



**MINISTRY OF TECHNOLOGY RESEARCH AND HIGHER
EDUCATION, PADANG STATE UNIVERSITY
FACTSOCIAL SCIENCE
DEPARTMENT OF
GEOGRAPHY**

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**SSSTANDARD OPERATIONAL PROCEDURES (SOP)
USING LABORATORY OF PHYSICAL GEOGRAPHY,
STATE UNIVERSITY OF PADANG**

A. Definition

The physical geography boratorium is a geography academic facility that is used by students or lecturers for practicum and research activities.

B. Destination

1. Optimizing laboratory management and all available resources in order to be productive, qualified and reliable. Providing excellent service as a center for scientific inquiry, development and application of research in the field of physical geography.
2. As a guideline for the use of laboratories for the implementation of practicum and research for students and lecturers.
3. Facilitate the control or supervision of laboratory equipment.

C. Reference

Pemmade standard operating laboratory procedures refer to:

1. SOP of Padang State University
2. SOP of the Faculty of Mathematics and Natural Sciences, Tanjungpura University majoring in chemistry
3. Journal of Educational Laboratory Management, 1

D. Scope.

This laboratory equipment lending procedure only applies to students, lecturers and outside parties who have received permission to borrow laboratory equipment with the conditions and conditions that apply for a laboratory equipment loan guarantee, namely in the form of user identity (KTM, KTP, and user's SIM). detained as long as the user borrows the laboratory equipment and will be returned after returning the laboratory equipment. In addition, lending laboratory equipment uses an official letter from the institution or lecturer in charge related to the person in charge's signature or activities addressed to the laboratory head who has received ACC from the supervisor.

The provisions that apply are

- a) The laboratory equipment lent is in accordance with the loan letter
- b) The length of time for borrowing laboratory equipment is in accordance with what is stated in the loan letter
- c) Laboratory assistants borrow and return laboratory equipment on weekdays, starting at 09.00-15.00
- d) If the return exceeds the time limit given without confirmation to Laboratorium, then there will be a fine. A fine in the form of money of IDR 100,000 /tool/day.

E. Procedure

1. Mechanisms and Procedures for Borrowing Tools

Mechanisms and procedures for borrowing laboratory equipment in physical geography laboratories are as follows:

- a) The user / student makes an official letter of application for borrowing Laboratory equipment with the signature of the chief executive or person in charge of activities to the Laboratory Coordinator.
- b) The letter that has been created by the user is shown to the Laboratory Coordinator to be coordinated whether on the D day the Laboratory equipment borrowed is used or not.
- c) If the laboratory equipment is used for other purposes, the letter is returned to the user to be replaced when the borrowing time or the borrowing is canceled, if the tool

Lathe laboratory is not used, the letter is returned to the user and the user continues the loan letter to be submitted to the Laboratory Coordinator

- d) Submit a letter of application for borrowing the tool that has been signed by the chief executive to the laboratory assistant
- e) The user leaves an identity card (KTM / SIM / KTP that is still valid), a number that can be contacted by the user and the person in charge of the activity, in accordance with the provisions.
- f) Laboratory assistants take laboratory equipment that will be borrowed by users / students. g) Users / students and laboratory assistants check the condition of the laboratory equipment to be borrowed.
- h) Users / students get Laboratory equipment in accordance with what was borrowed on condition that the return of Laboratory equipment must be in accordance with the initial condition of the equipment when it was borrowed.

2. Mechanisms and Procedures for Returning Laboratory Equipment

Mechanisms and procedures for laboratory equipment in the Study Program are as follows:

- a) User / student returns Laboratory equipment to the Laboratory Assistant
- b) Laboratory assistants and users / students check the condition of the laboratory equipment that has been borrowed, if the condition of the equipment is not in accordance with the initial conditions, the user is obliged to replace the laboratory tool which is the same as the previous specification of the instrument If the condition of the laboratory equipment matches the initial conditions before borrowing, then continue to the laboratory assistant.
- c) Laboratory assistants receive laboratory equipment that has been borrowed.
- d) Identity cards that have been returned by staff to users / students. e) Done.

F. Practicum Safety

Pethe understanding of practicum safety is safety related to chemicals, work tools and their processing processes, the foundation for the practicum and its environment and ways of doing work.

Practical safety can be interpreted as a state of avoiding danger while doing work or practicum. In other words, practicum safety is one of the factors that must be done during the practicum process. Nobody in the world wants accidents to happen. Practical work safety is very dependent on the type, form, and environment in which the work is carried out.

Supporting elements of practical work safety are as follows: a. There are elements of occupational safety and health that have been described above. b. There is awareness in maintaining occupational safety and health.

c. Be thorough in work or practicum.

d. Carry out work procedures / practicum with attention to occupational safety and health.

Material security supporting elements include the following.

1. Work clothes / laboratory coats
2. Gloves
3. Shoes

Non-material security supporting elements are as follows.

1. User manual of the tool
2. Signs and danger signals.
3. Appeals
4. Responsible for security.

Work Safety Purpose:

Protecting practitioners and others in the workforce.

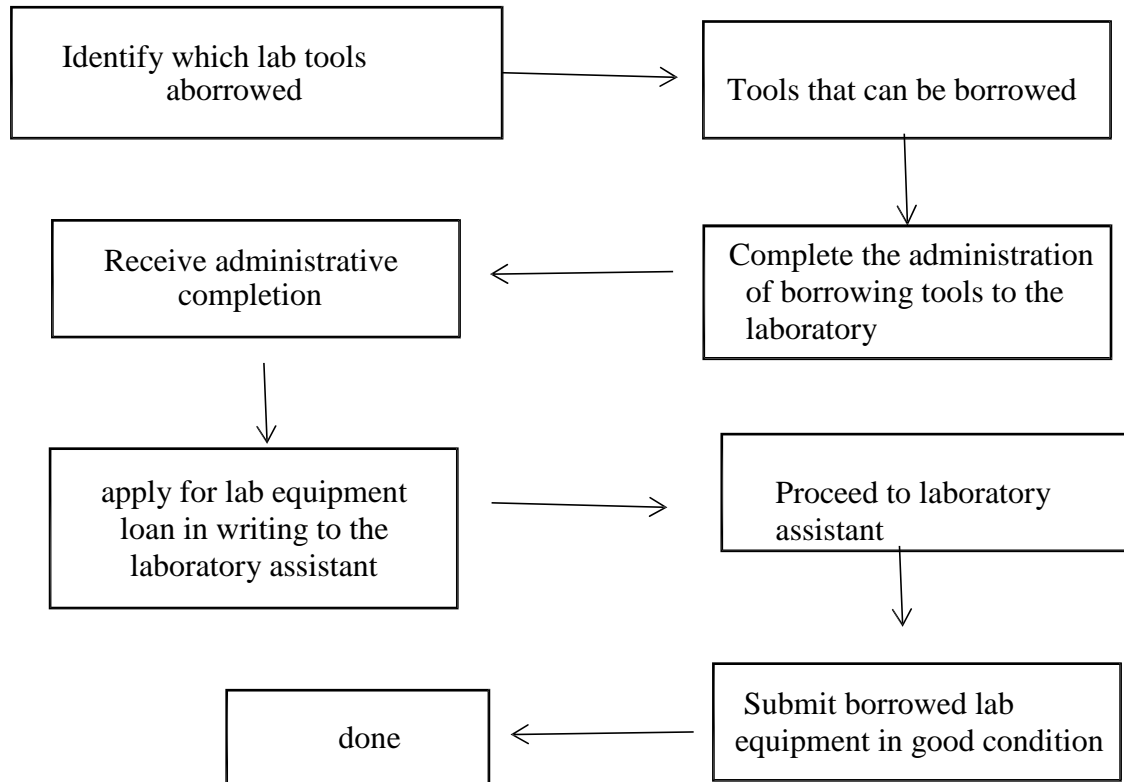
Ensuring that every practicum process runs safely and efficiently. Ensure that the practicum process runs safely

