Omiya Campus

Emergency Contact System

Instructor（Teacher:　　）

Laboratory　　–　　–

Emergency Contact　　–　　–

Injury / Fire
Accident Occurrence
Apply emergency treatments and call immediately

Ordinary Time

Extension / Outside Call

Night・Sunday & Holidays

Outside Call

Student Affairs Section
Extension
5105
Outside Call
048-687-5105

Student, Faculty, Staff Counseling Center
Extension
5113

Security Guard Room
Extension
5101
5201

Outside Call
048-687-5101
048-687-5201

Sainokuni Omiya Medical Center
Outside Call
048-665-6111

Saitama Medical Center Jichi Medical University
Outside Call
048-647-2111

Fire Department
Outside Call
119

In case of emergency, Do not panic and calm down!!

Call to Student Affairs Section / Phone Correspondence

Some people are injured in the xx lab room on xxth floor of building no. xx.
○ people are injured by ○○.
[The fire is caused by ○○.]
I need emergency assistance right here, please! I am △△.

Call to Fire Department / Phone Correspondence

This is Omiya campus of Shibaura Institute of Technology.
The address is 307, Fukasaku, Minuma-ku, Saitama-shi.
Some people are injured in the xx lab room on xxth floor of building no. xx.
Send an ambulance (Fire engines), please! I am △△.

Toyosu Campus

Emergency Contact System

Instructor（Teacher:　　）

Laboratory　　–　　–

Emergency Contact　　–　　–

Ordinary Time

Night・Sunday & Holidays

Injury / Fire
Accident Occurrence
Apply emergency treatments and call immediately

Extension / Outside Call

Outside Call

Student Affairs Section
Extension 7370
Outside Call 03-5859-7370

Student, Faculty, Staff Counseling Center
Extension 7400
Outside Call 03-5859-7400

Control Room
Extension 7280
Outside Call 03-5859-7280

Showa University Koto Toyosu Hospital
Outside Call 03-6204-6000

St. Luke's International Hospital
Outside Call 03-3541-5151

Fire Department
Outside Call 119

In case of emergency, Do not panic and calm down!!

Call to Student Affairs Section / Phone Correspondence

Some people are injured in the xx lab room on xxth floor of building no. xx.
○ people are injured by ○○.
[The fire is caused by ○○.]
I need emergency assistance right here, please!　I am △△.

Call to Fire Department / Phone Correspondence

This is Toyosu campus of Shibaura Institute of Technology.
The address is 3-7-5, Toyosu, Koto-ku,
Some people are injured in the xx lab room on xxth floor of building no. xx.
Send an ambulance (Fire engines), please!　I am　△△.

Shibaura Campus

Emergency Contact System

Instructor（Teacher:　　）

Laboratory　　–　　–

Emergency Contact　　–　　–

Injury / Fire
Accident Occurrence
Apply emergency treatments and call immediately

Ordinary Time

Extension / Outside Call

Night・Sunday & Holidays

Outside Call

Academic and Student Affairs Section
Extension 2600
Outside Call 03-6722-2600

Student, Faculty, Staff Counseling Center
Extension 2635

Building Management Office
Extension 2520
Outside Call 03-6722-2520

Tokyo Saiseikai Central Hospital
Outside Call 03-3451-8211

The Jikei University Hospital
Outside Call 03-3433-1111

Fire Department
Outside Call 119

In case of emergency, Do not panic and calm down!!

Call to Student Affairs Section / Phone Correspondence

Some people are injured in the xx lab room on xxth floor.
○ people are injured by ○○.
[The fire is caused by ○○.]
I need emergency assistance right here, please! I am △△.

Call to Fire Department / Phone Correspondence

This is Shibaura campus of Shibaura Institute of Technology.
The address is 3-9-14, Shibaura, Minato-ku,
Some people are injured in the xx lab room on xxth floor.
Send an ambulance (Fire engines), please! I am △△.

Safety Guide Manual

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1 .Safety Basics

1-1　Using this Guide

This Safety Guide has been created so that students can safely and appropriately perform experiments, practical training, crafts, and other activities. General information on safety common to each department, such as what to do in case of accidents and disasters, and various warning systems are also discussed. Please read and be familiar with this guide, review relevant items before starting experiments, and use as a reference for dealing with accidents and emergencies.

1-2　Fire

1-2-1　Fire Prevention

Fire prevention is very important. When a fire occurs, the damage can be great, and lives, important equipment, materials, and data can be lost. It is important to have the proper attitude and knowledge to respond to any fire that may occur.

- Prepare a fire extinguisher and fire extinguishing sand and confirm its location.
- Never use fire in the places indicated as "Fire prohibited"
- Minimize the amount of combustible materials used in the laboratory
- Regularly examine gas hoses, and replace if damaged.
- Use standard devices for organizing electric cords rather than random entanglement of wires.
- Pay attention to electric leakage due to dust and dirt.
- Confirm evacuation routes
- Actively participate in firefighting training for fire protection / disaster prevention awareness

1-2-2　Fire Extinguishers

In corridors, "ABC powder fire extinguishers" and "reinforced liquid fire extinguishers" are alternately placed every 20 meters. The "ABC powder fire extinguisher" is effective for the initial extinguishing of A) ordinary fires, B) oil fires, C)electric fires. The "Enhanced liquid fire extinguisher" can be used not only for A) ordinary fires but also for B) oil fires, It is especially effective against oil fires. When the pin is removed and the lever is pulled, the fire retardant (a cooling-effect potassium carbonate aqueous solution mist) will spray out for 15 seconds. It is also effective for C) electric fires. Besides this fire extinguisher, others, such as reinforced liquid fire extinguishers and, carbon dioxide fire extinguishers, may also be found in the laboratories. To use a fire extinguisher, follow these steps.

1. Unplug safety pin
2. Remove hose and aim at the source of the fire
3. Squeeze lever firmly and spray

1-2-3 How to Use Fire Extinguishers

In addition, we also have the following firefighting equipment.

(1) Automatic fire alarm system

Equipment that automatically detects smoke and heat and alerts people in the building of fire via an alarm bell. Every area and room in all buildings have "heat" sensors that automatically trigger fire alarms, and "smoke" sensors that are constantly monitored by the disaster prevention center and facilities control room receiver. Upon sensing smoke or heat, alarm bells and emergency broadcasts occur on that floor (fire floor) and the floor above it (just above the fire floor) and are transmitted sequentially to other floors. Floors in small buildings ring all at once. The reason for setting this time difference is to avoid confusion during evacuation, especially in high-rise buildings.

(2) Indoor fire hydrants

Fire extinguishers are installed indoors to help extinguish fires. Their location is marked by a red lamp, or a green seal and instructions are written on the back side of the storage lid. Green seal extinguishers can be used by anyone with access. If possible, try of operate it with at least two people. Extinguishers without a green seal are for use only by professional fire fighters.
Please follow the procedure below.

1. Locate the "Press button" above the Green seal hydrant.
2. Break its clear plastic cover to push the button.
   (A pump will start, an indicator light will flush, and an alarm will ring)
3. Open the door of the fire hydrant box
4. Hold the hose by the nozzle
5. Open the valve and spray water onto the fire

(3) Emergency broadcasting equipment

Emergency broadcasts will be made during emergencies or when otherwise needed. Speakers are attached to the ceiling, and microphones and amplifiers are installed in the Omiya Campus Central Monitoring Room, Toyosu Campus Disaster Prevention Center, and Shibaura Campus Facility Management Office, to broadcast messages to inform people how to respond.

(4) Fire doors and fire shutters

There are fire doors and shutters to prevent flames and smoke from spreading in corridors, elevator shafts, stairway entrances, and surrounding areas. Fire prevention doors are usually folded into the wall, but close automatically in conjunction with the sensor, so to escape, open the closed door briefly by hand. ※ Do not place objects in front of fire doors or shutters!

(5) Evacuation guidance lights

Green evacuation light (a figure is displayed next to escape routes) are always shining, indicating the location of the emergency exit and the direction of evacuation. Each one has an emergency power supply (battery) so is lit for about 20 minutes even if there is a power outage. In addition, please make sure to note the escape route, and the evacuation direction indicated by the green

sign which is not illuminated.

(6) Emergency lighting

Although attached to the ceiling, it is not usually lit, but in the event of a power failure it automatically switches to an emergency power supply and illuminates the evacuation route for about 20 minutes to help evacuate people from the building

(7) Sprinklers

When heat or smoke is detected, sprinklers automatically spray a large amount of water. Because they are always ready to spray water, please do not use hot plates under sprinklers.

(8) Elevator control operation

1. Fire: At the time of a fire, elevators immediately go directly to the evacuation floor (lst floor), and after opening their doors once, elevators close and stop.
   ※ The emergency elevator at the Toyosu Campus is used for firefighting and rescue work by fire brigades.
2. Earthquake: At the time of an earthquake, all elevators are forcibly stopped at the nearest floor. After the door is opened once, elevators close and stop.
   (Please press the "Open" button on the operation panel to open the door again from inside ※)
   ※ The escalator will not stop automatically in the event of a fire or an earthquake.

1-2-4 Initial Response to Fire

Anyone who discoverers a fire should "loudly" announce that a fire has been discovered. Please press the emergency button when the fire alarm does not sound. Try to extinguish the initial fire with fire extinguishers, firefighting sand, etc. Please contact the appropriate campus office as indicated below.

Report example	
"There is a fire. The place is ** building ** floor ** room, cause is **. There are no injured people (or * people are injured). Initial extinguishing is impossible. "	
Omiya Campus	Student Division Extension: 5105 Morning ward extension : 5101 · 5201 External line : 048-687-5101 External line : 048-687-5201
Toyosu Campus	Student Division Extension: 7370 Disaster prevention center extension: 7280 External line : 03-5859-7280
Shibaura Campus	Academic & Student Division Extension: 2600 Facility management office extension: 2520 External line : 03-6722-2520

Do not panic at the initial discovery. Eliminate the three elements that allow fires to spread: "heat", "oxygen" and "flame". Apply sand to the fire, lower the temperature, limit the oxygen by throwing a wet cloth onto the fire, remove flammable materials around the fire, and so on.

1-2-5 How to Treat Fire Injuries

If clothes should catch fire, use fire extinguishing methods such as applying water, smothering the flame with cloth, and rolling on the floor. When handling fire, it is best to wear natural fiber such as cotton or wool. Artificial fiber such a polyester can stick to the skin and cause serious burns.

Turn off the fire source such as gas valves, electric heaters, etc, and remove surrounding combustible materials

- Determine the presence of explosive or toxic gas
- Oil and alcohol float on water and spread when water is applied, So use fire extinguishers to fight oil and alcohol-Don't be in a hurry to splash water on the fire.

Individuals should not continue to fight a fire after it reaches the ceiling. After that please close the door of the room and loudly announce that everyone should evacuate promptly. If there is smoke, cover your nose and mouth with a handkerchief or cloth, and evacuate upwind by looking at the movement of the smoke while in a crouching position

- Confirm if there are any people who need relief in the vicinity and work in cooperation with any people who are present

1-2-6 When an Explosion Occurs

If an explosion happens suddenly, causing an accident, please take the following actions:

- First, provide assistance to those with major injuries
- Find the device or chemical that caused the explosion and return it to its original condition so that a second disaster does not occur
- If repair is difficult and there is danger of a secondary disaster, evacuate promptly
- If a fire occurs due to an explosion, follows the Safety Guide fire procedures

1-3 Earthquakes

1-3-1 Knowledge and Preparation for Earthquakes

The Japanese archipelago is an epicenter for earthquakes, and a another big one is expected to occur at any time. Earthquakes cause other simultaneous disasters, which may delay the response of fire and police departments, so it is important to take precautionary measures that can reduce damage by enhancing our state of preparedness:

● Create a safe working environment by taking preventative measures around you, as much as possible.

- Create a safe place indoors in case furniture falls over or glass is broken.
- Adopt practices that help prevent laboratory equipment and chemicals from tipping over or falling.
- Prevent furniture from falling over by securing it to the wall.
- Don't put heavy objects on high places, and tie down objects that move around easily.
- Use shatterproof sheets on windows and closets to prevent damage.
- Avoid displaying non-essential glassware, such as frames and memorabilia, as much as possible.

● Decide how to make contact with your family

- SIT will provide contact information via an emergency communication service such as the 'Disaster Message Service' or 'Disaster Message Dial'
- SIT will designate an emergency meeting place such as an evacuation center.

● Stockpile minimum emergency food and supplies needed to maintain life

- It is recommended to have a stockpile of food and water that will last about a week until an ongoing supply of food and water can be provided. At the university, we have a stock of water and emergency food for all three campuses, but it is also advisable for individuals to prepare their own from the viewpoint of "self-help" ※ 3 liters of water is required per person per day.
- Individuals have different daily needs, so please stockpile any items you might need, such as allergy or regular medications

● Review the evacuation route and prepare for action after an earthquake

- Review the route from the campus to your home, in advance. Based on their past earthquake damage assessment, the 3 campuses are prepared to accommodate staff for up to 3 days in accordance with the Tokyo Metropolitan Government's measures to deal with the difficulty of returning home. After 3 days, we will adjust our response plan based on the scale of the earthquake, and on the time, and transportation situation. Please prepare to walk home at the usual time.by keeping such items as a map and sneakers in your office.
- At the Toyosu and Shibaura campuses, tsunami vigilance is also needed. Please evacuate to the upper floors of each building when a 'big tsunami warning' is issued

● Use the Earthquake manual

Please read the "Great Earthquake Response Manual"(normally distributed at orientation) and keep it nearby.

1-3-2 What is an ‘Alert Declaration’

In the event of a major earthquake occurrence, a declaration will be issued from the Prime Minister. Please pay attention to information on television, radio, and other media, and act according to the disaster prevention plan of each local government.

1-3-3 Dealing with an Earthquake

When a life-threatening event happens, it is important to remain calm.
Shelter under a desk for protection against falling belongings, objects, and to protect yourself from fire, hot water and chemicals.

- There is no need to immediately extinguish fires during an earthquake.
  ※ It is dangerous to approach fires while shaking persists. The main jolt of most earthquakes is during the first minute, so please extinguish fires after the earthquake has subsided.
- If inside an elevator during a quake, press buttons for all floors and immediately get out at the first stop.
- When you are outside, beware of falling objects such as glass, protect your head and seek shelter inside a sturdy building

1-3-4 Evacuation and communication

It will take time to organize rescue, police, fire, and emergency response teams, so we need to work quickly and appropriately in cooperation with our colleagues and others who are present during the quake.

