

Pre-content / Content / Post-content	Learning outcome / objectives	
	General	Specific
PRE-CONTENT: Questions based on previous knowledge CONTENT: 1. What are life processes 2. Nutrition (a) autotrophic nutrition (b) heterotrophic nutrition (c) nutrition in human being 3. Respiration 4. Transportation 5. Excretion (a) in human beings (b) in plants POST-CONTENTS: Students will realize the significance of various life processes occurring in our body.	Students will be able to explore how various processes like nutrition, respiration, transportation and excretion essential for maintaining life. analyse the interdependence of plants and animals justify the need to conserve forests (plants) and bio-diversity. evaluate the coordination and cooperation of different life processes for survival of organisms. compare all the life processes in males and females and on this basis justify gender equality.	Students will be able to develop the concept of life processes i) evolve the meaning of autotrophic nutrition and compare the steps of opening and closing of stomata ii) identify heterotrophic nutrition in living organisms iii) organize all the steps of digestion of food in human in sequence. i) interpret the significance of various pathways of glucose catabolism. ii) investigate gaseous exchange in organisms i) Identify the component of transport system in human beings and conceptualize the path of circulation through flow chart and diagram of heart ii) find out how transportation takes place in plants. Explore the mechanism of removal of waste products i) in human beings ii) in plants

HOME WORK / ASSIGNMENTS: Text book exercise will be given as home work. Students will be asked to draw diagrams of various organ systems as home work for practice.

AND PROGRESS

MONTH: APRIL-MAY
CLASS: X

Teacher's activity	Students' activity	Teacher's observations and remedial action taken
Teacher will: . 1. help the students develop the concept of Life processes through questions. 2.i) Annexure 6 (A) show temporary mount of leaf peel to show stomata. ii) discuss heterotrophic nutrition through ICR iii) explain the structure and working of digestive system with the help of diagram iv) Annexure 6 (B) explain the Action of salivary amylase through activity 3. i) classify the pathways of glucose breakdown through flowchart ii) Annexure 6(C) -deduce that amount of CO₂ in exhaled air is more than in the atmosphere through activity - illustrate the mechanism of breathing through diagram 4.i) Annexure 6(D) Conduct role play to explain the components of transport system ii) discuss Transportation in plants through ICR 5.show the diagram of excretory system to explain excretion in human beings. -explain excretion in plants through ICR	Student will: 1.-answer the questions and comprehend the topic. 2. i) Annexure 6(a) observe the slide under microscope and identify guard cells and epidermal cells. ii) solve questions based on the topic. iii) practice drawing the diagram of digestive system and tabulate the functions of different parts. iv) Annexure 6(b) perform the activity and answer the questions that follow 3. i) draw the flowchart in their notebooks. ii) Annexure 6(c) -perform the activity and solve the worksheet. -draw a flowchart to show the steps of inhalation and exhalation. 4.i) Annexure 6(d) - participate in the activity and answer the questions given after the activity. ii) note down the points being explained. 5.-draw the diagram of excretory system and nephron -answer the questions related to the topic.	Teacher will write the observations after completion of the topic/s

Teaching aids: Smart board, stylus, charts, microscope, work-sheets, starch solution, Rhoeo leaf

Methodology / Innovative methods: Activity based (stomata demonstration in leaf peel), Action of saliva (amylase) on starch (demonstration), question answer and discussion methods, audio visual, collaborative learning.

Inter disciplinary links: Art – drawing skill developed; **health and hygiene** - digestion.

HOD

COORDINATOR

VICE-PRINCIPAL

PRINCIPAL

Annexure 6(A).(a)

Let's identify Guard cells and Epidermal Cells

Subject	Science
Class	IX
Chapter/Unit	Tissues
Topic	Guard cells and Epidermal cells
Time	40 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

To identify the guard cells and epidermal cells in a leaf peel.

Skills: Analyzing

What I have to do?

To identify and compare the guard cells and epidermal cells in the leaf peel of monocot and dicot plants

What do I require?

