MANAGEMENT OF TOOLS IN LABORATORY (2x meeting)

by:

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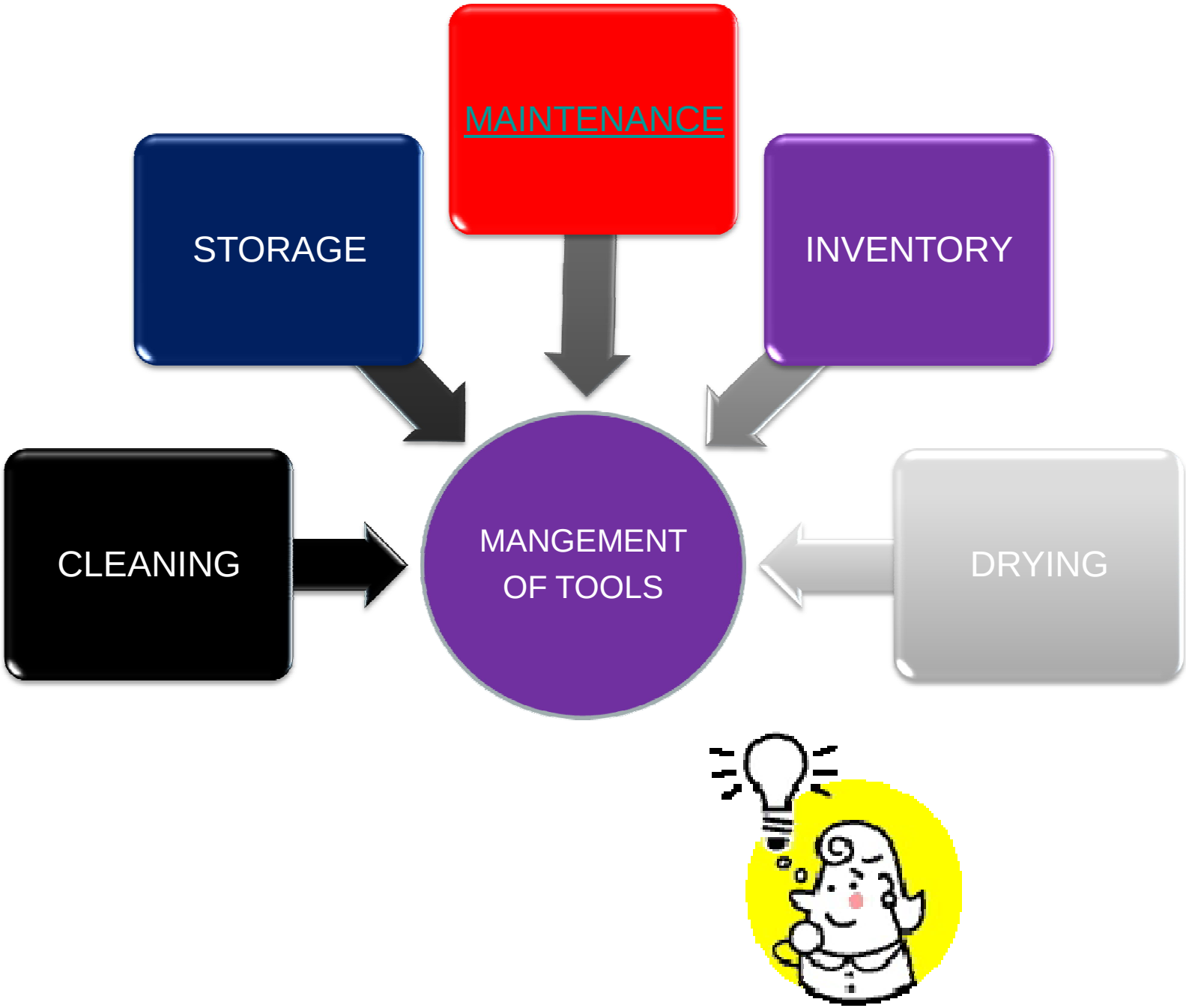

MAINTENANCE
STORAGE
INVENTORY
CLEANING
MANGEMENT
OF TOOLS
DRYING

Example of Science Laboratory Equipment

The technique uses laboratory equipment

- ***reliable***
- ***accurate***

- **treated, serviced, maintained, calibrated, to prevent rapid deterioration and guaranteed accuracy**

Laboratory equipment will be works well

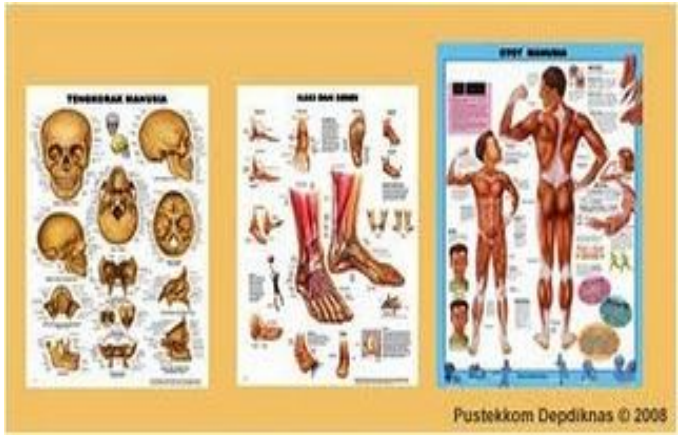
1. Have Been registered (already registered)
2. Ready-made, calibrated with accurate and can work well
3. Available infrastructure that supports (power supply, water, or gas)
4. There are experts / skilled for a special instrument (AAS, UV-VIS, HPLC, GC)
5. There are spare parts (spare parts)
6. There tooling equipment (tools kits)
7. There consumables (material support for specialized equipment such as a solution of reagents)
8. Routine inspection and regular
9. The existence of a continuous care and maintenance.

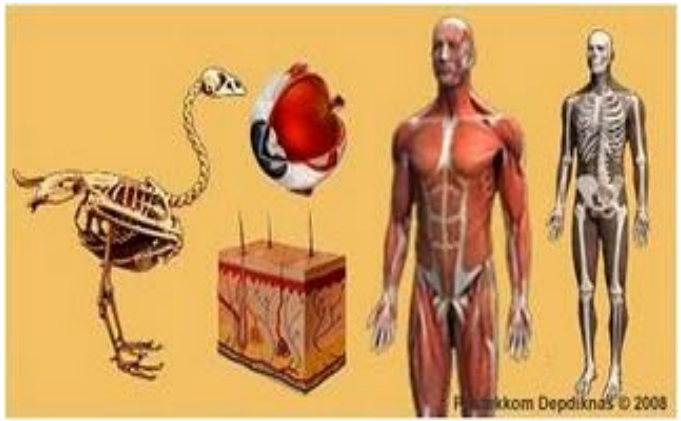
Laboratory Equipment

- Props education
- Equipment lab / research
- Furniture
- Tool
- Other equipment

Props education
(Alat peraga pendidikan)

- Chart
- Picture
- Model
- Film
- Slide
- book





Equipment of practicum/ research

- Glassware
- Instrument
- Other equipment

Furniture

Support equipment laboratory activities:

- table practicum
- table demonstration
- Desk
- Bench
- Wardrobe
- Shelf
- board

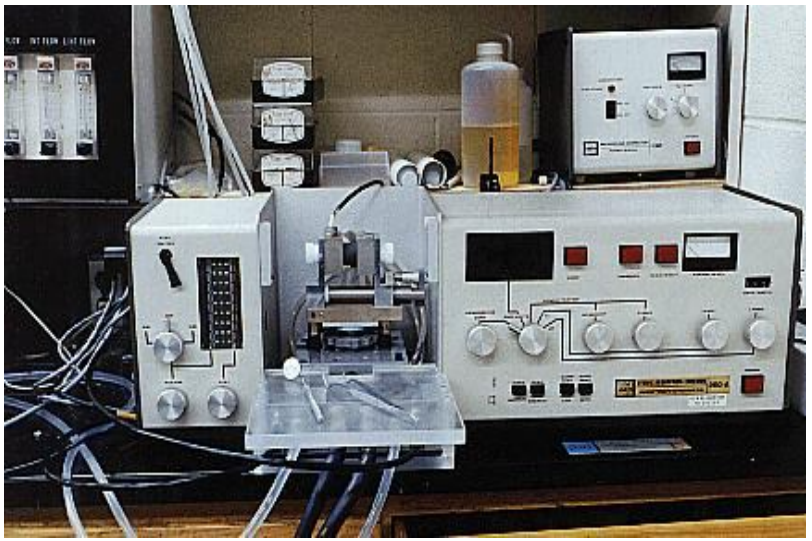
Tool

The tools used for making or repairing other tools:

- Screwdriver (obeng)
- Scissors (gunting)
- Pliers (catut)
- Hammer (martil)
- Miserly (kikir)
- Saws wood and iron (gergaji kayu dan besi)
- Etc

Measuring tools and specialized tools

- pHmeter
- chromatography Equipment
- Polarograf
- OHP
- Refractometer
- technical Balance
- Polarimeter
- analytical balance
- Spectrophotometer
- Dryng oven
- vacuum pump
- Centrifuged
- AAS, etc



Support equipment (tools) required for working in a laboratory

- Fire extinguishers
- P3K box complete with contents
- Hygiene equipment
- Other tools

A variety of laboratory equipment that is tooling support

Chemical Laboratory Equipment

glass
iron
wood
porcelain
plastic
rubber
electricity
optics

Chemical Laboratory Equipment

1. Properties
2. The situation (shape)
3. Functions
4. Price
5. usage

Glassware

- Erlenmeyer
- Flask
- distillation flask
- Round-bottom flask
- measuring glass
- Beaker glass
- watch glasses

- funnel glass
- Burette
- cooling Liebig
- glass stirrer
- test tube
- bottle weigh
- etc.

The tools of metal

tripod
stative
buret clamp
Three finger clamp
crucible tongs
stative funnel
etc.

The tools of wood

- Test tube rack
- Test tube clamp
- etc.

Setting glassware

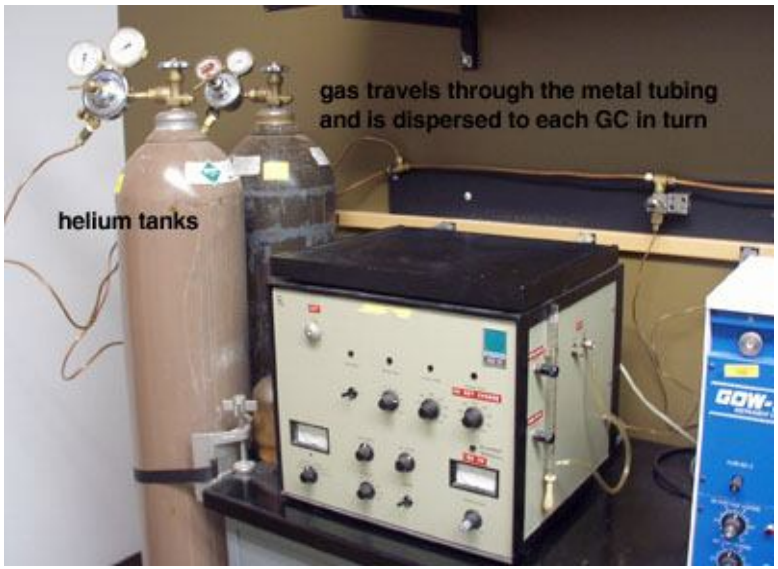
- heavier equipment on the bottom and the lighter in the higher
- tool size is higher in the back and a low or short in front
- tool length lying position / lie down
- tools that do not have a backrest (round-bottom flask) are stored in cardboard boxes.

