

Handbook on Scientific Literacy for PISA 2021



Education Department Chandigarh

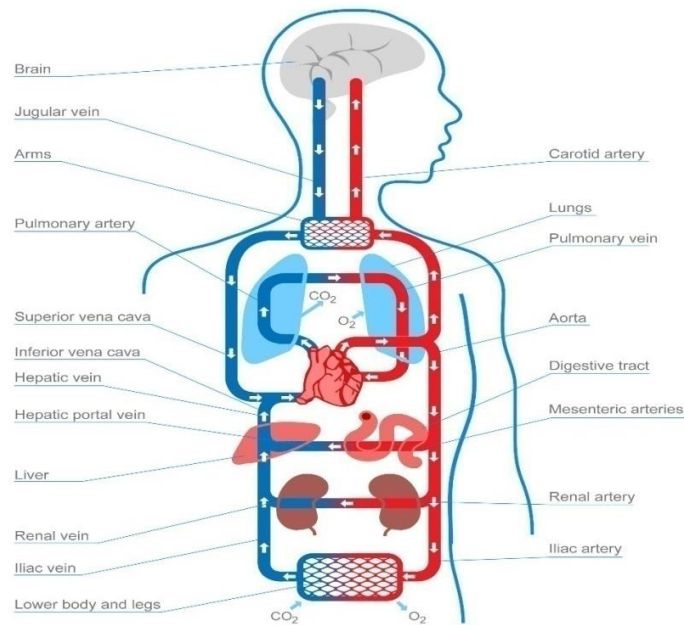
HEALTH

H1. CIRCULATORY SYSTEM

Study the diagram given below and answer the questions which follows:

The circulatory system consists of three independent systems that work together: the heart (cardiovascular), lungs (pulmonary), and arteries, veins, coronary and portal vessels (systemic). The system is responsible for the flow of blood, nutrients, oxygen and other gases, and as well as hormones to and from cells.

THE CIRCULATORY SYSTEM



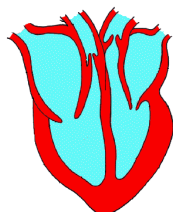
Q.1 Which type of blood vessels carries blood away from the heart?

- Veins
- Arteries
- Capillaries
- Arteries, veins and capillaries

Q.2 When oxygen-rich blood leaves the lungs for the heart, it enters the heart through the pulmonary vein into the _____

- left ventricle
- right atrium
- right ventricle
- left atrium
- None of these

Q.3 Use the diagram of the heart given below to answer the given questions:



Which part of the heart has the thickest walls?

- A. Right ventricle
- B. Left atrium
- C. Left ventricle
- D. Right atrium

Q.4 The blood vessel that carries deoxygenated blood from the body to the right side of the heart is called the_____.

- Pulmonary vein
- aorta
- pulmonary artery
- vena cava(e)

Q.5 Which one of the following describes a vein?

- It has thin walls and carries oxygenated blood away from the heart.
- It has thick walls with valves and carries blood under pressure.
- It has a very thin wall with valves and carries blood under pressure.
- It has thin walls with valves, and carries blood to the heart.

Q.6 Complete the table below by listing a part of the circulatory system and the pathway the blood takes. One item has been completed to help you.

Part of circulatory system	Pathway
1. Pulmonary artery	Takes deoxygenated blood out of the heart.
2.Aorta	
3. Right ventricle	

Answer Key

1. Full credit

- Score 1: B. Arteries
- Score 0: Other responses

2. Full credit

- Score 1: D. Left Atrium
- Score 0: Other responses_____

3.Full credit

- Score 1: C. Left ventricle
- Score 0: Other responses

Q 4 Full credit

- Score 1: D. vena cava(e)
- Score 0: Other responses

Q 5 Full credit

- Score 1: D. It has thin walls with valves, and carries blood to the heart
- Score 0: Other responses

Q 6 Full credit

Score 1: Takes oxygenated blood away from the heart to the body.

Score 1: Pumps blood out of the heart to the pulmonary artery.

