Health Sciences

Practical Notebook

9

PECTAA
Transformation, Innovation and Excellence

PUNJAB EDUCATION, CURRICULUM, TRAINING
AND ASSESSMENT AUTHORITY

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Preface

Welcome to the fascinating and vital world of Health Sciences!

The Government of Punjab is dedicated to making education more practical and useful for your future. The Matric-Tech Stream is a special program designed to connect your school studies with the real-world knowledge and skills you will need to thrive.

The subject of "Health Sciences" has been created to empower you with essential life-saving skills and a deep understanding of human health. In a world where health awareness is more important than ever, this subject gives you a practical understanding of the human body, how to respond in medical emergencies, and the principles of well-being. This is knowledge that prepares you not just for a potential career in healthcare, but to be a responsible and helpful member of your family and community.

This Practical Notebook is your hands-on guide for this journey. It is the bridge that connects the theories you learn in the classroom with real-world actions. Through a series of practical activities, you will get the chance to learn by doing, which is the most powerful way to learn.

Key Features of this Practical Notebook include:

- ✔ **Perfectly Aligned:** Activities that match exactly what you need to learn in your Health Sciences class.
- ✔ **Life-Saving Skills:** Clear, step-by-step guides for crucial first aid procedures like CPR, wound dressing, and managing burns.
- ✔ **Hands-On Medical Science:** Opportunities to use and understand basic medical instruments like stethoscopes, pulse oximeters, and sphygmomanometers.
- ✔ **Explore Your Own Body:** Activities to measure your own vital signs, such as respiratory rate, heart rate, and lung capacity.
- ✔ **Visual Learning:** Simple experiments and models that make complex biological processes, like kidney filtration, easy to understand.
- ✔ **Safety First:** A strong emphasis on safety protocols and correct procedures for every activity.



Our goal with this notebook is to build your confidence, promote health awareness, and equip you with practical skills that could one day save a life. This is part of the Government of Punjab's promise to prepare you for meaningful careers and to help you build a healthier, safer, and more successful future.

We wish all students and teachers the very best as you use this valuable resource in your classrooms.

Chief Executive Officer
Punjab Education Curriculum Training
and Assessment Authority
Lahore

General Instructions

1. Remember that first aid activities are simulations. Never practice on a real injury.
2. Wear your complete school uniform or lab coat properly.
3. If you have long hair, make sure it is tied back securely.
4. Keep your hands clean and your fingernails trimmed.
5. Always bring your practical notebook, pen, and any other required items.
6. Be punctual and always come to the lab on time.
7. Listen carefully to your teacher's instructions before starting any activity.
8. Handle all models, mannequins, and lab equipment with great care.
9. Never eat or drink anything inside the lab.
10. Be gentle and respectful with your partner during all activities.
11. Work together as a team and help your classmates.
12. Respect the opinions of others, even if you disagree.
13. Do not take photos or videos of anyone without permission from the teacher and the student.
14. Never taste or smell any chemicals used in the experiments.
15. Wear safety goggles when your teacher tells you to.
16. Handle all electrical equipment, like nebulizers, with dry hands only.
17. Report any accident, spill, or broken equipment to your teacher immediately.
18. Tell your teacher right away if you feel unwell, uncomfortable, or do not understand something.
19. Clean your work area and put all equipment back in its proper place after you finish.
20. Wash your hands thoroughly with soap and water at the end of every lab session.



Contents

GUIDELINES FOR TEACHERS ON PRACTICAL WORK

Teachers are encouraged to teach various concepts through learner-centered activities that promote curiosity, inquiry, creativity and critical discussions through group work and collaboration. The purpose of lab work is to enhance critical thinking skills, experimental design and instrument handling. Students should learn the skills to use tools, devices and apparatus with care and while noting observations and taking readings, they should strive for accuracy and precision. Students should not demonstrate a casual attitude toward practical work but should be active, careful and prioritize safety for themselves and their peers in the lab.

Preparation for Practical Work in the Lab

To optimize the use of limited lab equipment in a school setting, teachers should organize students into groups of 4 to 5 and encourage individual participation in handling apparatus and taking readings. A group-wise practical schedule chart should be prominently displayed in the lab, assigning multiple experiments to keep all groups engaged. The chart should track progress and indicate which group is assigned to each experiment. The lab in-charge should prepare apparatus in advance with teacher assistance, if needed. Teachers should supervise and provide support during lab work, keeping records of students' progress and providing feedback in their practical notebooks.

Bimonthly Practical Based Assessment / Evaluation

Some bimonthly practical-based assessment papers are provided in the practical manual. The teacher may prepare additional papers following the same pattern if the need arises to overcome the shortage of available apparatus for each group. The teacher should move around to monitor and assess the students' performance by asking prompt questions about their practical work. The teacher should also conduct a Viva-Voce on the experiment they are performing and ask questions that enhance their critical thinking skills. If a student is stuck somewhere, the teacher may address the issue or provide hints to guide him / her back on the right track. Based on the performance record, the teacher can identify students with below-average performance and provide them with extra care and personal attention to help them overcome their shortcomings.



1 Practical Identify different parts of Gastrointestinal System on Models / Diagrams

Background Information

The gastrointestinal (GI) system, also known as the digestive system, is responsible for the digestion and assimilation of food and elimination of undigested matter from the body. Digestion is the process of breaking down food into nutrients which the body can absorb. The GI system consists of two main parts i.e., alimentary canal and the accessory organs.

The alimentary canal consists of mouth (oral cavity), pharynx, esophagus, stomach, small intestine (duodenum, jejunum, ileum), large intestine (colon, rectum), and anus. Each part plays a specific role in digestion, nutrients absorption, and the removal of undigested matter. Accessory organs include liver, pancreas, and gallbladder. They aid in digestion by producing digestive enzymes and bile.

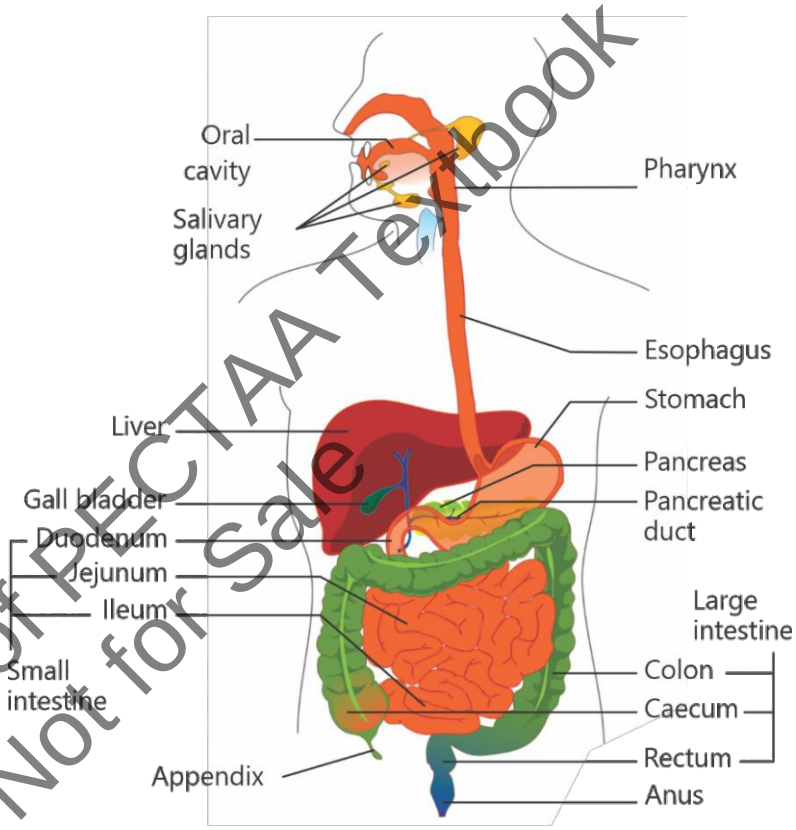


Figure 1.1: Human Gastrointestinal System

Materials / Apparatus Required

- Wall chart or 3D model of the human gastrointestinal system
- Practical notebook and pencil

Precautions

- Wash hands before and after touching the models.
- Do not mark the models or diagrams unless instructed.

Procedure

1. Observe the wall chart or 3D model of the human GI system provided by the teacher.
2. Identify and point out the following parts:
   - Mouth and oral cavity
   - Esophagus
   - Stomach
   - Duodenum
   - Jejunum
   - Ileum
   - Colon
   - Rectum and anus
3. Locate accessory organs i.e., Liver, Pancreas, and Gallbladder.
4. In your notebook, draw a neat diagram of the digestive system and label all the parts that you have identified.

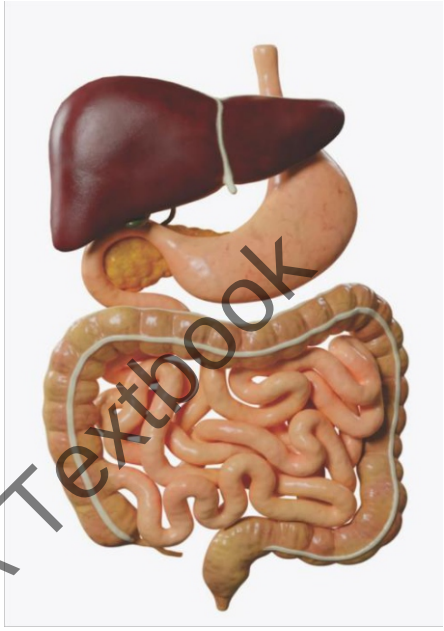


Figure 1.2: 3D Model of Human GI System

Observations

- Complete the following table based on your observations and background knowledge.

Parts Identified	Location in Body	Function Summary
Oral cavity		_____ _____
Pharynx		_____ _____
Esophagus		_____ _____
Stomach		_____ _____
Duodenum		_____ _____
Jejunum		_____ _____

Ileum		
Colon		
Rectum		
Liver		
Pancreas		
Gallbladder		

Draw you observation in the form a labeled diagram of human Gastrointestinal system.

During Ramadan, the digestive system gets a long rest during the day. That's why it's important to eat healthy, balanced meal at Iftar and not the fried foods. A balanced meal helps your system to restart gently.

If you could stretch out the small intestine of an adult, it would be about 6 meters (20 feet) long – that's taller than a giraffe!

Conclusions

_____

_____

Viva Voice

1. **Name any four major organs of the human digestive system.**

   Ans: Mouth, Stomach, Pharynx and Small intestine

2. **What is the function of the small intestine?**

   Ans: The small intestine is a long, coiled tube that plays a crucial role in digestion and nutrient absorption.

3. **Which organ stores bile?**

   Ans: Gall bladder stores bile.

4. **How does the stomach help in digestion?**

   Ans: The stomach is a muscular organ that churns food and mixes it with gastric juice. This juice contains hydrochloric acid (HCl) which kills bacteria, enzyme pepsin that breaks down proteins.

5. **A person has his gallbladder surgically removed. Justify why he should eat a low-fat diet?**

   Ans: He should eat low fat food because gallbladder play an important role in digestion of fats.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

2 Practical Demonstrate the Use of nebulizer to give medication to lungs

Background Information

Nebulization is a process by which liquid medicine in the form of a fine mist is administered to a patient (through breath). It helps treat breathing problems like asthma, bronchitis, and other lung diseases. A machine called a nebulizer pushes air through a tube into a cup that holds liquid medicine. The fast-moving air changes the medicine into a mist. This mist is breathed in through a mask or mouthpiece. The medicine goes straight to the lungs, where it is needed most, and gives quick relief. This method is helpful for young children, older people, or anyone who finds it hard to use a regular inhaler.

In spring, the air in Islamabad has a lot of pollen. This causes problems for people who have allergies. Many of them get symptoms like sneezing, runny nose, and difficulty in breathing. During this time, the use of nebulizers becomes very common in homes and hospitals.

Materials / Apparatus Required

- Compressor-type nebulizer
- Nebulizer kit containing medicine cup with a lid, face mask (child or adult size), and connecting tube
- Normal Saline Solution (0.9% NaCl) for demonstration (Note: No actual medication should be used)
- 5ml syringe or calibrated dropper
- Access to a power outlet
- Practical notebook and pencil

The "normal saline" we use for this activity is a simple salt-water solution. It has the same salt concentration (0.9%) as human tears and blood. That is why it is safe and doesn't sting when inhaled.

Figure 2.1: Parts of a Nebulizer

Precautions

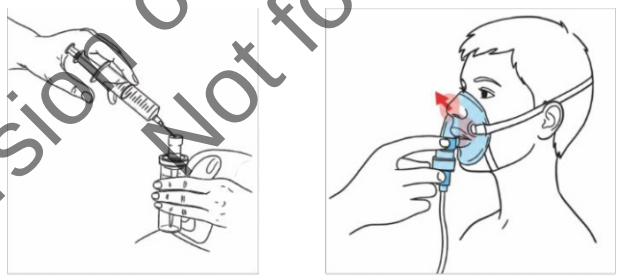
- Never use actual medication but use harmless normal saline only.
- Wash hands thoroughly with soap and water before and after handling the equipment.
- Ensure the nebulizer machine is placed on a stable, flat surface.
- Handle the machine with dry hands and keep it away from water to prevent electric shock.

In big cities like Lahore and Karachi, winter smog can be very dangerous for people with breathing problems. A nebulizer can deliver medicine directly to irritated lungs, providing quick relief when they face breathing problems.

Procedure

1. Wash hands. Connect the tube to the nebulizer machine and medicine cup.
2. Open the top of medicine cup. Pour 3 mL of normal saline into it using a syringe/dropper.
3. Attach the mask or mouthpiece to the cup.
4. Place the mask over a volunteer (or hold it in the air) to demonstrate how the mist is delivered.
5. Turn on the machine and allow the mist to be inhaled for about 5–10 minutes.
6. After the activity, turn off the machine and clean the parts properly.

The mist from a nebulizer has very tiny droplets, about 1 to 5 micrometers in size. Because the droplets are so small, the medicine can reach deep into the smallest airways of the lungs.



Filling the medicine cup — Placing the inhalation mask on nose and mouth

Figure 2.2: Demonstration of Nebulization Therapy

Observations

- Record your observations during the procedure:

What do you see coming out of the mask when the machine is on?	
Describe the appearance of the mist (e.g., dense, fine, smoke-like).	
What happens to the level of the saline solution in the cup after running the machine for a minute?	

Conclusions

_____

_____

Viva Voice

1. **Which liquid did we use in the medicine cup for this experiment? Why did we use it?**

   Ans: We use normal saline solution as it is safe.

2. **What is the function of the compressor machine?**

   Ans: It pushes air under pressure through liquid medicine breaking it into fine mist which can easily be inhaled in lungs.

3. **In which part of the kit, the liquid is turned into a mist?**

   Ans: The liquid is turned in mist in nebulizer chamber.

4. **Why might a doctor prescribe a nebulizer for a very young child with asthma instead of a handheld inhaler?**

   Ans: A doctor prescribe a nebulizer for a very young child as it easier, safer and more effective.

5. **A person using a nebulizer is told to sit upright and not lie down. Why is this important for effective treatment?**

   Ans: This position allows medicine to reach lungs properly.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

3 Practical: Measure how much air you can breathe in and out to check how well your lungs work

Background Information

The lungs are like two large, spongy inflatable bags located in the chest. They fill with air when we breathe in and vice versa. Total Lung Capacity (TLC) is the total amount of air our lungs can hold. For an average healthy adult, this is about 4 to 6 liters. In this activity, we will measure Vital Capacity (VC). Vital capacity is the maximum amount of air a person can breathe out after a maximal inhalation. For a healthy adult, the vital capacity is between 3 to 5 liters.A person's vital capacity can give us a clue about his lung health and fitness level.

The TLC and VC values can be very different from person to person and depend on factors like age, height, gender, and fitness level. Athletes, for example, often have a larger vital capacity. We will estimate our own vital capacity by blowing all that air into a balloon and then measuring the balloon's size.