Setting glassware

- All equipment is inventoried in the book inventory records
- Each device is placed in accordance with the kind of tools and size
- Use of the tool should be recorded in the log book out tools
- All the tools were kept back finishes used in a closed cupboard

Settings tool instrument

- In a special room with specific requirements
  For example: GC, UV-VIS and FTIR have AC
- Placed electrodes immersed in the solution
- The use by people who are experts, appropriate manual tool
- The damage must be repaired by skilled technicians



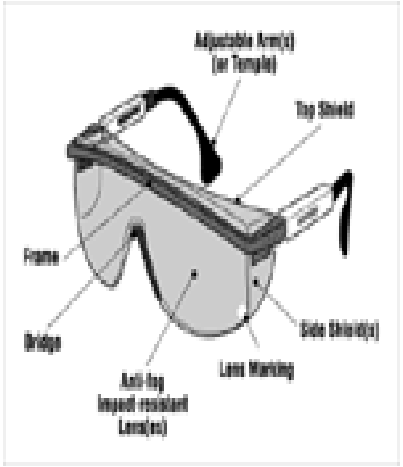
Safety Equipment

- Hydrant
- Eye washer
- Water shower
- Lab coats should be arm's length
- Gloves
- Gogle
- Mask
- First Aid Supplies

Personal Protective Equipment

Eye protection -

specific to the hazard



Personal Protective Equipment
Respiratory Protection

Requires:

training &

fit-

Can provide a

false sense of security.

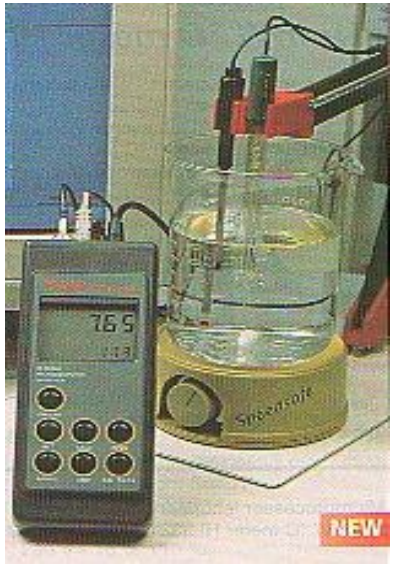
Care and Maintenance

1. Prevention is better than cure (prevention is better than cure)
2. Reading the fine manual tools
3. Learn the basic principles of equipment, installation method (installation), operation, maintenance methods, problem solving techniques "troubleshooting", and the use of tools (tool kits).

Care and Maintenance

1. The problem is usually caused by:

   neglect, abuse tool
2. The problem is usually caused by a mechanical problem and not an electronic problem
3. In pHmeter caused by the electrodes and batteries, the spectrometer as a current source or a detector, and the microscope due to dirt, mildew, or lights.



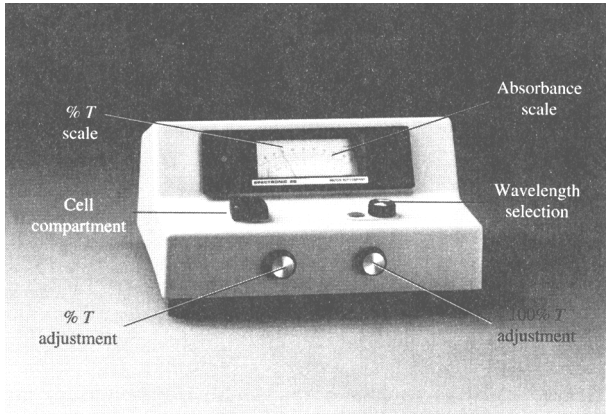
Tools that use electricity

- Source voltage
- The tool is turned on
- Fuse (fuse) unbroken
- Electricity reaches tool
- power cable
- Outlet
- Arde
- Fire hazard, shorted, or shock

Sample Care and Maintenance

Troubleshooting spectrometer:

1. Determining the details of interference
2. Reading the manual tool
3. Check for electrical equipment
4. Observing the table "Troubleshooting in the manual: the radiation source (light) can not be set at 100% radiation reaching the sample, the detector can not be set to zero.



In the machine tool

- Check engine oil
- Battery / power source
- Stability
- Safety (safety use)
- Disposal
- dangers round
- vibrational

Maintenance of Balance

Balance is often damaged due to these factors:
a. Failure to use
b. storage
c. The process of equilibrium (at zero or equilibrium

f not reached equilibrium there are 2 ways:
Small-scale shear load at the front to the right until it reaches equilibrium and mark shows what number of small loads that have shifted it. When used for weighing, then the value / number is later as a deduction. The mass of the load that weighed less number / scale of small loads that have shifted it.

Remove the mounting plate portion hanging weights, and go to the bottom using a screwdriver and complete or subtract expenses (such as buckshot, nails, small metal / powder).

How to Bring a Microscope

- Hold the handle with your right hand and place your left hand to support him
- Do not swing, toss, or vibrates when putting a microscope
- Do not lift the body of the microscope in the tube, as there will be parts that fall off or if this is done.

Maintenance of Microscope

Put it in a box to avoid dust

Clean

dust cover

GAMBAR 1.1

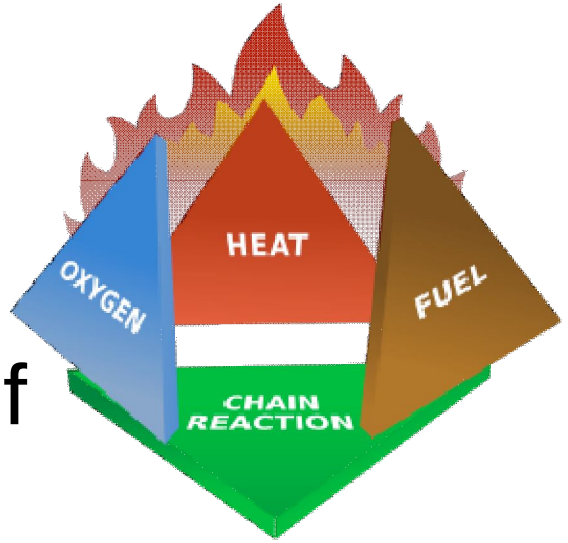
Store in dry place

In the cupboard+ **lamp (15-20) watt**

Clean the lenses carefully dg: a soft cloth moistened with xylol reply

Source of damage to the equipment / materials due to environmental

- Air
- Water, Acids, Bases, and Other Fluids
- Heat or temperature
- Mechanical
- Beam
- Fire
- The nature of the chemical itself