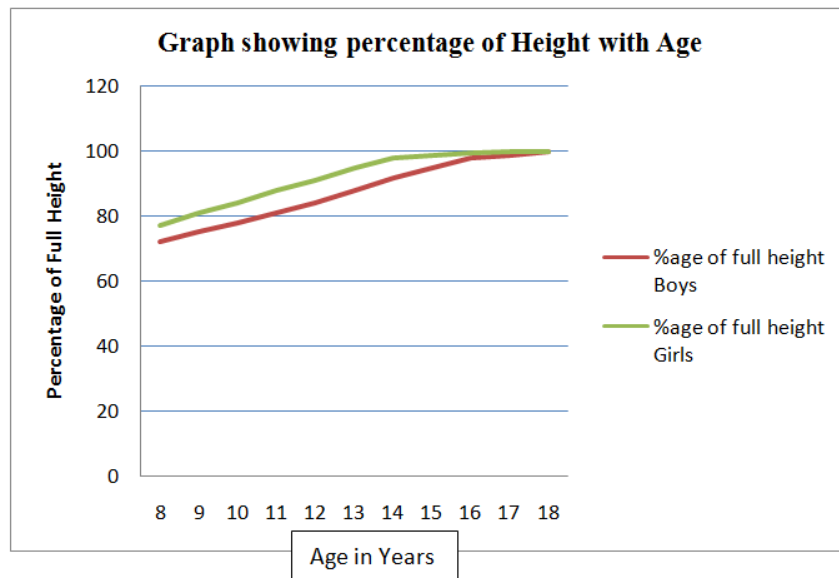
Score 2: for writing both the statements correctly.

Score 0: Other responses

H2. THE AGE OF ADOLESCENCE

Age	%age of full height	
In years	Boys	Girls
8	72%	77%
9	75%	81%
10	78%	84%
11	81%	88%
12	84%	91%
13	88%	95%
14	92%	98%
15	95%	99%
16	98%	99.5%
17	99%	100%
18	100%	100%

Calculation for full height (in cm) = $\frac{\text{Present height (cm)} \times 100}{\% \text{age of full height at this age}}$



- Q1. The maximum growth in girls shown above data
(a) 8-9 years (b)10-11 years (c)12-13 years (d) All of these
- Q2. A boy is 10 years old and 125 cm tall. At the end of the growth period he is likely to be
- Q3. In which age girls & boys attained full height?
- Q4. By using data calculate the full height of a boy & a girl (both are 12 years old and having the height 130cm).
- Q5. How much do you agree the following statement pick only one box in each row?

	Strongly agree	agree	disagree	Strongly disagree
a. Height depends on the genes inherited from parents				
b. Height depends only on balance diet				
c. We can enhance our height by doing physical exercise				

Answer Key

1. Full credit for option (d).
2. 160.2cm
3. Full height at the age of - 18 years.
4. (1) Full height of a boy is -154.7cm.
(2) Full height of a girl is -142.8cm.

H3. Computer Vision Syndrome (CVS)

Source:<https://www.rebuildyourvision.com>

CVS (sometimes referred to as digital eye strain) describes vision problems that are caused by too much time spent on a computer, tablet, smart phone, or any other digital device.

Don't think that office workers (or desk jockeys) are the only people affected by CVS. If you have a digital device, you're also prone to CVS. If you're living in the 21st century, chances are you have at the very least one digital device (younger people tend to have multiple). There's no doubt that digital devices are the main cause, but CVS can actually be caused by a number of screen-related issues.

The first is blue light. Most screens emit blue light, which is a light that is quite disagreeable. Our eyes filter out most natural blue light, but when it comes to screens where the light is much more concentrated, our eyes have a harder time filtering.

Another cause is the worsening of an existing vision problem. Sometimes screens can worsen undiagnosed vision problems.

CVS can also be caused by the size of the writing on screens. Unlike the letters on a physical page, the letters on a screen are not well defined (though it may look like they are) and cause our eye to have to focus more in order to read the letters. Aside from that, font sizes are often too small causing even more strain.

