SELECTION CRITERIA TOOL
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Basic competency:
Students can describe the criteria for a good tool as needed
Choosing the right tool in the procurement of equipment

• How to choose a good / correct as needed and funds are available?

Criteria for a good tool

- Aspects of academic / pedagogic
- Physical aspects
- Aspects of special assessment
Aspects of academic / pedagogic

Can be used for:

1. Instilling the concept of an existing chemical
2. Reveals a new concept of chemical
3. Stimulate students' thinking to construct a generalization
4. Accelerate the learning process of children
5. Accelerate the learning process
Steam distillation
Vacuum distillation & AAS (Atomic Absorption Spectrophotometer)
Glassware
Physical aspects

- Usability of the tool
- structure tool
- reliability tools
- material tool
- size of tool
- shape tool
- practicality tools
- value reparations
- user safety
Usability of the tool

- The tool can be used for several types of experiments, several laboratories
- pHmeter
pH Meter (Orion 3 Star) and pH Combination Electrode Calibration

Procedure:

Note: The pH meter and pH combination electrode must be calibrated each day before use. The ATC probe must be used during calibration of the pH probe and during pH measurement of samples.

1. Bring the temperature of the pH buffers and samples to room temperature before beginning calibration procedure. All solution temperatures should be within ±3 °C of room temperature.

2. Follow the calibration instructions for the Orion 3 Star meter and pH combination electrode being used (see “Orion 3 Star Meter User Guide pp.19-20”).
PROCEDURE
pH Meter (Orion 3 Star) and pH Combination Electrode Calibration

3. Press the ON/OFF button to turn the meter on. To set the pH meter parameters press the Setup button. Press the Line Select button and use the down arrow key to change the display to \textit{bUF}. Press the Line Select key again to accept the selection and move to the next line. The third line should display \textit{USA}. If not, use the up and down arrow keys until \textit{USA} is displayed. Press the Line Select key once more to accept that selection. Press the Measure key.

4. To calibrate the pH meter and electrode while in the measurement mode, press the up arrow key until the pH icon is displayed on the right side of the display. Then press the \textbf{Calibrate} key to begin the calibration process. The meter will display CAL.1 on bottom display line.
5. Begin calibration by removing the pH electrode from the storage solution, removing the plug from hole for the internal filling solution, rinsing the electrodes (pH and ATC) with deionized water and blotting dry with a Kimwipe®.

6. Place the electrodes into the bottle containing the pH4.00 buffer and a stir bar. Stir at a slow speed. When the meter indicates that a stable reading has been obtained for the pH 4.00 buffer (pH icon stops blinking), press the **Calibrate button on the meter**. The meter will display **CAL.2 on bottom display line**.
PROCEDURE  

pH Meter (Orion 3 Star) and pH Combination Electrode Calibration

7. Remove the electrodes from the buffer, rinse with deionized water and blot dry.
8. Repeat steps 6 and 7 for the pH 7.00 and 10.00 buffers. After the pH 10.00 buffer has been used for the calibration and the “pH icon” stops flashing, press the Measurement key to save and end the calibration. The meter will display the electrode slope. This should be recorded in an equipment- or project-specific notebook. The slope should be between 92 % and 102 %. If the slope is not in this range, the calibration procedure should be repeated.
The simplicity of form / structure

• Form a simple tool / not complicated
• Facilitate the process of data collection facilitate the use
• Example: measurement of soil pH with universal indicator paper or a "set of soil analysis" is not to be calibrated pHmeter
Reliability

Reliable tool if:
  Can be used by anyone, anywhere, with similar results
Terms: easy to read scale
Measuring instruments: volume, mass, pressure
Quality materials

- Good tools are made of quality materials which are not easily damaged.
  
  *example:*
  
  Glass pyrex or Jena
  
  Corrosion resistant metal
Size of tool

Depending on the intended use of the tool for:
- practicum
- demonstration
- research
Performance / forms

The shape is interesting and subtle
no rough
The surface of flat glass tools
Practicality

Easily stored and transported so as not to fast damaged

Example: - Kit tools
Repair

• Ease of repair, do not continue to waste disposable
• For example: Power supply pHmeter
Security

• Aid wearer safety is assured
• Not easy to pose a hazard
• Not easy to cause damage to the tool itself
Aspects of special assessment

- sensitivity:
  Gauge the influence of something known factors (temperature, humidity, pressure, wind) to change the appointment is to have
- high sensitivity
- availability of stock
- Thoroughness
- Partner
## Assessment of an instrument table

<table>
<thead>
<tr>
<th>Aspect</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>weight</th>
<th>Sum</th>
<th>information</th>
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Examples of circumstances gauges offered

<table>
<thead>
<tr>
<th>specification</th>
<th>Volumetric glass A</th>
<th>Volumetric glass B</th>
<th>Volumetric glass C</th>
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<tbody>
<tr>
<td>Size</td>
<td>100 ml</td>
<td>100 ml</td>
<td>100 ml</td>
</tr>
<tr>
<td>Material</td>
<td>pyrex</td>
<td>natron</td>
<td>Jena</td>
</tr>
<tr>
<td>Scale/table</td>
<td>etched / painted</td>
<td>painted</td>
<td>etched</td>
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<tr>
<td>Diameter</td>
<td>3 ml</td>
<td>5 ml</td>
<td>5 ml</td>
</tr>
<tr>
<td>Dasar alat</td>
<td>glass</td>
<td>Glass &amp; plastic</td>
<td>glass</td>
</tr>
<tr>
<td>Price (Rp)</td>
<td>30.000</td>
<td>20.000</td>
<td>25.000</td>
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Examples of the tool table A, B, and C

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<th>No</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>weight</th>
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<th>Information</th>
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</tbody>
</table>
Provision

• Range of values 1-4
• 1 : minimum value
• 4 : maximum value
• Total weight value = 25
• Total maximum value = 4 x 25 = 100
• Maximum figure for the best tool = 100 (the maximum eligible
Determination of purchase

<table>
<thead>
<tr>
<th></th>
<th>Total value</th>
<th>Price</th>
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<tbody>
<tr>
<td>A</td>
<td>85</td>
<td>30.000</td>
</tr>
<tr>
<td>B</td>
<td>70</td>
<td>20.000</td>
</tr>
<tr>
<td>C</td>
<td>80</td>
<td>25.000</td>
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</tbody>
</table>
Terms of the value of at least 60

• Means that all eligible
• Which has a reasonable price?
Example Ranking Reasonable

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Price (Rp)</th>
<th>Conversion Price</th>
<th>Ranking reasonable</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>85</td>
<td>30.000</td>
<td>85/85x30.000</td>
<td>30.000 (3)</td>
</tr>
<tr>
<td>B</td>
<td>70</td>
<td>20.000</td>
<td>85/70x20.000</td>
<td>24.285 (1)</td>
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<tr>
<td>C</td>
<td>80</td>
<td>25.000</td>
<td>85/80x25.000</td>
<td>26.562 (2)</td>
</tr>
</tbody>
</table>
Tools purchased are B

The reason:

1. Once converted it turns out the most reasonable price is worth 85 B because if the price is 24,285 (bid of Rp 20,000)

2. So even though the B value is only 70, but has been qualified and the lowest conversion price (cheap