CHEMICAL SERVICES
PRACTICE LEARNING

By:
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The benefits of learning practice models

- The knowledge learned through direct contact with the tool
- Individual freedom as the basic learning
- Anticipating a natural phenomenon
- Exercising using words and phrases for object
- Develop the intellectual and moral character of students
- Foster research
Basic skills that must be possessed by the laboratory personnel

- Managing lab, lab facility, chemicals, lab administration
- Projecting various purposes of lab
- Storage & maintenance equipment & chemicals
- Make adjustments to the curriculum
- Using a general workshop tools
Basic skills

- Perform basic techniques
- Planning and organizing the use of lab for 1 year
- Organize distribution of tools & materials lab
- Prepare regulations & safety lab for students and lab personnel
Basic skills..........

- Prepare clear instructions on how to use special equipment
- Determine the mobility of traffic flow in the practicum student with the benchmark number of students and lab conditions
- Completing P3K box and skilled do first aid in lab
- Task scheduling lab personnel
Aspects administered

- The room lab
- Lab facility
- Tools and materials
- Workforce
- Lab activities
Format for lab administration

- Format A
- Format B1
- Format B2
- Format B3
- Format B4
- Format C1
- Format C2
- Format C3

- Data space lab cardstock
- List of items
- List of proposed items
- Card tool
- List of tools
- Listing revenues / expenditures tool
Format for lab administration

- Format C4
- Format D1
- Format D2
- Format D3
- Format D4
- Format E
- Format F

- List of proposed equipment
- Card substance
- List of substances
- List revenue / expenditure substances
- List of proposed substance
- Data workforce
- Agenda lab activities
### List of Mathematics Education (Directorate General of Higher Education)

<table>
<thead>
<tr>
<th>Room</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room of weight</td>
<td>15 m²</td>
</tr>
<tr>
<td>Room of Analysts</td>
<td>20 m²</td>
</tr>
<tr>
<td>Room of assistant</td>
<td>20 m²</td>
</tr>
<tr>
<td>Room of warehouse</td>
<td>20 m²</td>
</tr>
<tr>
<td>Room of computer</td>
<td>20 m²/10 people</td>
</tr>
<tr>
<td>Room of practicum</td>
<td>4 m²/ people</td>
</tr>
<tr>
<td>Room of workshop</td>
<td>2.5 m²/ people</td>
</tr>
<tr>
<td>Room of electronics</td>
<td>20 m²/20 people</td>
</tr>
</tbody>
</table>
Table 1. Data room Lab. chemical
Lab Name: Basic Chemistry

<table>
<thead>
<tr>
<th>Area (m²) &amp; lab capacity</th>
<th>Types of room</th>
<th>Fix area (m²)</th>
<th>Area Should (m²)</th>
<th>Details of the development</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>R. Practicum</td>
<td>130</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>R. equipment</td>
<td>-</td>
<td>20</td>
<td>insulation space</td>
</tr>
</tbody>
</table>
Sample Tool Card:

- Name of equipment: measuring glass
- Group: G
- Specification: 100 mL, od. 2 cm
- Code No.: 5 pyrex
- Location/RAL: 1/2/3
# Table 2. Card Tool

<table>
<thead>
<tr>
<th>Date</th>
<th>Condition</th>
<th>Infor mation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>entry</td>
<td>exit</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>broken</td>
</tr>
<tr>
<td>1-2-2006</td>
<td>10</td>
<td>-</td>
</tr>
</tbody>
</table>
Chemicals Card

- Name of chemical: Silver nitrat (AgNO₃)
- Group: A
- Specification: 100 gram
- Code No.: 5 E Merck
- Location/RAL: 1/2/3
Preparation of copper sulphate
[CuSO₄.5H₂O] 1 M

- Mr Cu=63.5; S=32; O=16; H=1
- Mr CuSO₄.5H₂O = (1x63.5) + (1x32) + (4x16) + 5[(2x1) + (1x16)] = 249.5
- Mass of 1 mol CuSO₄.5H₂O = 249.5 g
- So to make a 1 M solution of copper sulphate is needed as much as 1 liter of 249.5 g CuSO₄.5H₂O and then dissolved in water to a volume of 1 liter solution.
**Preparation of 1 M HCl solution**

- In concentrated HCl is usually unknown levels of 36% density 1.18. Thus the mass of 1,000 mL of concentrated HCl is 1.180 g.
- In 1180 g of concentrated HCl, the amount of HCl = \( \frac{36}{100} \times 1180 \text{ g} = 424.8 \text{ g} \).
- In 1 liter (1,000 mL) 1 M HCl solution contained 1 mol HCl.
- The mass of 1 mol HCl = 36.5 g.
- So to make a 1 M HCl solution required 36.5 g HCl, contained in concentrated HCl = \( \frac{36.5}{424.8} \times 1,000 \text{ mL} = 85.9 \text{ mL} \) concentrated HCl.
CONTENT-BOX TOOL KITS

- Tape measure
- Glue/ lem
- Epoxy/ super glue
- Plastic cement
- Brush- teeth
- Drinking spook
- Terminal block (for joint the cable)
- Electric tape
- Screw driver/ dual screw
- Hammer (besi/ plastic)
- Mole trips pliers/ Tang clamp
- key ring
- Yank/ obeng getar/ pump action screw driver
- Stanley plier/ pemotong kawat
- Cutter
CONTENT-BOX TOOL KITS

- Tanks of various sizes
- Needle fliers / miser
- Knife
- Multimeter
- Test- pen
- Cotton yarn
- Cotton bud
- Electric soldering
- Volt- meter
- Metal cutting saws (with silicon carbide cinpade)
- Sandpaper
- Fuse sizes
- etc.
**TASK. DO THE FOLLOWING PROBLEMS!**

1. In the Lab. available 16M HNO₃ solution (concentrated). How many mL of concentrated HNO₃ required to make as much as 100ml of 2M aqueous HNO₃?

2. In the Lab. available solution of 70% HNO₃, bj = 1.42 g / mL. How many mL of concentrated HNO₃ required to make as much as 100ml of 2M aqueous HNO₃?

(Ar H=1, N=14, O=16, S=32, Na=23)
DO THE FOLLOWING PROBLEMS!

3. In the Lab. available solution of 96% H₂SO₄, bj = 1.84 g / mL. How many mL of H₂SO₄ required to make dollars. 2M aqueous H₂SO₄ as 250 ml?

4. How many grams of NaOH are required to make NaOH solution: a) 0.1 M b) 0.5 M c) 2M?

(Ar H=1, N=14, O=16, S=32, Na=23)