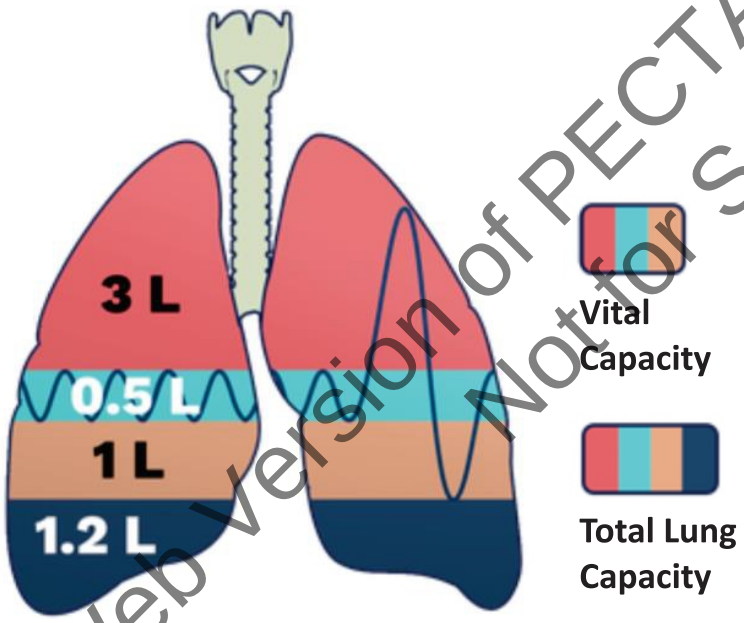


Figure 3.1: Total Lung Capacity and Vital Capacity

People living in the mountainous regions of Northern Pakistan, like Hunza and Skardu, often develop a larger lung capacity. Their bodies adapt to the "thinner" air (less oxygen) at high altitudes. They are able to take bigger breaths.

Materials / Apparatus Required

- Round party balloons (3 per student)
- Flexible measuring tape
- Calculator
- Practical notebook and pencil

Famous Qawwali singers, like the legendary Nusrat Fateh Ali Khan, need incredible lung power to deliver longer musical notes. Their training significantly increases their vital capacity over time.

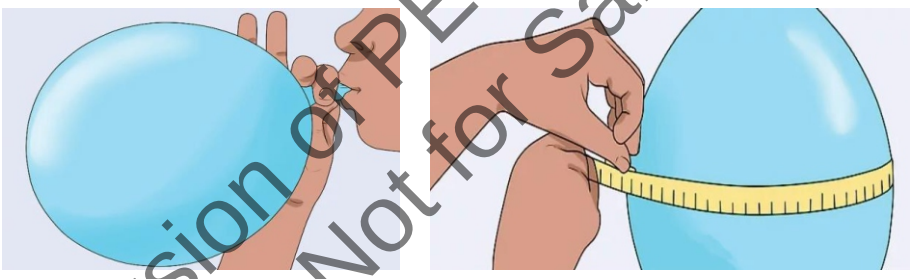
Precautions

- Any student with asthma, bronchitis, or other breathing problems should not perform this activity.
- Stop immediately if you feel dizzy or light-headed.
- Do not let any air escape from the balloon while you are pinching it closed.

Procedure

1. Stand up straight. Breathe in as deeply as you can. This will fill your lungs with the maximum amount of air.
2. Put the balloon to your lips and blow out all the air from your lungs into the balloon in a single breath. Do not take another breath.
3. Pinch the neck of the balloon tightly with your fingers so that no air escapes.
4. Measure the circumference (in cm) of the widest part of balloon using a measuring tape.

Many people believe that *sheesha* is safer than cigarettes, but this is not true. *Sheesha* is very harmful to the lungs. Just one session of *sheesha* cause harm to your lungs as much as caused by 100 cigarettes. It slowly reduces your lung capacity and makes your lungs weaker over time.



Blow out all air from your lungs into the balloon

Measure the circumference of the widest part of balloon

Figure 3.2: Pulmonary Function Test

5. Write down the measurement in your observation table. Perform the same procedure 2 more times (using a fresh breath each time).
6. Use your circumference measurements to calculate the volume of air in each trail.
   i. First, find the radius (r): Radius (r) = Circumference / (2 x 3.14)
   ii. Then, find the Volume (V): Volume (V) = (4/3) x 3.14 x r^3
7. The final answer will be in cubic centimeters (cm^3). Note that 1 cm^3 = 1 ml.

Observations

- Record your measurements in the table below:

Trial	Circumference of Balloon (cm)	Lung Capacity (mL)
1		
2		
3		
Average		

Conclusions

- Using a balloon, the estimated lung vital capacity was _____ ml.

Viva Voice

1. **What does a Pulmonary Function Test measure?**

   Ans: Pulmonary function tests assess the performance of the lungs. These tests measure lung volume, airflow, and the efficiency of gas exchange.

2. **What is "vital capacity"?**

   Ans: Vital capacity is the maximum amount of air a person can breathe out after maximal inhalation.

3. **Name two factors that can affect a person's vital capacity.**

   Ans: Age and height affect the person vital capacity

4. **If two students are the same age and height, but one plays football regularly and the other does not, what difference might you see in their vital capacity results?**

   Ans: The student playing football has high vital capacity.

5. **Why the TLC and VC values are different from person to person.**

   Ans: The TLC and VC values are different from person to person as it depends on factors like age, height, gender and fitness level.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

4 Practical: Check the breathing rate by counting how many breathe a person takes in one minute

Background Information

Respiratory rate is described as the number of breaths a person takes in one minute. One complete breath includes one inhalation (breathing in) and one exhalation (breathing out).

The normal respiratory rate for a healthy adult at rest is 12 to 20 breaths per minute. This rate can change based on the needs of the body. During exercise, our muscles work more and need more oxygen to make energy. The body also makes more carbon dioxide as waste. To handle this, the brain tells the lungs to breathe faster and deeper.

A newborn baby's resting respiratory rate is about 40-60 breaths per minute, almost three times faster than an adult. It is due to the fact that their bodies and lungs are much smaller than adults and they are growing rapidly.

Materials / Apparatus Required

- A stopwatch (or a mobile phone with a stopwatch function)
- A practical notebook and a pen/pencil
- An open space for light exercise

When a fast bowler like Shaheen Afridi runs in to bowl, his respiratory rate can jump from about 15 breaths per minute to over 40! His body needs this extra oxygen to power his muscles for that explosive delivery.

Precautions

- Any student with asthma, a heart condition, or other health problems should not perform the exercise part.
- Perform only light exercise (like jogging in place or star jumps). Stop immediately if you feel dizzy, sick, or experience any pain.

We often yawn when we are bored or sleepy, but a big reason for yawning is to take in a large amount of oxygen to cool down an overheating brain!

Procedure

This activity should be done in pairs. Your partner will measure your respiratory rate. Then, you will switch roles.

Part A: Measuring Respiratory Rate at Rest

1. Sit comfortably in a chair and relax for at least 2 minutes.
2. The partner will start the stopwatch. S/he will watch your chest or shoulders.
3. S/he will count the number of times the chest rises in exactly 60 seconds (1 minute). Each rise counts as one breath.
4. Record this number in the "At Rest" column of the observation table.

Part B: Measuring Respiratory Rate After Exercise

5. Perform a light exercise, such as jogging in place or doing star jumps, for 2 minutes.
6. Sit down immediately after the exercise.
7. The partner will start the stopwatch and count your breaths for 60 seconds (1 minute).
8. Record this number in the "After Exercise" column of the observation table.

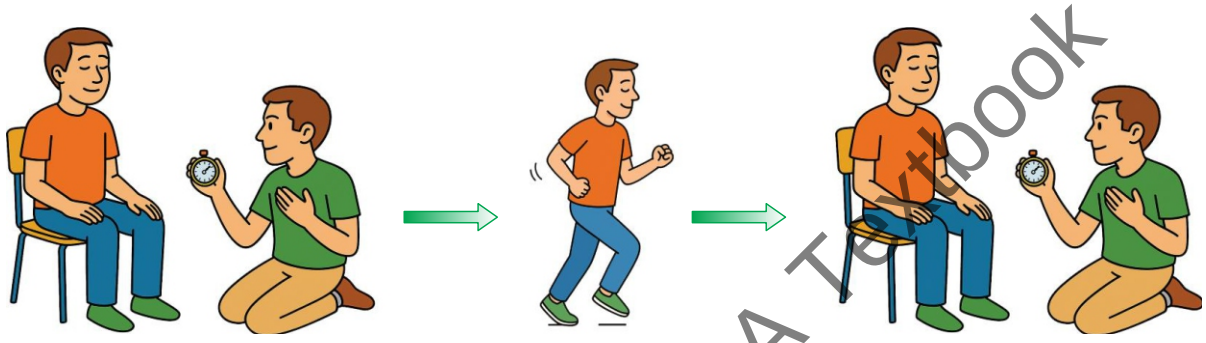


Figure 4.1: Assessment of Respiratory Rate

Part C: Switching Roles

9. Now, you will measure the respiratory rate of the partner.
10. Repeat Part A and Part B so that you have data for both partners.

Observations

- Complete the table with the data you and your partner collected.

Student's name	Respiratory Rate "At Rest" (breaths/minute)	Respiratory Rate "After Exercise" (breaths/minute)
Your name		
Partner's name		

Conclusions

- My respiratory rate at rest is _____ breaths/minute.
- After 2 minutes of light exercise, my respiratory rate increased to _____ breaths/minute.
- The increase in respiratory rate after exercise shows that:

_____

Viva Voice

1. **What is one complete breath?**

   Ans: One complete breath, or a respiratory cycle, is the full process of inhaling air into the lungs (inspiration) and then pushing that air out (expiration), driven by the diaphragm and rib muscles, bringing in oxygen and removing carbon dioxide for the body.

2. **What is the normal range of respiratory rate for adolescents?**

   Ans: For adolescents (typically 12-18 years), the normal respiratory rate is generally 12 to 20 breaths per minute (bpm).

3. **Did your breathing rate increase or decrease after exercise?**

   Ans: It increases after exercise.

4. **Why is it important to sit quietly for a few minutes before measuring the resting rate?**

   Ans: Any recent activity such as walking, talking, or changing posture can temporarily increase the breathing rate. Sitting quietly allows the body to return to its true resting state, ensuring the measurement is accurate and reliable.

5. **Besides exercise, name two other situations that might cause a person's respiratory rate to increase for a short time.**

   Ans: Pain and fever can increase respiratory system for a short time.

6. **If you check your breathing rate every minute after stopping exercise, what change do you expect in the respiratory rate?**

   Ans: It will gradually decrease with each passing time.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

5 Practical: Demonstrate the use of Stethoscope to listen sounds and identify any problems like wheezing or crackling

Background Information

A stethoscope is a medical instrument used to listen to the internal sounds of the body. It consists of three parts:

1. Earpieces
2. Tubing
3. Chest piece (Diaphragm)

The word 'stethoscope' comes from two Greek words: *stethos* meaning 'chest', and *skopos* meaning 'to examine'. So, stethoscope means a 'chest examiner'!

It works by amplifying (making louder) the small sounds made by the heart, lungs, and intestines. Listening to the sound of lungs (inside the body) is called auscultation.

Healthy lungs make a characteristic soft, rustling sound as air moves in and out. Doctors are trained to recognize this normal sound. When there is an infection (like pneumonia) or a blockage (like in asthma), the sounds change. Doctors can hear crackles (in pneumonia), wheezes (in asthma), or other unusual sounds. Such sounds help them diagnose health problems.

Pneumonia is a serious health problem for children in Pakistan. Doctors use a stethoscope to listen the sounds of lungs. If they hear a 'crackling' or 'bubbling' sound, it means there is fluid in the lungs, where only air should be. This helps doctors know the person might have pneumonia.

Materials / Apparatus Required

- Stethoscopes
- Alcohol swabs or cotton with rubbing alcohol
- Practical notebook and pen/pencil

Precautions

- Clean the earpieces with an alcohol swab before and after you use the stethoscope.
- Do not press the chest piece of stethoscope too hard against your partner's body.
- This activity should be done in a very quiet room.
- Students with any respiratory illness should not be checked by other students.

Procedure

This activity should be done in pairs. First, you will use stethoscope to listen the breathing sounds of the partner. Then you will switch the role.

1. Use alcohol swab and carefully wipe both earpieces of stethoscope.

2. Put the earpieces of the stethoscope into your ears. They should point a little forward, toward your nose so they fit properly inside your ears.
3. Gently tap on the diaphragm. Hear the tapping sound clearly. If not, twist the chest piece 180 degrees and tap again.
4. Ask the partner to sit on a chair, relaxed, with his/her back straight.
5. Ask the partner to breathe normally. Place the diaphragm of stethoscope on his/her upper back, between the shoulder blades.
6. Listen carefully through several full breaths.
7. Write down what you heard in the observation section.
8. Switch the roles. The partner will clean the earpieces again and will repeat the steps 2-6.

During allergy season in cities like Islamabad or on smoggy days in Lahore, doctors listen for a high-pitched whistling sound called a 'wheeze'. This sound tells that the patient's airways have become narrow, a common sign of asthma.

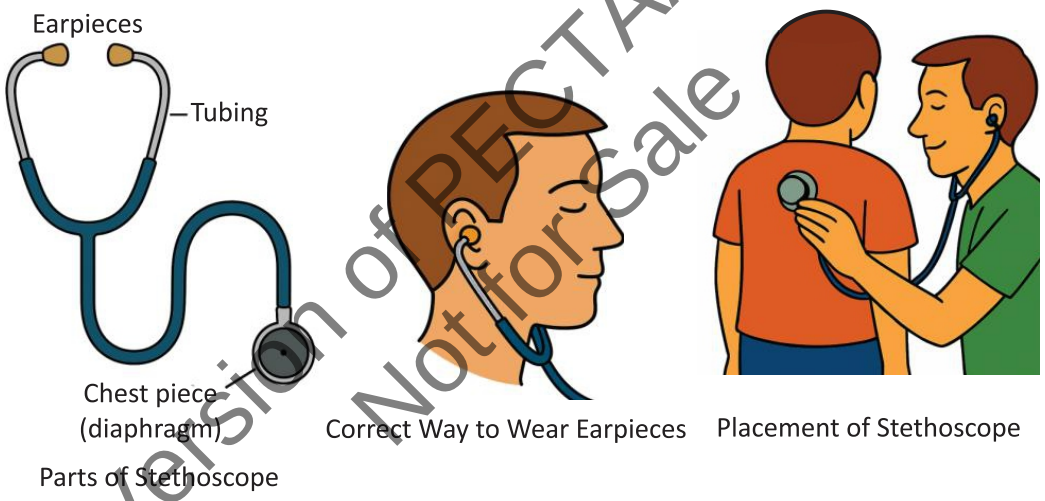


Figure 5.1: Stethoscope and its Use

Observations

- Describe the sound of normal breathing in your own words. (For example: was it loud or soft? a smooth sound or a rough sound? a "whoosh" or a "hiss"?)

_____

_____

Conclusions

_____

_____

Viva Voice

1. **What part of the stethoscope did you place on the partner's back?**

   Ans: Diaphragm of stethoscope is placed on partners back.

2. **Why is it important to clean the earpieces?**

   Ans: It is important to maintain hygiene and safety.

3. **Besides the lungs, what other major organ in the chest produces sounds that can be heard with a stethoscope?**

   Ans: The heart can produce sounds that can be heard with the stethoscope.

4. **Why is it better to place the stethoscope on the back to listen to lung sounds, rather than the chest?**

   Ans: It is better to place the stethoscope on the back to listen to lung sounds because the lungs are larger and closer to the back, especially the lower lobes where breath sounds are clearer.

5. **Imagine you are designing a stethoscope for a doctor who works with very small babies. What is one change you might make to the stethoscope's design and why?**

   Ans: If I were designing a stethoscope for a doctor who works with very small babies, one important change I would make a much smaller chest piece (diaphragm and bell) as babies have very small chests, so a smaller chest piece fits better.

6. **You listen to your partner's breathing and it sounds perfectly clear. One week later, they have a bad cold and you listen again. What difference might you expect to hear?**

   Ans: When your partner has a bad cold, the breathing sounds you hear with a stethoscope will be different from normal clear sounds. There may be wheezing, Crackles, rattling and thus less clear or muffled breath sounds compared to normal.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

Practical Based Assessment

INSTRUCTIONS FOR TEACHERS:

The teacher will divide students into groups and assign a specific practical to each group from given ones. Students are required to list the necessary apparatus, describe the procedure and note precautions. They should also record their observations in the Observation Table, if necessary. The teacher will conduct a Viva Voce with each student to evaluate their performance. The teacher will also provide guidance to students on any discrepancies in their work and award marks accordingly.

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Identify different parts of Gastrointestinal system on Models / Diagrams

Or

- Demonstrate the use of nebulizer to give medication to lungs

Q2: The student has to perform one experiment as per allotted by examiner. (12)

- Measure how much air you can breathe in and out to check how well your lungs work

Or

- Check the breathing rate by counting how many breathe a person takes in one minute

Q3: Viva voice (6)

Q4: Note book (5)

6 Practical

Demonstrate that exhaled air contains carbon dioxide by blowing air into lime water and observing the colour change.

Background Information

Respiration is a biochemical process in which glucose (or other food molecules) are oxidized to get energy. When we breathe in, we take in oxygen. Our cells use this oxygen to break down food and release energy. CO_2 is the gaseous waste product of this process. Our body gets rid of this gas when we breathe out (exhale).