Freshly plucked *Tradescantia* leaf (Monocot leaf), Freshly plucked *Rouwolfia* (Sarpagandha) leaf (Dicot leaf), glass slides, cover slips, safranin, glycerine, dissecting needle, brush, blotting paper, watch glass and compound microscope

What do I need to know?

Stomata are small openings found widely scattered on the epidermis of leaves and young stems. They are mostly found on the lower surface of a dicot leaf and on both the surfaces of a monocot leaf. Stomata regulate the exchange of gases and water vapour between the atmosphere and leaves.

➤ Teacher's Activity

Teacher will brief the experiment and make arrangements for the required apparatus and chemicals.

How will I proceed?

➤ Student's Activity

1. Take freshly plucked leaves of *Tradescantia* and *Rouwolfia*.
2. Stretch and break them by applying pressure.
3. While breaking them, keep them stretched gently so that some peel or skin projects out from the cut.
4. Remove the peels and put them in two different petri dishes filled with water.
5. Add a few drops of safranin in first petridish with *Tradescantia* leaf peel.(Petridish 1)

6. Now add a few drops of safranin in second petridish with Sarpagandha leaf peel. (Petridish 2)
7. Wait for a couple of minutes and then transfer these onto 2 slides. Gently place a cover slip both the slides.
8. Observe under microscope

What have I observed?

Record and compare your observations

	<u>Epidermal cells</u> <u>(Petridish 1 with</u> <u>monocot leaf)</u>	<u>Guard cells</u> <u>(Petridish 1 with</u> <u>monocot leaf)</u>	<u>Epidermal cells</u> <u>(Petridish 2 with</u> <u>dicot leaf)</u>	<u>Guard cells</u> <u>(Petridish 2 with</u> <u>dicot leaf)</u>
<u>Shape</u>				
<u>Size of nucleus</u>				
<u>Presence or absence of chloroplast</u>				

What have I learnt?

1. Epidermal cells are visible. These are ----- in outline and have ----- intercellular spaces.
2. Many ----- are seen scattered among the epidermal cells.
3. Each pore is guarded by two ----- guard cells in a dicot leaf, each containing chloroplasts and a nucleus.
- 4 ----- is absent in epidermal cells
5. Guard cells of the ----- are dumbbell-shaped, whereas the guard cells of ----- are bean-shaped.

What am I curious to learn-

Let us find out-

1. Desert plants cannot afford to lose water through stomata. How do they exchange gases?
2. Why are stomata absent in roots?

Let me evaluate myself

1. Jot down the steps involved in making a slide of epidermal peel of leaf .
2. Why should the leaf peel be mounted in glycerine?
3. How are guard cells different from the rest of the epidermal cells?
4. Where are the stomata usually found on a leaf? Where would the stomata be found on a floating water lily plant?
5. Make a drawing of a pair of guard cells and the surrounding epidermal cells. Label the guard cells, epidermis, and chloroplasts.

Annexure 6 (B). (b)
To deduce the action of Salivary amylase

Class-X

Duration-40mins

Nature of the Activity- Individual

Learning Outcome- The students will be able to explore the action of a simple and readily available enzyme.

What we have to do?

-To observe the effect of salivary amylase on food.

What do we require?

Test tube, funnel, cotton, iodine solution, 20 gm wheat flour

What do we need to know?

The first stage of the digestive process occurs in the mouth where food is mechanically broken down and mixed with saliva. Saliva contains an enzyme, amylase, which begins the digestion of starch and converts it to sugar molecules. In the presence of iodine ,starch turns blue black but sugar gives no color

How will we proceed?

- **Teacher's activity-** Teacher will give the instructions along with the protocol(Student's activity)

Teacher will arrange for the materials

- **Student's activity**

- 1.Collection of saliva (wash your mouth with water and think of some tasty food item, enough saliva will be collected in your mouth).
- 2.Filter the saliva through a cotton swab and collect 1 mL in a test tube. Add 9 mL of water to the saliva to make it saliva solution.(1:10)
3. Mix wheat flour in water (20 ml) and filter to make starch solution.
4. Take 5 mL of starch solution in two test tubes labelled as A and B.
- 5.To test tube A, add 1 mL of saliva solution and to test tube B, add 1mL of water and mix thoroughly.
6. Add 1 or 2 drops of iodine solution in both the tubes after 10 min.
7. Observe the colour change immediately.