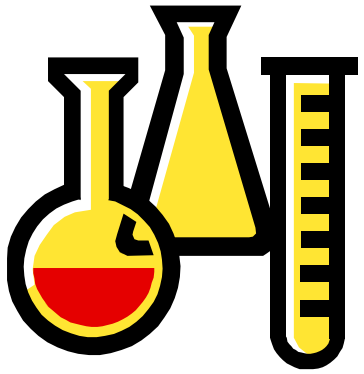
A variety of laboratory equipment made of glass

A variety of laboratory equipment in the form of assemblies, commonly used in physics laboratories or laboratory techniques

Trial process aids such as tweezers (pinset), scissors and a Bunsen burner, mortar

What to know before making arrangements equipment

- Identifying tools and functions
- Identifying the properties of materials
- Quality tools including the sophistication and thoroughness
- Value / price of the tool
- The quality and rarity of these tools
- The basic ingredients compiler tools
- The shape and size of the tools
- The weight / weight equipment



Maintenance of Glassware

- Washing
- Drying
- Storage
- Use
- stringing tools (merangkai alat)
- open circuit devices

How to remove dirt remnants of substance

- Remove as much material
- Do not throw dirt remnants substances, paper, or solid waste into the sink.
- Analysis of types of impurities and equipment to be cleaned
- Eliminate inorganic impurities with dust abrasive powder / soap, water and a brush, if hard with dilute HNO_3

How to Clean tools based pollutants

A. Organic matter impurities

1. Can be removed using abrasive ash or soap, brush and warm water.
2. The use of acid - a strong acid such as sulfuric acid or chromic sulfuric acid cleaning solution is dangerous
3. Vigreux and spiral coolers, with soapy water soaking, after washing with water and then rinsed with a solvent

B. Inorganic matter impurities

Eliminate inorganic impurities with ash scouring powder or soap, water, and brush, if hard to dilute HNO_3

Such as pipette measuring can be done by soaking in a solution of sulfuric acid

C. Fat impurities

The equipment washed with hot water (warm) and detergent to remove oil and grease
Rinsed with water to remove detergent
If stubborn as pipette measuring can be done by soaking in a solution of sulfuric a chromate (if I had to, because it is dangerous)

Drying

- Leave it overnight in the lab workbench (drying rack)
- Beaker and flask placed upside down on drying time
- Test tube, a small funnel, and so placed on filter paper scrap stored at the bottom of the beaker
- Glass tool can quickly dried with acetone

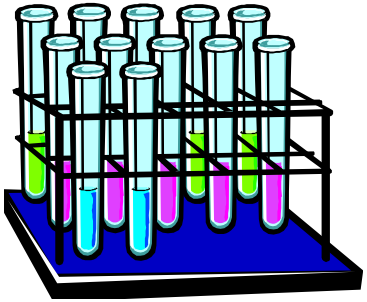
Drying

- Drying burette, pipette, measuring instruments, chromatography columns, is done by storing it upright with the tip upside down.

- Drying can quickly use the oven dryer, blow dryer or rinsed with acetone.

Glassware storage

- Not to be combined with iron or wooden
- Equipment with a glass connection (eg separator funnel, burette, and Soxhlet) connections must be removed or covered with vaseline
- To open a jammed joint glassware made dg heat the connection with a small fire while playing.
- Avoid connection atmospheric alkaline glasses
- Glassware should also be stored in the upper rack



Efforts to prevent possible damage

- Given a dust cover
  Arranged according to the existing table and layout available
  Optic equipment arranged in a special place / in the closet, given lamp (15-20) watts
  Arranged according to the function and characteristics
  Do not place the equipment is not in place

The room temperature

- For the subtropical temperatures are suitable (10-25 C)
- In Indonesia (tropical regions are operating temperature 310C).
- Other aspects that contribute to the damage are:
  Rarely or little used
  Placements are not suitable / bad (poor of accommodation)
  Less service (lack of services)
  Unsuitable environmental

Structuring and storage based on:

- Determined by the state laboratory facilities, laboratory layout, and the state of equipment / materials.

- User interest is determined based on the ease sought and achieved, security storage and retrieval.

Various laboratory equipment stored in wardrobes tool

- Using the appropriate tool usage instructions.
- Maintain cleanliness of equipment
- storing tools

Kebijakan Keselamatan Lab

- Tidak boleh makan, minum, merokok di lab
- Beri Label semua wadah bahan kimia
- Beri Label “No Food” pd refrigerator
- Beri Label “explosion safe” pd refrigerator
- Kontrol secara rutin pd APK
- dll