G. RELATED PARTIES

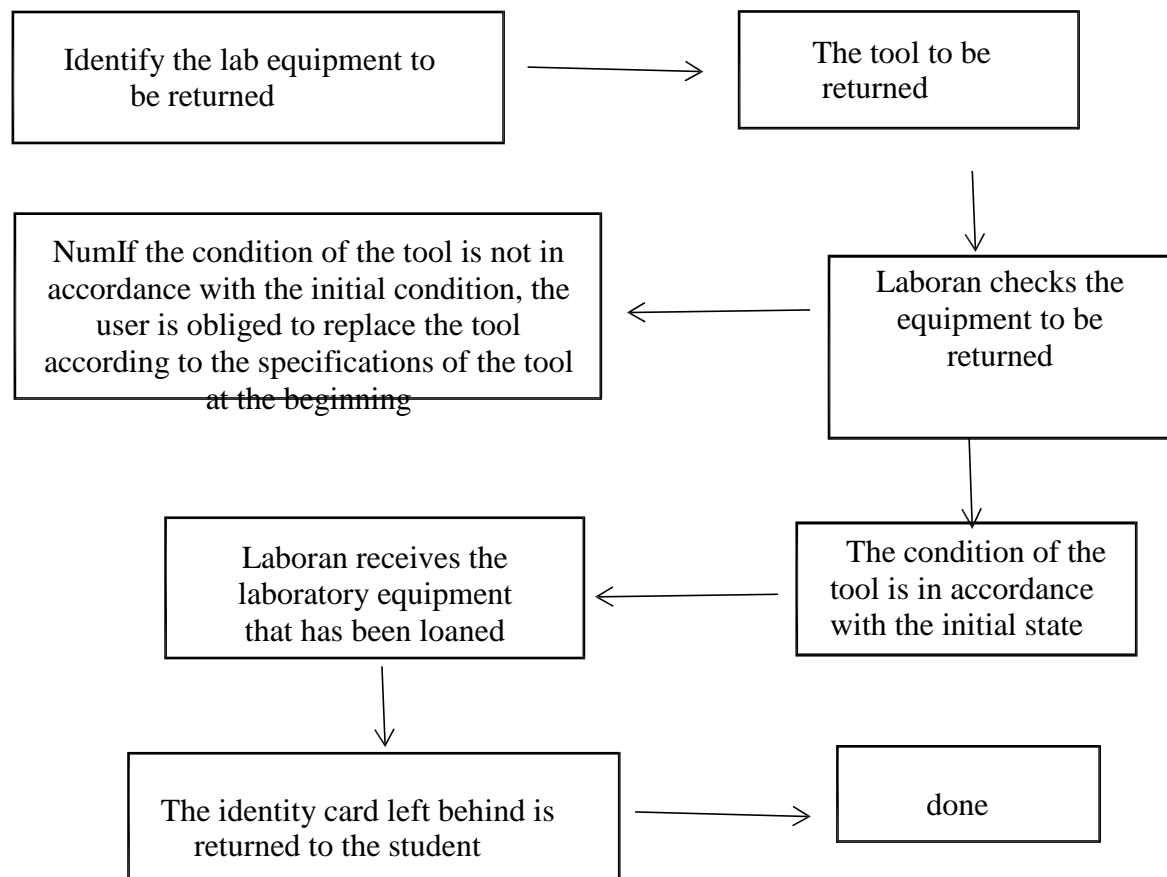
1. Chairman of the Department of Geography
2. Head of Laboratory
3. Person in charge of the physical geography laboratory
4. Users (students, lecturers and private parties)

H. Flowchat of Borrowing, Return of equipment and Security, Health and Laboratory Practicum Safety by Students.

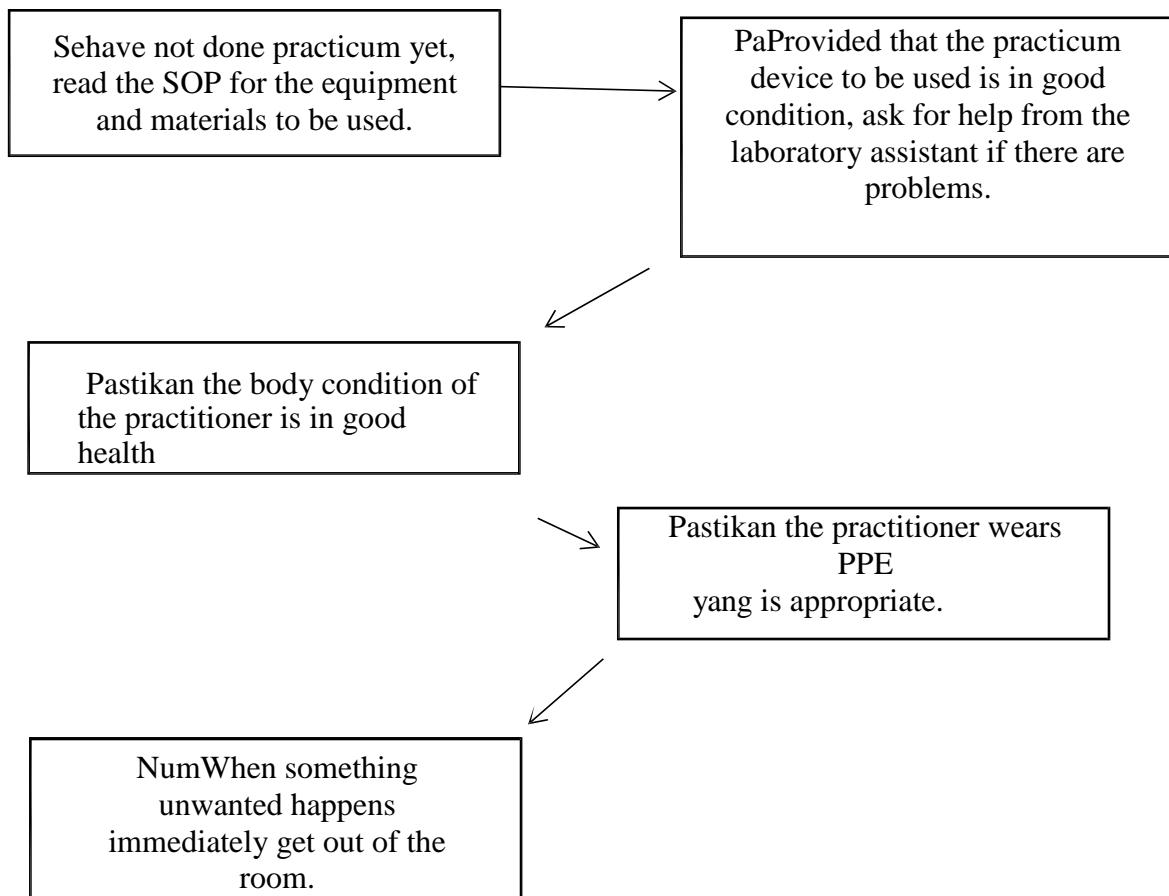
1. Borrowing Lab Equipment by Students



2. Return of Lab Equipment by Students



3. Practical Salvation.



I. Penalty

1. Practicum participants who do not comply with the rules and regulations are not allowed to enter the laboratory.
2. Practicum participants who come late, do not bring or enough practicum material (not according to the agreement), may not participate in practicum activities.
3. If the practicum participant moves or uses the practicum equipment that is not in accordance with what is stated in the practicum instructions and the tool lending file, the practicum activities carried out will be stopped and the practicum concerned is canceled.
4. Practicum participants who have not attended the practicum program for three times are declared void and must repeat in the following semester, unless there is a statement from the Head of the Geography Department / Head of the Physical Geography Laboratory.
5. Practicum participants who have lost, damaged or broken practicum equipment must replace according to the same equipment specifications, with the agreement between the Assistant, Practicum Assistant and the Head of the laboratory. Percentage

replacement of lost, damaged or broken tools is adjusted to the type of tool or the level of damage to the tool.

6. If the practicum participant up to the specified time period cannot replace the tool, the practicum participant may not take the final semester exam (UAS); and if the practicum participant is unable to replace the lost, damaged or broken equipment due to the price of the equipment is expensive or the equipment is not available in the market, then the replacement value is determined based on the agreement between the Head of the laboratory, the head of the physical geography department and the practicum participant (or the Borrower).



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STANDARD OPERATIONAL PROCEDURE

(SOP) of Laboratory Tertiary
Administration.

1. Fill in the attendance list in the visit book
2. Wearing polite, neat clothes and shoes (no sandals are allowed)
3. Wear a lab coat and preferably long sleeves.
4. Be polite and courteous when in the room
5. Mutual respect between students, lecturers and those around the laboratory.
6. Keeping the laboratory clean and comfortable.
7. Not allowed to carry items that can trigger fires and sharp objects unless permitted during the learning process.
8. Not allowed to eat in the laboratory.
9. Do not make noise in the laboratory.
10. Do not litter.
11. All collection of laboratory equipment and materials must be in accordance with the borrowing procedure.
12. The laboratory is opened according to a predetermined schedule
13. Read, understand, and understand every procedure in the use of laboratory facilities and services.



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SSTANDARD OPERATIONAL PROCEDURES

(SOP) Procedures for Laboratory Use

1. Lecturer activities

- a. Lecturers coordinate with the head of the laboratory, through laboratory assistants.
- b. Laboratory assistants / laboratory assistants provide complete equipment to be used by lecturers.
- c. If possible, laboratory assistants / laboratory assistants can assist lecturers' activities.
- d. After the activity, lecturers and laboratory assistants / assistants tidy up the equipment to its original condition.

2. Student services

- a. Students make a letter requesting the use of a physical geography laboratory for lecture purposes to the head of the laboratory with a copy of the head of the UNP geography department
- b. The head of the laboratory coordinates with the laboratory assistant / laboratory assistant and students with an interest in determining the laboratory use schedule.
- c. Students can ask the laboratory assistant for information about the media to be used, the completeness of the set, etc.
- d. Students get a usage schedule and use it at a predetermined time
- e. During use, before using the laboratory, students contact the laboratory / laboratory assistant to be able to prepare the equipment needed.
- f. Students carry out activities with supervision from laboratory assistants / laboratory assistants.

- g. After the activity, students put the equipment back in order to its original condition
- h. The laboratory assistant checks the completeness of the equipment after use.

3. Laboratory maintenance

- a. The laboratory assistant checks all laboratory equipment every month.
- b. The laboratory assistant fills in the laboratory equipment condition form.
- c. The laboratory assistant records the damaged equipment and puts it on the damaged equipment form
- d. The laboratory assistant checks whether the equipment can be repaired on its own, repair it outside, or replace it with a new one
- e. The laboratory assistant notifies and asks for the approval of the head of the laboratory and the head of the geography department of FIS UNP.



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**STANDARD OPERATIONAL PROCEDURES
(SOP) Implementation of Practicum.**

1. Practical equipment

Perlethe phrases below must be provided and brought every time you do a practicum.

- a. Preliminary task.
- b. Wear a lab coat and preferably long sleeves.
- c. Dress neatly, politely, and with shoes (no sandals allowed).
- d. Other equipment to help your work run smoothly, including: stationery, cloth, tissue, soap / detergent, etc.
- e. Practicum journal or practicum module which contains the title of the experiment, the objectives and principles of the experiment, the theoretical basis and the workings of the experiment in the form of a work scheme to simplify the sequence of work to be carried out.
- f. Observation table that contains working points and columns to fill in temporary observations / results.

2. Work flow and laboratory regulations

- a. All the practitioners on the day of the practicum, wait for the time to enter the laboratory, then enter the laboratory in an orderly manner.
- b. At the appointed time, the practitioner immediately enters, fills in the attendance / attendance list, then goes to their respective desks.
- c. Required to follow the explanation from the lecturer / assistant
- d. Submit a bill for borrowing laboratory equipment to laboratory personnel. e. Assistant will help to regulate the demand for substances / reagents required for the experiment on that day.
- f. After receiving the practical explanation, the practitioner returns to their desks, followed by borrowing tools and taking the necessary chemicals in the space provided in turns.

- g. Do work calmly, quickly, and orderly.
- h. If you face difficulties or doubts, ask the group assistant or laboratory assistant.
- i. Equipments that are shared will be placed by officers at designated places.
- j. Read and understand experimental procedures while working in the laboratory. If you don't understand, ask the assistant or lecturer who coordinates the practicum. Do not work without understanding what the work procedure means.
- k. Record and document the important stages of the work procedure carried out including the results obtained if needed.
- l. After completing the experiment, report and submit the results of the experiment.
- m. Make a temporary report that the assistant accepts.
- n. Return all tools borrowed on that day in a clean and dry condition, checked by the officer regarding their integrity and quantity. Also report all damage to the equipment you do to the laboratory staff.
- o. The reaction mixture / substance so that it is transferred to a container / place that has been provided with a well closed and fully labeled. Keep it from spilling or burning.
- p. Clean the table and floor where you work before you go home. If there is an experiment that has not been completed and needs to be continued the next day, it must be approved by the assistant and the practicum coordinator lecturer.
- q. After completing the practicum, the practitioner must have checked:
Have all the equipment borrowed on that day been returned? Is your work place / desk (and floor) clean again? Has the assistant accepted your provisional report?
Have the water, electricity, and fan taps been turned off?



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STANDAR OPERASIONAL PROCEDURE (SOP)
for Borrowing Equipment and Chemicals by Students

Purpose To provide a reference for students regarding the procedures for borrowing tools and using chemicals.

1. Students who have obtained permission to enter the laboratory can borrow tools to carry out their research.
2. Borrowing tools hand over the tool receipt card by the student concerned to the laboratory assistant, the laboratory assistant checks the availability of the tools needed. The tools are returned when the practicum is finished. If there is a missing / broken tool, it is required to replace it with the same equipment specifications. And the tool is returned in a clean state.
3. The chemicals used can be collected on weekdays, by submitting the material receipt to the laboratory assistant and recording the use of chemicals during the practicum in the chemical usage book.



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STANDARD OPERATIONAL PROCEDURE (SOP)

for Borrowing Equipment and Chemicals by Outside Parties

1. Outside parties submit applications for borrowing tools and use of materials to the Head of the Department.
2. The Head of the Department accepts requests for borrowing tools and use of materials from outside parties.
3. The Head of the Department coordinates the application for borrowing tools and material needs to the laboratory assistant.
4. The laboratory assistant checks the condition of the tools and materials according to the application for borrowing tools and materials submitted by outsiders. If there is a device that is not suitable, the laboratory assistant will inform the outside party. If the equipment matches what is needed / is not being used, it can be borrowed.
5. The laboratory assistant prepares tools and materials in accordance with the application for borrowing the tools and material requirements.
6. The laboratory assistant determines the period for borrowing the equipment.
7. The laboratory assistant hands over the necessary tools and materials to outsiders.
8. Outside parties inspect the equipment and materials received. If it is not suitable, the outside party will report it to the laboratory assistant. If it is suitable, the tools and materials can be carried.
9. Outside parties return the equipment within the specified time.
10. The laboratory assistant checks the borrowed equipment. If the condition is good, it is accepted. If the condition is damaged (broken, etc.) or lost, the outside party must replace the equipment with the same specifications.
11. The outside party pays the cost of equipment rental and the cost of purchasing materials.
12. The laboratory assistant stores the tools.



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STANDARD OPERATIONAL PROCEDURES

(SOP) for Borrowing Equipment and Chemicals for Research

1. Researchers make a letter of application for the use of a laboratory for research (research permit).
2. Researchers submit research permits and research proposals to the laboratory assistant.
3. The laboratory assistant determines the research schedule.
4. Researchers receive a research implementation schedule from the laboratory assistant.
5. Researchers fill out the form for borrowing tools and using materials for research to the laboratory assistant.
6. The laboratory assistant receives the tool borrowing form and the use of materials that have been filled in by the researcher.
7. The laboratory assistant prepares the tools and materials needed for research.
8. Researchers conduct research according to a predetermined schedule.
9. After the research is complete, the researcher returns the tool to the laboratory assistant.
10. Researchers pay the cost of equipment rental and use of materials.
11. The laboratory assistant checks the equipment that has been returned to ensure the condition of the equipment.
If the tool is in good condition, it is accepted by the laboratory assistant, if the tool is in a damaged condition, it is returned to the researcher to be replaced.
12. The laboratory assistant stores the tools.



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SSTANDARD OPERATIONAL PROCEDURE
(SOP) Occupational Health and Safety (K3) in the
Laboratory

A. General Work Safety Instructions in the Laboratory

1. Laboratory users are required to wear a laboratory coat and closed footwear or shoes.
2. It is strictly prohibited for laboratory users to smoke, eat and drink in the laboratory room.
3. All work and use of hazardous chemicals with toxic or inhalation stimulating vapors, must be carried out in an acid cupboard or outdoors.
4. Be careful with all heating work. Avoid splashing or inhaling vapors while working.
5. Keep all volatile organic compounds, such as: alcohol, ether, chloroform, acetone, and methylated spirits from open flames because of flammable materials. We recommend that you warm up using a waterbath.
6. When heating using an open fire, light a methylated spirits burner (bunsen) with a regular lighter, do not light it with another sparkling burner that is already lit, to avoid burning.
7. Put out the fire in the methylated burner by covering the wick, do not extinguish the fire by blowing to prevent fire or fire explosion.
8. Do not try to taste chemicals or smell smoke or vapors directly from the mouth of the test tube. However, first fan the steam towards the face.
9. Never inhale a pipette by mouth to collect strong acid or alkaline solutions such as: HNO_3 , HCl , H_2SO_4 , Glacial acetic acid, NaOH , NH_4OH , and others. Use a pipette with a suction ball for

Move these or other toxic materials into the equipment to be used.

10. Immediately close the chemicals provided in the closed bottle to prevent inhalation of the substances.
11. Do not spill chemicals, especially concentrated acids or bases, on the work table or floor. If this happens, report it immediately to the laboratory assistant or laboratory staff.
12. If there is contact with hazardous, corrosive or toxic chemicals, rinse immediately with plenty of water. Then immediately report it to the laboratory assistant or laboratory staff.
13. Do not rub eyes or other limbs with hands that may have been contaminated with chemicals.
14. Collecting liquids or solutions that have been used (liquid waste) in jerry cans of waste storage according to the characteristics of the liquid waste.
15. Leave the table and work tools as clean and tidy as before.

B. Possible Hazards in the Laboratory

1. Fire Hazard

Risk of fire (source: chemicals, stove) disinfectant which may be flammable and toxic. A fire occurs when there are 3 elements together, namely: oxygen, combustible materials, and heat.

As a result:

The onset of fires with burns resulting from minor to severe, even death.

Poisoning arises due to carelessness.

Prevention:

Provide fire extinguisher in every room.

Good storage system for combustible materials.

Control of the possibility of a fire.

Fire alert system

A manual that allows one to immediately declare a danger sign.

Oautomatic which finds fires and provides alerts automatically.

There is a way to save yourself.

Fire fighting and equipment.

Proper and safe storage and handling of chemicals.

2. Electrical Hazards

Perturn it off and study the places of the power source (socket and circuit breaker) and pay attention to how to turn it on and off.

If you see any damage that is potentially dangerous, report it to the laboratory assistant or laboratory staff.

Avoid accidental areas or objects that could pose an electric hazard (electric shock / shock), for example chipped netting cables, etc.

Do not do something that could pose an electrical hazard to yourself or others.

Dry wet body parts such as sweat or the rest of the ablution water.

Always be aware of electrical hazards in every activity in the laboratory.

Accidents due to electrical hazards that often occur are electric shocks.

Give itkut these are the things a laboratory user should follow if it happens:

Do not panic.

Turn off all electronic equipment and power sources.

BeIt is a laboratory user who has been electrocuted to escape from the power source.

Newshukan and ask for help from laboratory assistants or people around you about the occurrence of accidents due to electrical hazards.

3. Chemical Hazards

SemTwo chemicals can have a negative impact on health. The most common health problem is occupational contact dermatosis which is generally caused by irritants (ammonia, dioxan) and only slightly due to allergies (ketones).

BaToxic training (trichloroethane, tetrachloromethane) if swallowed, inhaled or absorbed through the skin can cause acute or chronic illness, even death. Corrosive materials (acids and bases) will cause irreversible tissue damage in the exposed area.

Peprevent:

" Material Safety Data Sheet "(MSDS) of all chemicals available for all laboratory personnel to know.

Using personal protective equipment (eye protection, gloves, apron, laboratory coat) properly.

Using respiratory protective equipment (masks) properly.



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STANDARD OPERATIONAL PROCEDURE

(SOP) for the handling of broken glassware

Prevent infection and injury due to broken glass utensils

1. Cleaning staff / laboratory assistant collects broken glass using gloves.
2. Staff / laboratory assistants disinfect the area affected by the spill with hypochlorite solution or clean the spill.
3. For tables or floors that have been disinfected by cleaning personnel and are still wet, must be marked.
4. If someone is injured because of the broken glass, then the treatment will be carried out according to the wound procedure.



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STANDARD OPERATIONAL PROCEDURE

(SOP) Maintenance of Laboratory Equipment

1. Grouping laboratory equipment in each group of equipment or the basic material of the tool.

To protect against damage to the tool, it is necessary to know the basic properties of the tool, including:

- a. Substance or Basic Material of Manufacture

The basic training of the equipment must be known so that its storage and use can be controlled. For example, the glassware that will be used for heating must be selected from heat-resistant materials. If a tool is made of iron, or part of the tool attachments are made of iron, it should not be stored near chemical substances, especially those that are corrosive. Iron with acid will rust quickly.

- b. Tool Weight

In the laboratory there are light tools and some are heavy. Do not store heavy equipment in a high place, so that when you want to store or pick up it is not difficult to lift or move it.

- c. Sensitivity of Equipment to Environmental Influences.

Such as a tool such as a microscope that is sensitive to the environment, for example to humidity, in a cold area or in a humid area, storage must be careful, because in humid areas when the appliance is stored in a cupboard it is likely to grow mold. The lens must be careful not to get moldy. Objective and ocular lenses quickly mold in damp areas. One way to prevent the influence of humidity in the storage cabinet is to install an electric light, so that the air in the cupboard becomes drier. The microscope must be stored in the box and given an absorption agent (silica gel).

d. Effects of Chemicals

In the laboratory there are chemical substances. Some chemicals, especially corrosive ones, can affect or damage the appliance. Therefore chemical substances must be kept away from tools, especially tools made of metal. Equipment that uses dry batteries when finished using the battery must be removed, and the tool must be stored in a turn of (sleep) state. For example: pH meter, environmental comparator.

e. The influence of one tool on another

In the storage of tools, it should be noted that tools made of metal must be separated from tools made of glass. Any tools that are combined from metal-glass should be separated as far as possible in their storage, when they are to be used then they are installed or set. Magnets should not be stored near tools that are sensitive to magnets. The stopwatch may lose stability if it is kept close to a magnet.

f. The value or price of the tool

The laboratory staff must know the value or price of the equipment, or at least the laboratory staff must be able to judge which items are expensive and which items are cheap. Judging from the price point of view, expensive equipment must be stored in a safe place or a cupboard with a key. Less expensive items can be stored on a shelf or other open space. However, if there is a place or a closed cupboard, all tools should be stored in the cupboard.

g. Shapes in sets

This type of tool uses energy in the form of a set, for example a blood meter set. To maintain the durability of the tool, when it has been used it should be rearranged in its original place with a predetermined arrangement of rules.

2. Before using the equipment, you should first read the soup for using the tool.
3. before using glassware first check the state of the equipment.
4. When using a glass tool, the practitioner should pay attention to the placement of the glass tool, the tool should be placed in a safe place.


5. Glass tools that contain chemical residues if not cleaned immediately can cause stains on the glass to be difficult or cannot be cleaned with a detergent solution or soapy water. The longer the stain stays on the glass, the harder it will be to remove.
6. Make sure the tools are dry before placing in a cupboard or storage area and also make sure the storage place is always dry and not damp.
7. The equipment should be calibrated every month so that the research is accurate.



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SSTANDARD OPERATIONAL PROCEDURE
(SOP) Laboratory Equipment

Department of	Tool name: Geological compass
St.andar Equipment Operating Procedure	

A. Purpose

The geological compass is used to determine the direction of strike and dip in rock outcrops. Determination of this direction is not only carried out on geological strike dip measurements, but almost all field measurements use a compass to determine the north direction and determine the direction of the measurement trajectory.

B. Person in charge

Laboran, and everything related to the use of a geological compass

C. Execution procedures or work methods.

1. Measure Strike (Kick direction)


Wayas follows, attach the E (east) side, then slide the nivo bubble (bull's eye level) into / the center of the circle. Wait for the compass needle to stop moving or stand still. Finally, observe the angle of the needle which leads to the north corner. Then write the correct direction with the format N _ E.

2.Measuring Dip (field direction)

Wayas follows: Attach the W (west) side of the compass body to try to form a 90 degree angle to the strike. Then the clinometer is rotated until the air bubble is right in the middle. Then read the angle in the clinometer scale.

D. Storage or maintenance

Pestore geological compass should always be stored in the case in case of exposure to water or heavy impact. Storage is carried out in Field Cabinet 1 in the tool room along with geological tools and other field tools. Maintenance of the geological compass is carried out by cleaning it using a dry cloth to remove dust after use.

Department of	Tool name: Geological hammer	
St.andar Equipment Operating Procedure		

A.Purpose

Palu geology is used to take existing rock samples in the form of outcrops. This geological hammer is divided into 2 types, sediment hammer and frozen / metamorphic hammer

B..Person in charge

Laborane, and everything related to the use of geological hammer

C.Execution procedures or work methods.

1. Hammer Parts Used

Senot yet using a geological hammer, it must be considered and estimated in advance, which part will be used to 'hit' rock samples. Usually the blunt front is used in sedimentary rock, while the sharp back is used in igneous rock. This difference in usage is important because it can have a significant impact on our own safety and comfort.

2. Stone Parts to be Sampled


In rock research, rock samples taken must be fresh or new. Rocks have hard properties, therefore fresh rock samples are rather difficult to take. However, in every rock there is a part that is softer or brittle, therefore for our own convenience it would be nice if we take rock samples from the ends or parts that have fractures.

3. Power Required

Do not use a geological hammer too hard, because the fragments can harm the hammer user or people around him. Estimate the energy sufficient to take the sample, also pay attention to the angle between the hammer and the rock and the safety distance to minimize the risk of being hit by shrapnel or hammer reaction reciprocity.

D. Storage or maintenance

Palu geology is stored in Field Cabinet 1 in the tool room, along with other geological and field equipment. Geological hammer storage should avoid water to avoid rust on the hammer head. Hammer maintenance is carried out by cleaning using water and drying it after each use.

Department of	Tool's name :MMonocular Polarization microscope	
St.andar Equipment Operating Procedure		

A.Purpose


Monocular microscope is a type of microscope that has only one ocular lens. The use of this ocular lens is to increase magnification in observing simple objects. But by only being able to see simple objects

B..Person in charge

Laboran, and everything related to useMicMonocular Polarization roscope

C. Execution procedures or work methods.

1. Place the microscope on the table by holding the microscope arm so that the microscope is directly in front of the user.
2. Turn the revolver so that the objective lens with weak magnification is in the same axis position with the ocular lens marked with a click on the revolver.
3. Adjust the mirror and diaphragm to see the strength of light entering until the ocular lens appears bright round.
4. Place the preparation on the object table right in the hole of the preparation and clamp it with the object clamp.
5. Adjust the focus to clarify the object image by turning the rough dial, while looking from the ocular lens. To sharpen rotate the smooth player.
6. If the image of the object has been found, then to enlarge the objective lens replace it with a size of 10x, 40x, or 100x, by turning the revolver until it clicks.
7. When finished using, clean the microscope and put it back in place.

Department of	Tool Name: Metal or Paper Hygrometer
Standar Equipment Operating Procedure	

A.Purpose

This hygrometer is very useful in providing a quick indication of changes in humidity. Metal or plain paper hygrometers are very low value devices and have limited accuracy. Each hygrometer is used, will give different results even if using the same tool and type. The difference in the humidity indicator can be 10% or more.

B..Person in charge

Laboran, and anything related to the use of Metal or Paper Hygrometers

C. How the Hygrometer Works

In a Manner common in hygrometers are two scales. The first scale shows the humidity of the air while the other scale is the temperature or air temperature. How to use it is quite easy, just put it where the humidity will be measured then wait for it to show a certain scale. The humidity scale is marked with the letter h while the temperature is determined by degrees.

For the old hygrometer design with a round shape or usually mounted on a wall, the method of reading the scale is the same as reading the scale on a thermometer in general. We can see the mercury contained in the thermometer up to a certain scale. When reading the scale, make sure that the hygrometer must be given a flow of air that blows in the direction of the hygrometer. The thing that can be done is by giving the wind by using a fan or a piece of paper to make the slink rotate.

D. Storage

Metal or paper hygrometer is stored in the appliance refrigerator.



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SSTANDARD OPERATIONAL PROCEDURE

(SOP) for Laboratory Waste Handling.

Purpose To provide a reference for students and laboratory assistants to handle laboratory waste

1. Students who carry out practicum / TA dispose of the remaining waste of their activities into the conductor general provided by the laboratory assistant.
2. Periodically the laboratory assistant will collect the full conductor of the waste collection area.
3. A new (empty) conductor is provided by the laboratory assistants in each laboratory.



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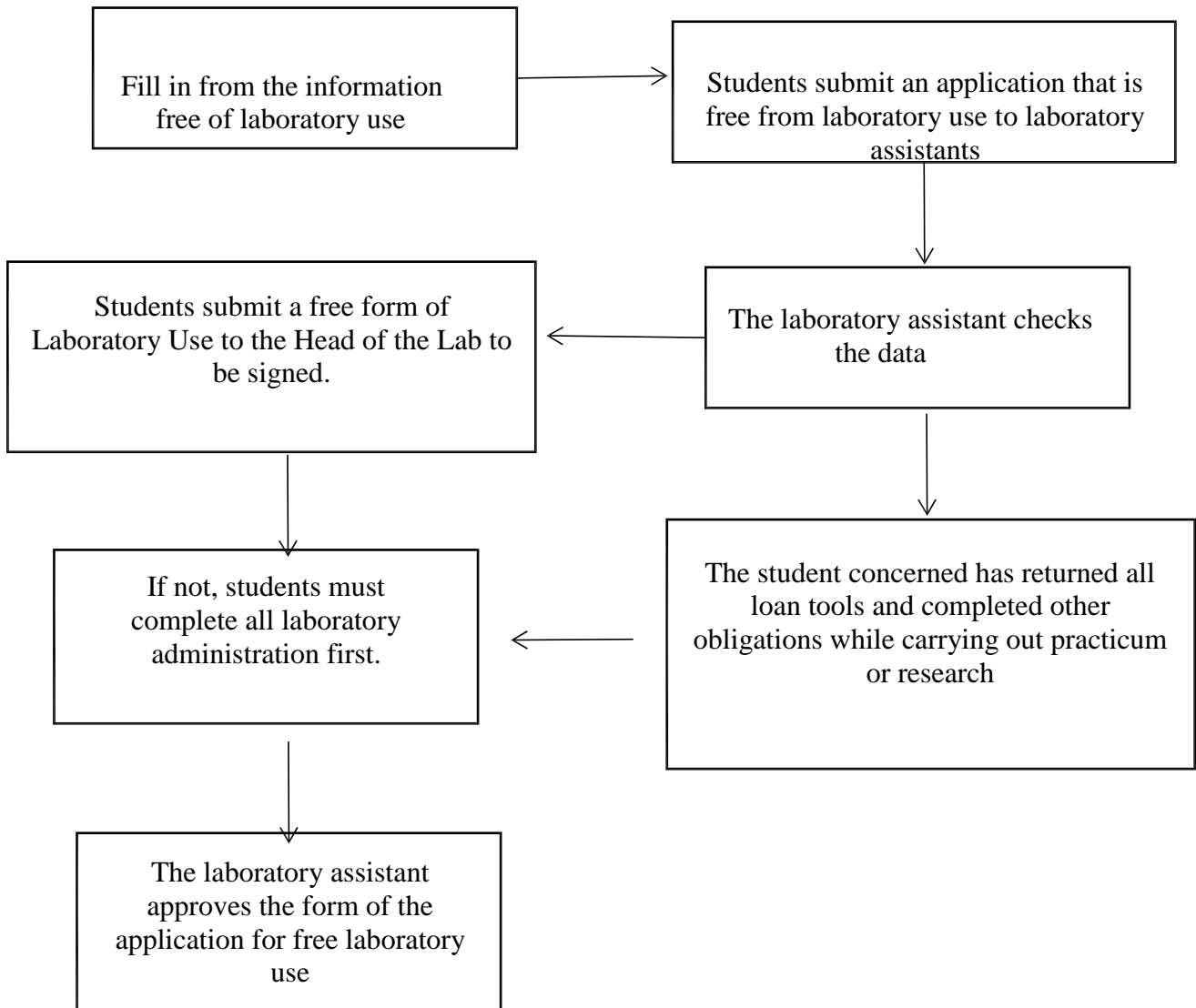
**SSTANDARD OPERATIONAL PROCEDURE
(SOP) Making Free Laboratory Letters**

A. Preparation of Free Laboratory Letters

Permohonan done directly in the physical geography laboratory.

1. Students fill out the information form that is free of laboratory use.
2. Students submit an application that is free of laboratory use to the laboratory assistant
- .3. The laboratory assistant conducts data check, whether the student has returned all equipment loans and completed other obligations while carrying out practicum or research, if not the student must complete all laboratory administration first.
4. The laboratory assistant approves the free application form for Laboratory Use for Students who have completed all loans and payments at the lab.
5. Students submit blanks already free of laboratory use to Head of Lab to be signed.

A. Flowchat of Laboratory Free Letter Making





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Physical Geography Laboratory Free Information

Student / I data below;

Name:

NIM:

Place / Date of Birth:

Address:

Study program:

The student / I mentioned above does not have the responsibility for the tools /
materials belonging to the physical geography laboratory of the State University of
Padang

Thus this letter of decree should be used properly.

Padang, 20

Head of the physical geography
laboratory

Sgd

(.....)

NIP.



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Sthe line of the Loan
Application
Equipmentn Laboratory By Students

Dear
Head of Laboratory
Physical Geography

With respect,

We, the undersigned

Name:

NIM:

Apply for laboratory equipment for the geography study program to carry out testing
(thesis / research / community service) at: Laboratory:

WaLoandate:

Loantime:

Used at:

Equipmentn borrowed 1.

2.

Thank you for your willingness and willingness to give permission.

Padang,
Who filed

(.....)

NIM



Berita Laboratory
Equipment Borrowing
Event by Students

Pada today, date located at the laboratory

.....

The handover of the laboratory equipment borrowing has been carried out below:

- 1.....
- 2.....
- 3.....
- 4.....

Afterh tested the tools above, we all know and state that all the tools tested are in good condition and functioning normally.

Who submit,

Lalab assistant Padang,

College student,

(.....) (.....)

NIP

NIM



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BON THE USE OF CHEMICALS

Department: Laboratory:

Semester: Practicum / Research

Title:

Practitioner / Group

Name:

NIM:

Used Day / Date up to:

NO	NAME OF CHEMICALS /	Specification	amount		Percount	Total volum
			gram	mL		

LaUser Guidance Drills

(.....)

(.....) (.....)

Knowing
Head of Laboratory

(.....)



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BON LENDING TOOL

Department: Laboratory:
Semester: Practicum / Research
Title:
Practitioner / Group Name:
NIM:
Used Day / Date up to:

NO	Tool's name	Capacity	amount	Circumstanc		Information
				awal	aend	

LaUser Guidance Drills

(.....)
(.....) (.....)

Knowing
Head of Laboratory

(.....)



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BON BROKEN / BROKEN EQUIPMENT

Department: Laboratory:
Semester:
Name of Practitioner / Group:
NIM:
Used Day / Date up to:

N O	Tool's name	Brand	capacity	amount	Information

LaUser Guidance Drills

(.....)
(.....) (.....)

Knowing
Head of Laboratory

(.....)



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Material Safety Data Sheet (MSDS) for Chemicals

1. HCl (Hydrochloric Acid)

A. HCL Hazards (Origin of Chloride)

If hydrochloric acid gets into the mouth or respiratory system tract it will be very dangerous. Therefore, fumes or fumes from hydrochloric acid should be avoided as much as possible. For people who work in companies whose daily activities are involved with hydrochloric acid, it is important for them to always know how to work so that hydrochloric acid is not contaminated with themselves.

B. Procedures for First Aid if Exposed to HCL (Origin of Chloride)

Pertfirst kick yang can be done onwork accidents abecause someone interacts with hydrochloric acid or because of something 'contaminated' with hydrochloric acid, several things need to be done including:

1. If hydrochloric acid is inhaled, the person concerned should immediately breathe fresh air so that the respiratory tract is not poisoned
2. If hydrochloric acid is touched by hands or other body parts, then the parts of the body that touch hydrochloric acid must be immediately washed and cleaned then sterilized
3. If hydrochloric acid is ingested, the person concerned must be immediately taken to a doctor because it has the potential to cause gastrointestinal disorders and even death

C. Proper Storage of HCL (Origin of Chloride)

Hydrochloric acid should definitely be kept out of reach and must be kept tightly because its vapor alone can irritate the human respiratory tract. Regarding the proper way to store hydrochloric acid, here's how:

1. Make sure to store the HCL in a dry and cool place
2. Keep away from fire
3. Keep away from various substances which are flammable
4. Ensure the HCL storage area is well ventilated
5. Store in a place away from incompatible materials

D. Other Chemical Substances That Must Be Keep Away With HCL (Origin of Chloride)

Hydrochloric acid or HCL is indeed a type of substance that is not suitable for certain materials. Some materials that are incompatible with hydrochloric acid include:

1. Metal
2. Substances - substances that are oxidizing
3. Substances that are alkaline

Hydrochloric acid also should not react with the following substances:

1. Chlorine
2. HCL smoke
3. Hydrogen
4. ClO_X

E. Procedures for Handling as well as overcoming

If someone is onliwork environment yang contaminated with hydrochloric acid or HCL, then there are several ways that can be done as please helpn first. First aid that can be done as follows:

1. If HCL comes in contact with skin, immediately flush skin with water for about 15 minutes. Clean clothes, shoes and various devices contaminated with HCL using clean water and dry them before you use them again.

