



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

LABORATORY WORK NO.1

SCALES AND WEIGHING – LABORATORY GLASSWARE

■ PRINCIPLE :

Weighing and weigh determination of substances is one of the basic operations when working with solid substances in a laboratory. The main weight unit according to the SI system is kg which is divided according to the needs into the derived units: g, mg.

According to the sensitivity and weight capacity (allowable scales load), we can distinguish two basic types of weight instruments used in a laboratory: 1.weighing scales

2. analytical balances.

Weighing scales are the scales with 0,001g accuracy and the weight capacity of 200g; they are used for weighing starting materials, semi-finished products and products of chemical reactions.

Analytical balances are the most precise scales, mostly with 0,0001g accuracy and the weight capacity of up to 200g. We use them especially when we need the exact chemical work.

■ INSTRUCTIONS FOR WEIGHING

1. When working with balances, we maintain the maximum possible cleanness. Important note: the chemicals must not come into direct contact with scales. For weighing the substances, we use a suitable container – weighing boats or a weighing bottle. Paper pads can be used only on technical scales. The weight of the object must not exceed the capacity of the balances as this could cause damage or destruction of the scales instrument.
2. Before weighing the object on an analytical balance, it is advantageous to determine its weight using the basic weighing scales.

3. We make sure that we don't stain the scales with the weighted agent. Put on the weighing dish only objects that are completely clean and dry. All handling of chemicals (adding or deleting) must be performed out of the scales. Light, powdery substances are weighed carefully so that they could not disperse.
4. Before we start weighing, we have to make sure that the scales work properly and the balance control is in the zero position. After finishing the work, we clean the scales and their surrounding and, if necessary, we can brush the scales off with a hair brush.

TASK No.1 WEIGHING OF SOLID SUBSTANCES

■ AIDS:

scales, weighing bottle or small beaker (50ml), 10 – 15 pieces of small glass balls

■ PROCEDURE:

1. Weigh an empty weighing bottle on analytical balances and write down its weight. After that, press the TARE button on the scales.
2. Put 10-15 glass balls into the weighing bottle and weigh the full bottle. Now you can calculate the weight of 1 glass ball.

■ CALCULATIONS :

Weight of 10-15 glass balls $m =$

Weight of 1 glass ball: $m_1 =$

■ CONCLUSION:

Weight of 1 glass ball is Weight of weighing bottle is (accuracy of 0,001g).

TASK No. 2 WEIGHING OF LOOSE SOLID SUBSTANCES

■ AIDS:

scales, weighing bottle or small beaker (50ml), laboratory teaspoon

■ **CHEMICALS:** technical NaCl

■ **PROCEDURE:**

1. We use the method called: Weighing by Difference. We weigh an empty weighing boat or weighing bottle on basic weighing scales to 3 decimal places – and we get the mass m_0 [g].
2. Outside the scales, we fill the weighing bottle with 2-5g NaCl, consider exactly 3 decimal places. In this way, we get the weight of the glass and the tested substance of NaCl m_1 [g].
3. Using the method Weighing by Difference, i.e. differencing between the two weights, we find out the weight of the tested substance m [g]: $m = m_1 - m_0$ [g]
4. We repeat the same process using the TARE button. We try to weigh as accurately as possible the same amount of NaCl. We fill in the tested substance outside the scales.

■ **CONCLUSION:**

Write down the weighed amount of the substance with the given accuracy.

TASK NO. 3 KNOWLEDGE OF CHEMICAL GLASSWARE AND SUPPLIES

■ **PRICIPLE:**

Chemical dishes are classified according to the material (glassware, porcelain, metal, plastic or rubber). According to the use, they must be made of material with low thermal expansivity, highly temperature resistant, resistant to acids, alkalis and solvents, even at increased temperatures.