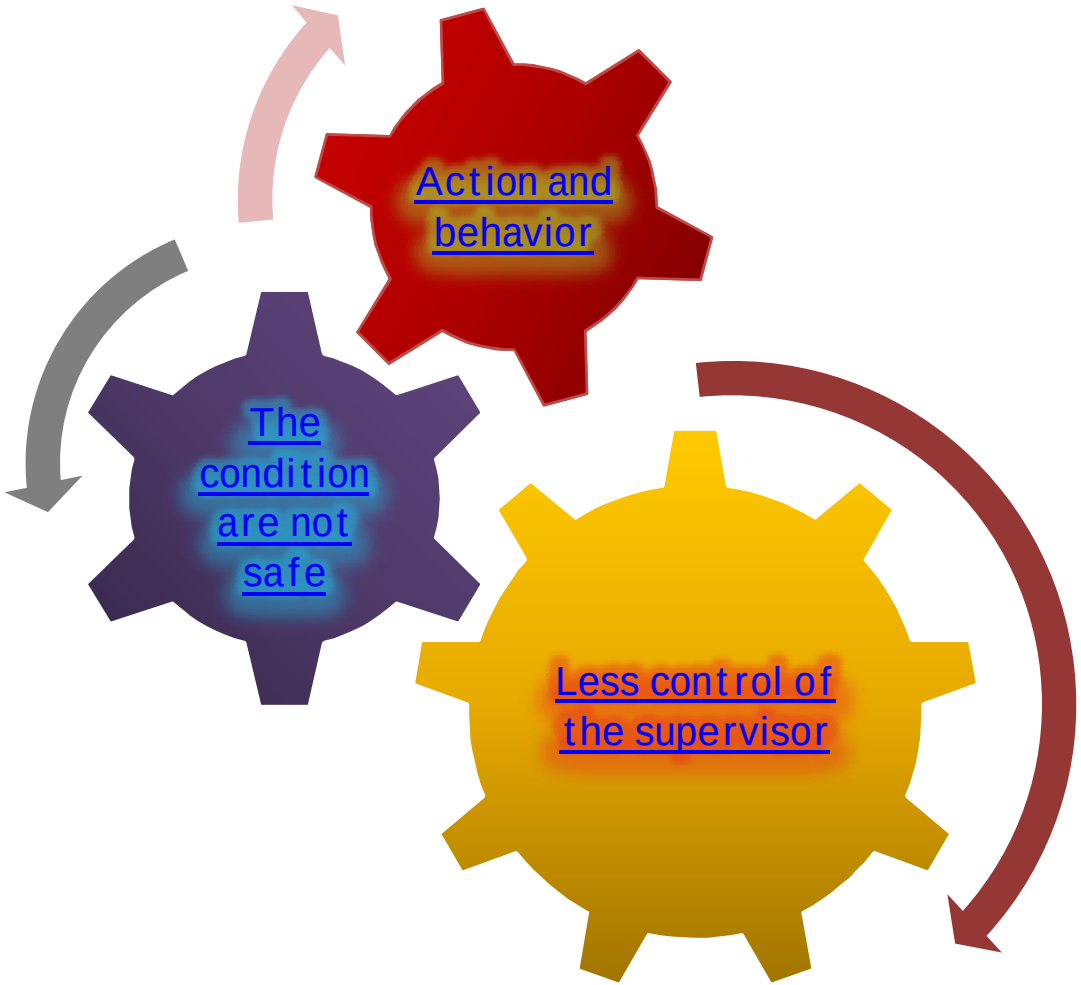
Control

How are the risks controlled?

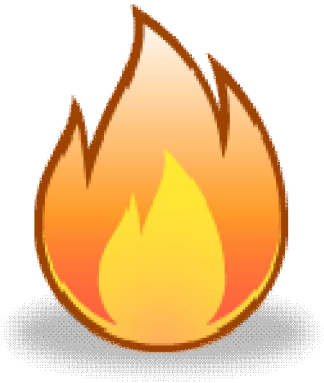
- **Engineering controls:**
  - – isolation
  - – ventilation
  - --hood
- **Emergency Plan**

- **Personal Protective Equipment (PPE) / Alat Pelindung Diri**

Factors of Accident



Recognition



Types of lab hazards:

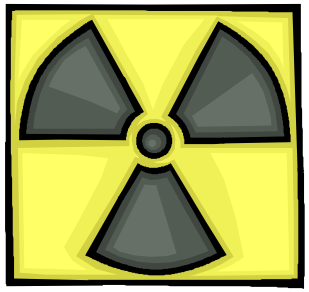
chemical toxicity

fire / explosion

physical hazards

biohazards

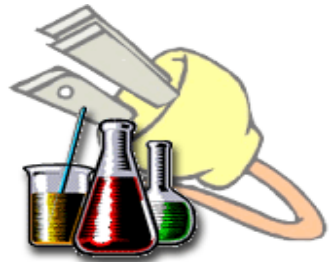
radiation



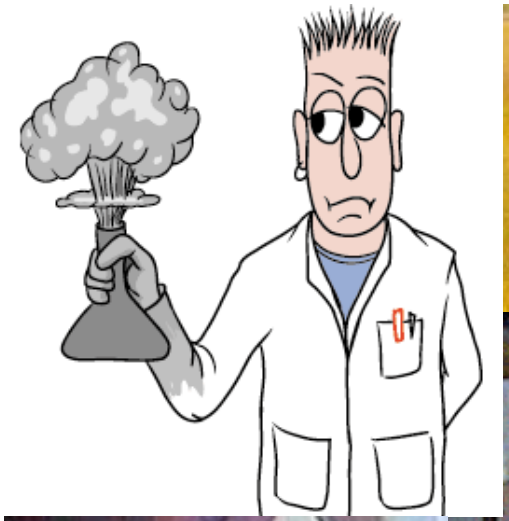
special substances

Physical and Ergonomic Hazards

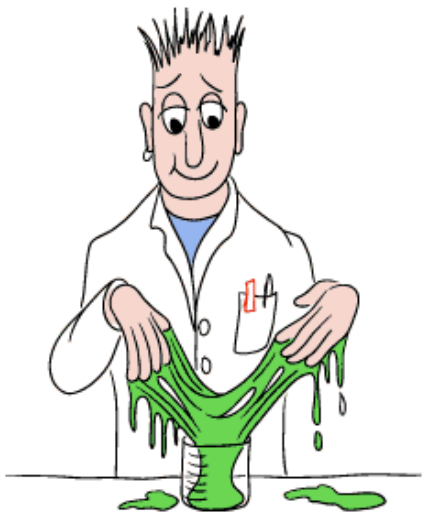
- Moving unguarded parts, pinches vacuum pump belts
- Broken glassware and sharps, cuts
- Pressure apparatus
- Vacuum containers
- Dewar flasks
- High voltage equipment
- Computer workstations
- Slips, trips & falls