1. Out of Myopia and Hypermetropia, which is more common in children?
2. Can reading an e-book be more taxing for your eye as compared to a regular physical book? Give reason for your answer.
3. Keeping in view the advantages of the internet, it is not possible for anyone to keep away from digital devices. Suggest any three ways in which CVS can be avoided or minimized.
4. Give your response on the basis of your observation given below

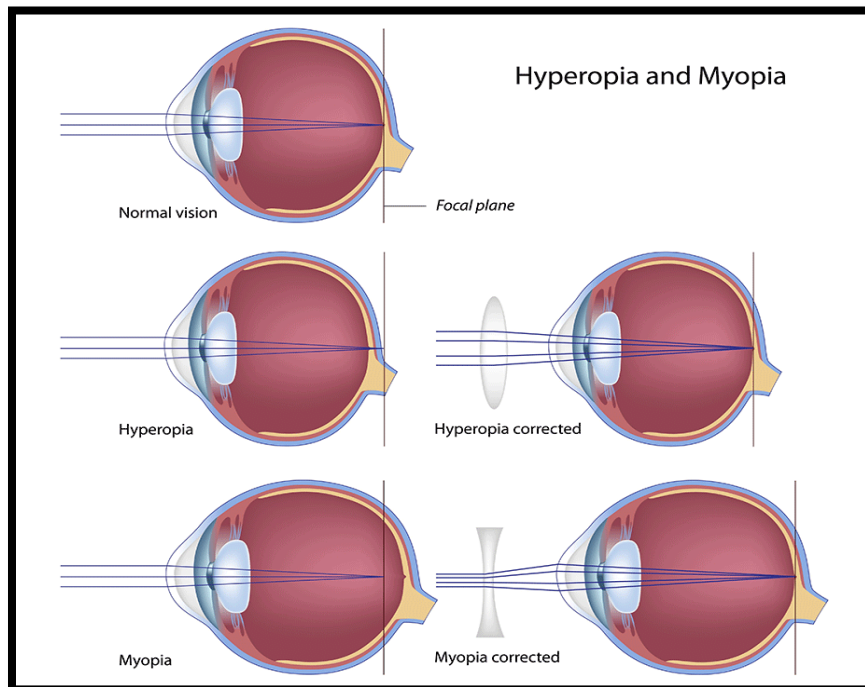
S.No.	Observation	Strongly agree (a)	Strongly disagree(b)	Partially agree(c)	Partially Disagree(d)
1.	Reading books in poor light conditions can cause CVS				
2.	Mobile phones are more responsible for CVS than movie screens.				
3.	Computer operators must undertake short breaks at regular intervals.				
4.	A person wearing spectacles is protected. He/she has no risk of CVS.				

Answer Key:

1. Myopia (2 marks)
2. Yes. Prolonged exposure to screen will put stress on eyes due to blue light.
Many Font sizes are either too small or poorly formed putting more strain on the eyes.
(both points – 2; any one point-1 mark)
3. a) Limit screen time.
b) take breaks to exercise/ Avoid prolonged use.
c) Use good quality screen guards.
d) Go for regular checkups.
(any 2 methods -including any other valid point- 2 marks, 1 valid suggestion- 1 mark,)
4. 1 b, 2a, 3a, 4b (any 3 correct – 2marks, 2 or 1 correct- 1 mark, none correct- 0)

H4. Defects of Vision

(Source: <http://www.opticalmasters.com>)

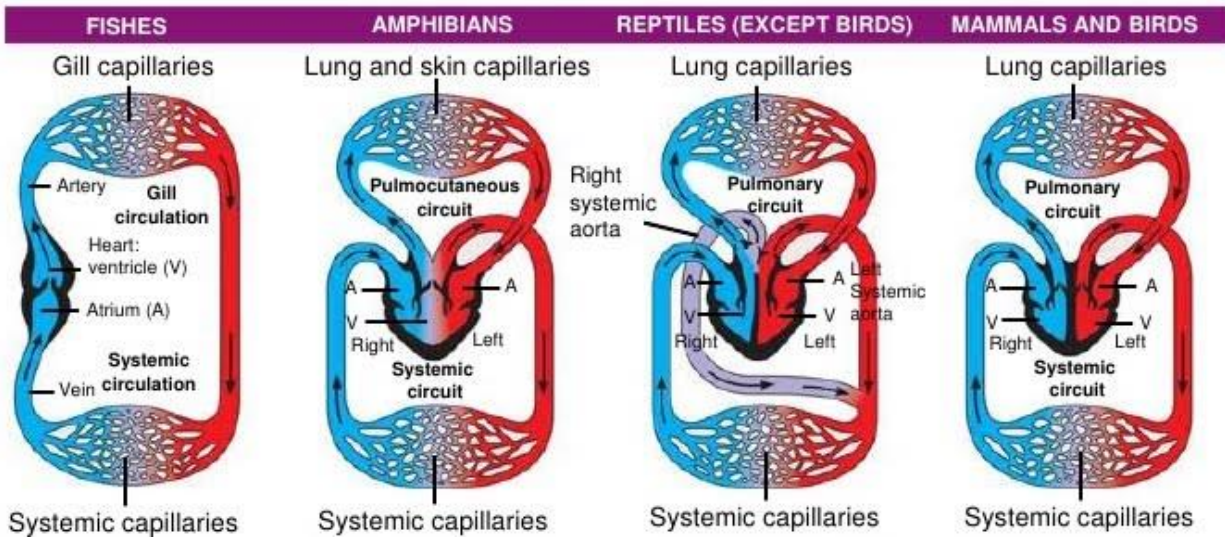


1. Name the part of the eye that functions as the screen.
2. Sarah has been diagnosed with a defect of vision. Do you think there may be a change in the size of her eyeballs? What are the possibilities?
3. Considering that Rohan is advised to wear concave lens, how has the converging power of his eyelens changed?
4. Tina is not able to read the text written on the blackboard from the last seat of her classroom. Assuming that the board is around 6m from her, find the power of the lens she must wear to restore proper vision.

Answer Key:

1. Retina
2. In myopia, eyeball elongates. In hyperopia, eyeball shortens.
3. Converging power of lens as increased.
4. -0.16 D

H5. Evolution of Vertebrate Heart



Q1 Name the organism which is having single circulation?

- a) Fishes b) Frogs c) Crow and d) Dogs

Q2 What is systemic and pulmonary circulation?

Q3 Arteries normally carry oxygenated blood. Name an artery which carries de-oxygenated blood.

Q4 Veins and arteries connected through:

- a) Joints
b) Nerves
c) Muscles
d) Capillaries

Q5 Find the correct/incorrect answer for the following

- a) Fishes have venous hearts
b) Amphibians and reptiles have oxygenated and de-oxygenated blood separate from each other.
c) Mammals have two auricles and one ventricle.
d) Birds and mammals have double circulation and complete separation of oxy and de-oxygenated blood.

Answer Key

1. a
3. Pulmonary Artery
4. d
5. Correct, Incorrect, Correct, Correct

H6. Inheritance (Mandel's Law)















CHARACTER	DOMINANT TRAIT	RECESSIVE TRAIT
Seed shape	 Round	 Wrinkled
Seed colour	 Yellow	 Green
Flower colour	 Violet	 White
Pod shape	 Full	 Constricted
Pod colour	 Green	 Yellow
Flower position	 Axial	 Terminal
Stem height	 Tall	 Dwarf

Fig. Mendel's seven different unit characters

Q1. Name the contrasting characters used for the height of the stem.

- a) Tall
- b) Dwarf/Tall
- c) Intermediate
- d) Short

Q2. A red colored flower is crossed with white flower. Mention the color which would appear in F1 generation and why?

Q3. Can we compare Mendel's factor with the present day genes or not?

Q4. Name the various contrasting characters depicted above in the picture

Q5. Answer the following in either Yes or No.

- a) A dominant character will appear in homozygous and heterozygous condition.
- b) A recessive character will always appear in heterozygous condition.
- c) Phenotypic ratio of monohybrid crosses is 3:1.

Answer Key

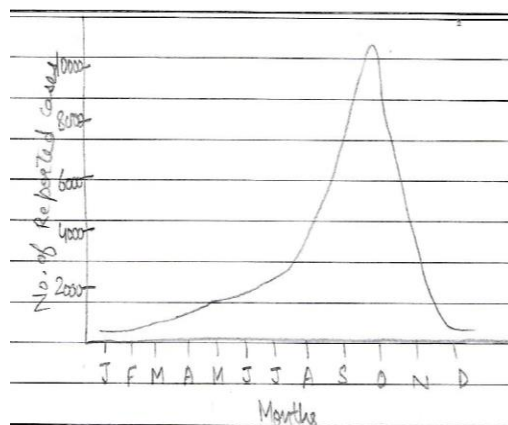
- 1. b
- 2. Red will appear in F1 as it is dominant.
- 3. Yes
- 4. Height, colour, etc.
- 5. Yes, No, Yes

H7. Malaria



Malaria is world's major infectious disease. There are about a hundred million cases of malaria each year & more than two million die of the disease. It is caused by a parasite known as plasmodium which is carried by the female anopheles mosquito. When the infected mosquito bites a person, the parasite enters the blood stream and quickly invades the liver. It goes to RBCs and multiply quickly. Symptoms include repeated attacks of shaking, high fever, headache and profuse perspiration. Mosquitoes also cause Dengue fever, another dangerous disease that have claimed many lives in the past few years. Mosquitoes need stagnant water to lay and develop eggs. Water left standing in roof gutters, flower vase, drains, water coolers serve as ideal breeding grounds for them.

1. Name the causative parasite and carrier of Malaria.
2. Which is the first site of attack of parasite in human body?
3. As an individual, what preventive measures you can take to decrease the incidence of Malaria in your locality?
4. Study the graph and answer. In which month should a child be administered Malaria vaccine?



5. What are the Conditions for max growth of mosquitoes?

6. Why the number of Malaria cases steeply increase in Aug – Nov months?

Answer Key

1. Plasmodium, female anopheles mosquito – (score 2) Plasmodium, mosquito – (score 1)

Any other answer -- (score 0)

2. Liver – (score 2)

Bloodstream – (score (1)

Any other answer – (score 0)

3.

1. Eradicate breeding ground of mosquito

2. Use mosquito repellants

3. Use of mesh nets

Any 2 correct points – (Score 2)

4. August/September – (Score 2)

July-October - (Score 1)

Any Other answer – (Score 0)

5. Optimum Temperature & high humidity -- (score 2)

One factor – (Score 1)

Any other Answer (Score 0)

6. Breeding ground of mosquitoes, _____ conditions – (Score 2)

Any other answer – (Score 0)

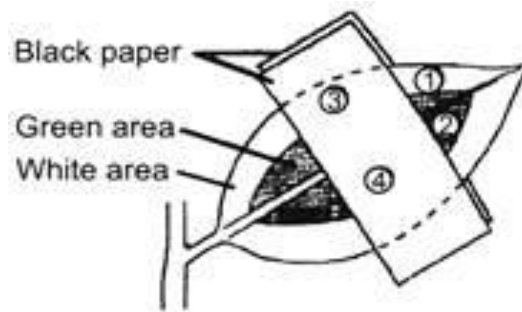
H8. Nutrition in Plants

To test whether chlorophyll is important for photosynthesis, a variegated leaf is tested for the presence of starch. Only the part having chlorophyll shows positive starch test. For testing the presence of sunlight for photosynthesis, a destarched potted plant's, part of a leaf is covered with black paper, exposed to sunlight and is then tested for the presence of starch. Only the part that is exposed to sunlight tests positive for starch test. The diagram shows a destarched, variegated leaf, partly covered by black paper. The plant is placed in bright light for several hours. Four discs are then cut from the leaf in the positions shown and are tested for starch.

Q1. Which reagent is used for starch test?

- i. benedict's solution
- ii. iodine solution
- iii. copper sulphate solution
- iv sodium hydroxide solution

Q2. Which disc will show the presence of starch?



Q3. Name the discs which will not show positive starch test. Give reasons for each case.

Q4. How would your result vary if the black strip is removed?

Answer Key

1. Score:

- 1 mark if the answer is ii
- zero if the answer is either i, iii or iv

2. Score:

- 1 mark if the answer is 2

Zero if the answer is 1, 3 or 4

3. Score:

- 3 marks if the answer is 1, 3 and 4 (part 1-sunlight present and chlorophyll absent; part 3-Sunlight and chlorophyll both are present; Part 4- chlorophyll present and sunlight absent)
- 2 marks if the answer is 1 and 3 **or** 3 and 4 **or** 1 and 4
- 1 mark if the answer is 1 or 3 or 4
- zero if the answer is 2

4. Score:

- 2 marks for writing 2 and 4 will test positive for iodine test as they are green and possess chlorophyll while 1 and 3 don't possess chlorophyll, so they will test negative for starch test.
- 1 mark for writing 2 and 4 will show positive iodine test.
- 1 mark for writing 1 and 3 show negative starch test.
- zero if the answer is 1 and 2 **or** 3 and 4.

H9. Concentration of carbon dioxide in a solution

Refer to the given experimental set-ups I, II, III and IV. Bicarbonate indicator was added to all of these set ups and change in colour was observed after a duration of 3 hours.

Bicarbonate indicator (red in colour) is used to estimate the concentration of carbon dioxide in a solution. The indicator

remains red, if there is no change in carbon dioxide concentration.

turns purple, If there is decrease in carbon dioxide concentration.

turns yellow, if there is an increase in carbon dioxide concentration.

Set up I

Fish and water plant in **dark** room



Download from
Dreamstime.com

Set up II

Water plant in **sunlight**



Set up III

Fish and water plant in **sunlight**



Download from
Dreamstime.com

Set up IV

Water plant in **dark**



Q1. Write your observations regarding concentration of carbon dioxide and colour of bicarbonate indicator in all the four set ups.

Q2. Arrange the four set ups in decreasing order of carbon dioxide concentration.

Answer Key

1.

Score:

- 4 marks if the answer is dark yellow in set up I and light yellow in set up IV red in set up III and purple in set up II.
- 3 marks if the answer is yellow in set up I and yellow in set up IV red in set up III and purple in set up II. (exact colour not mentioned)
- 2 marks if the answer is is correctly attempted for any 2 set ups.
- 1 mark if the answer is correctly attempted for any 1 set up.
- Zero if none of the answers is correct.

2.

Score:

- 2 marks if the answer is Set up: $I > IV > II > III$
- 1 mark if the answer is Set up: $I > IV < II > III$ or $I < IV > II > III$ or $I > IV > II < III$
- Zero if the order is $I < IV < II < III$ or any other jumbled form.

H10. White Button Mushroom

Mushrooms are packed with nutritional value. They're **low** in calories, are great sources of fibre and protein (good for plant-based diets). They also provide many important **nutrients**, including B vitamins, selenium, potassium, copper, and (particularly when exposed to the sun) vitamin D.

Characteristics: The most common and mildest-tasting mushroom around. Ninety percent of the mushrooms we eat are this variety. Less intensely flavoured than many of its more exotic kin, it can be eaten either raw or cooked, and works well in soups and salads, and on pizzas.

Q1. Are mushrooms good in cleaning our intestines? Give reason.

Q2. How is the flavour of white button mushrooms?

- i. strong flavor ii. moderate flavour iii. light flavor iv. Tasteless

Q3. How much calories do you think the white button mushrooms provide?

- i. 54 cal per 100 gm ii. 34 cal per 100 gm iii. 22 cal per 100 gm iv. 80 cal per 100 gm

Q4. How do mushrooms reproduce?

Q5. Which type of heterotroph is it?

- i. A parasite ii. A saprotroph iii. A symbiont iv. An insectivore

Answer key

1.

Yes, they are great source of fibre.

2.

iii. Light flavor

3.

iii. 22 cal per 100 gm

4.

They reproduce through spores.

5.

ii. A saprotroph.

H11. Lichens

Lichens are a complex life form that is a symbiotic partnership of two separate organisms, a fungus and an alga. The dominant partner is the fungus, which gives the lichen the majority of its characteristics, from its thallus shape to its fruiting bodies. The alga can be either a green alga or a blue-green alga, otherwise known as cyanobacteria. Many lichens will have both types of algae.



Q1. Which of the following is true for lichens?

- i. Because lichens do not have a waxy cuticle like plants, they cannot conserve water during drought periods. (Agree/Disagree)
- ii. Lichens need not require clean, fresh air to survive. (Agree/Disagree)
- iii. Similar to plants, all lichens photosynthesize. (Agree/Disagree)
- iv. Lichens grow on many kinds of surfaces including **trees**, soil and rocks. (Agree/Disagree)
- v. Lichens can have association with more than two algae. (Agree/Disagree)

Q2. Are lichens parasitic on the trees they are found on? (Yes/No)

Q3. Can you think of any other symbiotic relationship in nature, besides lichens.

Q4. Why aren't lichens found in crowded places?

Answer Key

Q2. No

Q3. Rhizobia with roots of leguminous plants/ Mycorrhiza with roots of higher plants.

Q4. Because of pollution

H12. Nitrogen Fixation

Nitrogen is an essential nutrient for plant growth. But farmers who cultivate pulse crops like green gram, bengal gram, black gram, etc. do not apply nitrogenous fertilizers during cultivation. Infact swollen structures can be seen in their roots. The legume looks healthy in presence of these structures and shows no symptoms of any disease. The soil too gets enriched after legume cultivation.



- Q1. What must be these swollen structures?
- Q2. There is no need to apply urea on legumes.(Agree/Disagree)
- Q3. Comment on how these structures/organisms might be helpful to the legumes.
- i . Colonies of Rhizobia fix nitrogen into nitrates. (YES/NO)
 - ii. Colonies of Rhizobia fix nitrates into ammonia.(YES/NO)
 - iii. Colonies of Rhizobia make food for the legumes.(YES/NO)
 - iv.Colonies of Rhizobia make water available for legumes to photosynthesise.(YES/NO)
- Q4. Do you think such relationships are successful? (YES/NO)

Answer Key

1. Nodules
2. Agree
4. Yes, such symbiotic relationships mutually benefit to both the organisms.

H13. Indigestion

Rohan's grandmother was facing problems of indigestion. After diagnosis, it was detected that her stomach was not secreting HCl and her liver was also not secreting proper digestive juices. Doctor advised her to avoid certain types of food. Whenever she had lemonade, her digestion improved. She started avoiding foodstuffs that would make her lazy.

Q1. Which type of foods do you think Rohan's grandmother should avoid?

Q2. Suggest some food items that Rohan's grandmother must take to treat her indigestion.

i. Yogurt, papaya, whole grains(AGREE/DISAGREE)

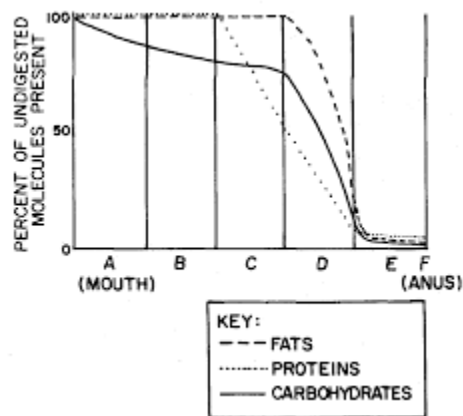
ii. bread, rice, banana(AGREE/DISAGREE)

iii. butter, cheese, milk(AGREE/DISAGREE)

iv. milk, sea food, fried foods

Q3. Which food will take longer time to get digested- carbohydrate rich or fat rich? Why?

The following graph shows undigested molecules of food:



Q4. Identify the parts of alimentary canal B,C,D and E.

Q5. What gets digested in the mouth?

Q6. Which food item takes longest time to get digested?

Q7. What would happen if part C is removed from the alimentary canal?

i. Carbohydrate digestion will be affected. (AGREE/DISAGREE)

ii. Fats digestion will be affected. (AGREE/DISAGREE)

iii. Protein digestion will be affected. (AGREE/DISAGREE)

iv. carbohydrates and fats digestion will be affected.(AGREE/DISAGREE)

Answer Key

1. Protein and Fat rich food

2. 1 mark for option i; zero for any other.