● Immediately after the earthquake

- If barefoot, watch out for fallen glass, put on shoes and then act
- Inspect the area for the occurrence of a fire and switch off the gas mains switch and electric appliances
- In case of a fire, alert others nearby in a loud voice and work with them to fight the fire.
- Evacuate by stairs (if you are on a higher floor, move to the lower floor after the earthquake has settled)
- Consult radio and TV for accurate information
- On the Internet, beware of information from unknown sources that may be based on ambiguous information or, rumors
- Reply to the safety confirmation e-mail sent to you by the university

● Until an organized relief system is in place

- SIT will strive to ensure accurate information to counteract hoaxes and false news
- Dial "171"to access the Disaster Message phone system and refrain from unnecessary communications as much as possible
- Heed university instructions, to return home in a reasonable way (movement in the afflicted areas may be dangerous and difficult)

1-3-5 Designated Evacuation Areas in Case of Disaster

● Omiya campus

At the Omiya campus, when a fire or earthquake occurs during class, disaster information will be broadcast throughout the premises to faculty and staff. The evacuation areas are the athletic grounds and school bus parking lot. The toilets that can be used during power outages are in university hall (B1F music practice room, B1F central monitoring room front), Building No. 5 (except for the Mathematics Building), the library, and the multipurpose court.

● Toyosu campus

The Toyosu campus has been designated as a"residual district within the district" by the Tokyo Metropolitan Government When a fire or earthquake occurs during classes, information on the disaster will be broadcast to Toyosu campus faculty and staff, and information on evacuation sites will bedesignated.
All hallway toilets become unusable during power outages.
As a general rule, shelter locations for students, faculty, staff and others at the time of a disaster shall be as follows:

Students	Graduate students and undergraduate 4th grade students: Laboratory or designated classrooms Undergraduate 1st grade, undergraduate 3rd grade female students: Designated classrooms only
Faculty and staff	Laboratory or office
Regional evacuees who cannot reach home	Athletic gym, part of the student lounge on the 2nd floor of the interchange building in front of Techno Plaza

● Shibaura campus

Shibaura campus has been designated as "residual district within the district" by the Tokyo Metropolitan Government When a fire or an earthquake occurs during class, information on the disaster will be broadcast to Shibaura campus faculty and staff, and information evacuation sites will be designated.
All hallway toilets become unusable during power outages.

● Places where students, faculty members, and university staff temporarily stay

As a general rule, students, faculty members, and university staff will stay in the areas designated below in the event of a disaster.

Students	Labs (or designated classrooms) for graduate school students and fourth-year students Designated classrooms for first-year students, third-year students, and female students Fourth to seventh floors for third-year students
Faculty and university staff members	Labs or campus office
People who have difficulty returning home Local evacuees	Third-floor classrooms

From the perspective of self-help, the Shibaura Institute of Technology stores a three-day supply of water and food, based on the Ordinance on Measures for Stranded Persons of the Tokyo Metropolitan Government. However, each person should also prepare for their own needs.

What You Need to Carry to Campus

It takes time for police, fire department, and rescue members to be able to rescue people and prepare for guidance systematically. You need to act quickly and appropriately in cooperation with your peers and those present.

(1) Valuables

- ☐ Cash (10yen coins for public phones)
- ☐ Health insurance card (can be copied)
- ☐ Identification card (can be copied)

(2) Information gathering supplies

- ☐ Great Earthquake Countermeasure Manual (keep necessary items distributed by the university)
- ☐ Mobile phone, smartphone
- ☐ Portable radio
- ☐ Mobile battery
- ☐ Map of university ⇔ home (for confirming return home route)
- ☐ Reserve battery
- ☐ Writing utensils (permanent markers and memo paper etc)
- ☐ Contact information
- ☐ Family photos

(3) Home items

- ☐ Pocket watch (LED mini light etc.)
- ☐ After earthquakes landmarks are altered so direction may not be reading apparent.
- ☐ Whistle (to call for help)
- ☐ 100 ～ 500 ml PET bottle (become water bottle)
- ☐ Mobile meal (chocolate, candy, etc.)
- ☐ Food　for allergies (as necessary)
- ☐ regular medication (person with chronic illness)
- ☐ Mask (also for cold weather)
- ☐ bandana and large handkerchief (for use as a sling)
- ☐ Tissue paper
- ☐ Wet tissue
- ☐ Mobile toilet
- ☐ Polyethylene bags
- ☐ bandages
- ☐ rain gear (Rain coat is preferable to umbrella)
- ☐ Female Supplies
- ☐ Disposable[Kairo](chemical-activated hand warmer)

Things to Keep in Your Laboratory or Locker

(4) Supplies for three day’ s stay	(5) Supplies for returning home
☐ Mobile battery ☐ Spare battery ☐ Drinking water ☐ Emergency food ☐ Allergy-free food (if needed) ☐ Regular medication (if you have chronic illness) ☐ Mask ☐ Tissue paper ☐ Wet tissue (also for wiping the body) ☐ Toiletries (that do not use water) ☐ Plastic bag ☐ Emergency medicines ☐ Rain gear ☐ Sanitary items ☐ Disposable heating pad ☐ Towel ☐ Underwear and socks ☐ Work gloves	(It is safe to keep the items (3) specified under What You Need to Carry to Campus as spares.) ☐ Flashlight (e.g., LED mini flashlight) ☐ Compass (the scenery will change if the earthquake strikes and difficult to find directions) ☐ Whistle (to call for help) ☐ 100 mL to 500 mL plastic bottle (used as a canteen) ☐ Portable ration (e.g., chocolate and candy) ☐ Allergy-free food (if needed) ☐ Regular medication (if you have chronic illness) ☐ Mask (used for protection from chilly weather as well) ☐ Bandana or large handkerchief (used as a triangular bandage) ☐ Tissue paper ☐ Wet tissue ☐ Portable toilet ☐ Plastic bag ☐ Sticking plaster ☐ Rain gear (a raincape is recommended) ☐ Sanitary items ☐ Disposable heating pad

1-4 First Aid

1-4-1 General Injury Precautions

- Accurately determine the cause, type, and degree of injury (including name of substance or poison)
- Early treatment is required for cardiac and respiratory arrest, loss of consciousness, massive bleeding, and poisoning
- Do not give water to unconscious individuals, as it may clog the trachea
- When foreign matter enters the eyes, rinse with running water without rubbing the eyes.
- Always report to the supervising professor when finishing first aid measures and refer to the accident prevention measures in this Guide.
- Regularly check the location of the first aid box and whether it has sufficient medicine

Direct contact numbers for the health counseling room (nurse's office)	
Omiya	TEL : 048-687-5113
Toyosu	TEL : 03-5859-7400
Shibaura	TEL : 03-6722-2635

1-4-2 First Aid Measures for Accidents

Initial response for victims who cannot move or are unconscious:
First ask the victim to provide information. If there is no reaction, seek assistance from bystanders.

(1) If still conscious, move victim into a comfortable position
※ If complexion is pale, place victim's feet in a raised position.
※ If face is red, elevate the upper body.
(2) If unconscious, establish a non-choking posture by tilting head slightly backwards so the lower jaw protrudes (to free airway)
※ If the victim can breathe without assistance, have them lay on their side.

- If behaving strangely, do not shake, hit, or forcibly move
- If complaining of abdominal pain, let the victim choose the most comfortable position
- Loosen belts, neckties, clothes, etc. and keep warm with a blanket or other covering.

1-4-3 Trauma・Sprain・Fracture Treatment

Be careful not to miss symptoms such as fractures, which may have been caused by falling from a high place, falling down or being crushed by objects, even if there is no visible trauma such as bleeding.

- When there is little bleeding and the wound is dirty, wash it with running water to clean the wound.
- If bleeding does not stop even when you hold a clean cloth on the wound, press down on the artery closest to the wound with your fingers and raise the wound higher than the heart
- Sprains occur by twisting joints by force, and dislocation occurs when joints are separated. Do not forcibly move sprain and dislocation victims.Orthopedic surgery may be needed to prevent permanent injury to the joints.
- If you suspect a fracture, secure with splints before moving

※ Sew or tie the bandage at the elbow of the arm to be treated.

1-4-4 Treatment of Burns, Frostbite, Electric Shock

Serious electric shocks can be recognized by skin that is deeply discolored and carbonized. Please treat this area as you would a burn.

- Light burns can be chilled with cold or ice water until the pain subsides.
- If clothes are stuck to a burn, cut the fabric around the edge of the wound and do not forcibly remove it.
- Do not break blisters or try to disinfect burns with ointment or apply gauze. Keep injured area cool until victim reaches the doctor's office.
- If victim is injured and in shock, cover with a towel or blanket and keep warm
- The affected part of frostbite should be soaked in hot water(about 40 degrees)for 20 minutes or more, then elevate the affected area (never strongly rub frostbit areas)
- Because the scar due to the electric shock is deeper than it seems, transport the victim to a medical institution as soon as possible
- Rescue victims of electric shock by first turning off the power so that the rescuer does not cause a secondary accident

1-4-5 First Aid for Gas Poisoning

- Open the window when rescuing, and look for secondary disasters
- Do not touch light switches. This could ignite flammable substances
- Victims who are nauseous or pale may be in shock, so quickly move them to fresh air, keep them warm and allow them to rest.

1-4-6 Treatment of Chemical Injuries If splashed by chemicals

If splashed by chemicals

Although it is usually safe to thoroughly rinse affected body parts with plenty of water for more than 15 minutes, certain rare chemicals should not come into contact with water.

- Become familiar with the toxic properties of chemicals used by your lab by checking the SDS(safety data sheet) in advance
- URL of "SDS search" of the Japan Reagent Association http://www.j-shiyaku.or.jp/Sds

Chemical Injury First Aid

1. Eyes

Rinse eyes for 15 minutes or more with clean flowing water

Sink Facility Installation Sites on the Toyosu Campus:

① Study Building, Floors9 ～ 14, 2locations in the corridor on each floor.

② Research Rooms in the Department of Applied Chemistry

③ Laboratory of the Department of Applied Chemistry

2. Skin

As soon as possible after the accident, rinse with large amount of running water for at least 15 minutes using the emergency showers place on the Toyosu Campus:

① Study Building, Floors9 ～ 14, 2locations in the corridor on each floor.

② Laboratory of the Department of Applied Chemistry

3. Mouth

Rinse with running water (depending on the kind of chemicals)

General Response Procedures:

- When harmful or large amounts of chemicals are spilled, urgent announcements will be made via the emergency contact system as required for evacuation and relief
- The responsibility for guiding undergraduate and graduate students lies with their supervisor. Describe the accident to the supervisor as soon as possible to receive instructions. If you cannot make contact, contact the faculty in the same department to receive instructions
- If highly hazardous gas has been released, block access to the room, and immediately tell workers nearby and those in laboratories on the same floor, instructing them to evacuate
- If highly flammable solvents are spilled, there is danger of an explosion, so ask people nearby for assistance, keep the area closed off, and keep ignition sources away. When such solvents are spilled in corridors, staircases and other such crowded areas, you need to pay especially close attention.

1-4-7 Utilizing the Student/Faculty/Staff Health Counseling Room (Nursing Room)

The Student, faculty and staff health counseling room (nurse's office) provides first aid at the time of injury and consultation at the time of mental and physical problems. For emergencies that occur outside of regular office hours, please receive instructions at the guard room, disaster prevention center, or facility management office for emergency guidance. Locations are as follows:

■ Omiya Campus (Building 2)	Hours: Monday - Friday 9 am - 6:30 pm
	Saturday 11 am - 5 pm
	Nurse's office extension: 5113
	guard room extension : 5101 · 5201
	direct: 048-687-5113
■ Toyosu Campus (Research Building 2F)	Hours: Monday - Friday 9 am - 6:30 pm
	Saturday 9 am - 3 pm
	Nurse's office extension: 7400
	Disaster prevention center extension: 7280
	direct: 03-5859-7400
■ Shibaura Campus (1st Floor)	Hours: Monday - Friday 9 am - 6:30 pm
	Saturday 9 am - 3 pm
	Student Division /Health Office Extension: 2635 Facility Management Office Extension: 2520
	Direct: 03-6722-2635 · 03-6722-2520

1-5 Work Environment

1-5-1 General Principles

Working environments are a collection of various conditions such as temperature, humidity, air cleanliness, illuminance, light. It is important to keep these working environments in good condition so that accidents and disasters will not result.

1-5-2 Hygiene Standards for Work Environments

(1) Temperature / humidity

In the laboratory, it is desirable to keep the temperature and humidity at an appropriate level according to the content of the work, seasons, etc. However, unlike in most offices, there are certain procedures and equipment that can cause discomfort. Temperatures that do not physiologically and psychologically stress workers are 18 to 20° C in winter, about 25 to 28 ° C in summer, and about 50 to 60% in favorable humidity conditions.

(2) Air / ventilation

In the laboratory, concentrations of suspended dust, carbon dioxide, etc. in the air may adversely affect workers. Also, although it is common to use a draft chamber or push-pull ventilator to protect people from things such as harmful chemical substances, lead and organic solvents, be aware of what the required safe concentration level is for such airborne substances in the working environment. Since the hygiene standards for offices is already defined, it is shown in Table 1 for reference.

Table 1. List of Office Hygiene Standards

<table>
<tr><th colspan="3">Item</th><th>Criteria</th></tr>
<tr><td rowspan="6">Air environment</td><td colspan="2">Volume</td><td>10 ㎥ / 3 or more persons</td></tr>
<tr><td colspan="2">Window and other opening</td><td>When the maximum area of the vent opening is constantly not less than 1/20 of the floor area (providing a ventilation establishment when less than 1/20)</td></tr>
<tr><td rowspan="2">Environmental standard of indoor air</td><td>Carbon monoxide</td><td>50 ppm or less</td></tr>
<tr><td>carbon dioxide gas</td><td>0.5% or less</td></tr>
<tr><td rowspan="3">Temperature</td><td>When it is less than 10 ℃</td><td>Perform measures such as heating</td></tr>
<tr><td rowspan="2">When air conditioning is on</td><td>Not significantly lower than ambient temperature</td></tr>
<tr><td>(The difference from the outside temperature is within 7 ° C)</td></tr>
</table>

Air environment	Air conditioning equipment	Supply air cleanliness	Floating dust volume (10 micrometers or less)	0.15 mg / m 3 or less
			Carbon monoxide	10 ppm or less
			carbon dioxide	0.1% or less
			Formaldehyde	0.1 mg / m 3 or less
		Standard of indoor air	air flow	0.5 m / s or less
			room temperature	Try to 17 ° C to 28 ° C
			Relative temperature	Try to 40% or more and 70% or less

(3) Daylight / artificial lighting

Provide adequate illumination -- taking into consideration such things as the degree of natural light, indoor color, and the type of light source.
The required degree of illumination is specified in JIS 's illuminance standard (Z9110 - 1979), as shown in Table 2 below.

Table 2. Illuminance required by JIS (for factories): may be obtained by local lighting at the location of the work marked with a circle.

Illuminance lx	place	Work
3,000 to 1,500	○ Instrument and control anels in such places as control rooms	Precision machinery, manufacture of electronic parts, extremely detailed visual work at printing factories. For example, ○ assembly, ○ inspection, ○ test, ○ selection, ○ design, ○ drafting
1,500 to 750	Design rooms, drawing offices	Sorting in textile factories, inspecting, typesetting in printing factories, proofreading, analysis in chemical plants, etc. Detailed work such as assembly, inspection, ○ testing, ○ sorting
750 to 300	Control rooms	Ordinary visual work in general manufacturing process, etc. such as ○ assembly, ○ inspection, ○ testing, ○ selection, ○ packaging, ○ office work warehouses
300 to 150	Electrical rooms, air conditioning machine rooms	Coarse visual work, such as ○ Limited work, ○ Packaging, ○ Packing
150 to 75	Exit / entrance, hallways, aisles, stairs, washrooms, toilets, warehouses	Very coarse visual work, such as ○ ○ limited work, ○ packaging, ○ packing
75 to 30	Indoor emergency stairs, warehouses, outdoor power plants	○ Work such as loading, unloading, moving loads
30 to 10	Outside (alleys, security guard posts)	

Remarks For dangerous work, double the illuminance.

(4) Noise and vibration

Noises are unpleasant, and often hazardous by interfering with conversation or signaling, and can also cause hearing loss. This is especially true of sounds concentrated in large sounds and narrow frequency bands (pure tone), high frequency sounds, steady sounds over long periods of time and those over the saftey criterion of 85 decibels (dB). If you cannot prevent noise, please use earplugs. Table 3 shows the standards and guidelines for noise levels for reference.

Table 3. Noise value standards and guidelines

Estimated 1 (noise type)	Approximate 2 (physical / life impact)	Noise value (dB)	Noise source and distance (standard of size)
Extremely noisy	Hearing function abnormality	120dB	・Near the jet engine
		110dB	・Car horn horn (2 m)
		100dB	・Under the guard when the train passes
	It's noisy and I can not bear it	90dB	・In a noisy factory
		80dB	・Inside the subway car
Noisy	I can not have a conversation unless I give quite loud voice	70dB	・In a noisy office ・Noisy street
	If you increase your voice, you can talk	60dB	・Quiet passenger car ・Ordinary conversation
usually	Normal conversation is possible	50dB	・Quiet office
	There is no hindrance to audible conversation	40dB	・library
quiet	Sounds very small	30dB	・Late night in the suburbs
	I hardly hear it.	20dB	・Tree leaves intertwining

1-5-3 VDT Operation

The IT environment has changed the workplace in such a way that our constant use of VDT (Visual Display Terminals) has created a number of common maladies:

(1) VDT disorder - VDT syndrome (symptoms include, dry eye, congestion, impaired vision, and eye strain)

Symptoms include cervical shoulder syndrome (key puncher's disease), stiff neck, waist and shoulders, chronic back pain, and numbness of the fingers.
Psychological symptoms include loss of appetite, irritation, anxiety, depressive symptoms

(2) Preventive Measures

1) Environmental management

It is important to prevent proper lighting, lighting and glare prevention, noise reduction, proper chair and desk for proper working posture, adjustment of VDT equipment etc.

2) Work management

Continuous working time should not to exceed 1 hour: Set a break time of 10 minutes to 15 minutes between each work period, and take short breaks once or twice within each work period.

1-6 Contact, Notification, and Warning systems

1-6-1 Contact at night and holidays

Emergency situations that occurr at late at night or on holidays are, as a general rule, reported to the Guard Office, Disaster Prevention Center, or Facility Management Office.

■ Omiya Campus (Guard Room)	Extension: 5101 · 5201 Direct: 048-687-5101
■ Toyosu Campus (Disaster Prevention Center)	Extension: 7280 Direct: 03-5859-7280
■ Shibaura Campus (Facility Management Office)	Extension: 2520 Direct: 03-6722-2520

1-6-2 Overnight Experiments / Reporting on Holiday Entry

When using the laboratory at night or on holidays, submit the "Laboratory Use Application" with the permission of the faculty of each campus student section. ※ Do not stay up all night with students.

1-6-3 Insurance System for Students

This is a system established for the purpose of ensuring that students can securely continue their studies. This system covers injury during academic and other activities, as well as the issues of property and accident insurance. Fees related to this insurance system are fully borne by the university. For more details about this system, please contact the Student Affairs Division.

● Types of Student Comprehensive Security System

Institution	Insurance system	
Type	Student Educational Research Disaster Insurance Insurance	Student Integrated Insurance
Handling institution	Japan International Education Support Association	Property insurance company
Contents	Guarantee during activities such as academic activities (regular or extra-curricular activities)	Security in daily life

● **Types of insurance:**

※ Student educational research disaster injury insurance system

This system can be applied to injury accidents that occur while the student is on campus or during extracurricular activities that are sponsored by the university.

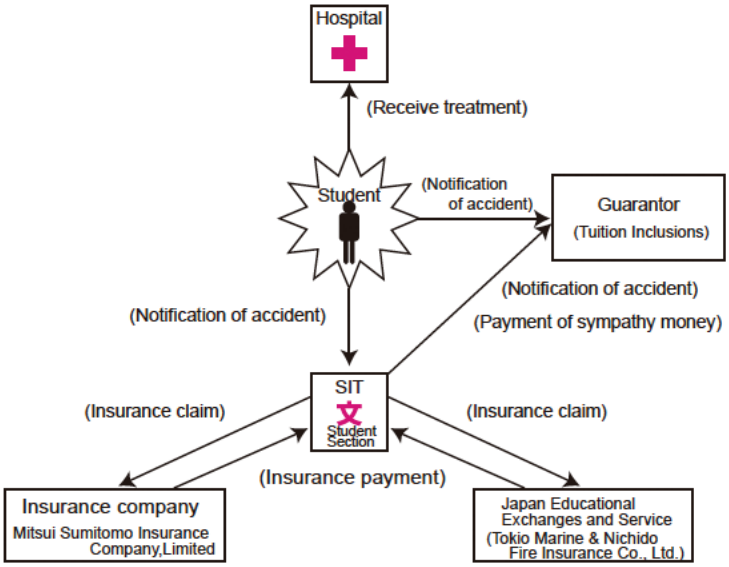
※ Comprehensive student insurance

This system is applicable to the student's death, injury, legal cost of harm to other people caused by accidents, and the accidental death of the student's guarantor.

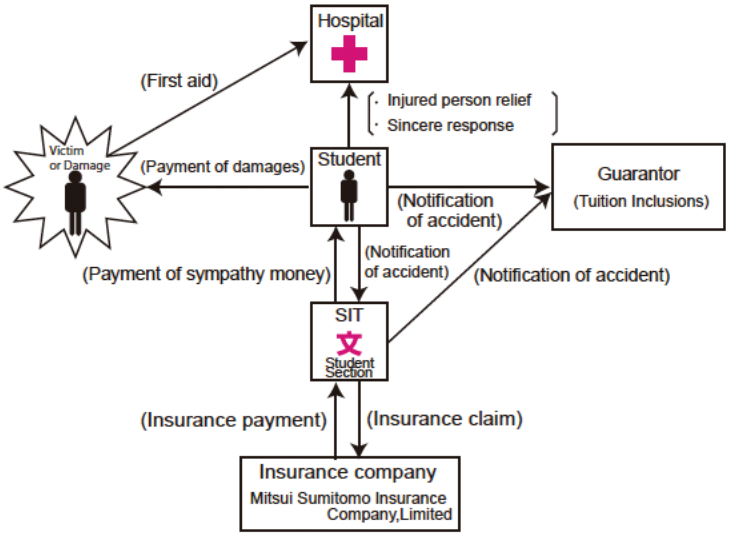
1-6-4 Insurance Procedures

● **Procedures in the event of a disaster or injury**

(1) In case of injury or death of the student



(2) When the student himself or herself injured another person or destroyed something of another person



〈Remarks〉

※The guarantee period of this system is 3 years for doctoral programs, 2 years for master's programs, and 4 years for undergraduate students. (Recurring students are enrolled)

※Compensation will be paid as a scholarship from the university

※Should a disaster or injury occur, report it to the Student Affairs Division and receive guidance on the scope and procedures.

2.Safety in Specialized Fields

2-1 Experiment Safely

2-1-1 Staying Alert to Danger

At our university, as a general rule, it is prohibited to do dangerous experiments alone at night. Please thoroughly understand the characteristics, purpose, and procedures for each experiment, and the performance function of equipment used, properties of materials and chemicals, and meet with the supervising teacher, to prepare a test plan before carrying out experiments. Absolutely do not leave equipment or materials unattended during experiments or work under dangerous conditions where accidents cannot be prevented. Otherwise dangerous incidents or conditions may be overlooked and there is a risk of causing serious problems. Eating and drinking are prohibited from a safety standpoint in laboratories handling substances with high toxicity and flammability.

- Do not forget that there is always the possibility of danger involved with any experiment
- Unfamiliar or dangerous experiments should be avoided during nighttime, and should never be done alone
- Should you discover a problem with a device etc, immediately stop the experiment and report it to your supervisor
- Be on the alert for the smell of gas or abnormal machine noise
- Read the instruction manuals for experimental equipment / devices. Follow standard practice and get used using to the required devices and materials.
- Do not work when you are not alert. Also, do not use devices or materials with which you are unfamiliar
- Do not eat, drink or smoke during experiments (all indoors areas are non- smoking)
- Be familiar with the location and use of safety equipment so that you can always respond to emergency situations
- After experiments, return remaining chemicals and materials to the specified storage place, and be sure that experiment waste liquid (including waste water) is stored or discarded according to the rule

2-1-2 Clothes and Footwear

Wear work clothes and white coats that are easy to move and work safely in. Footwear should be slip resistant and stable on your feet. Wearing shoes with high heels is banned as it may cause stumbling. When there is a danger of heavy objects falling on your feet, wear safety shoes with a steel lining. When handling chemicals, dry ice, and high temperature objects, use protective gloves suitable for each substance and job.

- In the case of work where there is danger of fire, wear natural fabrics rather than artificial fabrics
- For chemical treatment experiments, use long sleeve white gloves and aprons to protect the body from corrosive substances
- If necessary, use a hat or a helmet to protect the head
- Do not wear dangling accessories, such a ties, that can be caught in rotating equipment
- Secure long hair in buns so it will not get caught in machines or burn.
- Always use safety glasses or goggles to protect your eyes
- Wear appropriate masks for dust and fumes

2-1-3 Safe Working Posture

long experience, so please practice it. Maintaining the same posture for a long time causes static muscle fatigue. Light gymnastics are effective for solving this problem.

- Stand or sit up straight near equipment and desks and try to work in a natural posture
- Avoid work in narrow places as much as possible
- When passing behind a dangerous work area or an experimenter, pay attention to surroundings and announce your presence.

2-1-4 Tidiness / Organization / Cleanliness / Cleaning

The basic principles of safety are order, organization, cleanliness, cleaning, and inspection before starting any experiment or procedure. If there is nothing on the floor, one cannot stumble.

- Treat your laboratory like your own home, keeping it clean and tidy
- Do not put anything near a gateway, emergency exit, stairway or entrance
- Establish a place to put each object, always making sure to return it to its predetermined place after use
- Always clean up desks and tables after each use
- When leaving your work on a desk/table, push the chair under the desk/table
- Place fire extinguishers in a visible location where they can be easily taken out for use.

2-1-5 Water Accidents

Faucet and hose connections are where many troubles occur. Many kinds of equipment and instruments become unusable when inundated with water, and if notes and books get wet, it can hinder research.

- When the laboratory is unoccupied for a long period of time, as a rule, do not leave the water running (close the faucet). When water needs to be running, secure the faucet or appliance with wire to prevent the connection to the hose from ever coming loose.
- Perform an inspection of hose connection points for signs of deterioration once a month
- If a water leakage occurs, close the main water supply valve, stop the equipment, report it, and investigate and remedy the problem or damage
- If an outlet or electric cord gets wet or water comes into contact with electrical equipment, avoid electric shocks in the affected wet area.

2-2 Electricity

2-2-1 Basic Precautions for Using Electrical Equipment

In addition to the power supply (single phase AC 100 V and 200 V) used for general equipment, there are three-phase AC 200 V power supply laboratories, which are used for large motors and compressors etc. that require high electric power. Below, we will explain the precautions for handling this electrical equipment.

- Make sure that electrical appliances are functioning normally before use.
- Connect only to outlets with the voltage appropriate for the rating of the equipment, using a cord with sufficient current capacity
- Plug, and unplug cords by gripping the plug.
- In principle, electrical equipment should be connected to an earth ground
- Do not exceed maximum capacity of power strips by connecting too many devices.
- Do not place heavy objects on electrical cords. Also, do not place cords where people can trip over them.
- Take care not to cause poor contact or a short circuit at the plug and cord connection
- Be careful to not let dust and water come into contact with plug connections. This can cause electric leakage that generates heat, which may cause fire
- Before examining the inside of electric appliances or repairing, be sure to unplug from the outlet
- When not using equipment for a long time, remove the plug from the outlet

2-2-2 Electric Shock

Please be careful to avoid secondary shocks in the case of electric shock accidents. For example, you may fall when shocked, hit your head, or fall down from a high place. To prevent electric shock accidents, pay attention to the following.

- Ensure that the wiring between all the devices is inspected and that there are no bad connections.
- Do not touch electrical equipment with wet hands. Also, do not place water on or around electrical appliances.
- In high-voltage equipment experiments, pay careful attention to usage. Operating such equipment by oneself is dangerous. Establish a way to communicate danger to your workgroup, being sure to turn on and off the power after signaling each other
- If an electric shock accident occurs, immediately undertake a rescue after turning off the power. When it is unavoidable to touch live electric wires and electric devices during rescue, use dry wood, bamboo sticks, rubber gloves etc, instead of your bare hands.