2. If HCL comes in contact with eyes, flush eyes with water for 15 minutes.
Then open the lids of the eyes a few times and seek medical help.
3. If HCL comes in contact with respiratory equipment, get fresh air immediately. If unable to breathe, give artificial respiration. If it is still difficult to breathe, give oxygen to the person contaminated with the HCL.
4. If HCL is swallowed, give several glasses of milk or water. You will vomit several times. But don't force yourself to put anything in the mouth of someone who isn't aware of HCL as it is very dangerous, it can even cause itoccupational illness.

If hydrochloric acid or HCL has the potential to cause a fire, then there are several ways that can be done as prevention efforts. The handling procedures are as follows:

1. First, call the fire department fire and fire untuk extinguishes a fire that will continue to grow if not treated immediately
2. To avoid an explosion, make sure that the room that is burning has open ventilation.

For those of you who are in an environment where hydrochloric acid causes a fire, make sure that you always use breathing tools and protective clothing. This is important in order to prevent contact with skin and clothing.

If hydrochloric acid or HCL is spilled, make sure you clean up and clean up the spill as soon as possible. Then discard the cloth used to clean the hydrochloric acid and neutralize it with a weak base

2. H₂O₂(Hydrogen peroxide)

A. Hazards introduction

PaNasal, shock, friction, or contact with other materials can cause a fire or explosion. Harmful if swallowed. Avoid breathing vapors or dust. Use with adequate ventilation. Avoid contact with eyes, skin or clothing. Wash hands thoroughly after touching material.

B. First aid

Skin: remove contaminated clothing, wash the affected area with soap or water.

Eyes: wash eyes with sufficient amount of water for 15 minutes, opening closed eyes several times. Get medical help

Perinhalation: if unable to breathe, give artificial respiration, if breathing is still difficult give oxygen.

Ingestion: give several glasses of milk or water. There will be some vomiting, don't put anything in the mouth of an unconscious person.

C. Fire fighting procedures.

Fire-fighting type: use only water

Explosive power: strong oxidiser. Will not burn, but decompose under hot conditions, heat releases oxygen.

Fire-fighting procedures: wear protective clothing and breathing apparatus to avoid contact with skin and clothing.

D. Spill response procedures.

Contain the area of the water spill and channel it to an approved chemical disposal or sewage treatment system. May be crushed with sodium metabisulfite or sodium sulfite.

E. Handling and storage.

Store in a cool, dry, well-ventilated place away from incompatible materials. Avoid flammable materials or fuels.

3. Sulfuric acid (H₂SO₄)

A. Hazard recognition

May cause irritation and burns. Harmful if rubbed on. Avoid steam or smoke. Use with adequate ventilation. Avoid contact with eyes, skin or clothing. Wash hands thoroughly after handling and store tightly.

B. First aid procedures

First aid: call the doctor

Skin: In case of contact, immediately flush skin with water for at least 15 minutes when cleaning contaminated clothing or shoes, clean thoroughly before use again.

Eyes: flush eyes with water for at least 15 minutes, opening the lids several times. Get medical help.

Perinhalation: get fresh air immediately. if you cannot breathe, give artificial respiration, if it is still difficult to breathe give oxygen.

Ingestion: give several glasses of milk or water. There will be some vomiting, don't put anything in the mouth of an unconscious person.

C. Spill response procedures.

Scrap spill with a damp cloth, then place it in the chemical trash can. And it can also be neutralized with a weak base.

D. Handling and storage

SimPan in a cool, dry and well-ventilated place away from incompatible materials.

Don't forget to wash your hands after handling.

4. $K_2Cr_2O_7$ (Potassium

dichromate)A. Hazard recognition

May cause genetic defects. Can cause cancer. Can damage fertility. Can damage the fetus. Can intensify fire; oxidizer. Toxic if swallowed. Harmful in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Fatal by inhalation. May cause allergy or asthma symptoms or difficulty breathing if interrupted. May cause respiratory irritation. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects

B. First aid

If depressed: Rinse mouth. do not induce vomiting. On

skin: Wash with plenty of soap and water.

If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

If in eyes: Rinse thoroughly with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

IF exposed or concerned: Immediately call a poison control center or doctor

/ temedical
dragon.

C. Handling and storage

SimPan in a cool, dry and well-ventilated place away from incompatible materials. Don't forget to wash your hands after handling.

5. Alcohol

A. Hazard recognition

cairan clear colorless. Flash Point: 16.6 deg C. Warning: Flammable liquid and vapor. Causes respiratory tract irritation. May cause central nervous system depression. Causes serious eye irritation. This substance causes reproductive and fetal effects in humans. Causes skin irritation. May cause liver, kidney and heart damage.

B. First aid

Eye Contact: Get medical help. Gently lift the eyelids and continue to flush with water.

Skin Contact: Get medical help. Wash clothes before reuse. Flush skin with plenty of soap and water.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 milk or water. Never give anything by mouth to an unconscious person. Get medical help.

InHalation: Avoid exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical help. Don't use word of mouth.

Noten for Doctors: Treat symptomatically and supportively. People with skin or eye or liver, kidney, chronic respiratory disease, or central and peripheral nervous system disease may be at increased risk from exposure to these substances.

C. Handling and storage

PeHandling: Wash thoroughly after handling. Use only in well-ventilated areas. Soil and bond container when transferring material. Use splash-proof equipment and explosion proof equipment. Avoid contact with eyes, skin, clothing, and skin. Empty containers retain product residue (liquid and / or vapor) and can be hazardous. Keep container tightly closed. Avoid contact with heat, sparks and flames. Avoid ingestion and inhalation. Do not press, cut, weld, weld, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

PeStorage: Keep away from heat, sparks and fire. Keep away from sources of ignition. Keep in a closed container. Keep away from contact with oxidizing materials. Store in a cool, dry and well-ventilated area away from incompatible substances. Flammables-area. Do not store near perchlorates, peroxides, chromic acid or nitric acid.

6. MgSO₄(magnesium sulphate heptahydrate)

A. Hazard recognition.

Oxidizing substances, skin irritants, eye irritants.

B. First aid

Afterh inhalation: fresh air. If breathing stops, give artificial breath, give oxygen mask if possible.

Numa occurs in skin contact: wash off with plenty of water

Numa. Ingestion: Make sure to drink water (two glasses at most). only if the victim is unconscious swallow activated carbon and consult a doctor afterwards.

C. Handling and storage.

Very tightly closed. In a dry place. Do not use near flammable materials.