What do we observe?

Test Your Saliva for Amylase:

	Change in colour
Test tube A	
Test tube B	

What have you learnt?

1. The concentration of amylase varies within an individual's mouth.
2. Starch reacts with iodine, to produce the blue starch-iodine complex
3. When the enzyme in your saliva, amylase, reacts with the starch it causes the starch to be broken down into simple sugars. Once the starch is broken down into simple sugars it no longer forms a complex with the iodine and so the dark blue color no longer is present.

What would I like to know?

Chew food (chapati/ rice) and note change in taste from tasteless to sweet. Do you think that your chapati/rice has become sweeter?

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Extended learning-

- 1) What is meant by optimum temperature for enzyme activity?
 - (a) The temperature at which the enzyme shows the maximum activity.
 - (b) The temperature at which the enzyme shows the minimum activity.
 - (c) The temperature at which the enzyme denatured.
 - (d) The temperature at which the enzyme deactivated.
- 2) The digestion of food starts in the _____.
 - (a) Intestine
 - (b) Oesophagus
 - (c) Mouth
 - (d) Stomach

3.) The optimum temperature for the enzymatic activity of salivary amylase ranges from_____to _____.

- (a) 5⁰C to 10⁰C
- (b) 20⁰C to 25⁰C
- (c) 35⁰C to 40⁰C
- (d) 50⁰C to 55⁰C

4.) The enzyme salivary amylase is most active at pH_____

- (a) 6.8
- (b) 5.4
- (c) 2.5
- (d) 10

5.) What is an achromic point?

- (a) The point at which starch gives blue-black colour with iodine.
- (b) Time during the action of amylase on starch at which the reaction mixture no longer gives a change in colour with iodine.
- (c) The point at which the enzyme shows the maximum activity.
- (d) The time required to digest starch partially by the enzyme-salivary amylase.

6 .) In the stomach the salivary amylase is not functioning. Why?

- (a) pH of stomach is more than 6.
- (b) Stomach is highly acidic.
- (c) Stomach is highly basic.
- (d) There is no enzyme for starch digestion in the stomach.

7.) The experiment set up to study the effect of temperature on the activity of salivary amylase on starch is carried out at 10 °C. The solution mixture that contains amylase and starch keeps on giving blue colour for iodine test for about half an hour. What is the reason for this is that at lower temperature-

- (a) starch lose its functionality
- (b) the enzyme is more activated
- (c) reaction rate of starch reduces
- (d) the enzyme is deactivated

Annexure 6 (C).(c)
To deduce that our breath contains CO₂

Class-X

Duration-40mins

Nature of the Activity- Group work (Group of 4)

Learning Outcome- The students will be able to infer that the amount of CO₂ in exhaled air is more than that in the atmosphere.

What we have to do?

To deduce that our breath contains CO₂. (Qualitative analysis)

Worksheet

1. Write the composition of gases in air:

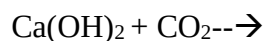
S.No.	Name of Gas	Percentage
1.	Oxygen	
2.		0.035
3.	Nitrogen	
4.		0.9
5.	Other gases	
6.	Dust particles	

2. From the table given above, make a checklist of the gases that are part of
- i) Inhaled Air
 - ii) Exhaled Air

S.No.	Name of Gas	Inhaled Air	Exhaled Air
1.	Nitrogen	√	
2.	Oxygen	√	

3.	Carbon dioxide		√
4.	-----		
5.	-----		

3. Complete the equation and name the reactants and products :



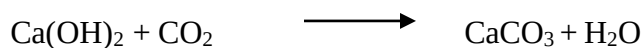
What do we require?

