must be taken him/her to the most closest health institution immediately.

#### **Respiratory Chemicals**

**70.** It must be supplied to breathe clean air of the sufferer.

**71.** Health institution must be contacted.

**72.** If the breath stops (breathing sound not being heard, no movement in the chest and until changing skin color) orally, artificial respiration must be performed from mouth to mouth or from mouth to nose.

### **Emergency Action Plan**

<b><u>EVENT</u></b>	<b><u>LABORATORY EMPLOYEES</u></b>	<b><u>LABORATORY MANAGER</u></b>
<b>Emergency Health Problems</b>	-Notify the responsible and other laboratory staff, -Eliminate the factor by taking precautions necessary If any cause of injury.	-Inform the medico unit, -Call the ambulance (112) if necessary.
<b>Fire</b>	-Notify the responsible and other laboratory staff, -Don't interfere alone, -Remove burning/flammable substances, -Interfere if a person is on fire (fire extinguisher etc.)	-If necessary, use a fire extinguisher, disconnect electrical or evacuate the laboratory, -Call 110, -Inform Faculty Management.
<b>Chemical Substance Pouring</b>	-Notify the responsible and other laboratory staff, -To get out of other workers away from the environment, -Do not touch and inhale the substance.	-Learn the properties of spilled chemical, -Rinse with plenty of water or clean with a vacuum cleaner. -Wear protective gloves and goggles when cleaning.
<b>Gas Smell/Electricity Leakage</b>	-Notify the responsible and other laboratory staff.	-Identify the source of gas / electric leakage, -Immediately inform the faculty administration, -Switch off the electrical switch of the electrical leakage zone, -If the gas leakage is coming from the tube, turn it off immediately and call the relevant installation.
<b>Earthquake</b>	-Don't panic, -If you are near the corrosive chemicals, move away immediately, -Kneel down to near the matters as desk and so on, which their center of gravity close to the ground. Put your arms on your head, wait by tilting your head between your legs.	-Things to be done except the next-side rules and after the concussion is over; - Evacuate the lab staff, - Inform the faculty.

I have read the document of the 'Laboratory Safety and Working Rules' prepared for our safety. I agree to abide by the all rules and if I fail to comply with the rules, I agree that I will be removed from the laboratory and I will not object to the failure of the laboratory course.

Student Number:

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Name-Surname:

Signature: