Co-ordination in Life Processes

One Mark Questions

1. **Suggest any two important habitual actions to your friend while eating food keeping in view of this chapter?**
   Ans. I will suggest my friend the following precautions while eating food.

    1. Do not swallow food without chewing properly.
    2. Do not eat food in a hurry and hectic manner.

2. **What is the use of saliva in our mouth?**
    1. Saliva maintains alkaline medium that helps digestion in stomach.
    2. Saliva moistens the food to make chewing and swallowing easier.

3. **What are the functions of the tongue?**
   Tongue is not only gustatory in function but also performs different functions including shifting and mixing the food in the oral cavity and swallowing.

4. **How can we recognize the taste?**
   Taste can be identified easily only when the tongue is pressed against the palate.

5. **What hormones are related to the hunger?**
    1. Ghrelin hormone is secreted in the stomach is responsible for hunger generating sensation.
    2. Leptin hormone suppresses hunger.

6. **Name the muscles that help in peristalsis?**
   Circular muscles and longitudinal muscles of oesophagus will help in peristalsis.

7. **What is meant by 'retropulsion'?**
   Small amounts of chyme is pushed into the duodenum simultaneously forcing most of it back into the stomach, which is known as 'retropulsion'.

8. **What is the main function of villi?**
   Villi increase the area of absorption of nutrients so that the food retained in the folds can remain longer, thereby enhancing absorption.

9. **What are the systems involved in the process of digestion?**
   Muscular system and nervous system are involved in digestion.

10. **What is meant by 'grinding'?**
    The most vigorous peristalsis and mixing of action occur close to the pylorus, which is called 'grinding'.

Two Mark Questions

1. **What do you mean by hunger pangs?**
   Ans:
   1. Hunger pangs are nothing but hunger generating signals that reach the brain from the stomach due to the secretion of a hormone called "ghrelin".
   2. When glucose levels in the blood fall, we get hunger pangs in the stomach
   3. Then "ghrelin" hormone is secreted from the cells of the stomach wall then 'hunger contraction' start in the stomach.
   4. Hunger pangs continue up to 30-45 minutes. Increase of ghrelin levels results in sensation of hunger and motivation to consume food.

2. **What are the organ systems involved in digestion of food which we eat?**
   Ans:
   1. Circulatory system, digestive system, central nervous system and endocrine system are the systems involved in the process of digestion.

3. **Rafi said smell also increase our appetite can you support this statement. How?**
   Ans:
   1. Rafi's statement is correct.
   2. Taste and smell are closely related.
   3. Anyone with severe cough and cold cannot make out the difference in tastes of certain food items. It is due to the failure in the combination of taste and smell.
   4. Interaction between the senses and taste enhance our perceptions of the foods we eat.

4. **What is mastication?**
   Explain the role of different sets of teeth in this process.

   1. The grinding chewing and shredding of food in the oral cavity with the help of teeth is called "mastication".

2. Incisors have sharp edges and very useful in biting the food to make small pieces
3. Canines have sharp and pointed edges which are very helpful in piercing (or) tearing the food especially, in carnivores these canines are very useful in piercing the flesh.
4. Molars and premolars have blunt and nearly flat surface. These are also called “grinding teeth”
5. Which help in grinding the foods like nuts, peas and ground nuts etc.

5. **Is there any reason for the intestine to be coiled with many folds? In what way it is helpful during the process of digestion?**
   Ans.
   1. Yes there is a specific reason for the intestine to be coiled with many folds.
   2. The inner surface of the small intestine contains thousands of finger like projections called villi.
   3. These villi increase the surface area so that the food retained in the folds can remain longer thereby enhancing absorption.

6. **How the taste and smell are related?**
   Ans:
   1. Taste and smell are closely related.
   2. It is evident in how we perceive the flavors of food.
   3. During severe cold and cough we cannot make out the difference in tastes of different food items.
   4. When a food is hot and delicious with spicy smell, we feel tastier while eating the food.
   5. The interaction between the senses of taste and smell enhance our perceptions of the foods we eat.

7. **If size and shape of small intestine is like oesophagus what will happen?**
   Ans:
   1. The complete digestion of entire food would not take place.
   2. The absorption of selective nutrients would not occur.
   3. The body suffers from starvation of nutrients. It becomes lean and weak.
   4. All the food taken into the body is expelled out only after completing partial digestion in stomach. Hence, the availability of energy to the animal is low.

8. **Explain the importance of mucus on the walls of food pipe?**
   Ans:
   1. The walls of the food pipe secrete a slippery substance called 'mucus'.
   2. Mucus lubricates and protects the oesophageal walls from damage.
   3. This helps in the food bolus to side down easily just as the oily potatoes that move in the tube.
   4. Mucus also aids in easy movement of food, which moves into the stomach.

9. **The mere smell or sight of food stimulates hunger.**
   Ans:
   1. When we smell, the air bone substances get dissolved in the watery film of nasal mucus.
   2. The chemo receptors in nose are otherwise called 'olfactory receptors' which trigger signals in the form of nerve impulses to the brain where smell is detected.
   3. Similarly, we see the food, the retina forms the image and the optic nerve carries the impulse to the optic lobes in the brain.

10. **How do you appreciate stomach as a churning machine? How does this coordination go on?**
    Ans:
    1. Our stomach is not like a bag with specific volume. It is like a pouch which is elastic in nature.
    2. The contraction of the stomach muscles squeeze and mix the food with the acids and juices of the stomach.
    3. Due to this churning, the bolus becomes a smooth porridge like consistency called "chyme". The large protein molecules are also broken down here.
    4. As the contractions in the stomach decreases, prompts the pyloric sphincter at the opening of the stomach and duodenum to relax.
    5. Hence, I appreciate the role of stomach as a churning machine in the process digestion.

Four Marks Questions

1. **Write a note on peristalsis and sphincter function in stomach ?**
   Ans: a. Peristalsis:
   1. The wave like movement of wall of oesophagus with the help of circular and longitudinal muscles that propel the food, bolus into the stomach are called "peristaltic" movements.

2. Contraction of the circular muscles results in narrowing of oesophagus just behind the "bolus". Due to this, the food squeezed downwards.
3. Contraction of the l muscles in front of the bolus widens the tube. This results in the shortening of that part of the oesophagus.
4. This is involuntary and under the control of autonomous nervous system.
5. "Mucus" secreted by the walls of oesophagus also helps in the sliding of bolus in the food pipe.

B) Pyloric Sphincter:

6. Pyloric sphincter is a muscular part present at the opening of the stomach and duodenum.
7. As the process of digestion in the stomach nears completion, the contractions of the stomach decrease.
8. This prompts the opening of the pyloric sphincter and opens the pathway into duodenum releasing the partially digested food (chime) in small quantities into the duodenum.

2. **Observe the given part of the digestive system. What is it? What is it's role during digestion?**
   Ans:
   1. The given part of the digesting system is intestine.
   2. It plays a vital role in the process of digestion.
   3. When the food enters the intestine the acidic nature of the food (chyme) initiates the production of hormones like 'secretin' and 'cholecystochinin' which stimulate pancreas, liver and walls of small intestine to secrete 'pancreatic juice' and 'succus entericus'.
   4. Due to their actions, glucose, amino acids and fatty acids are formed. They are absorbed by the intestinal blood capillaries. Villi are very helpful to increase the area of absorption.
   5. The unwanted waste materials reach the large intestine. The peristaltic waves move the stool into the rectum.
   6. Water gets absorbed and remaining waste material is later expelled out of the body through anus.

3. **Give Reasons.**
   a) If we press tongue against the palate we can recognize taste easily.
   b) We can't identify taste when food is very hot.
   c) If glucose level falls in blood we feel hungry.
   d) Small intestine is similar to a coiled pipe.
   e) Urination increases when we take lot of fluids.

f) The process of digestion goes on in a person whose central nervous system has been largely affected.

Ans:

a) When the tongue is pressed against the palate the food substance is pressed against the opening of the taste bud letting it to reach the taste cells and triggering taste signals. Finally, the taste is recognised by the brain.

b) The taste buds become paralyzed due to extreme heat of the food. So, they can't recognise the taste of food.

c) When glucose levels in the blood fall, we get hunger pangs in stomach. The reason for this is, a hormone called "ghrelin" is released into the blood when the stomach is empty.

d) The small intestine is just like a coiled tube. In order to increase the area of absorption, the small intestine is just like a coiled tube the inner surface of the wall of the intestine contains thousands of finger like projections called villi. These villi increase the surface area so that he food retained in the folds can remain longer thereby enhancing absorption

e)

1. when we take lot of fluids urination increases.
2. It is because; the person has consumed more fluids than actually needed.
3. Kidney expels this extra water in the form of urine.

4. **Write difference between the following.**
   a) Bolus –Chyme
   b) Small Intestine-Large Intestine
   c) Mastication -Rumination
   d) Propulsion-Retropulsion

A)

Bolus	**Chyme**
1). It is the food which is in the form of 'slurry mass'.	1). It is the food which is in the form of a 'smooth porridge'-like consistency.
2). This is formed due to mastication.	2). This is formed due to enzymatic action.
3). This is formed in the buccal cavity.	3). This is formed in the stomach.

B)

Small Intestine	**Large Intestine**

1). The diameter of the small intestine is lesser than large intestine.	1). The diameter of the small intestine is greater than small intestine.
2). Digestion of food is completely done here.	2). Absocrption of the water from the remaining wastes occurs here.
3) 'Sucuus entericus' is secreted.	3) 'No enzymes 'are secreted.
4) Villi are present.	4) Villi are absent.

C)

Mastication	**Rumination**
1). During mastication, food size becomes conviniet to swallow.	1) During rumination small pieces food is completely chewed and swallowed.
2) Mastication occurs in man	2) It can be seen in ruminants only like cows and buffaloes.
3) After mastication, the bolus is moved with the help of peristaltic movements.	3) Reverse peristolosis occurs and the food moves from stomach to the mouth and starts chewing.

D)

Propulsion	**Retropulsion**
1). In this, peristaltic waves move food from one part to other part.	1) Small amounts of chyme is pushed into the duodenum, simultaneously forcing most of it back into the stomach.
2). It is forward in direction.	2). It is backward in direction.
3) It occurs in the front portion of the stomach.	3) It occurs in the hind portion of the stomach.

5. **How can you say that mouth is a munching machine?**
   Ans:
   1. There is need of mechanical crushing of food. Hence the food in the mouth has to be broken down into tiny pieces to increase the surface area for action of substances that help in digestion.
   2. Teeth help in chewing food material.
   3. The circular muscles of the food to be pushed into the oral cavity and to be moved around.
   4. The teeth grind; chew and shred it. This process is called mastication.
   5. The surface muscles of the jaw help in biting and chewing actions during food mastication.

6. The teeth help in cutting and grinding while tongue helps in spread out the food and help in mixing it with saliva.
7. Thus, mouth acts as the munching machine.

6. **During the journey of food from mouth to stomach through oesophagus. How muscular system coordinate in this process?**
   Ans:
   1. The circular muscles of the mouth enable the food to be pushed into the oral cavity and to be moved around.
   2. During the mastication, the surface muscles help in the chewing and biting actions. Thus, the muscles of the mouth enable the food to push in to the oral cavity and to be moved around.
   3. The wall of the oesophagus is made up of two kinds of smooth muscles viz.
      i) Circular muscles and
      ii) Longitudinal muscles.
   4. Contraction of the circular muscles results in narrowing of the oesophagus just behind the bolus. So, the food is squeezed downwards.
   5. Contraction of the longitudinal muscles in front of the bolus widen the tube, this results in shortening of the particular part of the oesophagus.
   6. Contraction and relaxation of these muscles dring in a wave like motion that propels the food bolus into the stomach by the action called as “peristalsis”.

7. **What is the function of peristalsis in these parts?**
   a) Oesophagus
   b) Stomach
   c) Small Intestine
   d) Large Intestine
   Ans: a) The peristaltic movements in oesophagus propel the food bolus into the stomach.
   b) The peristaltic movements in stomach prompt the musular part, called as pyloric sphincter which is present at the opening of the stomach and duodenum to relax. This results in the movement of partially digested food (chyme) into the duodenum.
   c) The peristaltic movements in the small intestine result in the releasing of undigested food into the larger intestine.
   d) The peristaltic movements in the larger intestine prompt the muscular sphincter to relax. This results in expelling of smelly yellowish faecal mass to outside the body.

8. **How can you justify the enteric nervous system as the second brain of the gut?**
   Ans:
   1. The nervous apparatus of our digestive tract comprises of a vast and complicated network of neurons, nicknamed by scientists as the "second brain".
   2. This second brain acts as the connection with the brain and partly determines the mental state and plays a vital role in certain diseases throughout the body.
   3. "The enteric nervous system" (or) the second brain consists of sheaths of neurons embedded in the walls of the long tube of our gut which about 9 meters length.
   4. The second brain contains some 100 million neurons, more than either the spinal cord or peripheral nervous system.
   5. Due to the presence of these neurons, we "feel" the inner world of our gut and its contents.
   6. Stimulating, coordinating the breakdown of food, absorbing nutrients and expelling of waste requires chemical processing, mechanical mixing and rhythemic muscle contractions are completely under the control of enteric nervous system.

9. **Rajesh feels hungry upon seeing food. Sheela says no to food as she is not hungry. What makes Rajesh hungry and what suppresses Sheelas hunger?**
   Ans:
   1. Rajesh feels hungry on seeing the food. The reason for this secretion of hormone "ghrelin". It is secreted when the stomach is empty.
   2. Due to 'ghrelin' secretion hunger contractions start to occur in the stomach. Because of that, Rajesh feels hungry.
   3. Sheela refused to take the food because her stomach is full and there is no need of food any more.
   4. When the stomach is full and there is no need of food anymore, a hormone called "leptin" is secreted that suppresses hungry.
   5. Because of the secretion of "leptin", Sheela's hunger is suppressed.

10. **List out the sphincter muscles of the food canal you have observed and give a brief description?**
    Ans:
    1. **Pyloric Sphincter:**
       1. It is present at the opening of the stomach and the first part of the small intestine.

2. This sphincter allows the partially digested food in small quantities into the duodenum.

2. **Anal Sphincter:**
    1. This is the muscular that help in the opening and closing of the aperture of the digestive canal.
    2. This helps in the expulsion of stools from the body.

3. **Urinary Bladder Sphincter:**
    1. These are two sets of circular sphincter muscles present in the urinary bladder.
    2. When the bladder is filling up both these muscles are constricted in order to close the exit.
    3. The upper sphincter is having automatic reflex action with regard to the pressure of the urine.
    4. But the lower sphincter in contrast is under the control of the will and the urine can still be retained until this muscle is relaxed.

11. **What happens if salivary ducts are closed?**
    Ans:
    1. Any food substance when placed on the tongue gets dissolved in the saliva secreted by salivary glands in the mouth.
    2. When the tongue is pressed against the palate, this dissolved food substance is pressed against the opening of the taste bud and triggering the taste cells finally taste is recognized in the brain.
    3. If the salivary glands are not functioning the taste of the food can't be recognized.
    4. Beside that, mucous present in the saliva makes the food sticky and helps its passage easy. If they are not properly functioning, swallowing of solid food becomes very difficult.
    5. Saliva acts as a useful solvent dissolving the chemical substances present in food. If it is not secreted, chemical substances are not dissolved in the mouth.
    6. The enzyme called 'ptyalin' converts starch into dextrose and maltose. This partial digestion of starch would not occur if saliva is not secreted.

12. **What experiment should you perform to understand action of saliva on flour? Explain its procedure and apparatus that you followed?**
    Ans: Aim: test tubes, saliva, starch powder, iodine solution, paraffin wax.
    Procedure:

1. keep a piece of paraffin wax in your mouth and collect saliva into a test tube and filter it.
2. Take ¼ spoon of starch in a beaker, add little water and mix it. Then heat it and prepare 200 ml of starch solution.
3. Take 10ml of starch solution into a test tube and add 2 drops of iodine solution to it. The colour of the starch changes into blue.
4. Now divide it in to two parts. To one part add 5ml of water to other part add 5ml of filtered saliva.
5. Keep the tubes in a test-tube stand. Examine the test tube to after every few minutes for any colour changes.

Observation :

we will not find any colour change in the test tube to which water is added.

6. The solution of the test tube to which saliva is added, shows colour change.
   Inference: The saliva acts on starch solution and converted it into simple sugars like maltose and dextrose. Hence, the colour change in the solution.

13. **Suggest a simple experiment to prove the role of palate in recognizing taste?**
Ans: Aim: to prove that palate plays a major role in recognizing taste.
Apparatus: sugar crystals, stop watch.
Procedure:

1. Place some sugar crystals on your tongue doesn't touch the palate.
2. Record the time from the moment you placed the crystals on your tongue till you got the taste by using stop watch.
3. Now repeat the test by placing the sugar crystals on your tongue and pressing it against the palate till you got the taste by using stop watch.