- Small beakers (or test tubes)
- Rubber tubes or drinking straws
- Freshly prepared lime water
- 10 ml syringe
- Stop watch

What do we need to know?

- Breathing is a part of respiration. It is a mechanical process. It involves inhalation and exhalation. We are aerobes and breathe in O_2 and breathe out CO_2 .
- Test for CO_2

When CO_2 is passed through lime water (colourless), it turns milky.



How will we proceed?

- **Teacher's activity-** Teacher will give the instructions along with the protocol(Student's activity)

Teacher will arrange for the materials (10 pairs of beakers, 10 straws and 10 syringes)

➤ **Student's activity**

1. Work in groups of four
2. Mark one beaker A and the other B
3. Pour clear limewater into each beaker until they are half full
4. Blow bubbles through the rubber tube into the beaker B. Do this for at least 2 minutes. Notice what happens to the clear limewater.

5. Attach a rubber tube to the front of a syringe. Draw air into the syringe from the atmosphere.
6. Place this rubber tube into the beaker A and push out the air inside the syringe slowly and carefully into the limewater . Notice what happens to the clear limewater

What do we observe?

	Time interval (Seconds)	Intensity
BEAKER “A”	0	
	30	
	60	
	90	
	120	
BEAKER “B”	0	
	30	
	60	
	90	
	120	

1. Describe what you observed when you blew air from your lungs through the limewater. What does this mean?
2. Describe what you observed when you used the syringe to bubble air from the atmosphere through clear lime water.
3. Why do you think you observed the above result , when you pushed air from the atmosphere through the limewater(as in Beaker 'A')?
4. Why do you think you observed the above result ,when you exhaled out (as in Beaker 'B')?

What have you learnt?

CO₂ is present in the air, but more CO₂ is released during exhalation.

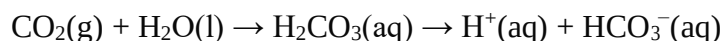
What would I like to know ?

Carbon dioxide dissolves in water

Here is some pure water, which has pH 7, shown by using pH paper and matching the color to the chart on the side of the box.

If I take a straw and blow into the water, what gases are going into the water?

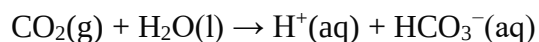
The one I am interested in is carbon dioxide, which can dissolve in water and react to form an acid.



So after I blow into the water several times, I should have a solution which is more acidic than it was before. Let's check by retesting the pH of the solution. It is now down to 5, rather than 7 we began with.

pH 5 indicates that it is an acid, so the carbon dioxide has dissolved in the water and reacted.

Thus my chemical reaction really has made hydrogen ions in the water, meaning that the carbon dioxide gas dissolved and reacted.



What does this mean about rain which passes through air with CO₂ in it?

What is acid rain?

Extended Learning-

Everyone knows that we breathe in oxygen and breathe out carbon dioxide. But that's not technically true. The truth is we breathe in air and breathe out air... so what's the difference?

1. Respiration is a _____ process
 - a. Physical
 - b. Chemical
 - c. Biochemical
 - d. Biological

2. Which gas makes up ~78% of the air around us?
 - a. oxygen
 - b. carbon dioxide
 - c. nitrogen
 - d. water vapour

3. How much of the air we breathe in is oxygen?
 - a. ~16%

- b. ~21%
- c. ~50%
- d. ~78%

4. How much oxygen would you find in exhaled air?

- a. ~0.04%
- b. ~16%
- c. ~21%
- d. ~78%

5. Other than carbon dioxide, which gas would you find more of in exhaled air?

- a. carbon monoxide
- b. oxygen
- c. nitrogen
- d. water vapour

6. What is the chemical test for carbon dioxide?

- a. Relights a glowing splint
- b. Turns lime water milky
- c. Burns with a squeaky pop
- d. Turns universal indicator purple

7. Why does lime water not change when inhaled air is bubbled through it?

- a. The percentage of carbon dioxide is too high
- b. The percentage of carbon dioxide is too low
- c. The percentage of oxygen is too high
- d. The percentage of oxygen is too low

8. Other than carbon dioxide, which gas would you find more of in exhaled air?
- a. carbon monoxide
 - b. oxygen
 - c. nitrogen
 - d. water vapour

Annexure 6(D). (d)

Blood Circulation in Human Heart

Subject	Science
Class	X
Chapter/Unit	Life Processes
Topic	Transportation in Human Beings
Time	40 min (2 consecutive days for 4 groups)
Nature of Activity	Group

What will I learn (Learning Outcome)?