2-2-3 Electrical Disasters

Electrical accidents can include electric shocks, fire, explosions, etc. Since there is a possibility that any of these can lead to serious injuries, it is necessary to pay sufficient attention to experiments using electric current and electric equipment.

- Turn on and off the power after checking the safety of the operation of the equipment. Also, in order to prevent electric shock accidents, don't turn equipment on or off before clearly signaling or informing the equipment operator. It is extremely dangerous to suddenly energize equipment without first doing this.
- Electric heaters, soldering irons etc. can easily cause fires. Forgetting this is extremely dangerous. In addition, burns may be caused by residual heat after equipment use, or flammable substances may ignite.
- Do not place combustible materials such as organic solvents near switchboards, outlets, and electrical equipment. Sparks during the interruption of electricity may cause explosion or fire. In addition, refrigerators have a switch for temperature control, but if explosive gas leaks into the cabinet, it may explode from sparks when the switch is operating, so be careful.

2-2-4 Response to Power Failures

- When a power failure occurs, be sure to switch off and remove plug from electrical outlet.
- If you leave equipment switched on at the time of a power outage, and the equipment starts to move when energized, this can cause a big accident or breakdown

2-3 Machines

2-3-1 General Precautions

Safe machine operation starts with dressing in proper clothes, protective shoes, and long hair ties. wear clothes that cannot be caught in the machinery and use machines that can be worked easily, without gloves. Always wear protective eyewear and mask. Doing daily regular inspections prevents accidents.

2-3-2 Precautions for Machine Tool Operation

- Receive guidance from the responsible person and use the machine tools with a good understanding of usage and possible dangers
- Do not operate unfamiliar machines
- Do not place anything on or near the machines
- Confirm that the machine is safe to use, including attached cutting blades etc
- As a general rule, each machine should be operated by one person
- If any abnormality occurs while using a machine, immediately stop the machine and contact the person in charge
- Machines and tools must be cleaned including the surrounding area after use. Put cutting powder in the specified container. Chips should not be mixed with combustibles
- Do not leave running machines unattended

2-3-3 Precautions for Laser Equipment

International standards for the manufacture and use of laser products are specified by IEC 60825-1 and in Japan safety standards conforming to this are found in JIS C 6802.

- Place the laser device in as isolated a room or area whenever possible
- Avoid installing laser devices with the light beam path at eye level as much as possible
- Ensure that the laser beam terminates at the end of its effective optical path using an absorber or the like
- Wear safety glasses and do not look directly at the laser beam
- Reduce exposure the skin as much as possible. Avoid clothing with chemical fibers
- Shield the periphery of the device before operating a laser, and do not let anyone other than stakeholders enter
- Notify surrounding people during laser operation
- Prevent reflection during laser operation or scattering of light by mirrors, lenses, window materials, etc.
- When using an invisible laser beam device, display an appropriate warning

2-4 Transporting Materials and Working in High Places

2-4-1 Handling Objects and Preventing Accidents during Transport

Common accidents when handling or transporting heavy objects include dropping the object on your feet and pinching your hands. It's also extremely dangerous if someone helping carry an object trips or relaxes their grip. It's essential that everyone helping be aware of the need to prevent accidents.

2-4-2 Transport Work Safety

Transportation work includes equipment such as cranes, derricks and chain blocks, and work with transport vehicles. This type of work can often require more than one worker, and the damage caused by transport accidents can be great, so using clear work rules is important. Please do the work of heavy load carrying under the direction of the person responsible for that work order.

- Make sure to organize the travel route and the installation site in advance
- Arrange a sufficient number of people to lift the required weight and size.
- Workers should start working only after all the workers understand the transportation procedure
- Lifting weight with your back bent can cause injury. Use legs to lift weight by bending knees.
- Always listen carefully while carrying things, and pay attention to other people and surrounding circumstances

2-4-3 Work Requiring a License, Skills Training, and Special Education

For crane operation and rigging work, a license and qualification are required. Unlicensed or unqualified persons cannot do the following work:

- Cranes with a lifting load of 5t(tons) or more, mobile cranes, and derricks with a load limit of 5t or more and rigging
- A device with a limit load of 1 t or more, or a crane with a lifting load of 1 t or more, a mobile crane or a derrick rig
- Driving of construction vehicles such as construction machinery (leveling, transportation, loading etc.)weighting 3t or more.

2-4-4 Working at High Elevations

Working in high places such as on stepladders / ladders / scaffolds / rooftops or verandas

- According to the Occupational Safety and Health Law, work to be carried out at 2m(meters) or more from the ground is considered high place work. Measures to prevent falls such as handrails etc, and a safety belt are required
- Ladders shorter than 2m, ladders, stepstools, etc. should be used properly after sufficient safety confirmation. Be sure that ladders are held up and supported by a second worker during use.
- 「Do not hesitate to post the height of a place. Even falling from a slight height may cause death.
- Make sure to review the site with a supervisor or an assistant multiple times
- Pay attention to clothing, wear a safety belt / safety cap, etc, wear slip resistant shoes.
- Be very careful not to drop tools and equipment. Do not leave things on scaffolds
- Do not walk under elevated work places.
- Place ladders against walls at an angle of 15° . Choose a strong foothold and avoid places where people can pass under. Ascend and descend single file. using the same ladder.

2-5 High Pressure Gas / Liquefied Gas

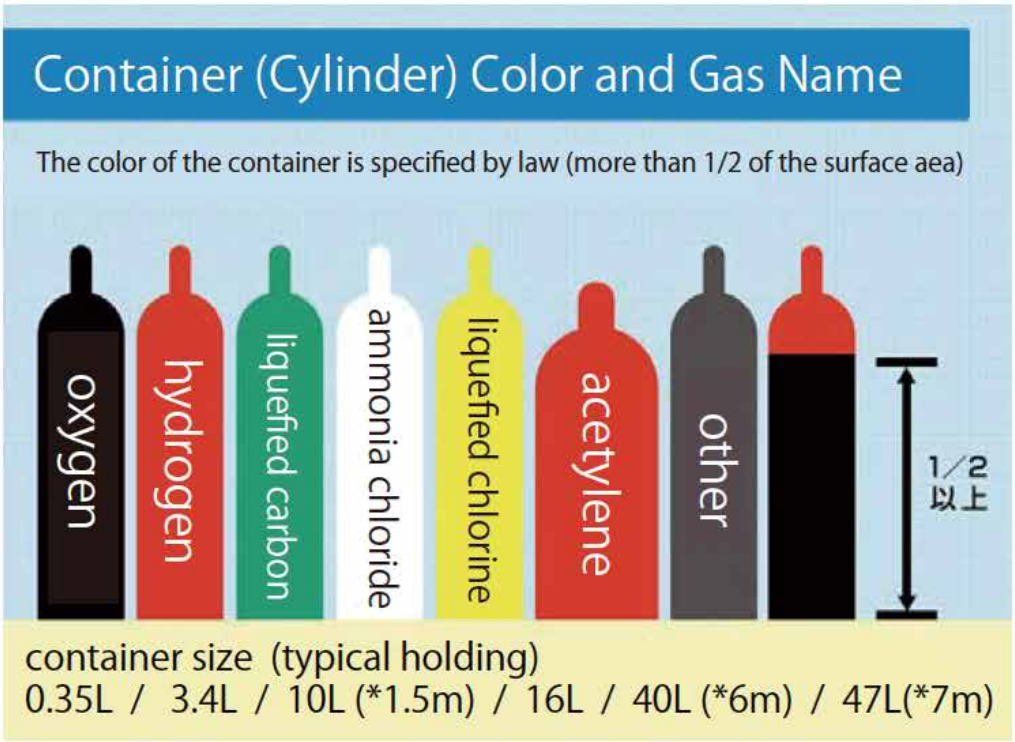
2-5-1 Caution on Handling High Pressure Gas

High pressure gas refers to one with a gauge pressure of 1.0 MPa or more (compressed gas), liquid state with a gauge pressure of 0.2 MPa or more (liquefied gas), and the rules of handling are stipulated by High Pressure Gas Safety Act. Accidents involving high-pressure containers often lead to serious accidents, so carefully handle cylinders under the guidance of those with sufficient knowledge. Become familiar with the nature and handling methods for various gases. Do not allow gas to escape. If you sense danger, evacuate immediately and close the valve of the container if possible. In order to act promptly, the experimenter himself should be conscious of the direction for closing the valve at all times, Also the use of gas equipment for other purposes is prohibited. For example use oxygen equipment only for oxygen, not for chemicals, oils, other gases, etc.

2-5-2 High Pressure Gas Containers (cylinders)

High pressure gas containers (cylinders) should have a stamp on the cylinder shoulder that describes its content. Below is an example of a cylinder engraving:

A color indicating the type of gas is painted in the cylinder.



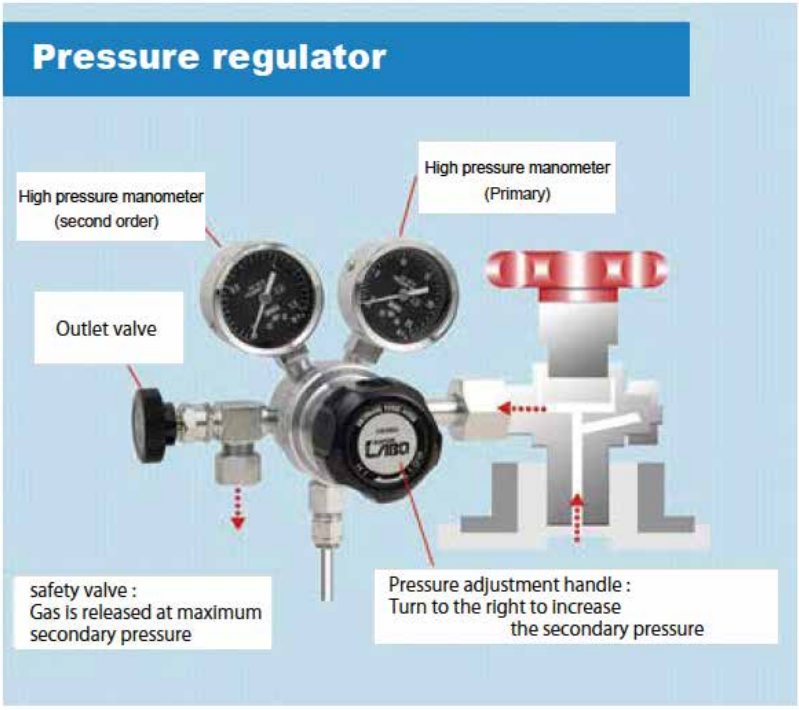
2-5-3 Pressurized Vessels (cylinders) -- Precautions for Use

(1) Operation procedure:

Secure the cylinder firmly to the wall and experiment base with chains or brackets. Connect the pressure regulator to the filling screw being careful not to over tighten or to connect threads at a wrong angle when connecting the fittings.

(2) Pressure regulator

1) Filling screw screws are left-turning screws and others are right-turning screws for preventing danger (for example, so oxygen regulators cannot be connected to a hydrogen cylinder) the flammable gas has a left-turning screw and others have a right-turning screw (except helium, which is left, and methyl bromide and ammonia, which is right.) An oil-less screw is required for use with oxygen gas
2) After confirming that the pressure adjustment handle seal is broken, gently open the valve of the cylinder (it cannot be opened for the first ? seconds). It is safer to operate the valve with the right hand.
3) Turn the pressure adjustment handle clockwise and adjust until the secondary pressure gauge reaches the desired pressure. If there is an outlet valve in the regulator open it. If necessary adjust the secondary pressure again. Always open and close the pressure adjustment handle carefully and not fully open. Use in a sealed room with ventilation.
4) When use is completed, close the pressure regulator and container valve tightly in reverse order.



(3)Used cylinders

After using most of the gas, deliver used cylinders to the gas vendor leaving an approximate residual pressure of about 1 MPa. Do not leave cylinders completely empty. Pay attention to the primary pressure, and stop using it at a certain pressure or lower. The reason is that atmospheric contamination and backflow from the equipment, corrosion of the container, and a decrease in purity of gas can result in an explosion of flammable gas.

Also, the transfer of gas from one cylinder to anther is absolutely forbidden.

(4) Storage and transport:

Avoid direct sunlight, be sure to secure cylinders to a wall or a laboratory bench with a chain in a place of 40°C or less. Cover all moving parts tightly with protective caps and carry carefully so as not to loosen the caps while on the cart. It is dangerous to roll cylinders on the bottom rim or to carry by hand.

2-5-4 Precautions for Flammable Gas, Oxygen, Toxic Gas, Asphyxiation Gas

- **Flammable gas** / **toxic gas** cylinders are to be installed in a room's **cylinder cabinet,** Gas alarm sensors, water spray nozzles, and forced exhaust duct is equipment are stored in cabinets.
- Use of fire is prohibited, and flammable materials are not to be placed within 5m (meters) of equipment using flammable gas (hydrogen, hydrocarbons, etc.), nitrogen trifluoride or oxygen,
- Oxygen is to be used only after removing combustible substances such as petroleum, fats and oils from appliances. For pressure regulators etc. which require oxygen, do not use flammable packing for connecting parts.
- To avoid inhaling toxic gas, use only with an adjacent ventilator.
- Exhaust gases outdoors, and render toxic exhaust gas harmless with alkaline absorbent filters etc.
- At the Toyosu Campus, when the pressure of gas (hydrogen, nitrogen, oxygen, argon) used in centralized piping decreases, close all the valves of the centralized piping system and contact the central monitoring room. Since the flowmeter of the gas used in the centralized piping is in the laboratory, it is preferable to check the usage amount about once a week.