Lime refers to calcium compounds commonly used in science and industry. When slaked lime i.e., calcium hydroxide ($Ca(OH)_2$) is dissolved in water, it forms a clear solution called limewater, We can use limewater as an indicator to prove that our breath contains CO_2. When CO_2 is passed through limewater, it reacts with $Ca(OH)_2$ to form calcium carbonate ($CaCO_3$).

The milky white chemical you make, called calcium carbonate, is the same material found in chalk, limestone, and the beautiful white marble used in buildings like the Faisal Mosque in Islamabad.

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

Calcium hydroxide	Carbon dioxide	Calcium carbonate	Water

Due to the formation of $CaCO_3$, limewater water turns cloudy or milky. This milky appearance proves that CO_2 has reacted with $Ca(OH)_2$. So, it is the positive test for carbon dioxide.

Materials / Apparatus Required

- Test tubes and test tube rack
- Freshly prepared lime solution
- A drinking straw
- A syringe
- Practical notebook and pen

Precautions

- Always wear safety goggles and gloves when handling lime or limewater, as it can be irritating to the skin and eyes.
- Do not drink limewater or splash it in your eyes. Wash your hands after experiment.
- When using the straw, blow gently into limewater. Do not suck it.

- Handle glassware carefully to avoid breakage.
- Use freshly prepared limewater solution. Old limewater may already be cloudy and will not give good result.

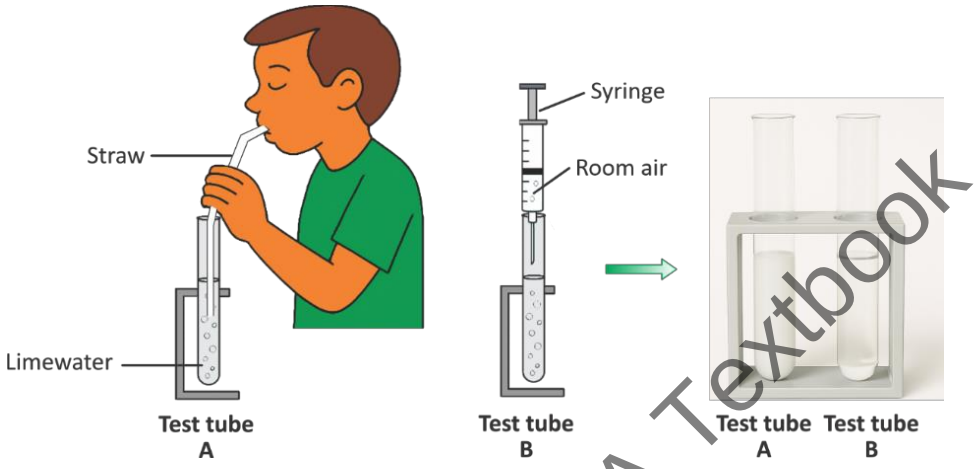


Figure 6.1: CO_2 & Lime Water Test

Procedure

1. Place two test tubes in the test tube rack. Label them 'A' and 'B'.
2. Pour about 2-3 mL of fresh, clear limewater into each test tube.
3. Place a clean straw into the limewater in test tube A.
4. Gently blow through the straw so that bubbles formed by your breath pass through the solution.
5. Continue for about 30 seconds, or until you see a distinct change.
6. Observe what happens to the limewater.
7. Test tube B is our control. Use a large syringe to pass normal room air through the limewater in test tube B.
8. Observe what happens. Note any changes (or lack of changes).
9. Compare the appearance of limewater in test tube A with test tube B. Record your findings in the observation table.

The fizz in your carbonated / soda drinks is made by forcing carbon dioxide gas into the liquid. It's the exact same gas you are bubbling through the limewater!

You have a special partnership with plants. You breathe out the carbon dioxide that plants use for photosynthesis. They release the oxygen that you use for respiration.

Observations

Test Tube	Air Source	Initial Appearance of Limewater	Final Appearance of Limewater
A	Exhaled Air (from lungs)	Clear and colorless	
B	Normal Air (from room)	Clear and colorless	

Conclusions

_____

_____

Viva Voice

1. **What is the chemical name for limewater?**

   Ans: The chemical name of Lime water is calcium hydroxide formula $Ca(OH)_2$.

2. **What color change in limewater shows a positive test?**

   Ans: The milky color will show a positive test .

3. **Why did the limewater in Test Tube A change but Test Tube B did not?**

   Ans: Test tube 'B' is our control so no change is observed.

4. **What is the chemical name of the milky-white substance that was formed?**

   Ans: The chemical name of milky white substance is Calcium carbonate.

5. **What is the purpose of the "control" (Test Tube B) in this experiment? Why is it important?**

   Ans: Control is used to compare results and ensure that the effect observed is due to independent variable only.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

7 Practical — Observe the Effect of Posture on Breathing.

Background Information

Posture is the way you hold your body when you sit, stand, or lie down. It has a big effect on breathing. The main breathing muscle is the diaphragm, which is a large muscle below lungs.

When you slouch, you press down on your chest. This gives your lungs less space to fill with air and stops your diaphragm from moving well. As a result, you start taking smaller and faster breaths. But when you sit up straight, your lungs and diaphragm have more space to work. This helps you breathe deeper and more efficiently.

Slouching after a big meal (like a tasty plate of *Nihari*!) can press down on your stomach and intestines. This can slow down digestion and make you feel more tired and bloated.

Materials / Apparatus Required

- A stopwatch (or a phone with a stopwatch function)
- A chair with a backrest
- Practical notebook and pen/pencil

Precautions

- If you have back pain or breathing problems, avoid the postures given in the procedure.
- When taking deep breaths, do it slowly. Stop if you feel dizzy.

Procedure

This activity will be done in pairs. First, one person will be observed, then you will switch roles.

1. Sit upright in a chair. Wait for 2 minutes to relax.
2. Your partner will use a stopwatch to count how many times you breathe in 1 minute. S/he will write down your breathing/respiratory rate.
3. Stand upright and your partner will measure your breathing rate after another 2 minutes.
4. Now, lie down on your back, relax for 2 minutes. The partner will record your breathing rate.
5. Take a slouched sitting posture and repeat the process.
6. Compare breathing rates across different postures.
7. Now it's your turn to measure the partner's breathing rates. S/he will take the same postures, and you will record his/her breathing rates.

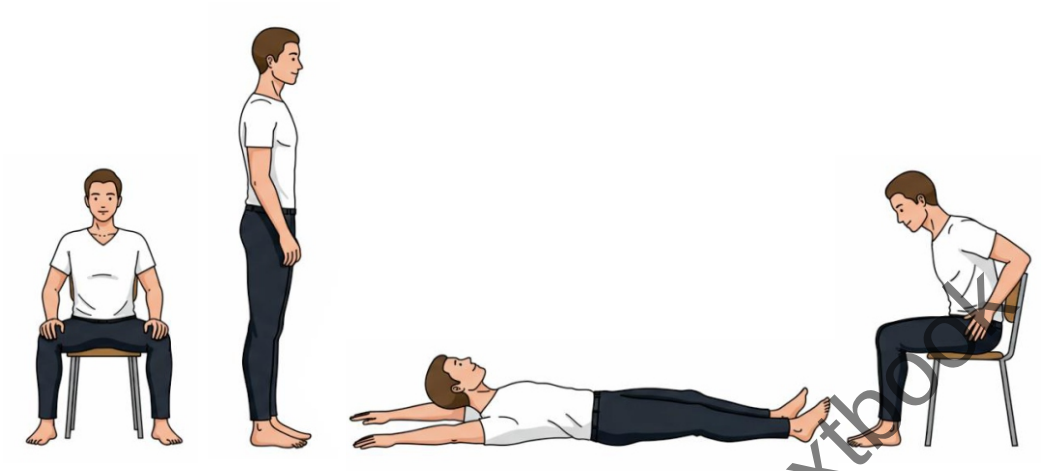


Figure 7.1: Different Postures

Observations

Posture	Partner's Name: _____		Your Name: _____	
	Breaths per Minute	Easy or Hard to Breathe?	Breaths per Minute	Easy or Hard to Breathe?
Sitting upright				
Standing upright				
Lying down (on back)				
Slouched sitting				

Conclusions

_____

_____

Viva Voice

1. **Which posture allowed the most comfortable breathing? Why?**

   Ans: The most comfortable breathing posture is upright sitting position.

2. **Why should we maintain good posture, especially when sitting for long periods?**

   Ans: Because it protects our body, improves breathing and prevent long term health problem.

3. **How does posture influence the function of the diaphragm?**

   Ans: It changes the space available for lungs and movement of diaphragm.

4. **What changes did you observe in breathing rate across postures?**

   Ans: Breathing rate is lowest in upright posture and increases in slouched or lying positions.

5. **Besides breathing, what is another problem that can be caused by sitting with bad posture for a long time?**

   Ans: Prolonged bad posture can cause musculoskeletal pain, poor circulation digestive problem, headache and fatigues.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

8 Practical — Demonstrate the working of Oxygen Concentrator and Oxygen Cylinder

Background Information

The air we normally breathe contains about 21% oxygen. People with lung or heart diseases cannot take required amount of oxygen from the air. There are two common ways to provide oxygen to such patients:

Oxygen Concentrator: This is an electric machine that takes in normal room air. It extracts oxygen from the air and provides to the user.

Oxygen Cylinder: This is a heavy metal tank filled with compressed oxygen. It needs to be refilled when empty.

For safety reasons, this activity will be a demonstration by the teacher. You will observe how these devices work.

When climbers try to reach the top of K2 or other very high mountains, they use oxygen cylinders. The air is too thin at that height, meaning there is very little oxygen, and the human body cannot survive for long without extra help.

Materials / Apparatus Required

- An oxygen concentrator and an oxygen cylinder
- A nasal cannula or an oxygen mask
- A beaker of water
- Practical notebook and pen

Precautions

- Students will watch from a safe distance. Do not touch any equipment.
- There must be no fire, sparks, or smoking near oxygen.
- Never use oil or grease on or near oxygen equipment.
- The heavy oxygen cylinder should be kept secure so it cannot fall over.

Procedure

1. The teacher will first show the oxygen concentrator and the oxygen cylinder. S/he will also show the nasal cannula (the tube for the nose).

Demonstration of Oxygen Concentrator:

2. The teacher will turn the Oxygen Concentrator on. You will hear it running.
3. The teacher will point to the flow meter. This part has a small ball that shows how fast the oxygen is flowing. The teacher will turn a knob to make the ball go up and down.
4. S/he will show you the humidifier. It adds moisture to the oxygen flow. So, the flow is more comfortable for patients to breathe.

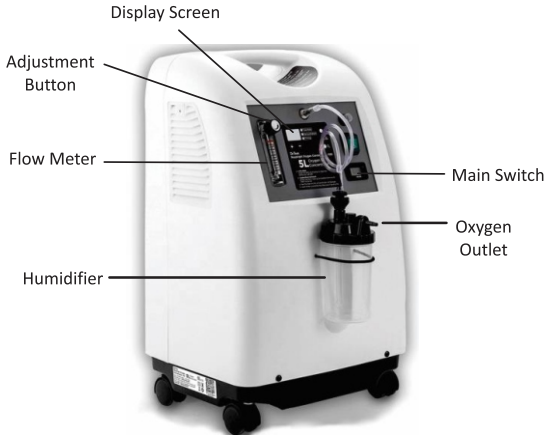


Figure 8.1: Oxygen Concentrator

Demonstration of Oxygen Cylinder:

5. The teacher will point to the pressure gauge. It is like a dial that tells how much oxygen is left in the tank.
6. S/he will show the humidifier. It adds moisture to the oxygen flow.
7. The teacher will carefully open the main valve. S/he will then adjust the flow meter.
8. The teacher will place the end of oxygen tube in a beaker of water. It proves that gas is flowing.
9. You will see bubbles rising in the water. This is the oxygen gas coming out of the tube.

Figure 8.2: Oxygen Cylinder

Observations

Fill in this table based on what you saw in the demonstration.

Question	Oxygen Concentrator	Oxygen Cylinder
Where does it get oxygen from?		
Does it need electricity?		
Does it need to be refilled?		
Does it make a sound?		

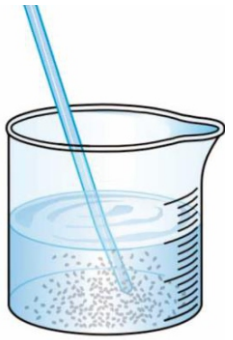


Figure 8.3: oxygen tube in a beaker of water

Conclusions

_____

_____

Viva Voice

1. **Which device (Oxygen cylinder or concentrator) needs electricity to work?**
   Ans: Oxygen concentrator needs electricity to work.
2. **What does the small ball in the flow meter show you?**
   Ans: The small ball shows how fast the oxygen is flowing.
3. **How do you know how much oxygen is left in a cylinder?**
   Ans: The pressure gauge tells how much oxygen is left in a cylinder.
4. **Oxygen cylinder has a pressure gauge but oxygen concentrator does not have it. Why?**
   Ans: Oxygen cylinder stores oxygen gas as it has high pressure so pressure gauge is needed but oxygen concentrator not store oxygen so gauge is not required.
5. **What is the biggest safety rule when you are near oxygen?**
   Ans: There must be no fire, sparks or smoking near oxygen.
6. **Which device, a cylinder or a concentrator, is better for an ambulance? Explain why.**
   Ans: Oxygen cylinder is better as it provides oxygen as required.
7. **Hospitals have a system of pipes to deliver oxygen to rooms, instead of using cylinders. Why?**
   Ans: It is more safer, reliable and efficient.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

9 Practical: Demonstrate the working of Suction Machine to clear Airway

Background Information

Sometimes, patients (especially those who are unconscious) cannot clear their airways by coughing. In these cases, a suction machine is used to remove mucus, saliva, or blood from the airway so the patient can breathe properly. Using a suction machine is an important emergency and nursing care skill.

A suction machine uses negative pressure (a vacuum) to pull fluids out of a person's mouth and throat through a flexible plastic tube called suction catheter. This catheter transfers the sucked fluid into a collection container.

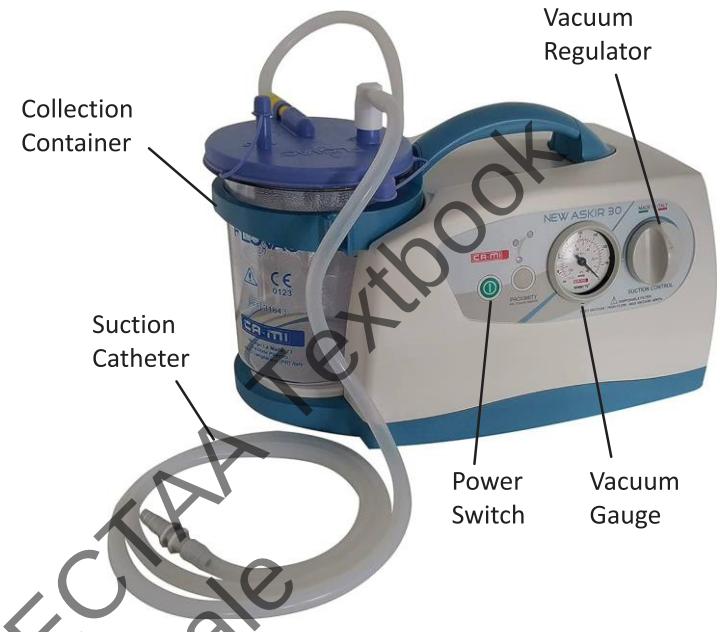


Figure 9.1: Portable Suction Machine

Materials / Apparatus Required

- A portable suction machine
- A beaker with colored water
- A few small, soft pieces of paper mixed in the water
- Disposable gloves
- Practical notebook and pen

Have you ever seen an ambulance of Rescue 1122 or Edhi Foundation? It almost always has a portable suction machine inside. This machine is very important for paramedics to clear a patient's airway during an accident or emergency.

Precautions

- This machine is never used on a healthy person. Do not attempt to use it on anyone.
- In a real situation, the person using the machine must wear gloves.
- The suction catheter is sterile and used only once.

Procedure

Your teacher will perform this demonstration. Your role is to watch carefully and understand the process. The teacher will explain the function of each part of suction machine.

1. The teacher will wear gloves and a mask and set up the

A suction machine is the exact opposite of a nebulizer. A nebulizer pushes fine mist into the lungs, while a suction machine pulls unwanted fluid out of the airway.

machine:

2. S/he will connect tubing from the machine to the collection jar.
3. The teacher will attach a sterile suction catheter to the tubing.
4. S/he will test the machine by dipping the catheter in clean water and turning on the suction.
5. S/he gently will insert the catheter into the mannequin's mouth.
6. S/he will apply suction is applied by slowly pulling the catheter back out.
7. The catheter will be then rinsed in clean water.
8. S/he will turn off the machine and will explain the disposal of used materials.

The vacuum power of a suction machine is carefully controlled. If it's too weak, it won't clear the blockage. If it's too strong, it can damage the delicate tissues of the throat. Doctors adjust the power based on the patient's age and needs.

Observations

Fill in this table based on what you saw in the demonstration.

Observation Point	Student Notes
What sound did the machine make when it was turned on?	
Use of gloves and mask	
How suction was applied and withdrawn?	
Time taken for suction	
How equipment was cleaned/disposed?	

Conclusions

_____

_____

Viva Voice

1. **What does a suction machine do?**

   Ans: It is used to remove mucus, saliva or blood from the air way of the person.

2. **Why must the suction catheter be soft?**

   Ans: It prevent tissue injury.

3. **What is the purpose of the collection container? Why is it usually clear or transparent?**

   Ans: It collects secretion and the transparent helps to identify the amount of fluid to be easily monitored.

4. **Why is a suction machine especially important for a patient who is unconscious after an accident?**

   Ans: These patient cannot cough or swallow so saliva or mucus can be collected in the air way.

5. **A person just has a simple cough from a cold. Should you use a suction machine on them? Why or why not?**

   Ans: He cannot use suction machine because he can cough and can clear the secretions naturally.

6. **Justify the fact that suctioning can be dangerous if done for too long.**

   Ans: Prolonged suctioning can remove air along with secretions reducing oxygen supply to lungs.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

10 Practical Measure the oxygen levels in blood using the Pulse Oximeter

Background Information

Our blood carries oxygen to all parts of body. The oxygen is carried by the hemoglobin present in red blood cells.

A pulse oximeter is a small, smart device that can see how much oxygen your blood is carrying. It shines a special light through our finger to check how "full" your red blood cell are with oxygen. The result is a percentage called Oxygen Saturation (SpO_2). For a healthy person, this number should be 95% or higher.

Figure 10.1: Fingertip Pulse Oximeter

Pulse oximeter also shows our Pulse Rate (PR), which is how many times our heart beats in one minute. Normal PR at rest is between 60 and 100 beats per minute.

Materials / Apparatus Required

- A fingertip pulse oximeter
- Alcohol swabs
- A stopwatch (or phone with a stopwatch)
- Practical notebook and pen

An oximeter works by shining a special red light through your finger. A sensor on the other side checks the color of your blood.

If your blood is bright red, it has more oxygen. If it is darker, it has less oxygen.

Precautions

- For a good reading, you must be still and relaxed.
- The device may not work correctly if you are wearing dark nail polish.
- Clean the inside of oximeter with an alcohol swab before and after use.

Procedure

Part 1: Measuring at Rest

1. Sit comfortably on a chair. Relax for one or two minutes.
2. Clean the inside part of pulse oximeter with an alcohol swab.
3. Press the button to turn on the oximeter. Gently open the clip and place it on your index finger (your pointing finger). Your fingernail should face up.
4. Keep your hand still. Wait a few seconds for the numbers on screen to become steady.
5. Read the two numbers on the screen: SpO_2% (oxygen) and PR (pulse).

6. Write these numbers down in the "At Rest" section of your observation table.

Figure 10.2: Use of Pulse Oximeter

Part 2: Measuring After Exercise

7. Take the oximeter off your finger.
8. Stand up and do a light exercise (like jogging in place or doing star jumps) for 1 minute.
9. Immediately after you stop, sit down and put the oximeter back on your finger.
10. Stay still and wait for the numbers to become steady again.
11. Read the new SpO_2 and Pulse Rate. Write them in the "After Exercise" section of your observation table.

Dark nail polish, especially black, blue, or green, can block the light from the oximeter and give a wrong reading. It's like trying to see through a painted window!

Observations

Fill in the table with your own results.

Measurement	At Rest	After Exercise
Oxygen Saturation (SpO_2 %)		
Pulse Rate (PR beats/min)		

Conclusions

After exercise, my pulse rate _____ (increased/decreased), while my oxygen saturation level _____ (stayed the same/increased/decreased).

Viva Voice

1. **What part of your blood carries oxygen?**

   Ans: Hemoglobin in the blood carries oxygen.

2. **What are the two measurements that a pulse oximeter gives?**

   Ans: The two measurements are oxygen saturation and pulse rate.

3. **What is a normal SpO_2 number for a healthy person?**

   Ans: 95% is a normal SpO_2 number for a healthy person.

4. **Why does your pulse rate go up when you exercise?**

   Ans: It goes up due to faster heart beat which pumps more blood to muscles.

5. **A patient in a hospital has a SpO_2 of 89%. Is this good or bad? What does it mean?**

   Ans: It is low and not normal which is bad.

6. **People who climb very high mountains sometimes need to carry oxygen tanks. What can happen to their SpO_2 reading at the top of the mountain without extr a oxygen?**

   Ans: The SpO_2 can fall below the normal level that is 80% to 85%.

7. **How is pulse oximeter a more useful than just checking the pulse with fingers on wrist?**

   Ans: The pulse oximeter is more useful as it gives accuracy.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

Practical Based Assessment

INSTRUCTIONS FOR TEACHERS:

The teacher will divide students into groups and assign a specific practical to each group from given ones. Students are required to list the necessary apparatus, describe the procedure and note precautions. They should also record their observations in the Observation Table, if necessary. The teacher will conduct a Viva Voce with each student to evaluate their performance. The teacher will also provide guidance to students on any discrepancies in their work and award marks accordingly.

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Demonstrate that exhaled air contains carbon dioxide by blowing air into lime water and observing the colour change.

Or

- Demonstrate the working of Oxygen Concentrator and Oxygen Cylinder

Q2 : The student has to perform one experiment as per allotted by examiner. (12)

- Demonstrate the working of Suction Machine to clear Airway

Or

- Measure the oxygen levels in blood using the Pulse Oximeter

Q3: Viva voice (6)

Q4: Note book (5)

11 Practical Measure the heart rate by Checking the pulse at different points on the body

Background Information

With every heartbeat, the heart pushes blood through the body. This push creates a small wave or "thump" in the arteries, called a pulse. We can feel the pulse by placing our fingers on an artery that is thumping.

The pulse shows the speed, rhythm, and strength of the heartbeat. You can feel the pulse in different parts of the body. These places are called pulse points. Common pulse points are the wrist, neck, inside of the elbow, and the top of the foot.

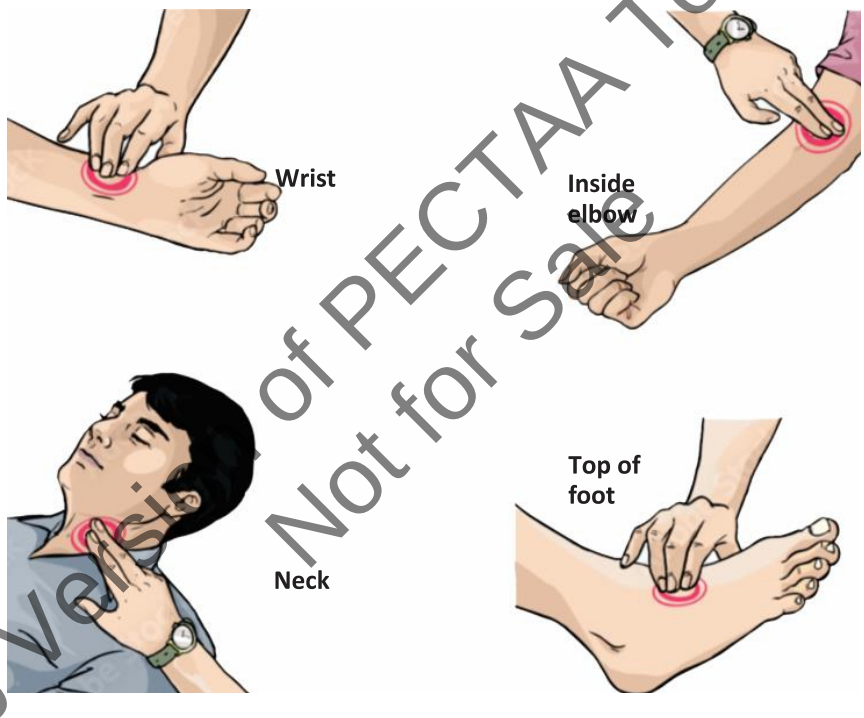


Figure 11.1: Common Pulse Points

Materials / Apparatus Required

- Diagram/chart of human pulse points
- Practical notebook and pen

Precautions

- Using your thumb can confuse you because the thumb has own small pulse. Always use your first two fingers.
- If you check the pulse in your neck, do not press too hard.

Procedure

Part 1: Finding the Wrist (Radial) Pulse

1. Sit comfortably and place one arm on a table, with your palm facing up.
2. Use the first two fingers of your other hand. Place fingers on the thumb side of wrist just below the base of palm. Press gently until you feel a steady beat.

Traditional doctors in Pakistan called *Hakims* check the pulse at the wrist *(Nabz)*. They believe they can feel not just the speed, but the quality and rhythm of the pulse. In this way, they can know a person's overall health.

Part 2: Finding the Neck Pulse

3. Take your two fingers and place them on the side of your neck, in the soft groove next to your windpipe.
4. Press very gently until you feel the pulse. This pulse may feel stronger than the one in your wrist.

Part 3: Finding the Inside Elbow Pulse

5. Straighten your arm out on the table, palm facing up.
6. Feel the crease on the inside of your elbow. Place your two fingers just to the inner side (the pinky finger side) of the center of this crease.
7. Press a little more firmly than on your wrist. You should feel the beat of an artery.

Part 4: Finding the Top of Foot Pulse

8. Take off your shoe and sock. Sit with your foot relaxed.
9. Place your two fingers on the top, bony part of your foot. Imagine a line running down from the space between your big toe and your second toe.
10. Use a very light touch. This pulse can be difficult to find. Be patient.

The pulse on top of the foot is very important for doctors, especially when checking diabetic patients. By feeling this pulse, doctors can check if blood is flowing properly to the feet. If the blood flow is not good, it can cause serious problems in people with diabetes.

Observations

Fill in this table about your experience.

Pulse Point Tried	Could You Feel the Pulse?	How Strong Was It? (Strong/Weak)
Wrist	Yes / No	
Neck	Yes / No	
Inside Elbow	Yes / No	
Top of Foot	Yes / No	

Conclusions

_____

_____

Viva Voice

1. **Name the four pulse points you searched for in this activity.**

   Ans: The four pulse points are wrist, neck, inside elbow and top of foot.

2. **Which pulse point was the easiest for you to find?**

   Ans: The easiest pulse point is wrist.

3. **Which pulse point was the hardest to find?**

   Ans: The hardest pulse point is top of foot.

4. **Why the pulse in the neck is often stronger than the pulse in the foot?**

   Ans: The carotid artery in the neck is very close the heart so the pressure wave from each heart beat is stronger.

5. **Why must you be very gentle when feeling for the pulse in your neck?**

   Ans: We must be very gentle because the neck contain the sensitive area which is carotid sinus.

6. **A doctor is checking a patient with diabetes to make sure there is good blood flow to their feet. Which pulse point would be most useful to check?**

   Ans: The pulse of the foot is best point to check.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

12 Practical — Measure the number of heart beats per minute during rest and after exercise

Background Information

Each single heartbeat creates one single pulse in our arteries. Therefore, pulse rate is exactly the same as the heart rate (the number of beats per minute). The normal heart rate for a healthy person is about 60 to 100 beats per minute (bpm) when resting. The rate goes up after exercise.

When you feel scared, excited, or nervous, your heart beats faster. Your brain releases a hormone, which acts like an accelerator pedal for your heart.

Materials / Apparatus Required

- A stopwatch (or a mobile phone with a stopwatch)
- Practical notebook and pen

Precautions

- Do not use your thumb to feel a pulse. Always use your first two fingers.
- If you check the pulse in your neck, do not press too hard.
- During exercise, stop immediately if you feel any pain or dizziness.

Procedure

You will work in pairs. First, one person will be measured, and then you will switch roles.

Part 1: Finding Your Heart Rate at Rest

1. Sit down on a chair and relax for one or two minutes.
2. Place your two fingers at the base of your partner's wrist, on the side of his/her thumb. Press gently until you feel a steady beat.
3. Start the stopwatch and count the number of beats you feel for exactly 30 seconds.
4. Multiply the number you counted by 2. This is the heart rate bpm.
5. Write this number down in the "At Rest" section of the observation table.

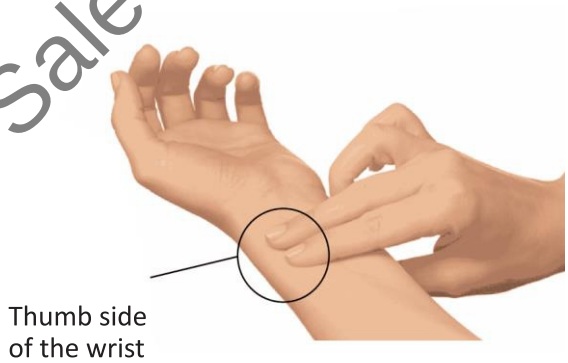


Figure 12.1: Measurement of Pulse/Heart Rate

Part 2: Finding Your Heart Rate After Exercise

6. Now, your partner will do a light exercise (like jogging in place) for 1 minute.
7. Immediately after s/he stops and sits down, find his/her wrist pulse again.
8. Count the beats for 30 seconds, just like before.
9. Calculate the new heart rate (your number x 2) and write it in the "After Exercise" section.

The smallest bird has the fastest heartbeat! A hummingbird's heart can beat over 1,200 times per minute. In contrast, the giant blue whale has the slowest heartbeat, at only 4-8 beats per minute.

Part 3: Switch Roles

10. Now it's your turn to be measured! Your partner will follow steps 1-9 for you.

Observations

Fill in the table with the data for you and your partner.

Student's Name	Heart Rate at Rest (bpm)	Heart Rate After Exercise (bpm)
Partner's Name		
Your Name		

Conclusions

_____

_____

Viva Voice

1. **What is a pulse?**

   Ans: A single heart beat is called a pulse.

2. **Which two fingers should you use to find a pulse?**

   Ans: The first two fingers are used to find the pulse.

3. **Did your heart rate go up or down after exercise?**

   Ans: Yes, heart rate go up or down after exercise.

4. **A doctor checks a patient's pulse for 15 seconds and counts 20 beats. What is the patient's heart rate in bpm?**

   Ans: The heart beat is 80 bpm.

5. **Why is it important not to use your thumb to check the pulse?**

   Ans: We cannot use our thumb to check the pulse because it has its own small pulse.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

13 Practical Use of Stethoscope to listen Heart Sounds

Background Information

Our heart is a pump. It makes a special sound with every beat. This sound actually consists of two sounds: "lubb-dubb." This sound is made by the valves present inside the heart.

- The first sound, "lubb," happens when the first set of valves (the tricuspid and mitral valves) slams shut.
- The second sound, "dubb," happens right after, when the second set of valves (the aortic and pulmonary valves) slams shut.

Doctors are trained to listen to this sound. If the sound is different (like a "whoosh" or a click), it can be a sign of a problem with the heart valves.

The "Lubb-dubb" sound is not the sound of heart muscle beating. It is the sound of the heart's four valves (like little doors) closing.

The "Lubb" sound comes from the first set of valves closing. The "Dubb" comes from the second set of valves closing right after.

Materials / Apparatus Required

- Stethoscope
- Alcohol swabs
- Practical notebook and pen

Precautions

- Always clean the earpieces of stethoscope with an alcohol swab before use.
- This activity requires placing the stethoscope on your partner's chest. Do this gently. There is no need to touch the skin.
- You need a very quiet room to hear the heart sounds clearly.

If a heart valve doesn't close properly, it can leak a little bit of blood. This leak creates a soft 'whoosh' or 'hissing' sound between the "lubb" and the "dubb." It's like the sound of air leaking from a tyre.

Procedure

You will work in pairs. First, you will be the "Listener". Then you will switch the roles.

1. Clean the earpieces of stethoscope with an alcohol swab.
2. Put the earpieces in your ears. They should point a little forward, towards your nose.
3. Your partner will sit on a chair, relaxed.
4. Gently place the diaphragm of stethoscope on the left side of his/her chest over shirt, almost directly under the breast.
5. Try to hear the "lubb-dubb... lubb-dubb..." rhythm.
6. Write down what you heard. Then, switch the roles. Now, your partner will clean the earpieces again before using the stethoscope.

Figure 13.1: Wearing the Earpieces of Stethoscope

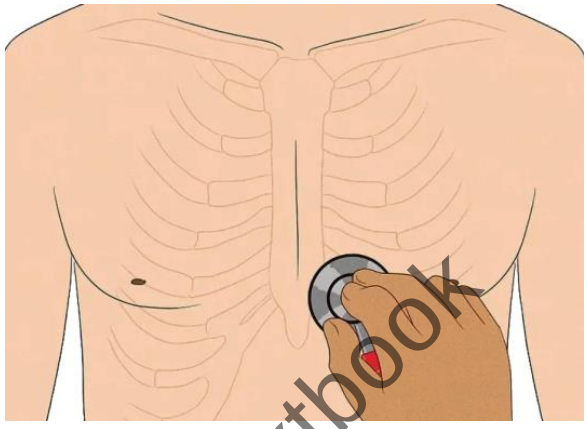


Figure 13.2: Spot for Listening Heart Sounds

Observations

Fill in the table with the data for you and your partner.

Student's Name	Could you hear the "lubb-dubb" sound? (Yes/No)	Describe the sound in your own words. Was it fast or slow? Loud or soft?
Your Name		
Partner's Name		

Conclusions

_____

_____

_____

_____

Viva Voice

1. **What is the normal sound of a heartbeat called?**

   Ans: The normal sound of a heartbeat is called “lubb-dubb”.

2. **What part of the heart makes this sound?**

   Ans: Valves of the heart makes this sound.

3. **On which side of the chest did you place the stethoscope to hear the heart?**

   Ans: The stethoscope is placed on the left side of the chest to hear the heart.

4. **If you listen to your partner's heart after they have done some exercise, what two changes would you expect to hear in the "lubb-dubb" sound?**

   Ans: The “lubb-dubb” sound will be stronger and there will be shorter pause between the beats.

5. **Why must the room be very quiet for this experiment?**

   Ans: To listen the sound clearly.

6. **How is listening to the heart different from listening to the lungs?**

   Ans: The listening of the heart is different from listening to the lungs because their sounds, purpose and technique are not same.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

14 Practical Use a Sphygmomanometer to measure blood pressure

Background Information

Blood pressure is the force of blood pushing against the walls of our arteries. Heartbeat consists of two phase. During systole, the heart muscles contract to push blood. During diastole, they relax to pull blood. This is the reason that there are two pressures:

- **Systolic Pressure:** This is the pressure when our heart squeezes to pump blood out into the arteries. It is the higher number.
- **Diastolic Pressure:** This is the pressure when heart muscles relax to allow its chambers to fill with blood again. During this phase, the pressure in arteries drops.

Blood pressure is written as two numbers, one over the other — like 120/80. This is a healthy blood pressure for most young adults. The machine used to measure it is called a sphygmomanometer. It has:

- a cuff for the arm
- a rubber pump
- and a glass tube (called mercury column)

When we pump air, the silver line of mercury goes up to show the pressure. Some modern sphygmomanometers have a pressure gauge instead of mercury.

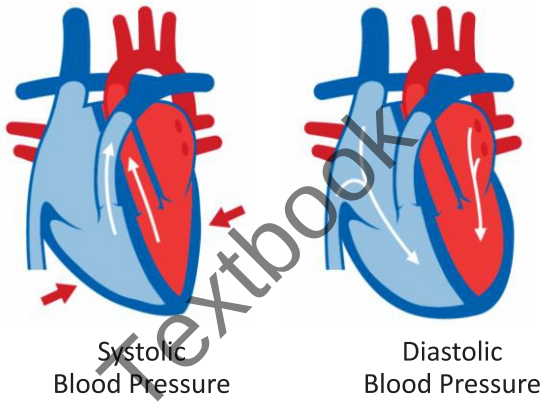


Figure 14.1: Status of Heart during Systolic and Diastolic Blood Pressures

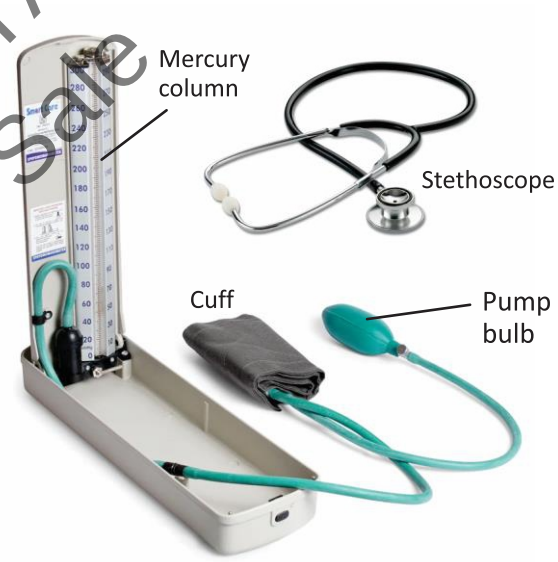


Figure 14.2: Sphygmomanometer & Stethoscope

Materials / Apparatus Required

- A mercury sphygmomanometer
- A stethoscope
- Alcohol swabs
- Practical notebook and pen

"Sphygmomanometer" is a long Greek word. "***Sphygmos***" means 'pulse', and "***manometer***" means a device that measures pressure. So, the word means "pulse pressure meter."

Precautions

- This activity must be done under the direct supervision of teacher.
- The device must be kept flat and stable on the table, as mercury is toxic if spilled.
- Make sure the mercury lock is open before you start and locked after you finish.
- Students with known high blood pressure, heart conditions, or arm injuries should not have their blood pressure taken. They can be the operator.
- Do not inflate the cuff higher than 160 mmHg for this practice.

Procedure

You will work in pairs. First, you will measure the blood pressure of the partner. Then, you will switch the roles.

1. Your partner will sit on a chair, relax, and put his/her arm on a table, palm up.
2. Wrap the cuff around his/her upper arm. It should be one inch above the elbow on his/her bare upper arm. Ensure that it's not too tight and there is space underneath.
3. Clean the stethoscope earpieces and place them in your ears. Then, place the flat part of the stethoscope on the inside of the partner's elbow.
4. First, you must make sure the mercury lock is open so the mercury can move.
5. Close the valve of the pump bulb (turn the screw clockwise).
6. Pump air into the cuff while watching the silver mercury column rise. Stop pumping when the top of the mercury reaches 160.
7. Listen and watch. Your eyes should be at the mercury column.
8. Slowly open the valve (turn the screw counter-clockwise) to let the air out. The mercury will begin to fall slowly.
9. Listen very carefully for the first "thump" sound. The number on the scale next to the top of mercury column at this moment is the systolic pressure.
10. Keep removing the air from cuff and keep listening. The moment when "thump" sound disappears, the number next to the top of the mercury is the diastolic pressure.
11. Quickly release all the remaining air, remove the cuff, and lock the mercury device. Record the numbers.
12. Now, it's your partner's turn to measure your blood pressure. S/he will follow the above steps.

This classic device uses mercury because it is a very heavy, dense liquid that responds accurately to pressure changes. But, since mercury is toxic, most hospitals now use newer dial or digital models.

High blood pressure (hypertension) is a very common problem in Pakistan, partly because of our love for delicious but salty foods like biryani, pickles (achaar), and snacks.

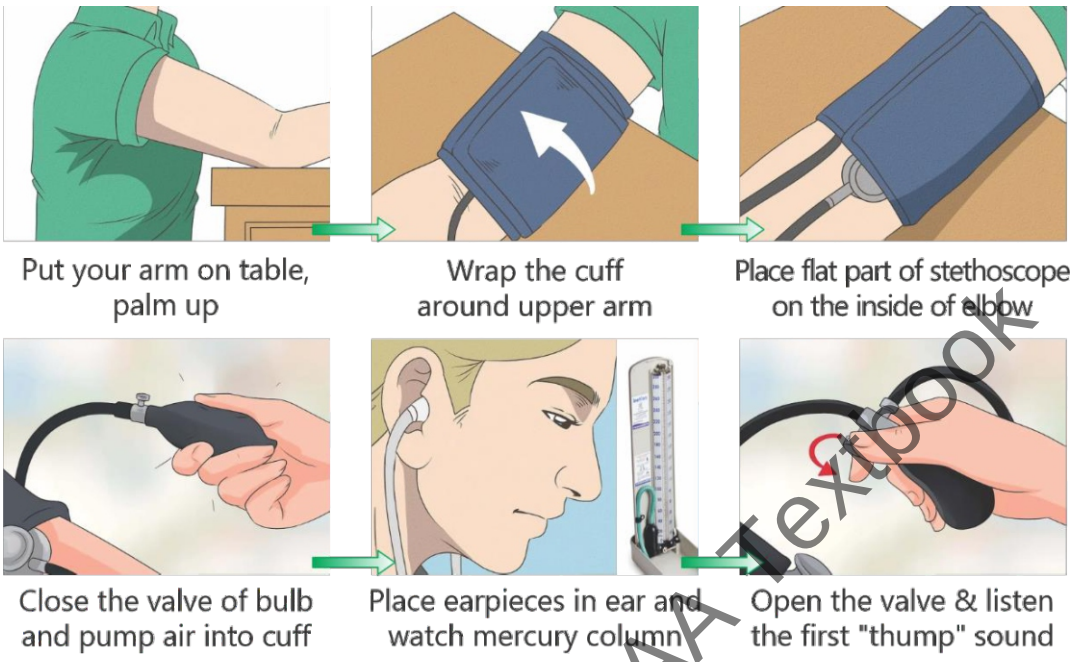


Figure 14.3: Set-up for using Mercury Sphygmomanometer

Observations

- Record the results for both you and your partner.

Student's Name	Systolic Pressure (mmHg)	Diastolic Pressure (mmHg)	Final Reading
Your Name			/
Partner's Name			/

Conclusions

_____

_____

Viva Voice

1. **What are the two numbers in a blood pressure reading?**

   Ans: The two numbers in blood pressure reading are 120 and 80mmHg Systolic and diastolic pressure.

2. **What is normal blood pressure?**

   Ans: The normal blood pressure is 120/80 mmHg

3. **Why do you need a stethoscope for this procedure?**

Ans: It helps to hear korotkoff sounds.

4. **Why must you release the air from the cuff slowly?**

   Ans: We must release the air from the cuff slowly for accurate reading.

5. **Why is it important to keep a mercury sphygmomanometer flat and stable?**

   Ans: It is liquid column and its level depends on gravity.

6. **Why is it important to use a cuff that is the right size for the person's arm?**

   Ans: If the cuff is too tight or narrow it will compress the artery too much.

7. **Many hospitals are replacing mercury sphygmomanometers with digital ones. What could be the main reason for this change?**

   Ans: Mercury is toxic and if it spills it is hazardous so it is replaced by digital one.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

15 Practical Develop a model to demonstrate of Kidney Filtration

Background Information

Our kidneys are the cleaning filters for our blood. Kidneys remove waste products (like urea) and extra water from the blood to make urine. The tiny filtering units inside your kidneys are called nephrons.

During, the filtration of waste products and extra water, kidneys keep important materials like blood cells and proteins in the blood. In this group activity, your will build a model to see exactly how kidneys do filtration.

Your two kidneys filter about 180 liters of blood every single day! That's enough to fill more than 20 large water cooler bottles. But don't worry, they reabsorb 99% of the water, so you only produce 1-2 liters of urine.

Materials / Apparatus Required

- A plastic funnel
- A coffee filter paper (or regular filter paper)
- A beaker or glass jar and a spoon
- Water and red food coloring
- Salt and Red beans
- Practical notebook and pen

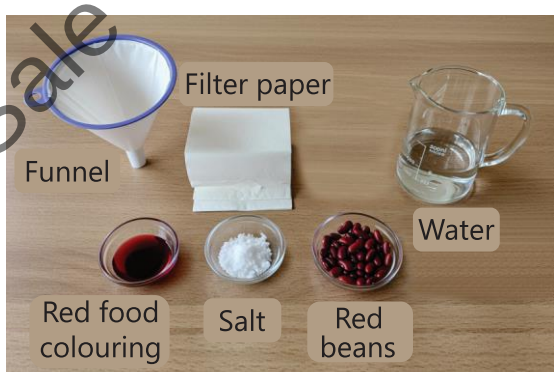


Figure 15.1: Materials for making Kidney Filtration Model

Precautions

- Work together as a group and be careful with the glassware (beaker/jar).
- Perform the activity on a tray to keep the table clean.
- Do not eat any of the materials used in the experiment.
- Wash your hands after the activity is complete.

Procedure

Your group will work together to build and test the model.

Step 1: Make the "Blood"

1. Pour about 200 ml of water into a beaker.
2. Add a few drops of red food coloring and stir until the water is red.
3. Add one spoonful of salt (the "waste") and stir until it dissolves.
4. Finally, add a spoonful of red beans ("blood cells"). Stir

Kidneys are so famous for their shape that we named a food after them – the red kidney bean. It is known as *lobia* in Urdu! You used *lobia* in your model to represent blood cells.

it all. Your "blood" is now ready.

Step 2: Build the "Kidney Filter"

5. Fold the round filter paper in half, and then in half again to make a cone shape.
6. Open the cone so that three layers of filter paper are on one side and one on the other. Place it inside the funnel.
7. Put the funnel on top of an empty beaker. Your "kidney" is ready to work.

Step 3: Filter the "Blood"

8. One person from the group will now slowly pour the "blood" mixture into the funnel.
9. Watch what drips through the filter into the beaker below.
10. Look at what is left behind in the filter paper.

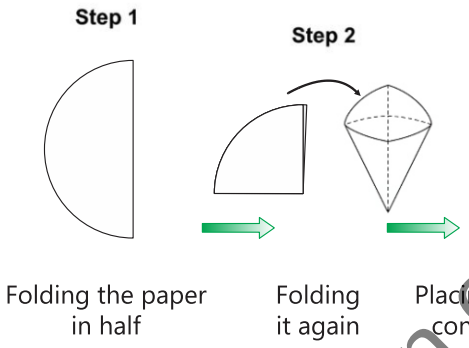


Figure 15.2: Folding the Filter Paper and Fitting it in Funnels

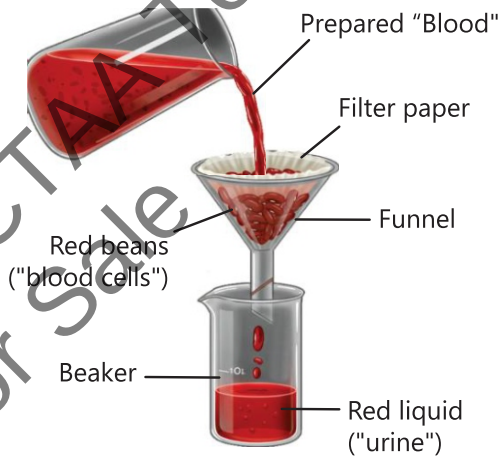


Figure 15.3: Kidney Filtration Model

Observations

As a group, discuss and write down your observations.

What you are looking at:	Describe what you see
The liquid in the beaker below ("Urine")	Color? Does it have beans in it? _____
The stuff left in the filter paper	What does it represent? _____

Draw a labeled diagram of nephron.

Conclusions

Viva Voice

1. **In your model, what did the red beans represent?**
   Ans: It represents red blood cells.
2. **What did the salt represent?**
   Ans: The salt represent dissolved substances in the blood.
3. **What part of our model acted as the kidney's filter?**
   Ans: The strainer mesh or filter paper act as the kidney filter.

4. **What do we call the liquid that passed through the filter?**
   Ans: It is called filtrate.
5. **A doctor tests apatient's urine and finds blood cells in it. What could this mean about the patient's "kidney filter"?**
   Ans: This means that kidney filter is damaged.
6. **The real kidney is much more complex. If you are very thirsty on a hot day, would your kidneys produce more urine or less urine? Why?**
   Ans: It will produce less urine to absorb water.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

Practical Based Assessment

INSTRUCTIONS FOR TEACHERS:

The teacher will divide students into groups and assign a specific practical to each group from given ones. Students are required to list the necessary apparatus, describe the procedure and note precautions. They should also record their observations in the Observation Table, if necessary. The teacher will conduct a Viva Voce with each student to evaluate their performance. The teacher will also provide guidance to students on any discrepancies in their work and award marks accordingly.

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Measure the heart rate by checking the pulse at different points on the body

Or

- Measure the number of heart beats per minute during rest and after exercise

Q2 : The student has to perform one experiment as per allotted by examiner. (12)

- Use Stethoscope to listen heart Sounds

Or

- Use a Sphygmomanometer to measure blood pressure

Q3: Viva voice (6)

Q4: Note book (5)

16 Practical: Perform an experiment to observe salt crystallization as a simulation of kidney stone formation

Background Information

Our kidneys clean our blood and make urine. Urine contains dissolved waste products and salts in it. Normally, these salts are flushed out of the body. However, if we don't drink enough water, there will be too much salt and not enough water. When this happens, the salts absorbed by the kidneys can turn into hard, solid crystals. These crystals can stick together and grow over time, forming a kidney stone.

In this experiment, we will make a very concentrated salt solution to see how these crystals are formed.

The most common type of kidney stone is made from a chemical called 'calcium oxalate'. This is found in many healthy foods we eat in Pakistan, like spinach *(palak)*, tomatoes, and nuts. This is why drinking lots of water is crucial to flush it out.

Materials / Apparatus Required

- Table salt
- Warm water
- A glass jar or beaker and a spoon
- Rough thread
- A pencil or a small stick
- A paper clip
- A tray to work on
- Practical notebook and pen

Figure 16.1: Materials for Salt Crystallization

Precautions

- Do not touch the hot beaker or jar with your bare hands.
- Do not eat the salt or any other materials provided in the lab.
- Once the experiment is set up, you must leave it in a place where it will not be disturbed.
- Wash your hands after handling the materials.

Doctors now use a high-tech machine called lithotripter. It sends powerful sound waves through the body. These waves break the large kidney stones into tiny, sand-like pieces. These tiny pieces can pass out easily in the urine.

Procedure

Your group will work together to set up the experiment.

1. Tie one end of the thread to the middle of a pencil. Then, tie a paperclip to the other end of the thread. Make sure the thread is short and doesn't touch the bottom of the jar.
2. Get a beaker of hot water. Start adding spoons of table salt to the hot water.
3. Keep stirring as you add salt. When the water can't dissolve any more salt, you will see extra salt collecting at the bottom. This is now a supersaturated solution.
4. Carefully pour salty solution into a clean glass jar.
5. Place the pencil across the top of the jar so the thread and paperclip hang down into the middle of the solution.
6. Place your jar in a safe place where it will not be moved or shaken.
7. Check on your jar every day and record what you see.

Figure 16.2: Results ofSalt Crystallization Experiment

Table salt is the refined sodium chloride (NaCl), with added iodine and anti-caking agents.

Rock salt is naturally occurring form of sodium chloride (NaCl) with some mineral impurities.

Sea salt is crystallized salt from evaporated seawater; mainly sodium chloride with trace minerals,

Observations

Observe your jar for a few days and fill in the table.

Time	What do you see on the thread/string and in the jar?
After 1 Hour	
After 1 Day	
After 2-3 Days	
After 1 Week	
After 1 Month	

Conclusions

_____

_____

Viva Voice

1. **What is a supersaturated solution?**

   Ans: A supersaturated solution is a solution that contains more dissolved solute than it can normally hold at a given temperature.

2. **Why did we use hot water to dissolve the salt?**

   Ans: We use hot water to dissolve more salt.

3. **What is the most important thing you can do to prevent real kidney stones?**

   Ans: We should not use spinach, tomatoes and nuts to prevent real kidney stones.

4. **If you did this same experiment with cold water instead of hot water, would you be able to dissolve more salt or less salt?**

   Ans: We cannot dissolve more salt in cold water.

5. **In our experiment, what was the purpose of using the string?**

   Ans: The string acts as a surface for crystals to form on.

6. **Doctors use sound waves to break large kidney stones into smaller pieces. How can it help the patient?**

   Ans: The tiny pieces can pass out easily in urine.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

17 Practical

Perform chest compressions and rescue breaths under supervision on a Mannequin

Background Information

CPR means Cardiopulmonary Resuscitation.

- Cardio means the heart.
- Pulmonary means the lungs.
- Resuscitation means to revive or bring back to life.

For every minute that passes without CPR, a person's chance of survival decreases by about 10%. Brain damage can start in just 4-6 minutes without oxygen.

When a person's heart stops beating (called cardiac arrest), he stops breathing and is unconscious. His brain and other organs are not getting oxygen-rich blood. CPR is a life-saving technique used to keep blood flowing through the body by manually pushing on the chest. CPR includes chest compressions (to pump the heart) and rescue breaths (to give oxygen to the lungs.) The modern approach follows C-A-B: Compressions, Airway, Breathing.

Materials / Apparatus Required

- A CPR mannequin (adult torso)
- A mat or blanket for the floor
- A phone (for simulating a call for help)
- Practical notebook and pen

Precautions

- Never practice CPR on a conscious or healthy person. It can cause injuries like broken ribs.
- The first step in any emergency is to check if the area is safe for you.
- Clean the mannequin's face and mouth area with alcohol swab and wash your hands.

Procedure

You will practice these steps on the mannequin.

You can call Rescue 1122 for emergencies. You should start CPR immediately and someone else should call for help. It can double or even triple a person's chance of survival.

1. Kneel beside the mannequin.
2. Tap its shoulders firmly and shout, "Are you okay? Are you okay?"
3. The mannequin does not respond. Point to a classmate and say loudly and clearly, "Call 1122 for an ambulance and come back!"



Start Chest Compressions (C)

1. Place the heel of one hand on the center of the mannequin's chest (on the lower half of the breastbone).
2. Place your other hand on top and interlace your fingers.
3. Position your shoulders directly over your hands and keep your elbows locked straight.
4. Push hard and fast. Press down about 5 cm deep. Give 30 compressions at a rate of 100-120 per minute. Count out loud: "1 and 2 and 3... up to 30!"

Figure 17.1: Chest Compression

Open the Airway (A)

5. After 30 compressions, gently tilt the mannequin's head back with one hand.
6. Lift the chin with the other. This opens the airway.

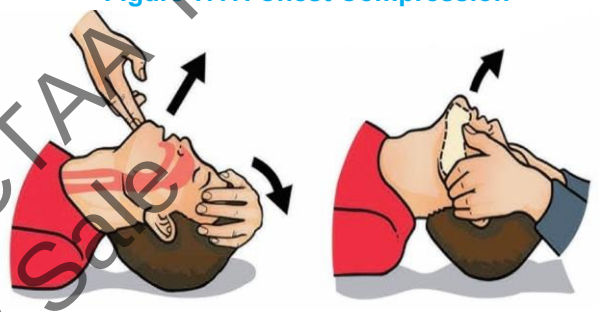


Figure 17.2: Head-Tilt, Chin-Lift Technique

Give Rescue Breaths (B)

7. Pinch the mannequin's nose shut.
8. Take a normal breath and make a complete seal with your mouth over the mannequin's mouth.
9. Give 1 gentle breath (lasting 1 second) and watch for the chest to rise.
10. Let the chest fall, then give a second breath. You only give 2 breaths.

Continue the Cycle

11. Immediately go back to chest compressions.
12. Continue the cycle of 30 compressions and 2 breaths until your teacher tells you to stop.

Observations

State your performance in this table.

Skill Check	Did you do it correctly?		
Checked for response and called for help?	Yes	No	Needs Practice
Placed hands in the center of the chest?	Yes	No	Needs Practice
Kept arms straight during compressions?	Yes	No	Needs Practice

Did 30 compressions at a fast speed?	Yes	No	Needs Practice
Tilted the head and lifted the chin?	Yes	No	Needs Practice

Conclusions

_____

_____

Viva Voice

1. **What does CPR stand for?**

   Ans: CPR stands for Cardiopulmonary Resuscitation.

2. **What is the very first thing you should do before approaching an injured person?**

   Ans: The first step in any emergency is to check if the area is safe for you.

3. **How many compressions and how many breaths are in one cycle of CPR?**

   Ans: 30 Compressions and one breaths are in one cycle of CPR.

4. **Why is it important to call for help (like 1122) before you start chest compressions?**

   Ans: It is important to take him to the hospital in emergency.

5. **Why must you never practice CPR on a healthy person?**

   Ans: Never practice CPR on a conscious or healthy person. It can cause injuries like broken ribs.

6. **Why is it important to perform better chest compressions than to give rescue breaths?**

   Ans: This is important to increase the heartbeat.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

18 Practical: Stimulate bleeding wound dressing using fake sounds or red coloured liquid

Background Information

A cut or a scrape is a break in the skin. This can be dangerous for two reasons: bleeding and infection. First aid for a simple wound has three main goals:

1. Stop the bleeding.
2. Clean the wound to remove dirt and germs.
3. Cover the wound with a clean (sterile) dressing to keep it safe while it heals.

By learning these simple steps, you can help someone (or yourself) and prevent injury from becoming a big problem.

If a wound is deep or caused by a rusty metal object, you need a tetanus vaccine injection. Tetanus is a serious infection. It can be prevented by vaccine. Its vaccine also is part of the vaccination program in Pakistan.

The brown liquid "Dettol" is found in almost every Pakistani home. It is an antiseptic. It helps to kill germs and prevent infection when cleaning a wound.

Materials / Apparatus Required

- Antiseptic wipes or cotton balls with antiseptic solution
- Sterile gauze pads (different sizes)
- Medical tape or a roller bandage
- Disposable gloves
- Red food coloring or fake blood
- Practical notebook and pen

Figure 18.1: Common Materials in First Aid Kit

Precautions

- This is a simulation only. Do not practice on a real cut or wound.
- Wash your hands before and after giving first aid.
- Wear gloves to protect both yourself and your partner from germs.
- Be gentle with your partner. Do not apply real pressure or tie the bandage too tightly.

Procedure

You will work with a partner.

Step 1: Get Ready and Stay Safe.

1. As the First Aider, wash your hands and put on the disposable gloves.
2. On your partner's arm, use a drop of red food coloring to create a "wound".

When you get a cut, your body immediately sends blood platelets to the spot. They stick together to form a clot, which dries into a scab. A scab is your body's own natural, protective bandage!

Step 2: Stop the bleeding.

1. Minor cuts usually stop bleeding on their own. If needed, gently press the wound with a clean bandage or cloth. Raise the area until the bleeding stops.

Step 3: Clean the Wound Area.

2. Take an antiseptic wipe or a cotton ball with antiseptic solution.
3. Gently wipe the area around the wound first.
4. Clean the wound with a new wipe. Wipe away from the center of the wound, outwards.

Step 4: Cover the Wound.

5. Open a sterile gauze pad package without touching the clean pad inside.
6. Place the clean pad directly over the "wound". Make sure the pad is larger than wound.

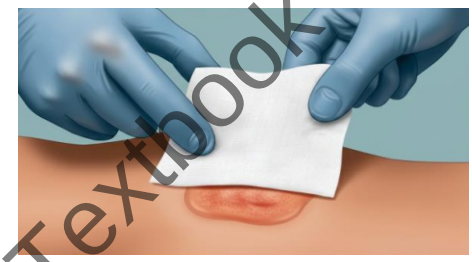
Step 5: Secure the Dressing.

7. Use medical tape to stick the edges of the gauze pad to the skin. Make sure it is secure.
8. Alternatively, you can use a roller bandage to wrap around the arm and hold the gauze.

Step 6: Switch Roles.

9. Now, you be the Patient, and your partner will be the First Aider. Repeat the steps.

Correct Cleaning Technique



Applying the Sterile Gauze

Gauze on the wound, taped down

Figure 18.2: Wound Cleaning & Dressing

Observations

State your performance in this table.

Skill Check	Did you do it correctly?		
Washed hands and wore gloves?	Yes	No	Needs Practice
Cleaned the wound from center outwards?	Yes	No	Needs Practice
Used gauze pad without touching the center?	Yes	No	Needs Practice
Secured the dressing so it was not too loose or too tight?	Yes	No	Needs Practice

Conclusions

_____

_____

Viva Voice

1. **What are the three main goals of dressing a wound?**

   Ans: The three main goals are to:

   1. Stop the bleeding.
   2. Clean the wound to remove dirt and germs.
   3. Cover the wound with a clean dressing to keep it safe while it heals.

2. **Which direction should you wipe when cleaning a wound?**

   Ans: The direction is upward towards the wound.

3. **Why should you clean the area around the wound before cleaning the wound itself?**

   Ans: The area should be cleaned so that no germs may survive there.

4. **You have dressed a small wound of a friend. What you would tell him/her to look for over the next few days that might mean the wound is infected?**

   Ans: Ask him to check increasing redness, swelling, pain, pus & fever.

5. **Why is a "scab" sometimes called "nature's bandage"?**

   Ans: It protects the wound naturally.

6. **Your friend has a small cut, but you don't have gloves. What will you do?**

   Ans: I will use wipes for cleaning the wound.

7. **What would you do if the gauze pad became soaked with "blood"?**

   Ans: I will remove the gauze pad immediately.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

19 Practical Demonstrate how Splints and Slings are used to immobilize injured limbs

Background Information

When a person has a broken bone (a fracture) or a bad joint injury (a sprain), movement can cause a lot of pain and make the injury worse. Immobilization means keeping the injured part from moving.

In an emergency, you don't need a medical kit. A great splint can be made from a folded newspaper or a sturdy tree branch! The sling can be a belt, a dupatta, or a piece of cloth.

We use two common tools for this:

1. **Splint:** A splint is a rigid (stiff) object, like a piece of wood or a rolled-up magazine. It is tied next to an injured limb to keep it straight and still.
2. **Sling:** A sling is a triangle-shaped piece of cloth used to support an injured arm, wrist, or shoulder. It holds the arm in a comfortable position and stops it from moving.

Materials / Apparatus Required

- Triangular bandages (or a large square piece of cloth, like a dupatta or scarf)
- A rigid object for a splint (e.g., a thick ruler, a rolled-up magazine, or a piece of flat wood)
- Bandages or strips of cloth
- Safety pins
- Practical notebook and pen

Figure 19.1: Materials for Immobilization

Precautions

- This is a simulation only. Practice on a healthy partner, not a real injury.
- Do not tie splint or sling too tightly. Otherwise, they cut off blood circulation.
- Communicate with your partner. Ask him/her if s/he is comfortable.

Procedure

You will work with a partner.

In many cultures, including in Pakistan, offering your arm or shoulder for an injured person to lean on is a sign of support and compassion. This is a simple, human form of immobilization.

Part 1: Applying an Arm Sling

1. You are to apply sling on injured arm, wrist or hand. Ask your partner to support his/her "injured" arm with

his/her other hand. The injured arm should be bent at the elbow, with fingers slightly higher than the elbow.

2. Place the open triangular bandage over your partner's chest. One point should be at his/her elbow, and the top point should go over his/her shoulder on the uninjured side.
3. Bring the bottom point of the bandage up over the injured arm.
4. Tie the two top points together on the side of the neck. Use a simple knot that is easy to untie. Note that the hand should be slightly elevated above the level of the elbow.
5. Neatly fold or pin the point of the bandage at the elbow.

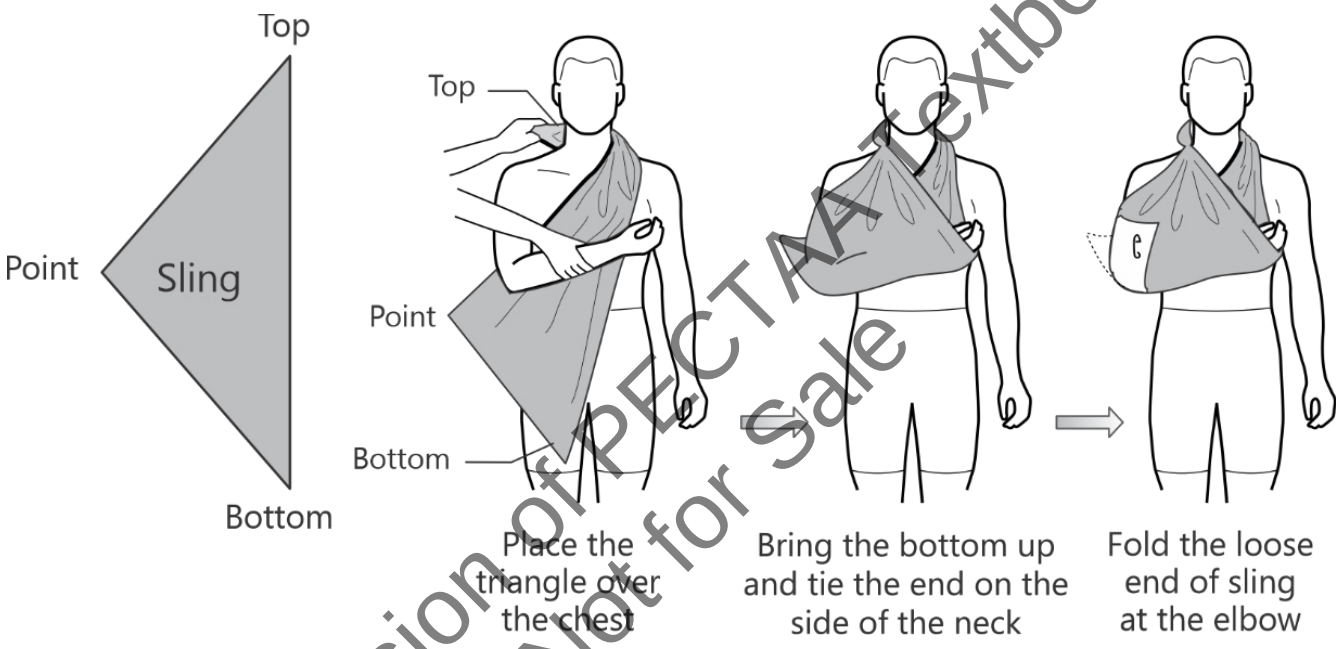
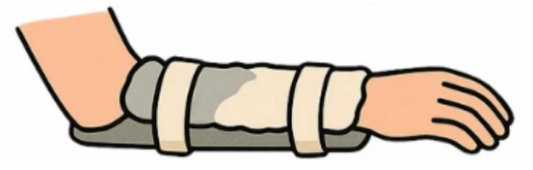


Figure 19.2: Applying a Sling

Part 2: Applying a Forearm Splint

6. Ask your partner to sit down and rest his/her "injured" forearm on a table or his/her lap.
7. Apply padding by using cloth around the injured area to provide cushioning.
8. Gently place the rigid splint (e.g., a wooden stick) underneath their forearm. The splint should be long enough to go past his/her elbow and wrist just before the knuckles of fingers.
9. Use bandages or tape to secure the splint in place. Start from the farthest point.
10. Ask your partner if s/he feels numbness in her/his fingers. Avoid excessive tightness that can slow blood circulation leading to pale or bluish discoloration of the hand.



