

PRACTICALS

PRACTICAL - TABLE OF CONTENTS

Sl. No.	Name of the Experiment	Time
1.	To find the diameter of a spherical body	40 minutes
2.	To find the thickness of given iron nail	40 minutes
3.	Melting point of wax	40 minutes
4.	Measurement of volume of liquids	40 minutes
5.	Identification of adaptations in animals	40 minutes
6.	Identification of plant and animal tissues	40 minutes
7.	To detect the adulterants in food samples	40 minutes
8.	Identification of microbes	40 minutes
9.	Economic biology	40 minutes
10.	Identification of adaptations in plants	40 minutes



I. TO FIND THE DIAMETER OF A SPHERICAL BODY

Aim:

To determine the diameter of a spherical body using Vernier Caliper.

Apparatus required:

Vernier Caliper, given spherical body (cricket ball).



Formula:

(i) Least count (LC) = 1 Main scale division - 1 Vernier scale division

$$LC = 1\text{mm} - 0.9\text{ mm}$$

$$LC = 0.1\text{ mm (or) } 0.01\text{ cm}$$

(ii) Diameter of the spherical object (d) = M.S.R. + (VC × LC) ± ZC cm

where, MSR - Main Scale Reading

VC - Vernier Coincide

LC - Least Count. (0.01 cm)

ZC - Zero Correction.

Procedure:

- Find the least count of the Vernier caliper.
- Find the zero correction of the Vernier caliper.
- Fix the object firmly in between the two lower jaws of the Vernier.
- Measure the main scale reading and the Vernier scale coincidence.
- Repeat the experiment by placing the jaws of the Vernier at different position of the object.
- Using the formula find the diameter of the object.

Least Count (LC): 0.01cm

Zero Correction (ZC): _____

Sl. No.	Main Scale Reading (MSR) cm	Vernier coincidence (VC)	Diameter of object $d = \text{MSR} + (\text{VC} \times \text{LC}) \pm \text{ZC (cm)}$
1			
2			
3			

Average _____ cm

Result: The diameter of the given spherical object (Cricket ball) is _____ cm





II. TO FIND THE THICKNESS OF GIVEN IRON NAIL

Aim:

To find the thickness of the given iron nail.

Apparatus required:

Screw gauge and iron nail



Formula:

$$(i) \text{ Least Count (LC)} = \frac{\text{Pitch scale Reading}}{\text{No of divisions in the Head scale}}$$

$$(ii) \text{ Thickness } (t) = \text{Pitch scale Reading (PSR)} + \text{Head scale coincidence (HSC)} \times \text{Least Count (LC)} \pm \text{zero correction}$$
$$t = \text{PSR} + (\text{HSC} \times \text{LC}) \pm \text{ZC}$$

Error:

(i) If positive error is 5 points, for zero correction, subtract 5 points.

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) - \text{ZC}$$

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) - 5$$

(ii) If negative error is 95 points, for zero correction add 5 points (100 - 95 = 5).

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) + \text{ZC}$$

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) + 5$$

(iii) If no correction is needed, $t = \text{PSR} + (\text{HSC} \times 0.01) \pm 0$

Procedure:

- The Least count of screw gauge is 0.01 mm.
- The zero error is to be found when the two faces of the screw gauge touch each other.
- Then place the iron nail between the two faces of the screw gauge. The pitch scale reading (PSR) and head scale coincidence (HSC) are to be noted.
- Repeat the process by placing other parts of the iron nail in the screw gauge.
- Tabulate the readings.

Zero corection:

Least count:

0.01 mm

Sl. No.	Pitch Scale Reading PSR (mm)	Head Scale Coincidence (HSC)	Thickness of the iron nail $t = \text{PSR} + (\text{HSC} \times \text{LC}) \pm \text{ZC}$ (mm)
1			
2			
3			

Average: _____ cm

Result: The diameter (Thickness) of the iron nail is _____ mm.



III. MELTING POINT OF WAX

Aim:

To determine the melting point of wax using cooling curve.

Principle:

The determination of melting point is based on latent heat which is the amount of heat required to change a unit mass (1gm) of a substance from one state to another state without changing its temperature.



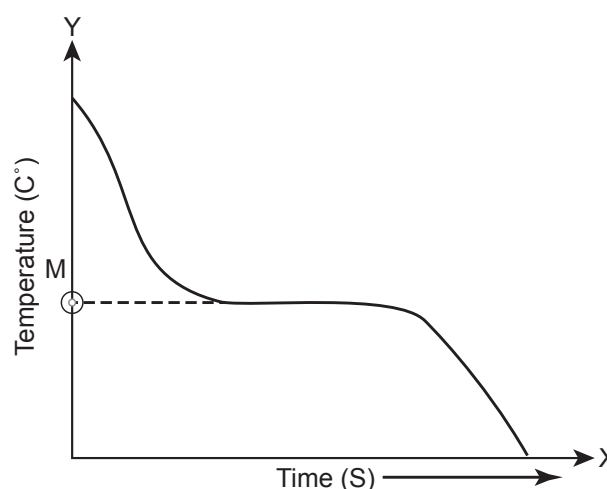
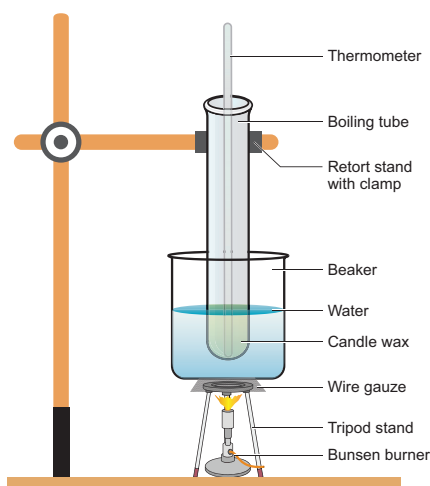
Materials Required:

Beaker, burner, thermometer, boiling tube, retort stand and clamp, wire gauze, tripod stand, candle wax, stop watch, bowl of sand.