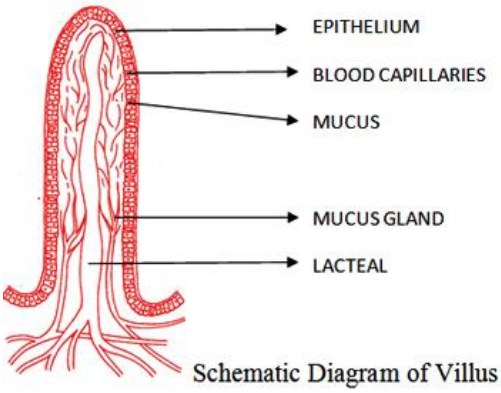
Observation: the taste is identified easily when tongue is pressed against the palate.
Inference: when the tongue is pressed against the palate the food substance is pressed against the opening of the taste bud letting it to reach the taste cells and triggering taste signals and finally taste is recognized in the brain.

14. **Collect information related to feeling hunger from your school library and prepare a note on it?**

Ans:

1. Russian scientist Ivan Pavlov (1849 to 1936) has conducted experiments on conditioning with dogs.
2. He discovered that dogs produced extra saliva when they were offered food. This is natural response to a stimulus.
3. Pavlov noticed that saliva is excreted when the person who fed them came into the room, even if the person had not brought any food.
4. Pavlov went on to ring bell at the start of feeding time and eventually the dogs produced extra saliva when they heard the bell, before any food was brought in.
5. A dog salivating when it hears a bell is not a natural response. The behavior has been learned. It's called a conditioned response.

15. Explain how digestive system coordinate with circulatory system?



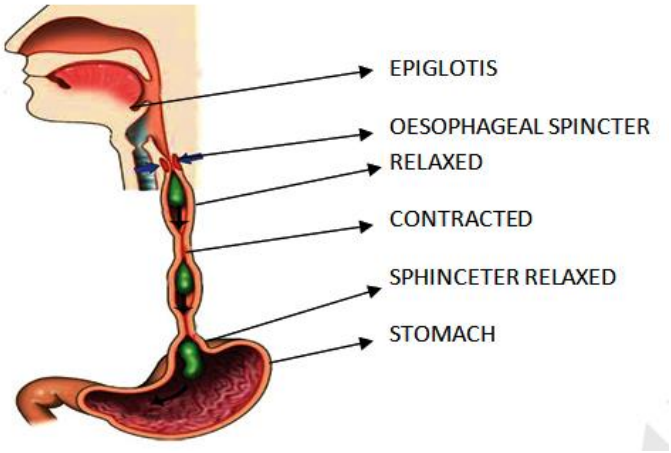
Schematic Diagram of Villus

1. **Schematic Diagram of Villus**

Ans:

0. Small intestine is the main region for the absorption of digested food.
1. The walls of the small intestine is richly supplied with blood capillaries. A finger like projections called villi, increase the area of absorption of nutrients.
2. Due to villi, the large surface of the intestine helps in the rapid absorption of digested food.
3. The blood carries digested and dissolved food to all the parts of the body where it becomes assimilated as part of the cells.
4. The energy is released by the oxidation of assimilated food in the cells, during respiration.
5. The digested food which is not used by our body immediately is stored in the liver in the form of 'glycogen'. This 'glycogen' can be used as a source of energy in our body.

16. Show the movement of food from mouth to the stomach with the help of diagram. What muscles and nerves are involved in the movement of food and what is this action called?



1. **Ans:**

    1. When the food is placed in the mouth, the circular muscles of mouth enable the food to push into the oral cavity and to be moved around.
    2. The teeth grind and shred the food. This process is called mastication.
    3. The teeth help in cutting and grinding the food. The muscles of the mouth enable the food to be pushed in the oral cavity and to be moved around.
    4. The fifth cranial nerve has been found to control the movement of muscles in the jaw.
    5. Under the action of autonomous nervous system saliva is secreted to make the swallowing easier. As a result of chewing, food forms a slurry mass called “bolus”.
    6. The mechanism for swallowing is also under nervous coordination and its control centre is ‘medulla oblongata’.
    7. The wall of the esophagus is made up of two kinds of smooth muscles and longitudinal muscles.
    8. The contraction and relaxation of these muscles bring a wave like motion called “peristalsis”. This action is involuntary and under the control of autonomous nervous system.

17. There is a great variety in diversified life processes, express your feelings in the form a poem?
Ans:
Nutrition, excretion, respiration
All are essential for our life

Control and coordination are
Much needed to lead a balanced life
Reproduction makes our species
Go on and on forever.
Autotrophs and heterotrophs are brothers
And depend on each other in a systematic way.
Thus, making the human beings in a stable tray.