Students will develop the concept of blood circulation in heart

Skills: Applying, Analyzing, Creating

What I have to do? To develop the concept of transportation in human beings through collaborative approach.

What do I require? Handouts with dialogues(for the chambers in heart/ blood vessel), 40 Placards for a class of 40 students, Chart of Human heart

What do I need to know? Heart is muscular organ, for pumping blood through blood vessels of the circulatory system . Its size is approximately the same as the size of a closed fist. It sits in the chest, slightly to the left of center. As the heart contracts, it pumps blood around the body.

Teacher's Activity

- Teacher will
 - brief the activity.
 - show and explain the structure of heart with the help of chart.
 - divide the students in to 4 groups with 10 students in each group
 - assign roles to each group as-
 1. Narrator
 2. Right auricle
 3. Right ventricle
 4. Left auricle
 5. Left ventricle
 6. Venacava
 7. Aorta
 8. Pulmonary artery
 9. Pulmonary vein
 10. Septum
 - provide handouts for their role to each student in all the groups, a day before the activity.
 - prepare 40 placards with the ten roles written four times.

- provide 10 placards per group to be worn by the students according to their roles.

How will I proceed?

➤ Student's Activity

Students will present their dialogues in front of the class, one by one according to the following sequence.

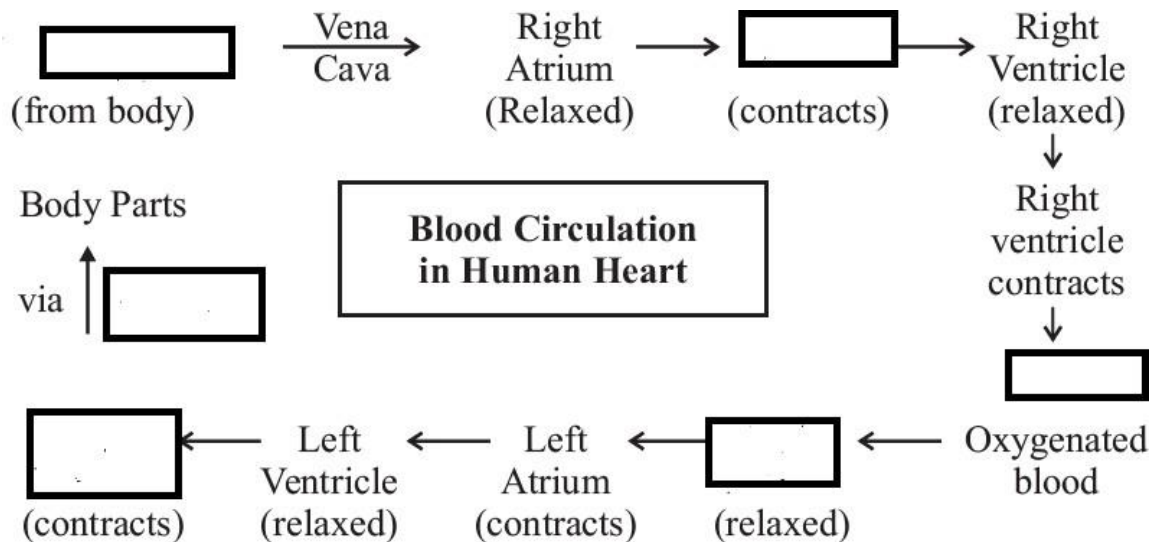
1. Student 1- Narrator
2. Student 2- Pulmonary vein
3. Student 3-Left Auricle
4. Student 4- Left Ventricle
5. Student 5- Aorta
6. Student 6- Venacava
7. Student 7-Right Auricle
8. Student 8- Right Ventricle
9. Student 9- Pulmonary artery
10. Student 10- Septum

What have I observed?