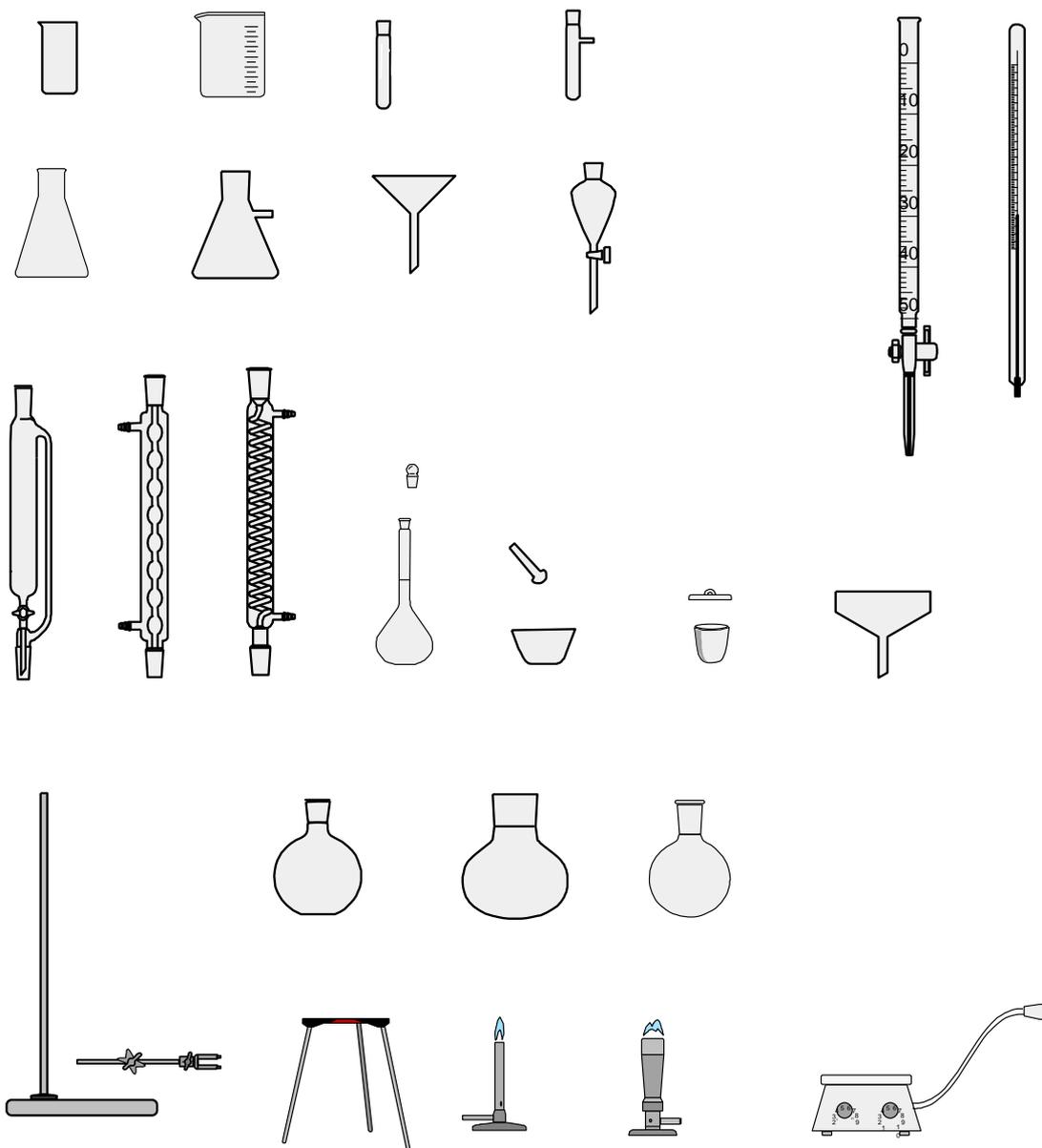
Not every material meets all these requirements, so it is always necessary to consider which aid you choose for given type of work (e.g. what kind of thermometer for measuring the boiling point of the substance or only for tempering bath to 50 ° C, which of the various types of filtration materials, etc.).

The work sheet follows.



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■ NAME THESE CHEMISTRY SUPPLIES AND LABORATORY EQUIPMENT:



Find in the textbook more laboratory glassware and supplies and learn them.

■ Work safety in the laboratory:

Teacher uses **instruction BOZP**, prepared together for lab work for chemistry in MSŠze, VOŠ and other fields, and also the laboratory order.



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

STUDENT´ S SHEET No.1

SCALES AND WEIGHING – LABORATORY GLASSWARE

1. VOCABULARY

Match the Czech words with their English equivalents:

a) sensitivity	meziprodukt	1...
b) exact	čínidlo	2...
c) Intermediate produkt	lodičky	3...
d) agent	jednotka hmotnosti	4...
e) weigh boats	váživost	5...
f) weight unit	přesnost	6...
g) capacity	váhy	7...
h) accuracy	vhodný	8...
i) balances	citlivost	9...
j) suitable	přesný	10...

2. WORD SEARCH

Find the words and translate them:

1. _N_LYT_C_L B_L_NC_S
2. _A_O_A_O_Y _L_SS_A_E
3. W_I_H_G _OTTL_
4. T_ERM_M_T_R
5. G__SS _ALL_
6. _ORC__IN



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3. MATCH AND LEARN THE FOLLOWING VERBS:

- | | |
|----------------------------|----------------|
| 1) převýšit, přesahovat | A. press |
| 2) zmáčknout | B. distinguish |
| 3) odlišit | C. consider |
| 4) vážit (hmotnost něčeho) | D. weigh |
| 5) uvážit, zvažovat | E. exceed |
| 6) zabarvit | F. stain |

4. Find in the the materials following words and translate them:

- 1) pevný
- 2) sypký
- 3) rozpouštědlo
- 4) pryž
- 5) zásada
- 6) kyselina
- 7) nádoba
- 8) papírové podložky

5. Match the Czech terms with their English equivalents

*High temperature resistant; to meet all the requirements; a low thermal expansivity;
a boiling point; various types; resistant to acids; an increased temperature*

- 1) různé druhy
- 2) zvýšená teplota
- 3) bod varu
- 4) odolný proti kyselinám
- 5) nízká tepelná roztažnost
- 6) odolávající vysokým teplotám
- 7) splňovat nároky