Place the splint under the forearm
Tie the splint to the arm

Figure 19.3: Correct Splint Placement

Part 3: Switch Roles

11. Now, your partner will practice applying the sling and the splint on you.

Observations

State your performance in this table.

Skill Check	Did you do it correctly? (Yes/No)
For the Sling:	
Supported the arm in a comfortable position?	
Tied the knot at the side of the neck, not on the spine?	
For the Splint:	
Chose a splint that was long enough?	
Tied the splint above and below the injury, not on it?	
Checked if the ties were snug but not too tight?	
Checked if the fingers or palm was not pale, blue or numb?	

Conclusions

_____

_____

Viva Voice

1. **What does "immobilize" mean?**

   Ans: Immobilization means keeping the injured part from moving.

2. **What is the most important rule when applying a splint to an injury?**

   Ans: It is tied next to an injured limb to keep it straight and still.

3. **Where should you tie the knots for a sling?**

   Ans: One point should be at her elbow at the top point should go over his shoulder on the uninjured side.

4. **Why is a triangular bandage so useful in first aid?**

   Ans: It is helpful in immobilization.

5. **Your friend's arm is injured. You don't have a first aid kit. What two things could you find and use to make a splint?**

   Ans: Two things are dupatta and tree branch.

6. **Why is it important for a splint to be rigid (stiff)? What would happen if you used a soft pillow as a splint?**

   Ans: It will not heal.

7. **You have put a splint on someone's arm. He says his fingers are feeling numb. What does this mean? What should you do immediately?**

   Ans: The blood circulation will be cutoff so make it lose.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

20 Practical Illustrate proper burn treatment including cooling, covering and avoiding incorrect methods

Background Information

Burns are injuries to the skin caused by heat, chemicals, electricity, or radiation. Proper first aid can reduce pain and the risk of infection, and minimize damage to deeper tissues. This demonstration focuses on treating minor thermal burn (a burn from heat, like touching a hot pot or spilling hot *chai*). The following are the aims for treating a burn:

1. Stop the burning process by cooling the skin.
2. Relieve the pain.
3. Prevent infection by covering the area.

There are three levels of burns:

First-degree burns affect only the outer layer of the skin. Second-degree burns affect both the outer and underlying layer of skin. Third-degree burns affect the deep layers of skin.

Minor burns are:

- First degree burns anywhere on the body.
- Second degree burns less than 2-3 inches wide.

Materials / Apparatus Required

- A bowl of cool water
- Lint-free cloth or sterile gauze pads
- Cling film (plastic food wrap)
- A sink with a running tap (if available)
- Practical notebook and pen

Figure 20.1: Materials for First Aid for Burn

Precautions

- This is a simulation only. You will only pretend there is a burn.
- Use cool water, not icy or very cold water. Very cold water can damage the skin.
- Do not put any creams, oils, or antiseptics on the simulated burn.

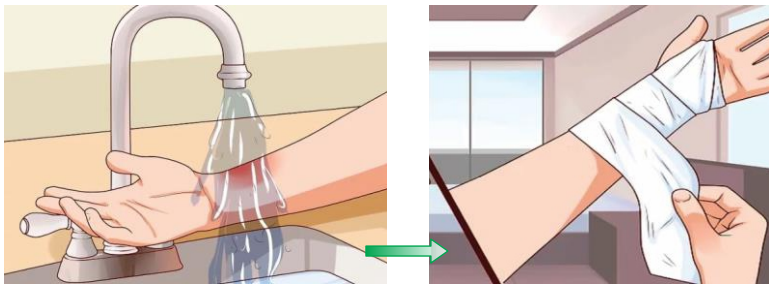
Procedure

You will work with a partner. First, the partner will pretend burn on his/her forearm

1. Immediately place your partner's "burned" arm under a running tap of cool water.
2. If a tap is not available, place the "burned" area into the bowl of cool water.
3. Keep cooling the area for at least 10-20 minutes. This is the most important step.
4. After cooling, gently pat the area dry with a clean cloth, but do not rub the burn itself.

5. Loosely cover the burn with a sterile gauze pad, or a dressing or a layer of cling film.
6. Do not wrap it tightly. Just lay it over the area.
7. Now, your partner will practice the steps on you.

In Pakistan, some people put toothpaste, butter, or ice on a burn. This is wrong! Ice can damage the skin further. Things like toothpaste and butter can trap heat and increase the risk of infection.



Cool the Burn

Cover the burn with a sterile gauze pad, or a dressing

Figure 20.1: First Aid Treatment of a Burn Injury

Observations

State your performance in this table.

Skill Check	Did you do it correctly? (Yes/No)
Cooled the burn immediately with cool water?	
Kept the burn cool for a good amount of time?	
Gently dried the area around the burn?	
Covered the burn loosely with a clean covering?	

Conclusions

_____

_____

Viva Voice

1. **What is the very first thing you should do for a burn?**

   Ans: Put the burn area under the running tap of cool water.

2. **For how long should you cool a burn?**

   Ans: Cool the burn area for at least 10-20 minutes.

3. **State any one thing you must never put on a burn.**

   Ans: Toothpaste must never be put on a burn.

4. **What are some signs of infection to watch for in a burn injury?**

   Ans: Signs of infection are Increased redness,swelling a pus and fever

5. **Why should ice not be applied directly to a burn?**

   Ans: Ice can damage the skin further.

6. **Your friend burns their hand on a hot tawa. He is going to put toothpaste on it. What should you tell him?**

   Ans: Ask him not to put the toothpaste on it.

7. **Why do we cover a burn? What are we trying to prevent?**

   Ans: We are trying to prevent it from germs.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

Practical Based Assessment

INSTRUCTIONS FOR TEACHERS:

The teacher will divide students into groups and assign a specific practical to each group from given ones. Students are required to list the necessary apparatus, describe the procedure and note precautions. They should also record their observations in the Observation Table, if necessary. The teacher will conduct a Viva Voce with each student to evaluate their performance. The teacher will also provide guidance to students on any discrepancies in their work and award marks accordingly.

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Perform an experiment to observe salt crystallization as a simulation of kidney stone formation.

Or

- Perform chest compressions and rescue breaths under supervision on a Mannequin

Q2: The student has to perform one experiment as per allotted by examiner. (12)

- Stimulate bleeding wound dressing using fake sounds or red coloured liquid

Or

- Demonstrate how Splints and Slings are used to immobilize injured limbs

Q3: Viva voice (6)

Q4: Note book (5)

21 Practical Demonstration of basic First Aid Techniques for Treating a Sprain or Strain

Background Information

In sports and daily life, we often get "soft tissue" injuries. The two most common types are:

- **Sprain:** A sprain happens when you stretch or tear a ligament (tissue that connects one bone to another at a joint).
- **Strain:** A strain happens when you stretch or tear a muscle or a tendon (tissue that connects muscles to bones).

Ankle sprains are the common injuries for Pakistani cricketers, especially fast bowlers. You will often see the team physiotherapist run onto the field and immediately start the RICE method.

RICE is the first aid for both these injuries. RICE stands for Rest, Ice, Compression, and Elevation. It reduces pain and swelling and allows the injury to heal faster.

Materials / Apparatus Required

- Elastic bandage.
- An ice pack
- A pillow or a folded blanket
- Practical notebook and pen

Precautions

- This is a simulation only. You will only pretend there is a sprain or strain.
- Never put ice directly on the skin. Always wrap it in a cloth or towel.
- Do not wrap the compression bandage too tightly.
- Be gentle and communicate with your partner.

Procedure

You will work in pairs to practice the RICE method on a simulated sprained ankle. First your partner will be the "patient" and you will provide first aid. Then, you will switch roles.

1. **REST:** Tell your partner to stop any activity immediately. Help them sit down comfortably in a chair and take the weight off their "injured" ankle.
2. **ICE:** Take your ice pack (wrapped in a cloth). Gently place it over the "sprained" ankle.

   In a real situation, you would leave the ice on for 15-20 minutes, then take it off for a while, and then repeat. For our simulation, we will just demonstrate the placement.

3. **COMPRESSION:** Remove the ice pack. Star wrapping elastic compression bandage from the toes and move up towards the ankle. It should provide support, but not too tight. Ask your partner if his/her toes are numb. Confirm that the color of toes is not pale or blue.

> Cold doesn't just reduce swelling. It also numbs the area. The cold temperature slows down the pain signals that are being sent to your brain.

4. **ELEVATION:** Ask your partner to lie down. Help your partner lift his/her leg up. Place the foot on a pillow so that the ankle is higher than their heart.
5. Now, you will be the "Patient", and your partner will practice the RICE method on you.

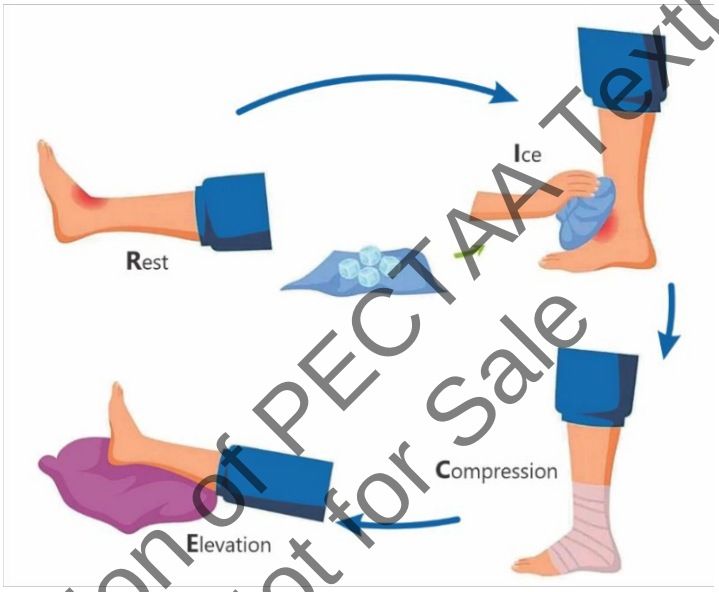


Figure 20.1: RICE: First Aid Techniques for Treating a Sprain or Strain

Observations

State your performance in the following table.

RICE Step	Skill Check	Did you do it correctly? (Yes/No)
Rest	Made the patient stop and sit down?	
Ice	Used a cloth between the ice and the skin?	
Compression	Wrapped the bandage from the toes upwards?	
	Checked if the bandage was snug but not too tight?	
Elevation	Raised the limb above the level of the heart?	

Conclusions

_____

_____

Viva Voice

1. **What does RICE stand for?**

   Ans: RICE stands for Rest, Ice, Compression and Elevation.

2. **What is the difference between a sprain and a strain?**

   Ans: Sprain: A sprain happens when you stretch or tear a ligament (tissue that connects one bone to another at a joint).

   Strain: A strain happens when you stretch or tear a muscle or a tendon (tissue that connects muscles to bones).

3. **Why should you never put ice directly on the skin?**

   Ans: We should not put the ice directly on the skin because it can damage the tissues.

4. **Why is it better to wrap a compression bandage starting from the toes and moving up, rather than starting at the ankle and moving down?**

   Ans: It promotes blood and fluid flow back to the heal.

5. **After RICE treatment, the doctor advises to use gentle heat. Why is it so?**

   Ans: Doctor advises so to improve the blood flow.

6. **Your friend has a sprain at his/her wrist. You don't have an ice pack. What could you use from a nearby shop to act as a cold pack?**

   Ans: We can use cold drinks or cold water bottles from nearby shop.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

22 Practical — Observe Common Posture Mistakes and demonstrate their correction.

Background Information

Posture is the way we hold our body when we are sitting or standing. Many of us develop bad habits without realizing it, like slouching over our phones or leaning back in our chairs. This is called poor posture.

Poor posture can cause problems like back pain, neck pain, headaches. It can also make it hard to breathe properly. Good posture means our body is aligned correctly. It helps our muscles work better, reduces stress on our body, and makes us look more confident. In this activity, we will find common posture mistakes and learn how to fix them.

Looking down at your phone all the time puts a lot of pressure on your neck. When your head is bent forward at a 60-degree angle, it feels like it weighs 27 kilograms! This is becoming a serious problem for young people in Pakistan and around the world.

Materials / Apparatus Required

- A chair
- A typical school backpack
- A full-length mirror (optional, but helpful)
- Practical notebook and pen

Precautions

- The goal is to help, not to criticize. Give feedback in a positive and gentle way.
- Do not push or pull your partner to "fix" his/her posture.
- If you have any real back or neck pain, do not participate in this activity.

Procedure

You will work with a partner.

Part 1: The Sitting Slouch

1. Your partner sits in a chair and pretends to look at a phone (or book) in his/her lap. S/he should slouch naturally, rounding the back and letting the head fall forward.
2. Look at partner from the side. Notice the curved

Think about how Mughal emperors sit in old paintings — always tall and straight. Good posture has always shown confidence and power. You can look more confident right away just by sitting up straight.

spine and the forward head position.

3. Guide your partner to sit correctly. S/he should:
   i. Sit with his/her upper back straight against the chair.
   ii. Bring his/her phone/book up closer to eye level.
   iii. Pull his/her shoulders back and relax them down.
   iv. Have his/her both feet comfortably touching the ground.

Part 2: The Standing Slump

4. Your partner stands naturally with rounded shoulders or leaning too far back or rounded back.
5. Look at his/her alignment. Is his/her head in front of shoulders?
6. Ask him/her to stand with his/her back against a wall.
7. His/her head, shoulders, and bottom should touch the wall.
8. There should be only a tiny space behind his/her lower back.
9. Tell him/her to step away from the wall and try to hold that same straight posture.

The standing position in Islamic prayer (*Namaz*), known as *Qiyam*, is a perfect example of good posture. It aligns the spine and opens the chest, which is both spiritually significant and physically beneficial.

Part 3: The Backpack Burden

10. Your partner puts a heavy backpack on only one shoulder.
11. Observe that what happens to his/her body? Notice how one shoulder drops and their spine curves to balance the weight.
12. Ask your partner to:
    i. Wear the backpack on both shoulders.
    ii. Tighten the straps so the bag is high on his/her back and close to the body.

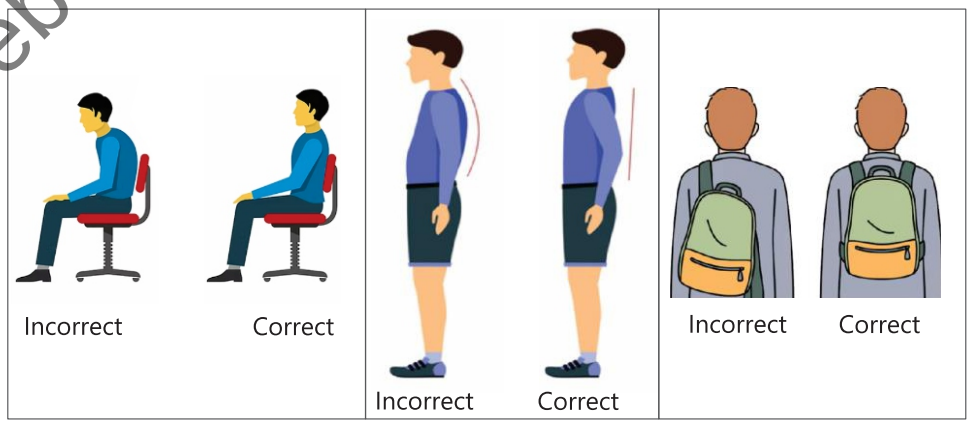


Figure 22.1: Body Postures

Part 4: Switch Roles

13. Now, your partner will observe your postures by repeating all three parts.

Observations

As a group, discuss and write down your observations.