2-5-5 Low Temperature Liquefied Gas

(1) Low temperature liquefied gas

- Because it is cryogenic, this type of gas can cause frostbite. Wear dry leather gloves, protective glasses, protective surface etc. You must use gloves that cannot stick to the skin and cause frostbite.
- When handling liquids always wear long pants and hard, non-absorbant shoes
- Liquefied gas evaporates as its volume increases, replacing air and posing danger of suffocation
- Do not put liquefied gas in sealed containers. Always make an escape port for vaporized gas
- The liquefied gas container must be handled carefully and gently, and stored in a well-ventilated place without direct sunlight

(2) Handling precautions for liquid nitrogen

1) Handling precautions

- When liquid nitrogen is used in a closed space, ventilate adequately so as not to deplete with oxygen in the space. Make sure that the closed place is visible from the outside and do the work with two or more people
- Be sure to cover open type containers. In closed type containers, the pressure increasing valve and the liquid takeoff valve are to be kept closed and the gas discharge valve is kept open
- Liquid nitrogen storage containers should not be layed on their sides. Because it is vulnerable to shock, handle it gently
- When a container contains only metallic liquid nitrogen. tape should be wrapped around the outer circumference of the bare glass dewar bottle to prevent cracking due to contact
- If liquid nitrogen is stored for a long time in a wide-mouthed container, oxygen enters from the atmosphere and liquid oxygen may accumulate. Since oxygen ignites violently when it comes into contact with organic matter, pay attention to the handling of fire around liquid nitrogen containers.
- Do not ride in the same elevator that is carrying gas cylinders

2) Handling precautions for liquid helium

- Liquid helium will suddenly evaporate with a slight heat inflow from the outside
- Liquid helium is contained in a insulated metal vacuum container. Be careful not to tip over when moving because its high center of gravity increases the risk of tipping over. In addition, the inner container is an extremely thin special metal container designed to minimize heat inflow from the outside. Furthermore, since it is almost suspended at the cervical part, it is easy to break, so be very careful to protect it from shocks
- In experiments, it is advisable to attach a balloon made of rubber to the evaporated gas discharge port for evaporation monitoring. However, when air flows backward from the discharge port, it solidifies on the inside of the container (the neck portion of the container) and becomes clogged, so be careful
- Seek direction from those familiar with transport before transferring liquid helium using a dedicated transfer tube.
- When keeping liquid in a liquid helium container, carefully check the opening and closing of the safety valve installed at the top of the container, and the cover of the liquid helium supply port, and secure the gas discharge port (micropore), etc.

2-6 Chemicals

2-6-1 Chemical Substance Management and Laws

Research and educational activities at universities use a large number of chemical substances, and their properties vary widely.
Handling with inadequate knowledge of the chemicals used is extremely dangerous and have a significant risk (Accidents such as explosions and fires, health hazards due to exposure to harmful substances, environmental destruction due to discharge and leakage)

To reduce the risks of such chemicals:
We are regulated by various laws (Fire Service Act, Poisonous and Deleterious Substances Control Act, Industrial Safety and Health Act) and Ordinances (ordinances to ensure an environment that protects the health and safety of Tokyo residents and regulations on the maintenance of the Saitama-shi living environment), Responsible measures are required from acquisition to storage, use, and disposal. Experimenters should understand the risks of chemical substances on a daily basis and strive to conduct safe research and education.

2-6-2 General Provisions

- Shibaura Institute of Technology "School corporation chemical substance management regulations" were enacted on March 21st 2017 for the proper use and management of chemical substances, etc. Chemicals of interest are substances subject to regulation by relevant laws and regulations
- Relevant laws include the Occupational Safety and Health Act, the Poisonous and Deleterious Substitute Control Law, Fire Service Law, High Pressure Gas Safety Act, and ordinances concerning the environment that ensures the health and safety of the citizens of Tokyo
- In the Shibaura Institute of Technology's chemical substance management system, under the president, a chemical substance management officer is appointed for each campus under the supervision of the chemical substance supervisor (department chief), and the person responsible for using chemical substances (faculty of the laboratory) in order to ensure the proper management and storage of chemical substances.
- Always investigate to see if chemical substances acquired for the first time constitute a danger or hazard
- Before use, please verify the safety and nature of the chemical substance using the safety data sheet (SDS)to become familiar with precautions on handling these substances and legal compliance obligations.
- Toxic substances, deleterious substances, dangerous goods, specified chemical substances, etc. must, of course, be stored, but their usage records must also be strictly prepared. Poisonous substances are subject to weight management (weight is documented for each use), and deleterious items to unit management (fill in what percentage of the original quantity is used each time), and report any dangerous goods and specific chemical substances to container management. It is necessary to submit the usage records for the previous year at the beginning of the fiscal year. If you purchase, use or discard chemicals, remember to record these transactions.

※ For details of how to manage chemical substances at the Omiya Campus contact the Omiya Academic Affairs Division. For the Toyosu Campus contact to Facilities section

2-6-3 Storage of Chemicals

- Keep medicines and other substances in a safe container clearly displaying the name
- Exercise caution with chemical shelf items, being careful not to cause accidents due to mixing
- Take measures such as attaching partitions to keep chemical bottles from breaking when an earthquake occurs,
- Especially poisonous substances and deleterious may cause danger to life even in small quantities, so strict storage and control book management procedures should be carried out based on laws and regulations

2-6-4 Cautions for Using Organic Solvents

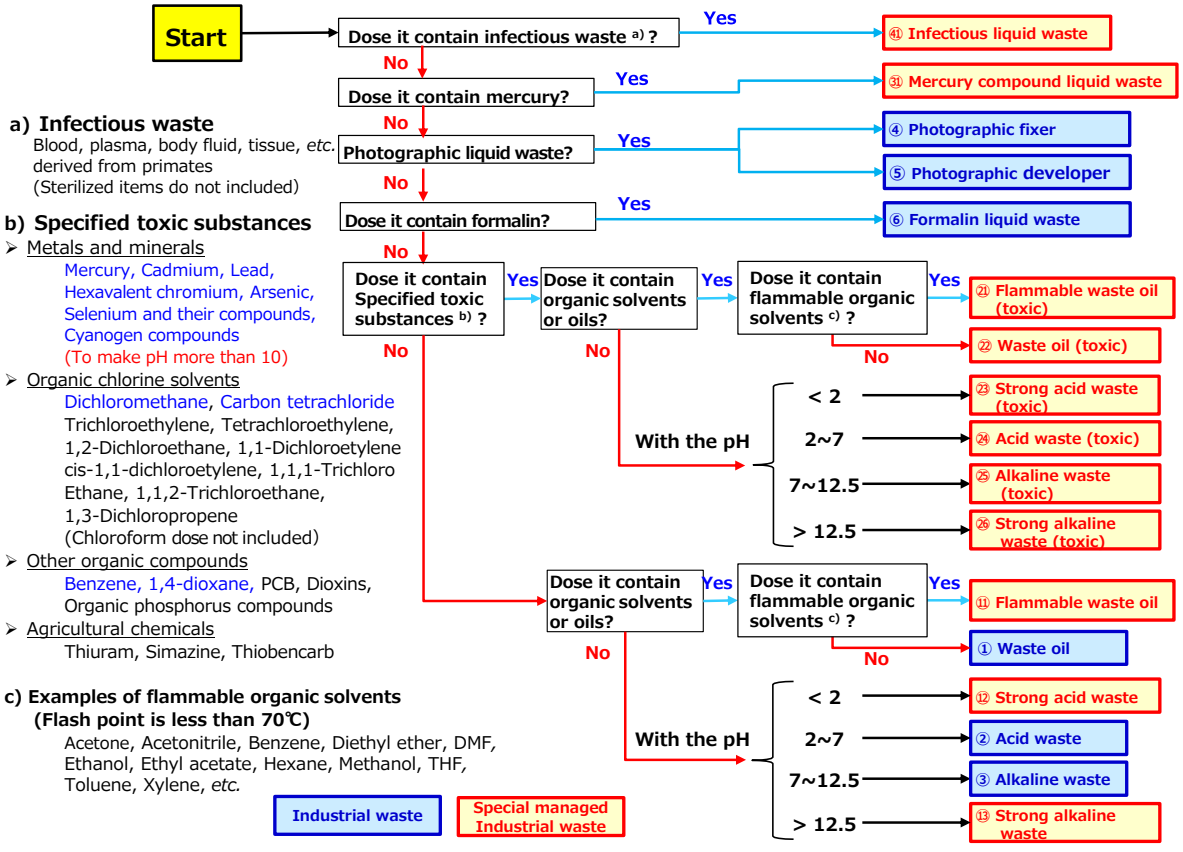
- Chemical substances such as organic solvents that are required to be handled in conjunction with local exhaust systems (draft chambers) and push-pull ventilators must be used with those devices
- Since organic solvent impacts the human body, careful handling should be used and, when poisoning occurs, appropriate first aid measures taken

2-6-5 Dangerous Goods

- "Dangerous goods" are defined by the Fire Service Law as having explosive properties, ignitability, water proofing ability, flammability, and related properties and can cause serious accidents and disasters, so it is necessary to pay close attention to management and handling
- The storage location of dangerous goods varies according to the type and amount of dangerous goods
- Since the Omiya campus and Toyosu campus store a large amount of dangerous goods, operation management is strict, and the amount that can be brought into a room at any one time is limited
- Outside the laboratory, the Omiya campus has a dangerous goods warehouse on the 1st floor of Building No. 3, and the Toyosu Campus has a dangerous goods store shared by all departments under the large stairs

2-6-6 Flow Chart for Sorting Experimental Liquid Waste

Flow chart for sorting experimental liquid waste



2-6-7 Co-solvents

On the Toyosu Campus, four types of organic solvents (acetone, hexane, methanol, and ethanol) can be used as a common solvent. These common solvents are hazardous substances in the Class 4 Class I petroleum category (methanol is designated as a deleterious substance) but due to a low flash point, are kept in the dangerous goods warehouse under the big staircase. These common solvents can be used for free in each laboratory at the expense of the school corporation, but please use "strict observance" of the following matters when using them:.

- When pumping a common solvent, write down the department, supervisor, name, date, time and amount to be pumped in the ledger, and record when opening each new can
- Pay close attention so as not to spill solvent while pumping it out
- For carrying a common solvent, use a metal solvents can or a polycarbonate container made of organic solvent resistant material. Do not use a glass container.

On the Omiya Campus, seven types of organic solvents (acetone, ethyl acetate, hexane, methanol and ethanol) are used. The following solvents are available as common solvents: alcohol, rubbing alcohol and ether. Ether has a low flash point. Moreover, they are considered hazardous peteroleum-based products, while ethyl acetate and methanol are also designated as deleterious substances. All of these solvents are stored in the hazardous materials warehouse next to Building 6.
These common solvents can be used free of charge in each laboratory at the expense of the school corporation. The following procedures must be strictly adhered to.

- Do not use fire in the hazardous materials warehouse. Before we go into the hazardous materials warehouse, we need to put on a static eliminator pad which removes static electricity from the human body when touched.
- The hazardous materials warehouse must be locked at all times and its keys must be kept under strict control.
- Doing refills and dispensing materials in hazardous materials warehouses is prohibited.
- Acetone, ethyl acetate, hexane, methanol, and ethanol are stored in half cans (9L), 3L bottles, and 500mL bottles, respectively; disinfectant alcohol is stored in 500mL plastic bottles only, and ether is stored in 500mL bottles only. Only the amount of solvent that is actuallys needed should be taken out of the container.
- When a solvent is carried in or out of the warehouse, write the date, time, name and quantity of the solvent in the provided delivery book. Be sure to accurately state the quantity after it has been removed.
- When carrying out the shared solvent, it should be in a container made of an appropriate material and strength, and transported in such a way as to prevent the container from tipping over or colliding with something. Use only transport equipment or containers that have been designed for such transport (e.g., safe bottles, bottle carriers, carts with baskets, etc.)
- If a person finds a leak, overflow, splash, etc. of a shared solvent, he or she must use the provided safety kit to prevent leakage of hazardous materials. Take first-aid measures and immediately contact the Hazardous Materials Security Supervisor.

2-6-8 Transport of chemicals

Extreme caution is required when transporting chemicals, waste liquids, etc., including the above common solvents.

- Before transporting, confirm that the container lid is properly closed and that the container has not deteriorated
- When carrying degraded containers and glass containers by truck, put them on a cart after putting them in corrugated paper or a plastic case with packing materials
- At the Toyosu Campus use the cargo elevator

2-6-9 IASO R6 Chemical Management System

- Some laboratories of the Department of Applied Chemistry and Department of Materials Science and Technology are using the IASO R6 chemical management system, so can understand inventory quantity and chemical useage issues related to stored toxic substances and deleterious substances.

Please contact the Toyosu Academic Affairs Division about the laboratory of the faculty of engineering that you wish to use.

2-7 Living Things

2-7-1 Microbial Experiments

- The most important thing to note in microbiology experiments is that the microorganisms handled are invisible to the naked eye
- In the laboratory, a wide variety of microorganisms float in the air, falling bacteria are present on experiment tables, and a large number of microorganisms can adhere to the experimenter. Therefore, before actually handling microorganisms, it is necessary to learn theories and techniques about disinfection, sterilization, and aseptic operation It goes without saying that eating and drinking in a laboratory that handles microorganisms is prohibited
- For experiments, please investigate the characteristics of the microorganism to be used beforehand and handle it according to its characteristics. Especially careful attention must be paid to unidentified bacteria isolated from nature. When handling microorganisms, be careful not to contaminate hands, clothes, and the environment with the materials used. Be sure to sterilize cultures before discarding them
- When handling viable bacteria, do not put culture media or test tubes into which bacteria have been placed into your pocket during experiments. There is a danger of contamination due to leakage and breakage. Be sure to inform the faculty in charge of experiments whenever injured by glassware, needles etc. that seem to have attached bacteria
- When handling dangerous microorganisms such as pathogens, take necessary precautions according to the risk group classification (National Institute of Infectious Diseases Research Institute Pathogen Safety Management Regulations)

2-7-2 Animal Experiments

- From the viewpoint of science and animal welfare, the "Shibaura Institute of Animal Experiment Regulations" has established both an ① Animal experiment committee approval procedure for animal experiment plans, and ② The Rules Concerning the Protection and Management of Animals", and "Standards Relating to Reduction and Storage of Experimental Animals and Pain Relief"
- It is necessary to apply for approved for each experiment plan and to get approval
- An experimental animal is defined as any mammal, bird, or reptile that is kept for use in an animal experiment or the like

(1)In order to conduct animal experiments, it is necessary to receive education and training on the following items

- Related laws and regulations, guidelines, regulations prescribed by the Shibaura Institute of Technology, etc.
- Basic matters concerning the keeping of laboratory animals
- Matters concerning safety assurance and safety management
- Other matters concerning the implementation of appropriate animal experiments

(2)In conducting animal experiments, experiments must be properly implemented according to the animal welfare management law and animal care standards, based on the following animal experiment principles:

- Utilize alternative methods (to the extent that the purpose of scientific use can be achieved) as much as possible to substitute for the use of animals
- To reduce the number of uses (to the extent that the purpose of scientific use can be achieved), efficient and appropriate use of laboratory animals should be made to minimize the number of animals used for experiments.
- Experiments must be properly implemented based on the reduction of pain (to the extent necessary for scientific use, as much as possible by a method that minimizes the distress of the animals as much as possible). In addition, during animal experiments, we must beware of the possibility of receiving wounds and diseases from animal bites and from zoonosis, etc.