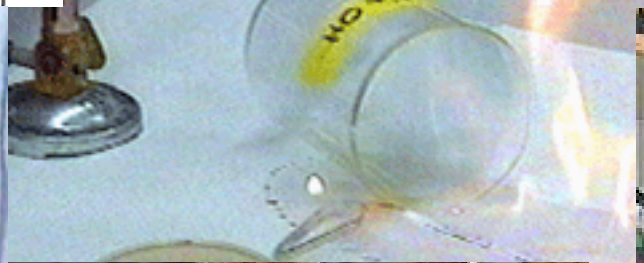


Other Hazards in a Chemical Laboratory









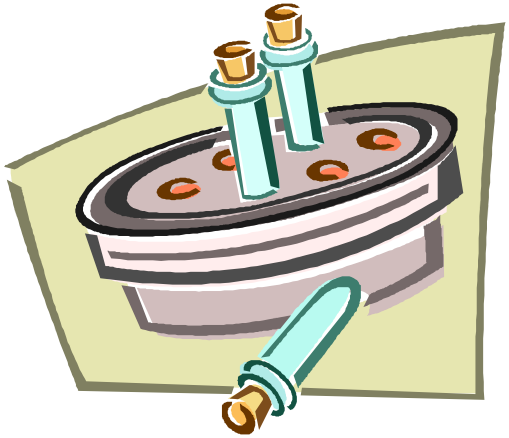


Asbestos-Containing Materials

- Gloves
- Lab hoods
- Lab benches


Johns-Manville
TRANSITE
AIRDUCT-VENT

Centrifuge Equipment



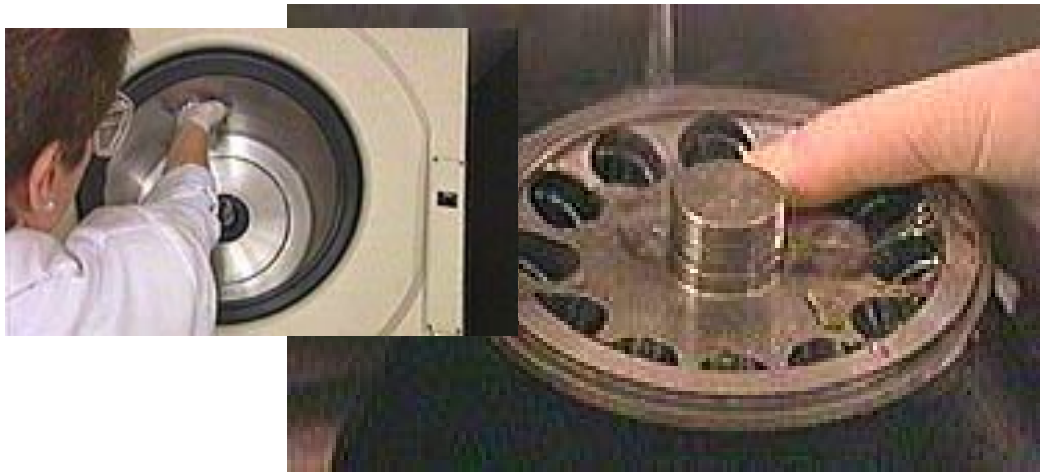
- Uses
- Hazards
- Control of hazards
  - Only authorized users can use equipment
  - Users must be trained
  - Assign responsibility to lab tech
  - Include in periodic lab inspections