Procedure:

- Melt the wax in a warm water bath.
- When the wax is melted entirely, remove it from the bath, dry it and then bury it in sand.
- Record the temperature each 30 seconds while the liquid is being converted to solid.
- At the same time watch for constant temperature at which liquid and solid are present.

Melting point of wax = Constant Temperature over a period of time



Observation and Tabulation:

S.No	Time (Second)	Temperature

The temperature at the point M denotes the melting point of wax

Suggestion: With the help of ICT corner, the teacher can show the live video of the experiment of melting point of wax using the link www.kau.edu.sa



IV. MEASUREMENT OF VOLUME OF LIQUIDS

Aim:

To measure the volume of given colourless and coloured liquids.

Materials required:

Pipette (20ml), sample liquids and beakers



Procedure:

Take a 20 ml pipette. Wash it thoroughly with water and then rinse it with the given liquid. Insert the lower end of the pipette into the given liquid and suck the solution slowly till the solution rises well above the circular mark on the stem. Take the pipette out of the mouth and quickly close it with the fore finger. Take the pipette out the liquid and keep it such a way that the circular mark on the stem is at the level of the eyes. Now slowly release the fore finger to let the liquid drop out until the lower meniscus touches the circular mark on the stem. If the liquid in the pipette is exactly 20 ml, this can be transferred to an empty beaker by removing the fore finger.

Tabulation

Sl. No.	Name of the liquid	Colour of the liquid	Nature of the meniscus	Volume of the liquid
1				
2				
3				

Report: Exactly 20 ml of various liquids are measured using a standard 20 ml pipette.

Note:

1. Keeping the circular mark on the stem of the pipette above or below the level of the eyes will lead to error.
2. When colored liquids are measured, the upper meniscus should be taken into account.
3. Never suck strong acids or strong alkalis using a pipette.

V. IDENTIFICATION OF ADAPTATIONS IN ANIMALS

Aim:

To identify the given vertebrate animals and list out the adaptations seen in them.

Required specimens:

1. Pisces (Fish), 2. Amphibian (Frog), 3. Reptile (Calotes), 4. Aves (Dove), 5. Mammal (Rat)



The following adaptations are noted.

Sl. No.	Name of the animal	Habitat	Body structure	Body covering	Locomotory organs
1	Fish				
2	Frog				
3	Calotes				
4.	Dove				
5.	Rat				

VI. IDENTIFICATION OF PLANT AND ANIMAL TISSUES

Aim:

To identify the structural features of plant and animal tissues from permanent prepared slides.



Observation:

Identify the given plant and animal tissues.

- Simple tissues- parenchyma, collenchyma, sclerenchyma
- Complex tissues-xylem and phloem
- Epithelial tissue- columnar epithelium, ciliated epithelium
- Connective tissue- section of bone
- Muscle tissue- skeletal muscle, smooth and cardiac muscle
- Nerve tissue

Draw a labelled sketch and write the location and function of the tissues observed.

VII. TO DETECT THE ADULTERANTS IN FOOD SAMPLES

Aim:

To detect the adulterants in the given samples.

Requirements:

Beakers, glass bowl, spoon and match box.



Materials required:

Given samples: pepper (A), honey (B), sugar (C), chilli powder (D), green peas (E) and water.

Procedure:

- Take 5 beakers with water and label it as A, B, C, D, E.
- Take samples A, B, C, D, E and add to the respective beaker.
- Observe the changes in each beaker.
- Record your observations.

Observation:

Sl. No.	Sample	Observation	Indication
1.	A		
2.	B		
3.	C		
4.	D		
5.	E		

VIII. IDENTIFICATION OF MICROBES

Aim:

To identify the different types of microbes (Bacteria and Virus).



Observation:

To observe the following with the help photograph/picture/permanent slide using a compound microscope/model/biovisual chart.

- Escherichia coli*
- Vibrio cholerae*
- Lactobacillus*
- Retrovirus (HIV)*

Answer the following:

- Draw a neat labelled diagram.
- Write the shape of the bacteria and virus observed.
- Mention the structural details of the bacteria and virus.
- Indicate its microbial importance/disease caused.



IX. ECONOMIC BIOLOGY

Aim:

To identify the plants and animals of economic importance.

Observation:

To observe the following using specimen/photograph/picture/model.

- a. **Biofertilizer** – *Rhizobium*
- b. **Medicinal plants** – Nilavembu, *Aloe vera*
- c. **Mushroom** - *Agaricus bisporus*
- d. **Indigenous cattle breed** - Umblachery
- e. **Indian major carp** - *Catla catla*
- f. **Type of Honey bees** - Queen bee, Worker bee



Answer the following:

- a. Draw a neat labelled sketch
- b. Write its economic importance

X. IDENTIFICATION OF ADAPTATIONS IN PLANTS

Aim:

To identify the given plant specimen and list out its adaptations

- | | | | |
|----|---------------------|---|-------------------------|
| 1. | Mesophytic plant | – | Tomato or Brinjal plant |
| 2. | Xerophytic plant | – | <i>Opuntia</i> |
| 3. | Aquatic plant | – | <i>Eichhornia sp</i> |
| 4. | Insectivorous plant | – | <i>Nepenthes</i> |



Observation:

The given plants are identified and the following adaptations are noted.

- 1.
- 2.
- 3.
- 4.
- 5.