Put a tick in the right column

S. No.		A-RightAuricle B-Venacava	A-Left Auricle B-Pulmonary Vein	A-Right Ventricle B-Pulmonary arthey	A- Left ventricle B- Aorta
1.	This chamber A which receives oxygenated blood from lungs through this blood vessel B				
2.	This chamber A pumps deoxygenated blood to the lungs through blood vessel B				
3.	This chamber A receives CO ₂ rich blood from the body through blood vessel B				
4.	This chamber A pumps O ₂ rich blood to the body through blood vessel B				

What have I learnt?



What am I curious to learn?

Let us explore the mechanism of blood circulation in organisms with open circulatory system.

Let me evaluate myself

1. Name the blood vessels entering the heart and leaving the heart.
2. Why is circulatory system also known as transport system?
3. The walls of the left ventricle are thicker than the walls of all the chambers. Give reason.
4. Schematically represent blood circulation in human body.
5. Draw a well labeled diagram of Human Heart.

Dialogues for Role-play

1. Student 1- Narrator- Today we are going to meet the chambers of Heart- Right auricle,
Right ventricle, Left auricle and Left ventricle, blood vessels-Venacava,
Aorta
Pulmonary artery, Pulmonary vein and the partition between the chambers-
Septum.
They are going to talk about mechanism of blood circulation . Let's start with
Pulmonary vein.
2. Student 2- Pulmonary vein- Do you know, I am the only vein which carries
oxygenated blood.
I get pure oxygenated blood from lungs. I am called pulmonary which means
'pertaining to the lungs'. I carry oxygen rich blood from lungs to the upper
left chamber of the heart – left auricle.

(Student 2 will point towards Student 3)
3. Student 3-Left Auricle- Yes, I receive blood from my friend pulmonary vein.
I relax when I am collecting oxygen rich blood from pulmonary vein. Then I
contract, while I transfer the blood to left ventricle located below me. Over to
left ventricle
4. Student 4- Left Ventricle- I am the bottom left chamber of the heart. I expand
when I collect oxygenated blood from left auricle. I then contract to pump
blood out to the body through Aorta. Since ventricles have to pump blood to
various organs, we have thick muscular walls than atria.
5. Student 5- Aorta- Left ventricle pumps oxygen-rich blood into me. I am the
main artery. The blood travels from me to larger and smaller arteries and into
the capillary network. There the blood drops off oxygen, nutrients and other
important substances and picks up carbon dioxide and waste products. The
deoxygenated blood is now collected in veins.
6. Student 6- Venacava- Finally I transfer the impure CO₂ rich blood into the
upper right chamber of the heart i.e. Right auricle. I function as inferior and
superior venacava . Inferior vena cava carries blood from the lower part of
the body. The superior vena cava collects blood from the head and the arms.
7. Student 7-Right Auricle- I am the upper right chamber of the heart. I receive
deoxygenated blood from venacava. I expand while collecting the blood and

then contract and transfer it to the chamber positioned below me- Right Ventricle.

8. Student 8- Right Ventricle- I am the lower right chamber of the heart. I collect blood from right auricle. I expand while collecting the blood and contract to pump the blood in to the lungs through pulmonary artery.
9. Student 9- Pulmonary artery- Do you know I am the only artery which carries deoxygenated blood. I get impure deoxygenated blood from right ventricle. I carry CO₂ rich blood from the lower right chamber of the heart – right ventricle to the lungs for oxygenation. So, blood becomes pure and Oxygen rich in the lungs.
10. Student 10- Septum- I separate the atria and ventricles and form a barrier between the heart chambers. This prevents mixing of oxygenated and deoxygenated blood. Such separation allows highly efficient supply of oxygen to the body.