- Rotor
- Drive Shaft
- Motor
- Cabinet provides varying degrees of protection

Centrifuge Safety

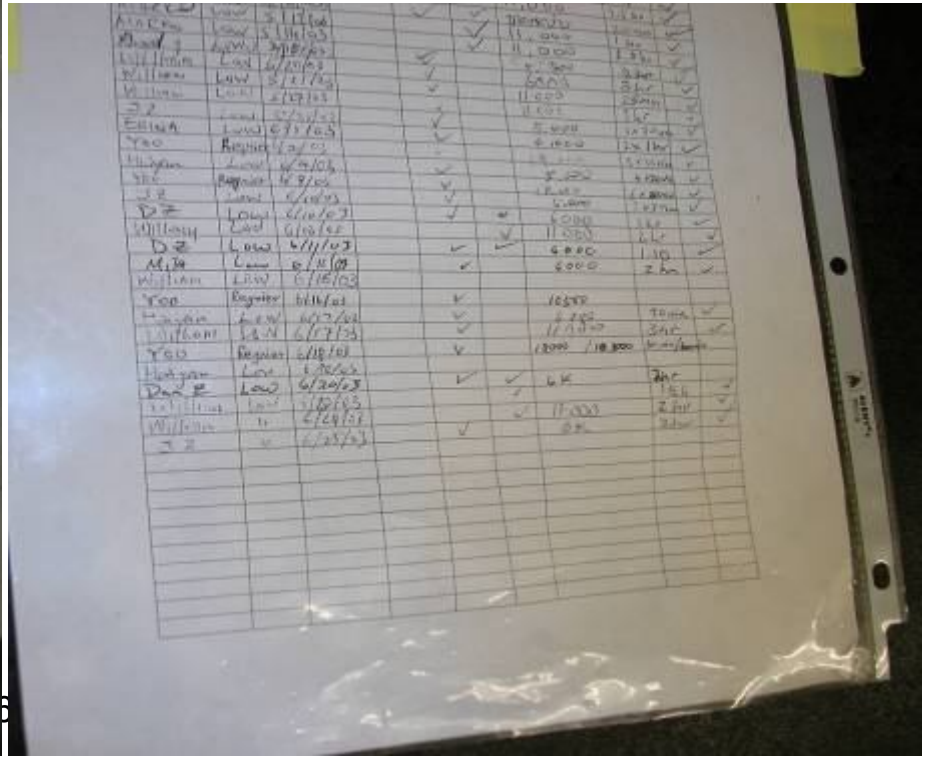
Don’t overload …

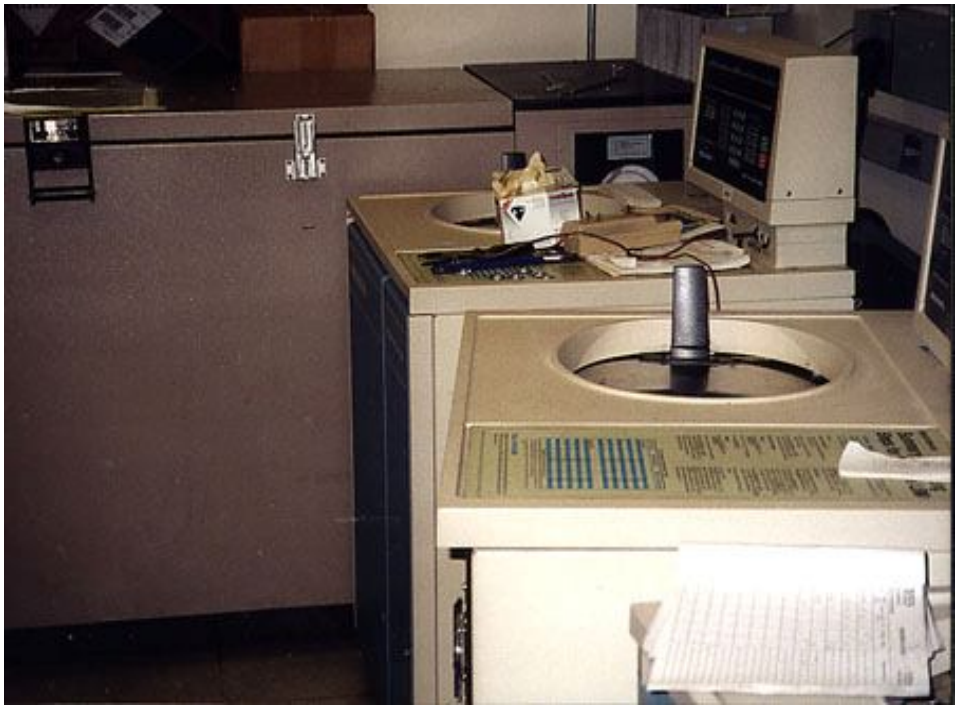
Check rotor for cracks



Keep rotor and centrifuge clean …

Set it up right…





Housekeeping

Do not use hoods for storage!

Don’t block hood air flow.

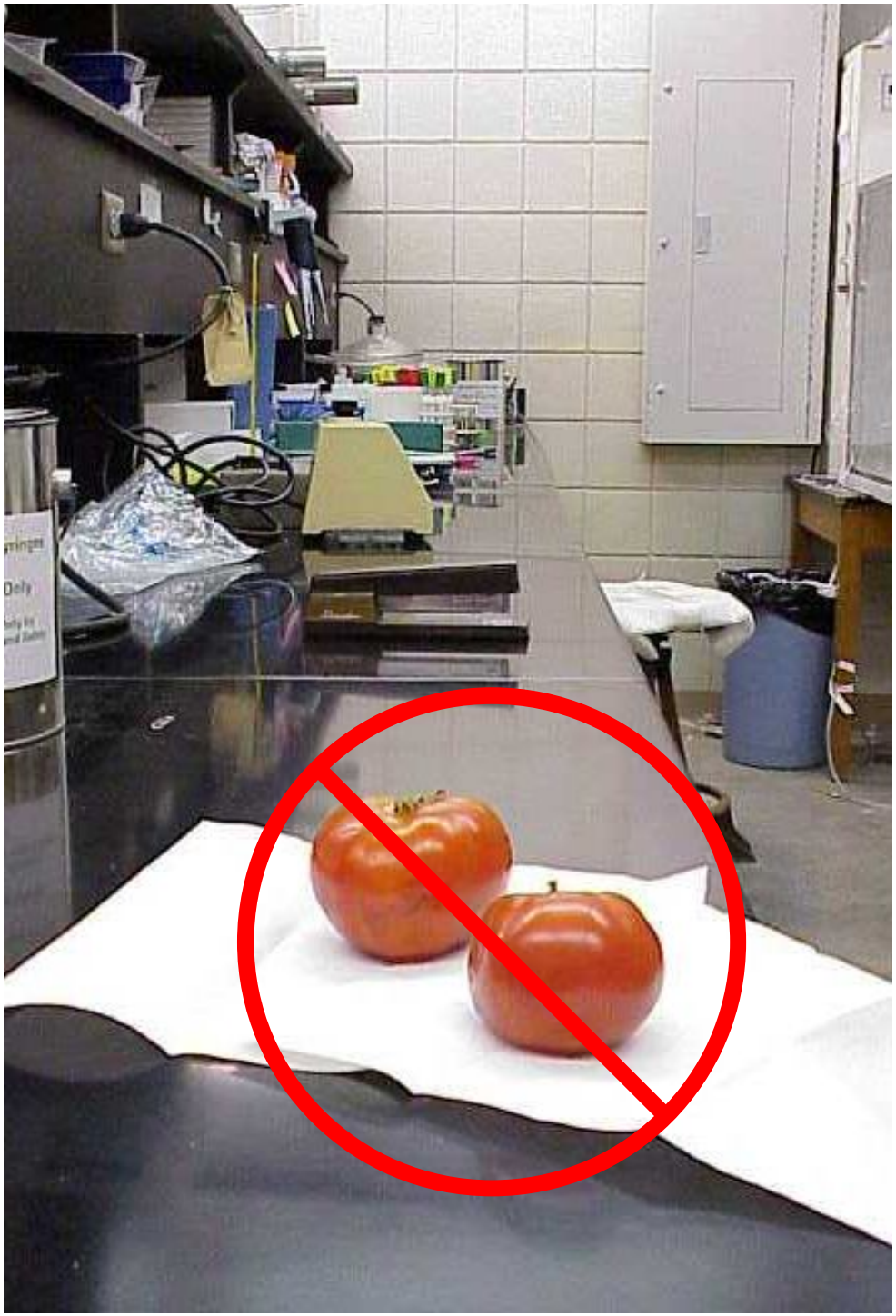
Place large equipment in a hood on 5 cm blocks to allow air flow around and under equipment.

Don’t block hallways and exits!

Access to emergency equipment is <u>essential</u>.

Always check that equipment is not blocked.

Food is never allowed in laboratories.