(3)In facilities dealing with experimental animals, observe the following:

- Wear special white clothing, footwear, cap, mask, and gloves
- Do not eat or store food etc inside the facility
- Before carrying out experiments, try to master the necessary procedures. If you are not confident, do it under the guidance of well-qualified people (faculty etc.)
- Conduct experiments only in designated areas and report to the teacher when injured during experiments. Use of anesthesia drugs, fixation reagents, and solvents should be carefully managed and ventilated
- Avoid contact with laboratory animals that are in poor physical condition

(4)For the breeding of laboratory animals, observe the following:

- Keep records on your entry into and exit from the storage facility and keep it locked to prevent others from entering
- When breeding, try to maintain a comfortable environment by feeding, watering, cleaning, changing bedding, etc. while taking into consideration the ecology and habits of laboratory animals
- Be careful not to let the experimental animals escape when changing the bedding etc. Should an experimental animal escape, notify the supervising faculty promptly after applying measures to prevent it's escape to other rooms. Follow instructions for handling experimental animals that escape
- If abnormal animals or dead animals are found in the storage facility, contact the faculty

(5) The treatment of animals used in experiments shall be as follows:

- Use a specialized supplier to dispose of laboratory animals. Keep dead animals frozen in storage until the processing day so that there will be no liquid leaks such as blood. Avoid mixing aluminum foil and unnecessary paper, and make sure not to wrap up used needles, cutlery, etc. with the remains.
- Bloody waste, needles, such as injection needles, and dangerous small cutlery, such as knife replacement blades, etc. must be stored in a freezer dedicated to infectious waste

2-7-3 Genetic Recombination Experiments

(1) What are Genetic Recombination experiments? Such experiments involve:

- Fragments of DNA molecules extracted from an organism or in which artificially synthesized DNA is artificially transferred into self-propagating DNA (host/vector) such as a plasmid or a virus using enzymes or other means in vitro to grow different types of DNA, as well as using the resulting recombinant material.
- Growing heterologous DNA by using fragments of DNA molecules extracted from living organisms and artificially synthesized DNA which are artificially transferred into a self-proliferating DNA (host / vector) such as a plasmid or a virus using an enzyme etc. in a test tube, and using the resulting recombinant. By this technique, recombinants combining genes among heterologous organisms which do not occur in nature are produced.

Cautions:

- The development of DNA recombination technology incorporates of the use of recombination creatures including the cultivation of recombination plants, which could have a negative impact on non-recombination biodiversity, including cultivated plants and wild animals, that inhabit natural environments.
- As a result, internationally, the "Convention on Biological Diversity (Cartagena Protocol)" was concluded and, in Japan, the domestic "Law on securing biodiversity by regulation of the use of genetically modified organisms" (Cartagena law),was passed in 2004

■ According to the Cartagena Law, Containment Measures are of two types.

① Type1: Used without doing nonproliferation measures in a farm and a factory.

② Type2: Used with nonproliferation measures in a laboratory or biological cultures device,

(2) About diffusion prevention measures, assuming type 2 use:

- In order not to release the recombinant produced in the laboratory into the outside environment, the following statutes are applied: ① "Ministerial Ordinance specifies that diffusion prevention measures etc. be taken in the use of the second kind of genetically modified organisms related to R & D, etc." (2004'Ministry of Education, Culture, Sports, Science and Technology, Ministry of the Environment Ordinance), ② "Guidelines for Recombinant DNA Experiments at University etc." (1998'Ministry of Education,), ③ "Shibaura Institute of Technology Gene Recombination Experiment Implementation Regulations"
- These rules define biohazard measures in recombinant DNA experiments based on knowledge of general biohazards posed by pathogens
- Genetic recombination experiments require application for and approval of the experimental plan and the experimenter must have adequate knowledge of microorganisms and related experimental methods
- In order to prevent diffusion to the outside world, the physical containment by laboratory facilities, equipment, operation method, etc. are classified into levels P1, P2, P3, and P4, depending on the degree of risk of the recombinant
- Biological containment is divided into levels of B1, B2 depending on the viability of the recombinant in the external environment

2-8 Experimental Equipment

2-8-1 Draft Chambers

Draft chambers are used in work and experiments involving chemical volatilization and generation of dust etc. to prevent workers' exposure and indoor air contamination. Although it is mandatory to use local exhaust equipment, etc. when using organic solvents or specified chemical substances under the Occupational Safety and Health Law, it is not limited to substances specified by law, but in order to prevent exposure of hazardous substances in general, please use correctly.

- Be sure to check the operation of the exhaust fan before use and use it
- To prevent accidents such as inhaling chemicals, close doors as much as possible
- To prevent electric shock accidents, do not perform switch operations and plug and unplug the power plug with wet hands
- When gas odor occurs, immediately close the main gas valve, open the windows and doors and ventilate the room adequately. Trying to turn exhaust fans and ventilators on and off will cause sparks from the switch and there is a danger of igniting or exploding the filled gas.
- When using the heat source in the draft chamber, keep it as far as possible from the inner wall and observation door
- Due to different chemical resistance depending on the type of chemicals used, the working surface should be properly covered depending on the reagent to be used
- The draft chamber must undergo a periodic voluntary inspection, once per year to confirm its condition, exhaust capability, etc. by regulation

2-8-2 Electric Furnaces

Beware of fire, burns, electric shocks, explosions. Especially at 100 ～ 500 °C, the inside of the furnace will not turn red, so it is necessary to clearly indicate "in use" = "hot".

- Keep the periphery of the furnace in order, not placing combustibles nearby
- Do not heat the furnace to excessive temperature. Also, pay attention to abnormal odor etc. during use, and monitor the side of the furnace for high temperatures
- In an unmanned state, attach a post-it note etc. in which users, work contents, contact information, etc. are written
- Do not touch the high temperature part of the furnace body
- Do not touch heated test specimens directly with your hand. When handling test specimens, wear safety shoes and wear gloves
- Do not let high temperature samples taken out of the furnace touch moisture immediately after removal. Particularly when casting molten metal (molten metal) into a mold etc, always do without moisture. As moisture adheres, water vapor explosion may occur, so be careful
- Never put combustible gas or liquid in an electric furnace
- Do not install furnaces under sprinklers

2-8-3 Centrifuges

- In order to prevent the contents from scattering, securely replace the lid after using it
- Use the proper attached rotor or bucket to maintain acceptable speed
- The weight balance of samples is symmetrical with respect to the rotation axis (If you do not balance it, it may cause vibration of the centrifuge and destruction of the equipment)
- Set tubes and buckets at symmetrical positions so that the rotor balances
- While driving, do not open the lid, and do not give a shock to the machine body
- Do not touch the rotor or rotating shaft until the rotation has completely stopped
- Perform periodic voluntary inspections

2-8-4 Incubators

- Do not put chemicals such as volatile, flammable and corrosive gases in the cabinet
- Do not put metals, foreign matter or flammable materials that cause ignition in the incubator
- Never put samples in a sealed container, because expanding gas due to vaporization can cause the container to explode.
- Be careful as a short-circuit may occur when spilling water etc. inside the storage container.
- The heater switch must be turned off by the user after completion of work
- When using continuously for a long time, take measures against empty cooking and overheating

2-9 Radiation

2-9-1 Impact of Radiation on the Human Body

Radiation has permeating, ionizing and exciting properties, and is widely used in research. On the other hand, because humans cannot feel radiation, there is a danger of radiation exposure unless there is sufficient knowledge of radiation safety handling.

In order not to cause radiation accidents, it is important to have a basic understanding of the characteristics of radiation, the difference between radiation and radioactivity radiation detection and prevention methods.

The Earth always receives a small amount of radiation. This is called natural radiation, and there are several types such as cosmic rays. There are regional differences in the exposure dose of natural radiation, but the global average is about 2 mSv per year. In addition, we may receive artificial radiation from medical equipment.

The radiation dose limit for radiation workers is set at 100 mSv / 5 year and 50 mSv / year by the rule for prevention of ionizing radiation disorders. This is about 10 to 25 times the level of natural radiation.

Generally, the influence of radiation on the human body becomes dangerous as a result of its influence on atoms, molecules, cells, tissues, organs and individuals, and its impact may also affect offspring.

Radiation exposure is internal exposure when the radiation source is in the body, and external radiation is from the outside of the body. The way to prevent these exposures is to prevent "inhalation, ingestion, percutaneous invasion" in internal exposure. Three principles of "time, distance, shielding" are important for external exposure.

2-9-2 Radioisotopes and Radiation Generators

Experiments using radioactive isotopes are conducted within an isotope controlled area, and the experimenter is required to take a special medical examination prescribed by law as well as education and training. Also, during experiments, you should wear a radiation dosimeter to record the exposure level. Furthermore, observe the following main points:

- Since radiation is invisible, confirm with a measuring instrument whether there is contamination by radioisotope before and after starting the experiment
- After the experiment is over, exit after confirming that the body / white suit / gloves / slippers are not contaminated
- Handle with a good understanding of the physical and chemical properties of the radioactive isotope to be used
- Those with little work experience must refrain from working alone We keep the laboratory in order so as not to cause a pollution accident
- Do not bring unnecessary items into the laboratory, always make contamination checks when bringing laboratory items out
- In case of emergency such as a radiation accident, theft of radioactive isotope, earthquake, fire, etc, report immediately to the radiological handling chief

2-9-3 X-ray Devices

X-rays emitted from an X-ray generator such as an X-ray diffractometer or a fluorescent X-ray analyzer also have a risk of radiation damage to the human body These uses are prescribed by the Occupational Safety and Health Law and the Ionizing Radiation Injury Prevention Regulation and can be handled only by those who are permitted to use X - ray equipment. X-rays are harmful to the human body and it is necessary to pay close attention when handling to avoid exposure.

- When using the equipment, familiarize yourself with the functions and mechanisms of the equipment, minimize radiation exposure by avoiding careless handling. When installing, moving, or changing equipment, it is necessary to notify in advance
- In the X-ray generating apparatus in which only the inside of the apparatus is set as the controlled area, safety parts such as interlocks for preventing exposure are attached to each part of the apparatus, so there is little risk of X-ray exposure during normal use, Although it does not become an object, the user needs to know the mechanism in advance and to work very carefully. Of course, do not inadvertently remove or change any parts.

2-10 Unmanned Aerial Vehicles

The aeronautical law amendment defines no-fly zones for unmanned aerial vehicles (drones etc.), On the Omiya campus drones are prohibited near the student dormitory and the Omiya playground. If you wish to experiment with a drone at SIT, follow the "Procedures for Implementing Experiments Using Unmanned Aircraft".

- Both indoor and outdoor are prohibited in principle
- Indoors unmanned aircraft are only allowed in limited places (Toyosu Techno Plaza, Condominium Toyosu Research Building and Omiya Gymnasium)
- Indoors, (Toyosu research building inside · Omiya gymnasium) or when there are measures to prevent runaways against collision or mis-operation such as for drone in the outdoors, Flying may be permitted However, consult with the Research Promotion Office / Facilities Division in advance to confirm permission.
- With regard to the inside of laboratories, flying under the direction of the academic supervisor

2-11 Laboratory Waste

2-11-1 Treatment of Waste Liquid (collection of experimental waste liquid, waste oil, and waste chemical containers)

Disposal of laboratory waste products etc. is regulated by laws and local ordinances because there is a possibility of fire hazard etc., water pollution and soil contamination. Therefore, it is forbidden to dispose of such material that is used in research and experiments including containers, solid waste materials, used bottles, etc without permission. In particular, we collect disposal waste twice a year at Omiya Campus and 3 times a year at Toyosu Campus, so please dispose of waste materials each as soon as it is created.

Waste liquid should be tightly capped and stored in the poly tank provided by the university in each room. Please clearly indicate contents / affiliation (laboratory / group name) /and responsible person on these storage containers. Please check with Omiya Academic Affairs Division Academic Affairs Division on the Omiya Campus and with the Toyosu Campus Facilities Division regarding their respective detailed rules and collection schedules.

2-11-2 Experimental Waste

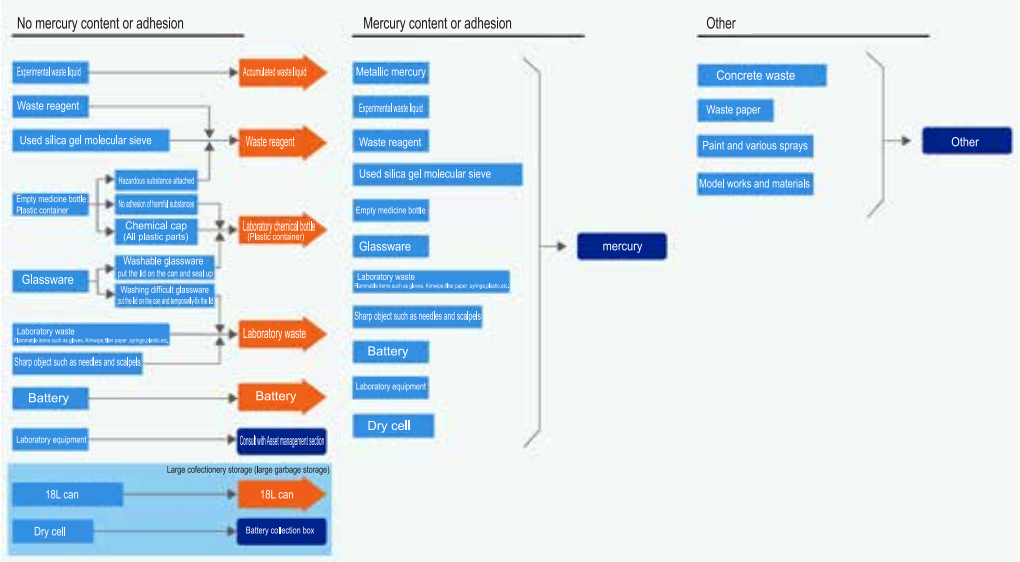
In addition to chemical substances and their associated waste, other waste from fungi being cultured, animals being observed, injection needles, falcons, mercury-containing substances, etc. should be discarded unless needed for ongoing treatment. If you are uncertain how to dispose of any waste, please consult with the Omiya Academic Affairs Division Academic Affairs Section on the Toyosu Campus Facilities Section. For instructions. Also, please report such consultations to the Academic Affairs Division or Facilities Division promptly, especially when waste liquid is spilled from dropped chemical

bottles.