17. How can you show that taste is affected by the sense of smell?
Ans: Aim: Taste is affected by the sense of smell.
Requirements : zeera, sounf, potato slices and apple.
Procedure:

a. First close your nose with your fingers.
b. Pop in some zeera in your mouth and chew it for some time.
c. After sometime, wash your mouth and repeat the activity by chewing a piece of an apple followed by a potato (remember to close your nose).

Observations:

d. Recognition of taste is delayed.
e. It takes much longer time to identify the taste.

Conclusion:

f. We can taste the food that is in the form of liquid only.
g. When we smell, the chemo receptors in the nose trigger signals in the form of nerve impulses to the brain where smell is detected.
h. Without the smell of the food, recognition of taste is delayed.

18. How do you show the breakdown of food by using the model of chalk piece kept in vinegar?
Ans: Aim: To show the breakdown of food by using the model of chalk piece.
Requirements: beakers, plastic water bottles, vinegar, pieces of chalk.
Procedure:

i. Break a piece of chalk into two halves crush one half into tiny pieces leaving the other as it is.
j. Take two small mineral water bottles, cut them into two equal halves and discard the upper portion. Now fill them half with vinegar and add the crushed chalk to one beaker and the other uncrushed half chalk to the other observe this for half an hour.

Observation:

k. The crushed chalk kept in the vinegar quickly broken down into small particles. Inference: mechanical crushing in necessary for the food to increase the surface area for action of substances that aid to digestion.

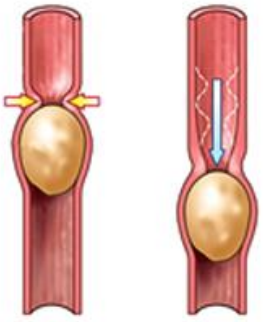
19. Perform an activity to show the functions of different teeth in man?
Ans: Aim: to show the relation between shapes and their function in man.
Requirement: Plaster of Paris dentition model.
Procedure: observe the relation between their shape and their function.
Inference:

l. The dental formula of man is 2123 /2123
m. Incisors have sharp edges and useful to bite the food substances. Canines have sharp and pointed edges useful to pierce the meat.
n. Molars and premolars have blunt and nearly flat surface. They are useful to grind the food substances.

20. How do test the pH of mouth at intervals of one hour?
Ans: Aim: To test the ph of mouth with the help of pH paper
Requirements: pH indicator paper (with a colour chart).
Procedure:

o. Take the pH paper from your lab and touch it to your tongue.
p. Match the colour with the colour chart and note the pH value.
q. Take some readings after having lunch, fruits or breakfast. Take at least four readings compare the readings with your colour chart.
r. Test with different types of food as you eat them and check just after you have swallowed them. Findings: it is found that the saliva secreted causes the medium to change to alkaline as it aids in action of enzyme, salivary amylase.

21. How do you demonstrate the forward movement of bolus in oesophagus?



1. **Ans: Aim:** to show the movement of food in the oesophagus with the help of a rubber tube.
   Required materials: waste cycle tube piece, two potatoes, lubricant oil.
   Procedure:

    1. Take a piece of waste cycle tube and insert one or two potatoes into it.
    2. Lubricate the inner side of the tube with oil. Smear the oil over potatoes.
    3. Insert oil coated potatoes in the tube now try to push the potatoes by squeezing the tube.

       Observation: the potatoes move like waves and make a forward movement simply sliding through the rubber tube.
       Inference: this shows that the bolus moves in the oesophagus through a lubricant passage (mucus) that is secreted by the walls of oesophagus.

22. How do you demonstrate an experiment showing how the stomach is protected from its own acid secretions?
Ans: Aim: to show that mucus protects the stomach lining from its acid secretions.
Required material: green leaves, grease, weak acid like sulphurus acid.
Procedure:

4. Take two similar green leaves.
5. Grease one leaf with petroleum jelly and leave the other free.
6. Add 1 or to drops some weak acid on both the leaves (sulphurus acid).
7. Observe them for half an hour.

Observations:

1. The leaf that has petroleum jelly coating is not affected by the action of the acid.
2. The normal leaf has got the acid affect. The leaf has damaged.

Inference: The petroleum jelly protected the leaf acidic action. Like this petroleum jelly, our stomach wall is also coated with mucus layer which protects the stomach from the action of hydrochloric acid.