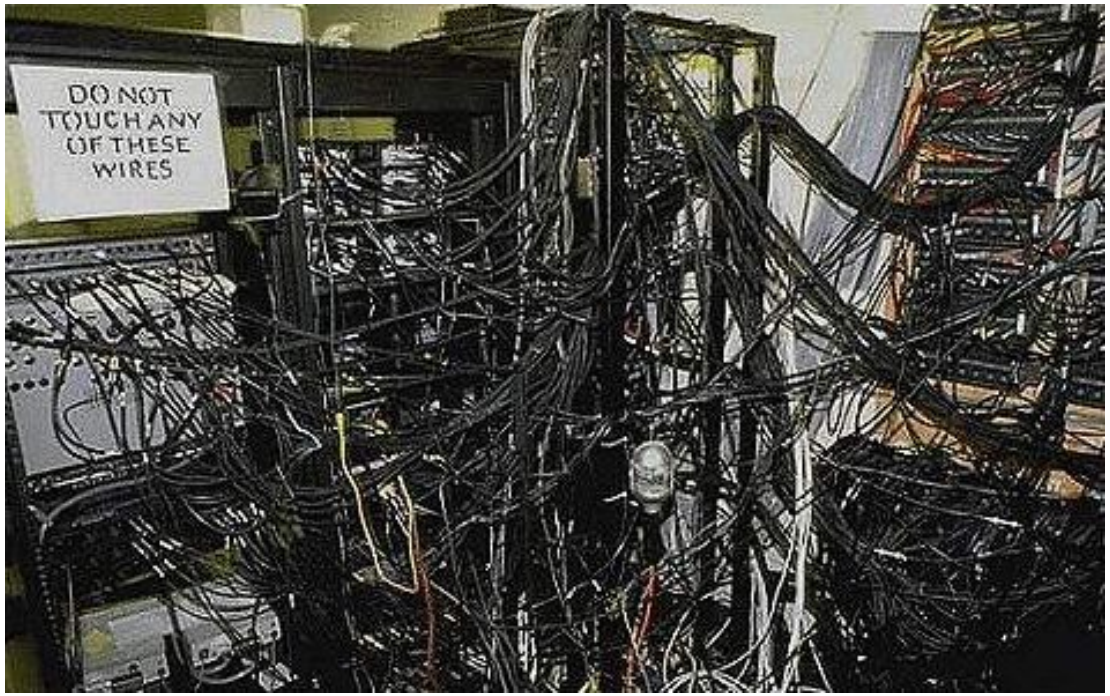


What's Wrong With This Picture?

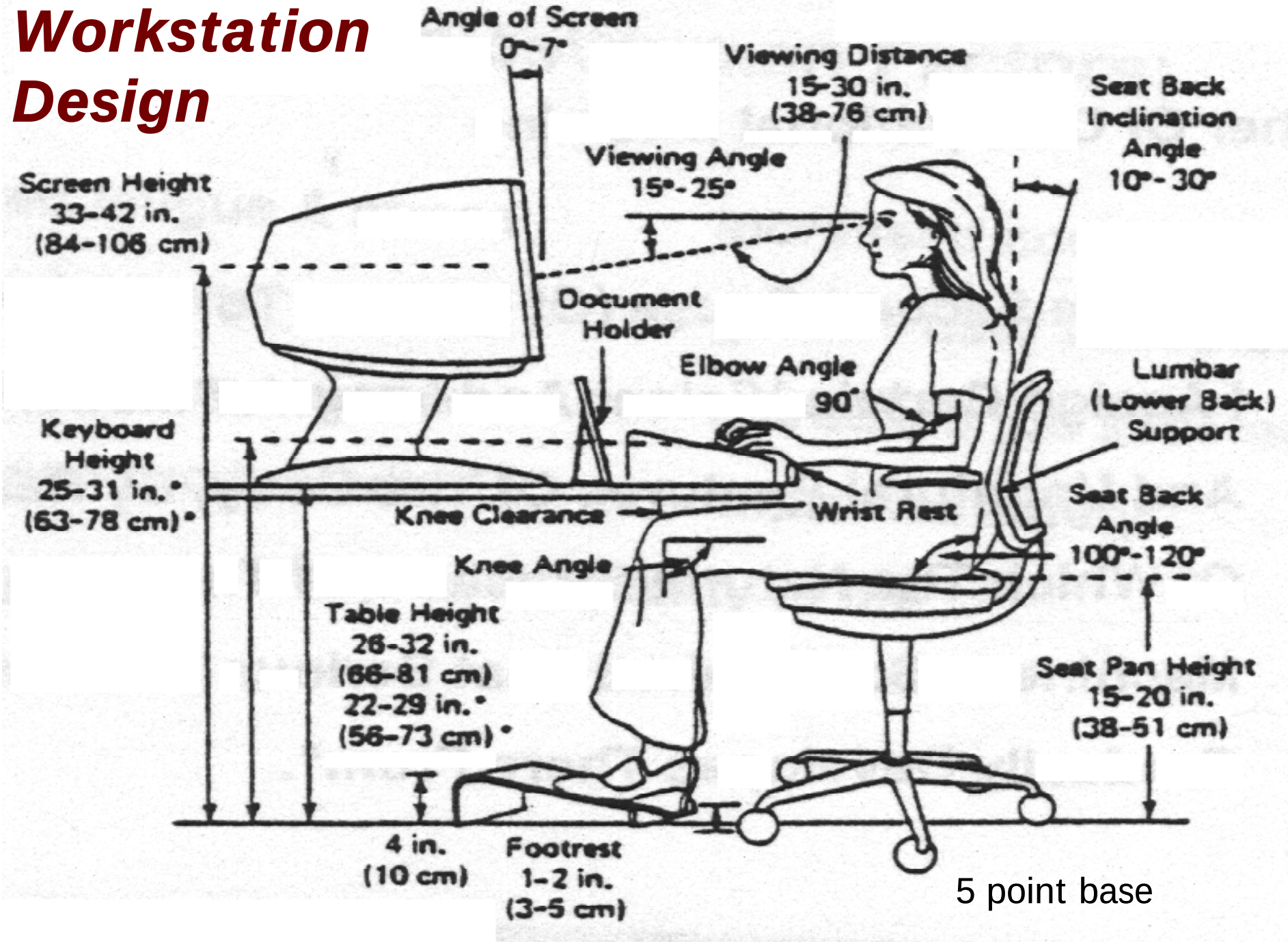
Open-toed shoes are not allowed in laboratories.

Employees are not allowed to wear gloves, lab coats or other PPE outside the lab.

Don’t Do This…



Workstation Design



5 point base

Workstation Design Rules

- **Chairs: 5 cm and 110 degree rule**
  - **Adequate lumbar support**
- **Neutral wrist position**
- **Elbow 90 degree at “keyboard home row”**
- **Screen below eye level**
  - **Copy at same height**
- **Illumination: prevention of glare**
- **Breaks: rest eyes and body**

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