Posture Mistake: Sitting with a phone	
What did it look like?	Rounded back, head forward
How did you correct it?	
Posture Mistake: Standing incorrectly	
What did it look like?	Shoulders forward or leaning back or rounded
How did you correct it?	
Posture Mistake: Carrying a backpack wrong	
What did it look like?	Body is tilted to one side
How did you correct it?	

Conclusions

_____

_____

Viva Voice

1. **Show the correct way to sit in a chair.**

   Ans: Sit with his/her upper back straight against the chair.

   Pull his/her shoulders back and relax them down.

   Have his/her both feet comfortably touching the ground.

2. **What is wrong with carrying a heavy bag on only one shoulder?**

   Ans: Carrying the heavy bag on only one shoulder can cause uneven strains and posture problem.

3. **How can a wall help you fix your standing posture?**

   Ans: A wall help in aligning our bag correcting slouching and training our muscles.

4. **Why must you be kind when giving feedback to your partner?**

   Ans: It will increase learning, confidence and cooperation.

5. **Do your school desk and chair help you have good posture or bad posture?**

   Ans: Yes, it helps having our good posture.

6. **Good posture can make you feel more confident. Why do you think this is true?**

   Ans: Good body posture signals, affect mind and give positive impressions on others.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

23 Practical: Analyse food samples to detect the presence of macronutrients (starch, proteins and fats)using standard biochemical tests

Background Information

Obtaining and utilizing the food for growth, energy and health is called nutrition. It involves the intake, digestion, absorption, assimilation of food. The substances found in food that are required for growth, energy, repair and overall health are called nutrients. The nutrients required in small quantities are called micronutrients e.g., vitamins, and minerals (iron, calcium, zinc etc.). The nutrients our body needs in large amounts are called macronutrients. Three main kinds of macronutrients are:

- Carbohydrates (like starch) are our main "energy foods." Examples of foods with starch are rice, bread, and potatoes.
- Proteins are our "body-building foods." They help us build muscles and repair our body. Examples of foods with proteins are eggs, milk, and beans.
- Lipids give us a lot of energy and help our body store it. Examples of foods with lipids are cooking oil, butter, and nuts.

A glass of Lassi after a heavy meal is a popular tradition in Pakistan. The good bacteria (probiotics) in the yogurt help in digestion and keep your large intestine healthy.

In this activity, we will use special chemicals called reagents to confirm the presence of specific macronutrients. These reagents will change color if a specific nutrient is present.

Materials / Apparatus Required

- A piece of potato (for starch), milk (for protein), cooking oil (for lipid/fat)
- Reagents: Iodine solution, Biuret solution, Sudan IV solution
- Three test tubes, a test tube rack, a glass rod
- A pestle and mortar
- Practical notebook and pen

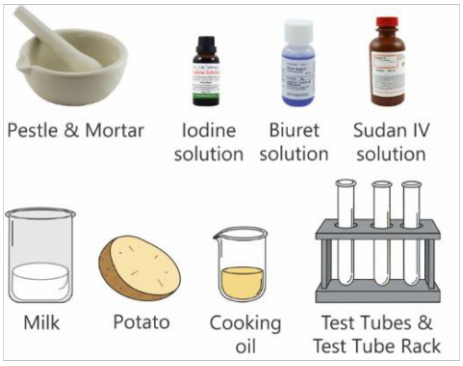


Figure 23.1: Apparatus for Nutrients Testing

Precautions

- Do not touch reagents with your bare hands, and do not taste or smell them.
- Wear safety goggles and lab coat, as Sudan IV can stain your clothes and skin.
- Wash your hands with soap and water after the experiment.

Procedure

If you chew a piece of plain *roti* for a long time without swallowing, it will start to taste sweet. This is because the enzymes in your saliva are breaking down the starch (which isn't sweet) into simple sugars (which are sweet)!

Test 1: Testing for Starch

1. Take the piece of potato and crush it using a pestle and mortar.
2. Add the crushed sample to a test tube.
3. Add a few drops of iodine solution.
4. Watch the color of the material in test tube. It will turn from orange brown to blue black.

Test 2: Testing for Protein

Daal (lentils) is often called the "poor man's meat". It is packed with proteins. These proteins act as "building blocks" your body uses to make everything like strong muscles and strong hair.

5. Take a clean test tube. Add about 2 ml of milk into it.
1. Using a clean dropper, add few drops of Biuret solution to the milk.
2. Shake the test tube gently and watch for a color change. It will turn from blue to purple.

Test 3: Testing for Lipids/Fats

Your brain is nearly 60% fat! Eating healthy fats, like those found in almonds *(badam)*, walnuts, and fish, is essential for a sharp memory and a healthy brain.

3. Take a clean test tube and add about 2 ml of water.
4. Add a few drops of cooking oil. You will see two separate layers.
5. Using a clean dropper, add few drops of Sudan IV solution.
6. Shake the test tube gently to mix. Then let it stand for a minute.
7. Observe the color of the top oil layer. Sudan IV solution will give reddish orange colour.

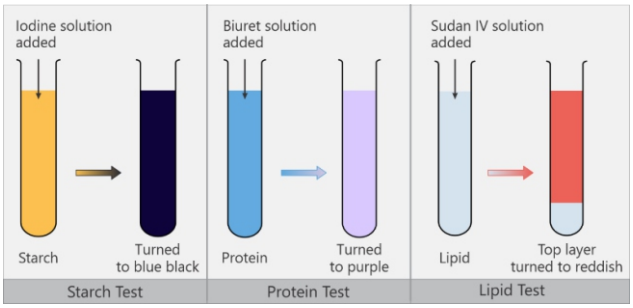


Figure 23.2: Testing for Starch, Proteins, and Lipids

Observations

Fill in this table with your observations.

Food Test	Reagent Used	What I Saw (Observation)?	Nutrient Present?
Starch Test	Iodine solution	The iodine turned from brown to ___.	Yes / No
Protein Test	Biuret solution	The solution turned from blue to ___.	Yes / No
Fat Test	Sudan IV solution	The top oil layer turned _____.	Yes / No

Conclusions

_____

_____

Viva Voice

1. **What color does iodine gives if there is starch?**

   Ans: The iodine gives blue-black colour if there is starch.

2. **What chemical do we use to test for protein?**

   Ans: Biuret reagent is used to test the protein.

3. **What color shows that fats are present when you use Sudan IV solution?**

   Ans: Red stained colour shows that fats are present when you use Sudan IV solution.

4. **You add Biuret solution to a food powder. It turns purple. What does it have?**

   Ans: The addition of Biuret solution to a food powder shows that there is protein present in it.

5. **Why does the Sudan IV dye color the oil layer but not the water layer?**

   Ans: It follows the chemical principle that is 'like dissolves like'.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

24 Practical Determine the pH levels of Different Digestive Juices and explain their role in digestion

Background Information

Like other metabolic reactions, enzymes speed up chemical digestion. Each enzyme works in a specific pH (acid or alkaline level). The pH scale measures how acidic or alkaline a liquid is. Scientifically, pH is a measure of the concentration of hydrogen ions (H^+) in a solution.

- High concentration of H^+ ions = a low pH number = Acidic.
- Low concentration of H^+ ions = a high pH number = Alkaline (or Basic).
- A pH of 7 is Neutral, where the solution is neither acidic nor alkaline.

Different parts of our digestive system have specific pH values for enzymes to function:

- Saliva (in the mouth): The enzyme salivary amylase starts digesting starch. It works best at a neutral pH of about 6.7 to 7.0.
- Stomach (Gastric) Juice: The enzyme pepsin starts digesting proteins. It needs a very acidic pH of 1.5 to 3.5 to work.
- Intestinal Juice (in the small intestine): Enzymes like trypsin and lipase digest proteins and fats. They need an alkaline pH of about 7.0 to 8.5.

When you eat spicy Pakistani food like biryani or karahi, you may feel a burning in your chest. This is called heartburn — but it's not your heart! It happens when stomach acid comes up into your esophagus (the food pipe).

Materials / Apparatus Required

- pH paper and pH color chart
- Three test tubes, a test tube rack, and a glass rod
- Small samples of:
  - Lemon juice (as stomach/gastric juice substitute)
  - Saliva (your own, collected carefully)
  - Baking soda solution (as intestinal juice substitute)
- Practical notebook and pen

Precautions

- Do not touch or taste the solutions. Wear safety goggles to protect your eyes.
- Rinse the glass rod with water and wipe it dry before testing each juice.
- Wash your hands with soap and water after the experiment.

Procedure

You will work in your group to test the three different digestive "juices."

1. Place three test tubes in the rack. Label them: 1. Stomach juice, 2. Saliva, 3. Intestinal juice. Pour about 3 mL of each substitute juice into the correct test tube.

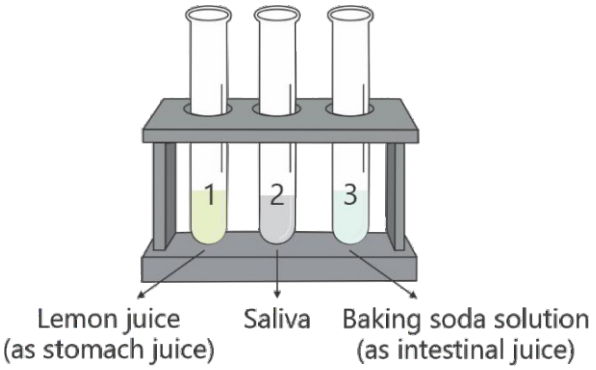


Figure 24.1: Samples of Digestive Juices

The acid in your stomach (hydrochloric acid) is very strong — strong enough to dissolve a small iron nail! But don't worry — your stomach walls are safe because they have a thick layer of mucus that protects them from acid.

Test the "Stomach / Gastric Juice":

2. Dip a clean glass rod into test tube 1 containing the "Stomach Juice".
3. Touch the wet rod tip to a fresh strip of pH paper.
4. Compare the color change in the spot to the pH color chart. Record the pH value.

Test the "Saliva":

5. Wash and dry your glass rod completely.
6. Dip the clean rod into test tube 2 containing the "Saliva"
7. Touch the rod tip to a new strip of pH paper. Compare the color change in the spot to the pH color chart and record the pH value.

Test the "Intestinal Juice":

8. Wash and dry your glass rod completely again.
9. Dip the clean rod into test tube 3 containing the "Intestinal Juice".
10. Touch the rod tip to a new strip of pH paper. Compare the color change in the spot to the pH color chart and record the pH value.

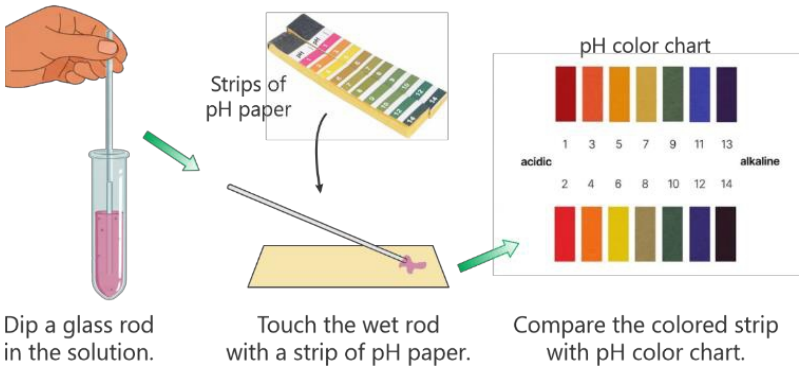


Figure 24.2: How to Use pH Paper

Observations

Fill in this table with your group's results.

Simulated Juice	Color of pH Paper	Estimated pH (from chart)	Acidic, Neutral, or Alkaline?
Stomach Juice			
Saliva			
Intestinal Juice			

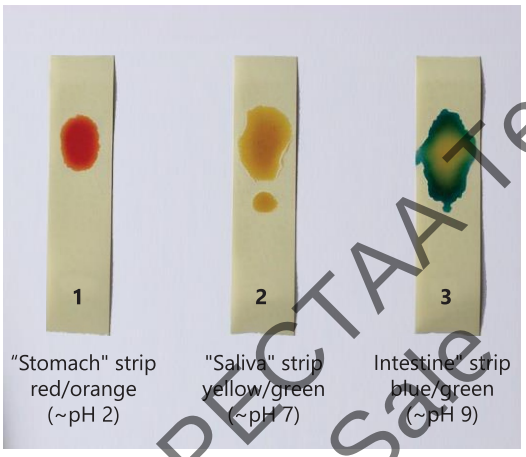


Figure 25.3: Expected Results of pH Testing of Digestive Juices

Conclusions

_____

_____

Viva Voice

1. **What do you mean by pH?**

   Ans: A pH is a measure of the concentration of hydrogen ions (H^+) in a solution.

2. **What tool did we use to measure the pH today?**

   Ans: The pH paper and pH colour chart are used.

3. **Which of the model juices was the most acidic?**

   Ans: The lemon juice was most acidic.

4. **Is the environment in the small intestine acidic or alkaline?**

   Ans: The environment in the small intestine is alkaline.

5. **Why is it important that saliva is neutral and not acidic?**

   Ans: Saliva is neutral because the enzymes and lining of intestine cannot work in the acidic medium.

6. **Pepsin digests proteins in stomach. What would happen if it traveled into small intestine?**

   Ans: Pepsin would not work properly if it travelled into the small intestine.

7. **A person takes an "antacid" tablet for stomach pain. What would be the pH of this tablet (above 7, below 7, or 7)?**

   Ans: The pH of this tablet is above 7.

8. **The food leaving our stomach is very acidic. The small intestine needs to be alkaline. What must our small intestine add to the food to do this change?**

   Ans: The small intestine must add bicarbonate ions to the food to do this change.

Teacher's Signature: _____ **Date:** _____

Remarks: _____

Practical Based Assessment

INSTRUCTIONS FOR TEACHERS:

The teacher will divide students into groups and assign a specific practical to each group from given ones. Students are required to list the necessary apparatus, describe the procedure and note precautions. They should also record their observations in the Observation Table, if necessary. The teacher will conduct a Viva Voce with each student to evaluate their performance. The teacher will also provide guidance to students on any discrepancies in their work and award marks accordingly.

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Demonstrate basic First Aid Techniques for Treating a Sprain or Strain.

Or

- Observe Common Posture Mistakes and demonstrate their correction.

Q2: The student has to perform one experiment as per allotted by examiner. (12)

- Analyse food samples to detect the presence of macronutrients (starch, proteins and fats) using standard biochemical tests.

Or

- Determine the pH levels of Different Digestive Juices and explain their role in digestion.

Q3: Viva voice (6)

Q4: Note book (5)

PAIRING SCHEME

INSTRUCTIONS FOR PREPARATION OF PRACTICAL PAPER OF HEALTH SCIENCES FOR CLASS-9

ESSENTIAL INSTRUCTIONS FOR PRACTICAL PAPER SETTERS

Max Marks: 35 **Time Duration: 2 Hrs.**

Attempt any two practicals from the following:	12
Note: Attempt any one of the following practical. **Q-1:** • 1 practical will be given from Practicals No. 1, 2, 3, 4, 5, 6 OR • 1 practical will be given from Practicals No. 7, 8, 9, 10, 15, 16	
Q-2: • 1 practical will be given from Practicals No. 11, 12, 13, 14, 17, 18 OR • 1 practical will be given from Practicals No. 19, 20, 21, 22, 23, 24	12
This section will consist of checking Practical Notebooks and conducting Viva Voce. The details are as follows:	
Practical Notebook	6
Viva V oce	5

MODEL PAPER OF HEALTH SCIENCES PRACTICAL FOR CLASS-9

Time allowed: 2 Hrs. **Max. Marks: 35**

Note : Distribution of 12 marks

The procedure and diagram will carry 4 marks and if diagram is not necessary then the only procedure will be given 4 marks. Setting of apparatus 2 marks, Performance 3 marks observation 2 marks and result 1 mark.

Q. 1: The student has to perform one experiment as per allotted by examiner. (12)

- Measure how much air you can breathe in and out to check how well your lungs work

Or

- Measure the oxygen levels in blood using the Pulse Oximeter

Q.2: The student has to perform one experiment as per allotted by examiner. (12)

- Use a sphygmomanometer to measure blood pressure

Or

- Demonstrate basic First aid techniques for treating a sprain or strain

Q.3: Viva voice (6)

Q.4: Note book (5)