Inquiries:
Omiya Campus Omiya Academic Affairs Division Extension 5000
Toyosu Campus Facilities Division Extension 7270

2-11-3　Disposal at Toyosu Campus

Separation of experimental waste



No mercury content or adhesion

Stagnant liquid waste
Waste reagent
Chemical bottles and plastic medicine containers for experiments
Experimental waste
Battery
Experimental equipment
18L can
Dry cell collection box

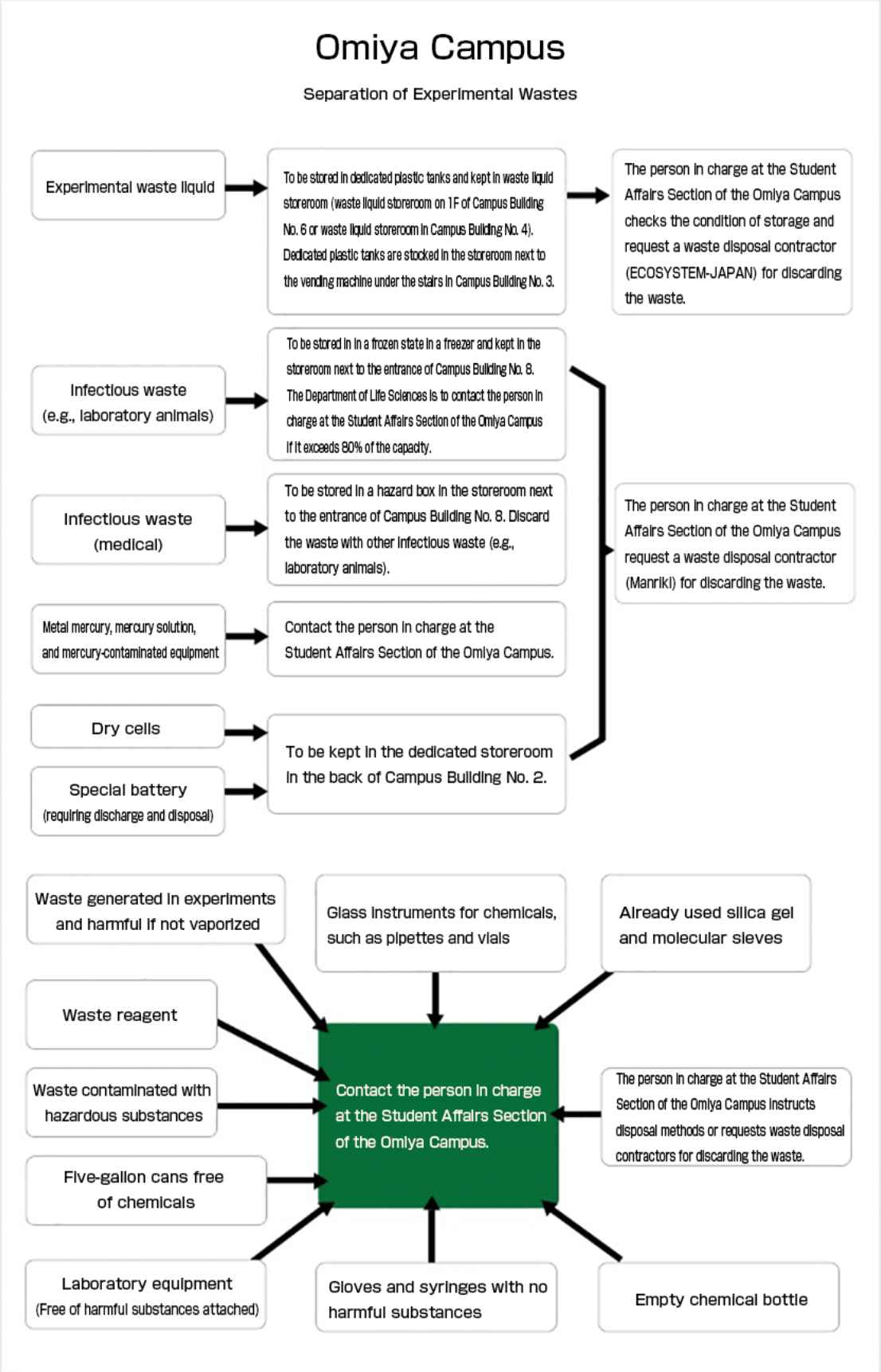
Items containing or adhering to mercury

Mercury

Other:

Separation of laboratory waste on the Omiya Campus

Omiya Campus



Toyosu Campus

Residual waste fluid

Residual waste fluid

Collection Date Application Form "Attachment 1"

"Collection of residual waste fluid (including waste materials) and laboratory waste" in June, October, and February -- generally on the last Wednesday 9:30 ～ 12:00 Department Specify collection time Collection place and storage

Location of poly tank (see guide map)

Collection place	Empty poly tank storage location
Loading area is in front of the garbage storage facility on the Viva Home side of the research building. Use only the Cargo Elevator. Check the guide map for loading and unloading routes. Place items in front of the appropriate numbered signs near the collection desk.	Room in front of the experimental waste repository under the large staircase You can borrow the key from the Fire Prevention Center on the first floor of the classroom building. Enter the number of polyethylene tanks to be taken out in the ledger. Contact the Facilities Department (7270) if you are out of stock

Collection method

	sun	mon	tue	wed	thu	fry	sat
week1				Distribution of application			
week2				Application deadline			
week3							
week4		Distribution of seals		On the day of collection			

Reception period　　Seal application period

Notes

Plastic bottles and other deformed plastic containers are not allowed Before dropping off liquid waste, use an oil-based ink pen or permanent marker to draw a line indicating the “80% full” level on your polyethylene waste container. Do not fill the container above this level. Tighten the inner and outer lids tightly.

When you carry by truck

Be careful items do not fall off the dolly when passing over uneven flooring. Do not use double-tiered dollies.

【Things that cannot be accepted as waste material】

× Experimental effluent containing mercury → consult with the facility section (7270) on the 5th floor of the Research Building

Temporary storage space until collection (see guide map)

Temporary storage space until collection. Be sure to confirm that no materials are kept in temporary storage until after (?) the application deadline

Experiment Waste Storage Under the Large Staircase	Experiment Waste Liquid Reservoir on 11th and 13th floor
For waste fluids covered by the ‘Treatment No. 2 and 3 Hazardous Materials of the Fire Service Act, Class 4’ Up to 10 polyethylene tanks per room Waste must be placed either within the tape divider on the floor or on the bottom row of a shelf (the top row is dangerous). Label temporarily stored items with "(Teacher's name) Lab"	For waste liquid other than treatment no. 2 and 3 Label temporarily stored items with "(Teacher's name) Lab" Secure with a chain to prevent items from falling over Beware of polyethylene tank expansion due to a rise in room temperature.

Waste Reagents

★ Collection date / application form "Attachment ② "

"Collection of residual waste fluid (including waste materials) and laboratory waste" in June, October, and February Generally on the last Wednesday
9:30 ~ 12:00 Department Specify collection time

★ Collection place

In front of Viva Home center at the research building Front loading space
Elevator used for cargo

Confirm guide map for unloading route

Arrange collection receipts and arrange them in front of numbered tags

○ Schedule until collection (calendar of collection month)

	sun	mon	tue	wed	thu	fry	sat
week1				Distribution of application			
week2				Application deadline			
week3							
week4		Distribution of seals		On the day of collection			

Reception period　　Seal application period

(1) Unneeded chemicals Waste samples

★ Disposal method

For laboratories using the IASO drug management system, register empty reagent bottles and plastic chemical containers, and dispose of them in their original state.

【Things that cannot be treated as waste reagent】

× Metallic Mercury · Mercury Reagent → Consult with Facility Division (7270) on the 5th floor of the Research Building

× Something that can be safely dissolved / mixed → Disposal as residual waste corresponding to process number. 1 to 20

× Oils → transferred to a poly tank for waste liquid and discarded as treatment number 1 "waste oil"

▲ Paints · Spray → Others

(2) Silica gel · molecular sieve celite

★ Disposal method

Make sure 45L transparent plastic bags are doubled and squeeze out the air firmly. Proceed as application No. 21 "waste reagent"

【Things that cannot be treated as waste reagent】

× Adhered mercury → Consult with the facility section (7270) on the 5th floor of the research building

(3) Empty bottle that contained harmful substances and adhesion chemicals that cannot be washed off

【Things that cannot be treated as waste reagent】

× Adhered mercury → Consult with the facility section (7270) on the 5th floor of the research building

▲ Cleaned chemical bottle to laboratory chemical bottle collection

Experimental waste

★ Collection date and time application form "Attachment ③

""Collection of residual waste fluid (including waste reagent) and laboratory waste" in June, October, and February Generally on the last Wednesday

9:30 ~ 12:00 Department Specify collection time

★ Collection place and storage area for lidded cans (see guide map)

Collection place	Storage location of lidded can
Loading area is in front of the garbage storage facility on the Viva Home side of the research building. Use only the Cargo Elevator. Check the guide map for loading and unloading routes. Place items in front of the appropriate numbered signs near the collection desk.	Room in front of the experimental waste repository under the large staircase You can borrow the key from the Fire Prevention Center on the first floor of the classroom building. Enter the number of polyethylene tanks to be taken out in the ledger. Contact the Facilities Department (7270) if you are out of stock

Temporary storage is available on the top shelf of the cabinet in the laboratory waste storage area under the main stairs and on the 11th and 13th floors until collection.
(Write the name of the department and laboratory (name of the faculty member) and the month in which the disposal is planned with an oil-based ink pen.

★ Collection method

○ Schedule until collection (calendar of collection month)

	sun	mon	tue	wed	thu	fry	sat
week1				Distribution of application			
week2				Application deadline			
week3							
week4		Distribution of seals		On the day of collection			

Reception period　　Seal application period

(1) Flammable materials such as gloves, kim-wipes, filter paper, syringes, plastics, etc.

★ Disposal method

Make sure 45L transparent plastic bags are doubled and squeeze out the air firmly.

★ Notes

【Things that cannot be treated as experimental wastes】

Strict prohibition of inclusion of household garbage

Apply separately for syringes and needles

Please wrap items that can break through the plastic bag, such as those with sharp edges, in newspaper or similar material.

× Infectious waste → Consult with facility section (7270)

(2) Glassware (difficult cleaning) ★ Disposal method

★ Disposal method

Put it in a lidded can but do not seal it permanently until its contents can be confirmed. Bring a sticker without pasting it contents can be confirmed.

Bring a sticker without pasting it

【Things that cannot be treated as experimental wastes】

× Wash with water or appropriate solvent (see*) → Discard these items in a laboratory chemical bottle;

(3) Sharp and dangerous tip

- Syringe integrated with needle and needle
- Pipette tip
- Surgical knife
- Other needle / insect pin

★ Disposal method

Put it in an special container but do not seal it permanently until its contents can be confirmed. Bring a label but do not stick in on the container until it contents can be confirmed.

【Things that cannot be treated as experimental wastes】

× Infectious waste → Consult with facility section (7270)

Experimental medicine bottles / plastic medicine containers

★ Collection date (No application is required.)

"Collection of laboratory chemical bottles (containers)" in February is on or around the final Thursday 9:30 - 10:30 of the month.

★ Collection method

○ Schedule of collection times (calendar of collection month)

	sun	mon	tue	wed	thu	fry	sat
week1				Distribution of imformation			
week2							
week3							
week4		Distribution of seals		On the day of collection			

Seal application period

"To be cleaned" stickers should go to the secretary of each department's center

★ Collection place and storage area for lidded cans (see guide map)

Collection place	Storage location for lidded cans
Loading area is in front of the garbage storage facility on the Viva Home side of the research building. Use only the Cargo Elevator. Check the guide map for loading and unloading routes. Place items in front of the appropriate numbered signs near the collection desk.	Room in front of the experimental waste repository under the large staircase You can borrow the key from the Fire Prevention Center on the first floor of the classroom building. Enter the number of polyethylene tanks to be taken out in the ledger. Contact the Facilities Department (7270) if you are out of stock

(1) Chemical bottles (washed)

【Things that cannot be treated as laboratory chemical bottles (containers)】

× Those that cannot be removed due to adhesion of harmful substances → Disposal as treatment No.21 "waste material"

★ Disposal method

Laboratories using the drug management system IASO performs the empty bin registration Be sure to empty it and wash it as many times as necessary with water or an appropriate solvent, and collect the washing liquid in a polyethylene tank designated for liquid waste storage.

Put a "cleaned" sticker on it → Pick up the sticker at your department's secretary center.

Discard the caps separately.

★ Notes

It is dangerous to dispose of uncleaned items as they can react with rainwater and other chemicals, so they cannot be collected if they are not cleaned.

【Things that cannot be treated as laboratory chemical bottles (containers)】

× Those that cannot be removed due to adhesion of harmful substances → Disposal as treatment No. 21 "waste reagent"

※ **How many times should a bottle or container be washed with water or a suitable solvent? Three times!**

Chemicals that are water-soluble and that do not react with water → Use water
Chemicals that are not water-soluble or that react with water (most Class 3 hazardous materials as defined by the Fire Service Act, with the exception of yellow phosphorus) → Use the suitable solvent

(2) Chemical plastic containers

Example: Washed chemical containers (plastic)

【Items that cannot be processed as lab chemical bottles (containers)】
Containers with hazardous material residue that cannot be removed → Dispose using Processing Rule No. 21 (waste reagent).

Disposal method

Labs using the IASO reagent management system should register empty bottles.
Be sure to empty each container and wash the necessary number of times with water or a suitable solvent (*see below). After washing, collect remaining liquid in a plastic tank for waste liquid.
Apply "Washed" stickers → Stickers are available at each department's Clerical Center.

Precautions
Disposing of bottles without first washing them poses the risk of reactions with rainwater or other chemicals. If told that a bottle is unwashed, take it back with you.

Glass products (washed)

Example: Washed glass and ceramic lab implements

【Items that cannot be processed as lab chemical bottles (containers)】

Items with hazardous material residue that cannot be removed → Dispose using Processing No. 23 (lab waste).

Disposal method

Wash the necessary number of times with water or a suitable solvent (see below) and collect any remaining liquid in a plastic tank for waste liquid. Apply a “Washed” sticker to the lid → Stickers are available at each department’ s Clerical Center. If full, pour into an 18 L drum, affix the lid to the drum, and seal with protective tape. If there is some space left, do not seal and only secure lid lightly.

※ **How many times should a bottle or container be washed with water or a suitable solvent? Three times!**

Chemicals that are water-soluble and that do not react with water → Use water
Chemicals that are not water-soluble or that react with water (most Class 3 hazardous materials as defined by the Fire Service Act, with the exception of yellow phosphorus) → Use the suitable solvent

18 L Cans

18L Cans no chemical residue

★ Disposal method

Laboratory using drug management system IASO performs empty bin registration Be sure to empty it, wash with water or a suitable solvent (see ※) Remove the lid and discard

★ Disposal place (see guide map): Large waste storage space

Batteries

(1) Lead batteries

★ Collection date Application form "Attachment 1" "Processing No.20" Other "

"Collection of laboratory waste" in June, October, and February -- generally on the last Wednesday of the month
9:30 ～ 12:00 Department Specify collection time

○ Schedule until collection (calendar of collection month)

	sun	mon	tue	wed	thu	fry	sat
week1				Distribution of application			
week2				Application deadline			
week3							
week4		Distribution of seals		On the day of collection			

Reception period　　Seal application period

Attach photos so that you can show the size of the battery at the time of application

【Things that cannot be treated as experimental wastes】

× Other than lead batteries (mainly following(3) → consult with manufacturing / purchasing source and discard

(2)Small rechargeable batteries

<Example>Ni-Cd battery, Ni-MH battery, Lithium ion battery

★ Disposal method

nside of the Large waste storage space, there is a battery collection box.

please borrow the key at Disaster prevention center Classroom building 1st floor

(3) Special batteries

<Example> Battery manufacturing requiring discharge treatment · Consult with the purchaser to request collection

(4) Dry batteries

< Example> Alkaline batteries

There is a dedicated collection box in the room next to the freight elevator in the research building (next to the garbage storage area).

× Lead batteries, small rechargeable batteries, special batteries, laptop batteries

Mercury

- Metallic mercury
- Mercury thermometer
- Experimental instruments containing mercury (manometer, vacuum tube etc)
- Mercury adhesion garbage
- Fluorescent lamp
- Mercury lamp
- Mercury battery / air zinc battery

★ Collection date, time and location

Any time during business hours in the facilities management section (extension 7270), 5th floor, Research Building

★ When mercury is spilled

Contact the Facilities Section (7270) on class days. Contact the disaster prevention center (7280) at night and on holidays.

1. Enhance ventilation and do work with a gas mask, protective gloves, protective goggles etc. Mercury evaporates easily! There is a danger of inhaling its vapor.
2. In the case of large amounts, collect with paper, a plastic plate, dropper etc. and put in containers (glass · poly) which can be sealed.
3. For fine droplets of mercury, collect it using tin foil or copper wire (peal the coating off electric wire first)
4. Finally, copper powder or zinc dust (neither oxidized) can be sprinkled on the mercury and, after being adsorbed, can be collected with something like a small broom.
5. Bring the mercury deposits to the Facilities Section (5th floor of the research building).

Other

(1) Concrete or iron scrap

★ Disposal method (refer to the guide map)

Scrap storage → If it gets full, contact to asset management section (7270)

★ When mercury is spilled

Contact the facility section (7270) on class days. Contact the disaster prevention center (7280) at night and on holidays.

Iron scrap

Concrete scrap

★ Disposal method(refer to the guide map)

(2) Paint and Paint Spray Cans

Paint containers such as cans, bottles and plastic vessals

- In a ventilated area (indoor/outdoor spray booth), open the lid and allow to vaporize or solidify completely with the treatment agent.
- Put it in a double-layered plastic bag soaked with newspaper, etc., and apply for treatment number 22 "Experimental Waste".
- Put the oil in a polyethylene tank for disposal and apply for treatment number 1 "Waste Oil".

Paint

- Soak it in newspaper or similar material in a ventilated place, and place it in a double-layered plastic bag with the treatment number 22 (Experimental Waste).

Paint Spray Cans

- Completely vent the gas and then put the can in the bulky waste dumpster.

Spray can contents

●Include in newspapers etc, put in a doubled garbage bag of 45L in a place where ventilation is possible (spray booth indoor and outdoor), and apply as disposal #22 "experimental waste"

Spray can

●Make degas completely and discard to large waste storage space

(3) Experimental machines ·Expendable supplies

Please contact the Asset management section (7270) before disposing of the following items

- Large laboratory equipment
- PC equipment (things that battery can sort out)
- Furniture
- Fluorescent tubes
- Button batteries

(4) Empty cylinders

Spent high pressure gas cylinders are returned to the supplier [KOTOBUKI SANGYOU(03-5735-4311)]

(5) Model waste

★ Disposal method

Models are classified as household garbage Be sure to sort the waste wood, board, corrugated cardboard, and panels.
Use the "large amount garbage disposal reservation slip", go to the disaster prevention
center and submit it by 15 o'clock of the day before pick up

↓

Get a notification of reservation acceptance from the cleaning officer

↓

Bring it to the garbage disposal room at 3:15 PM

【Things that cannot be treated as model waste】

× Not sorted as household garbage

Non-experimental (household) garbage

★ Disposal method - Refer to sorting table installed in the predetermined place

- Burnable garbage bin : Waste paper · Cloths · Small wood chips (fragments) · Flowers
- Incombustible garbage bin: lunch containers · vinyl · plastic · rubber · leather products · portable warmer · metal ware · glass · pottery · spray cans, oil (salad oil, tuna can)
- Bottle/ can bin: plastic bottles Drink leftover of beverages is emptied and discarded, lid removed and incombustible waste
- Oversized waste storage(size more than 30 cm) · Experimental equipment · Home appliances
- Other garbage. books → cardboard tied with vinyl strings etc (up to 60 cm on a side)
- Cutlery · tableware etc (wrapped in thick paper and labeled “danger”)

【Things that cannot be treated as household garbage】

× Experimental waste

★ Notes

For safety and efficient processing by workers, do not mix laboratory waste into household garbage!

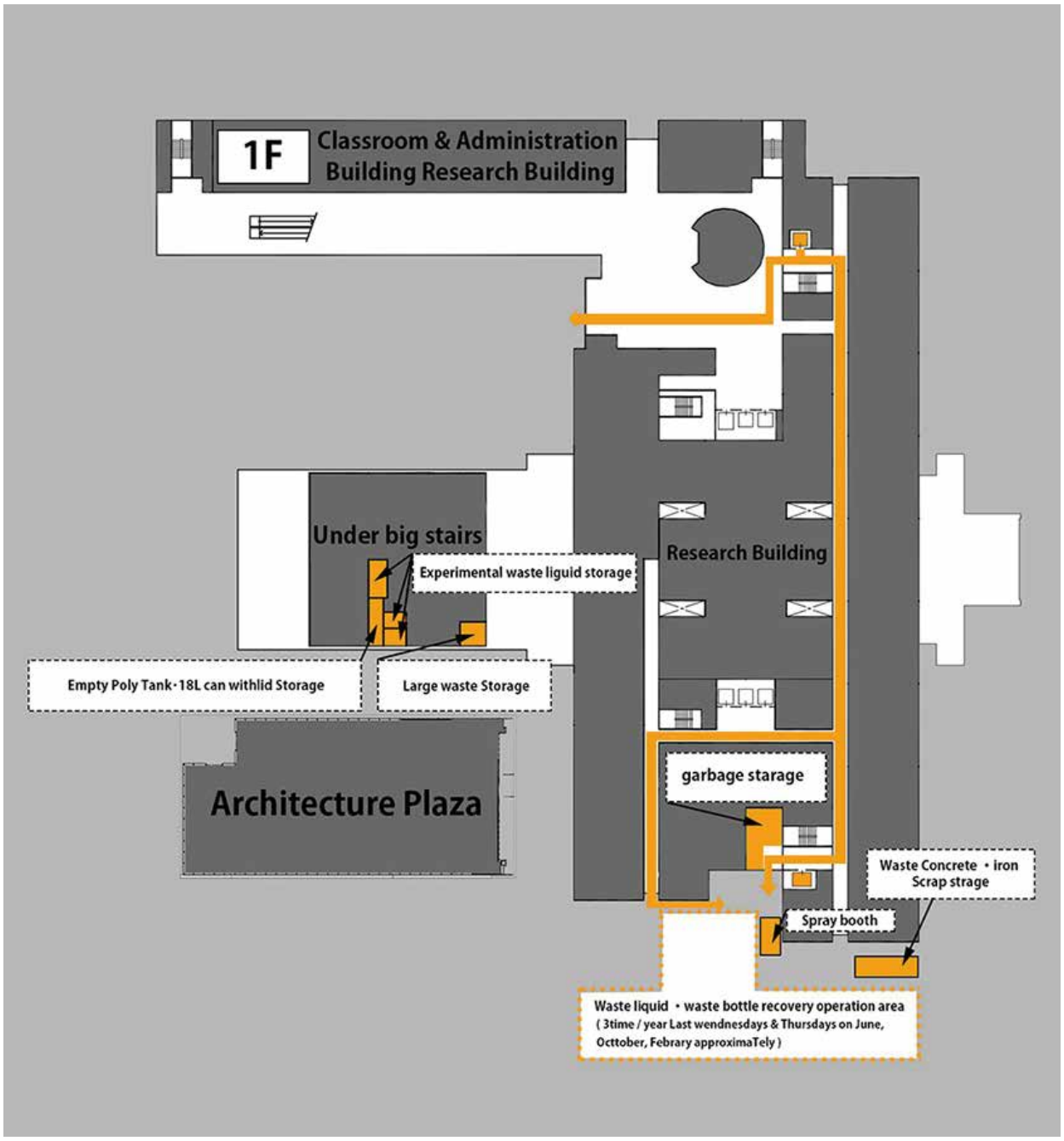
★ When chemical substances are spilled

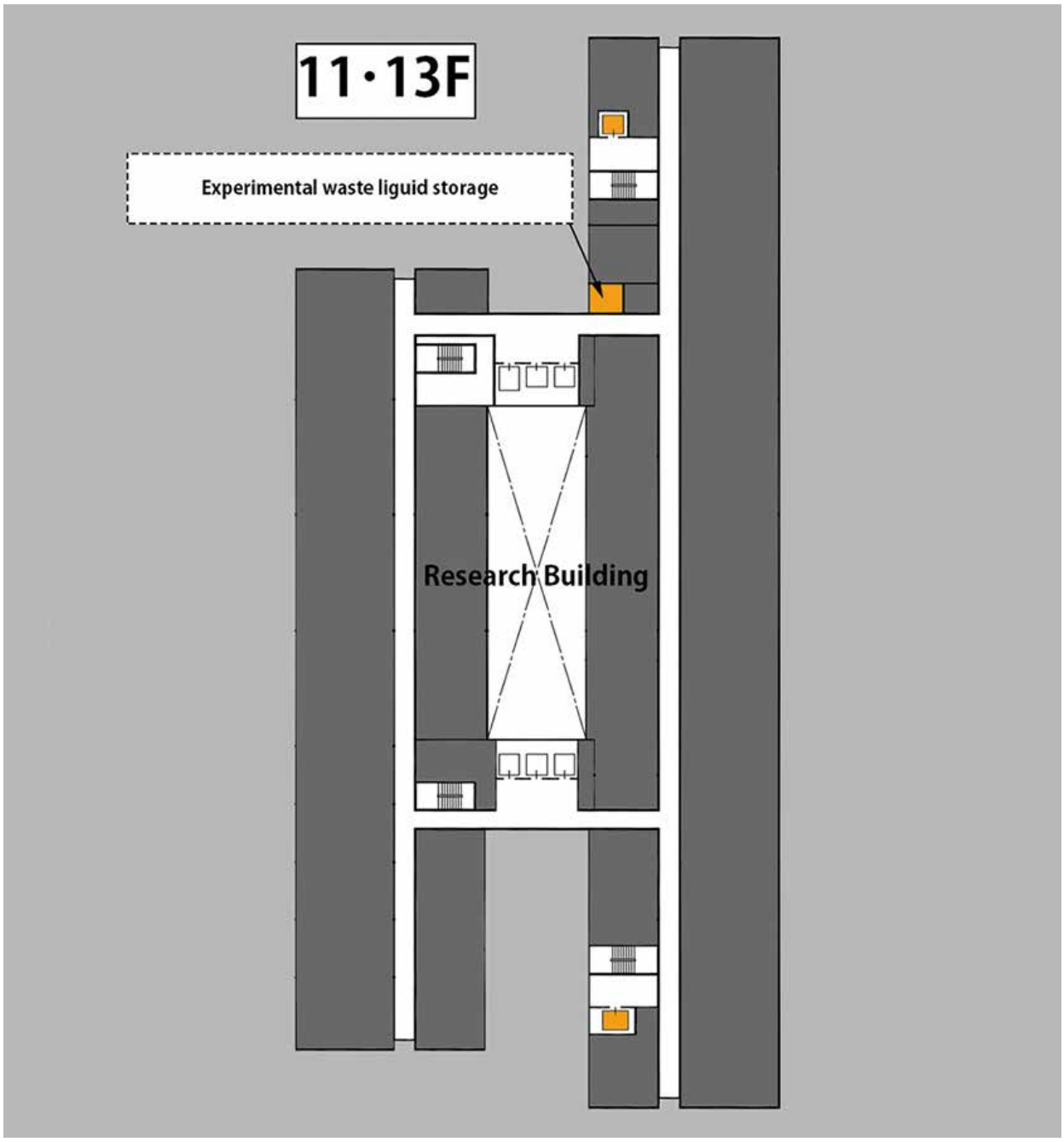
- Contact the facility section (7270) on class days, and contact the disaster prevention center (7280) at night and on holidays.

On-campus / telephone response
Chemical substances were scattered at XX on the XX floor of XX building. The chemical is ○ ○ . The person has been injured or exposed to chemicals. Other damage situation ... (quantity, state of reaction) ... Please support me. I am a (faculty member) graduate △△ .

- Check the safety data sheet (SDS), or retrieve it by smartphone.
- Ventilate (open the window, take in outside air · press ventilation switch) well.
- In the case of a substance with a strong toxicity, help people evacuate from the floor.
- Fire Law Dangerous Goods Class 4 Special Flammable Materials In case of highly flammable substances, it is strictly prohibited to use electrical devices and switches!
- Work should be done with a gas mask, protective gloves, protective goggles etc.

Disposal place guide map

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Experimental waste liguid storage
Research Building