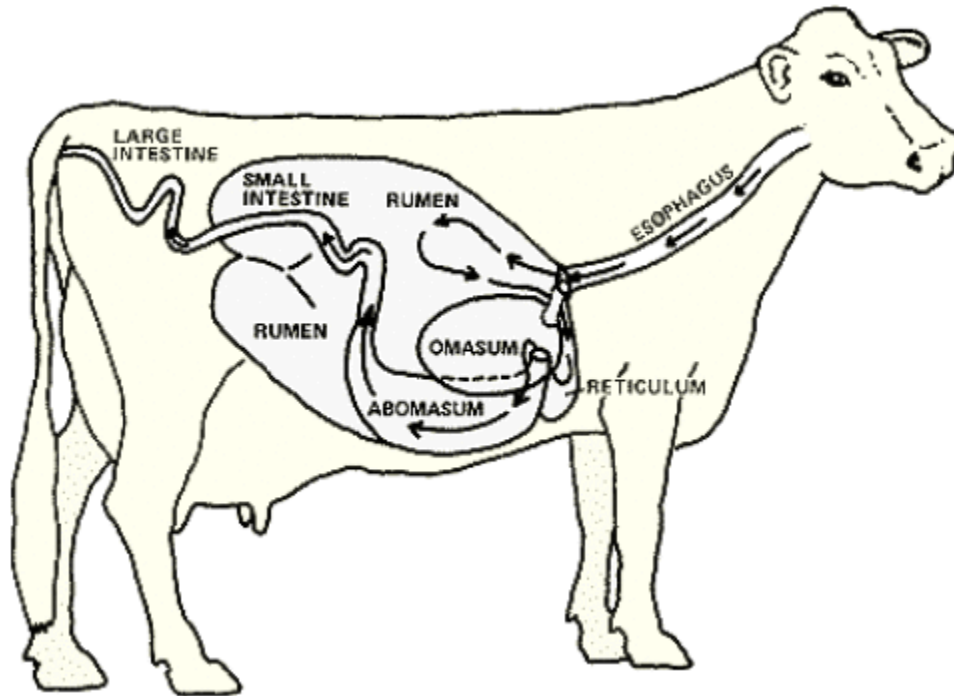
3. Carbohydrates digestion begins in mouth; fats are complex and get digested in small intestine.

4. B- Oesophagus C- Stomach D- Small intestine E. Large intestine

4. 1 mark for writing Carbohydrates or starch

5. 1 mark for writing Fats

H14. Ruminants



Ruminants are mammals that are able to acquire nutrients from plant-based food by fermenting it in a specialized stomach prior to digestion, principally through microbial actions. The process, which takes place in the front part of the digestive system and therefore is called foregut fermentation, typically requires the fermented ingesta (known as cud) to be regurgitated and chewed again. The process of rechewing the cud to further break down plant matter and stimulate digestion is called **ruminating**. The word "ruminant" comes from the Latin *ruminare*, which means "to chew over again".

Q1. Identify the four stomachs.

Q2. Observe the above ruminant and write down the journey the food takes, in sequential order, starting from the oesophagus.

Q3. Cellulase enzyme is absent in ruminants so how do you think they digest cellulose?

Q4. Where does actual digestion of fermented products take place?

Q5. When does fermentation in ruminants take place:

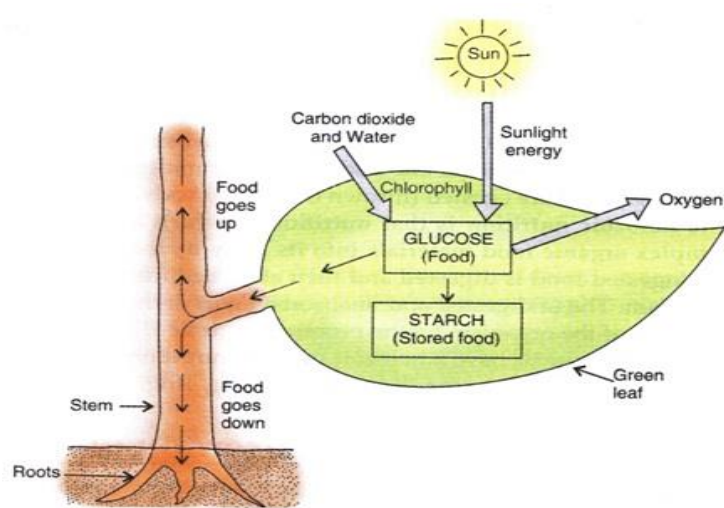
- i. after digestion.(agree/disagree)
- ii. before digestion(agree/disagree)
- iii. does not take place (agree/disagree)
- iv. occurs in the foregut(agree/disagree)

Answer Key

1. Ans. Rumen, reticulum, omasum and abomasums

2. Rumen, reticulum, omasum and abomasum, small intestine.
3. They chew their cud and digest cellulose by cellulose digesting bacteria present in their intestines.
4. Abomasum
5. 2 marks for writing: ii. Before digestion and iv. Occurs in the foregut
1 mark for writing ii or iv.
0 for any other option besides ii or iv

H15. Nutrition in plants



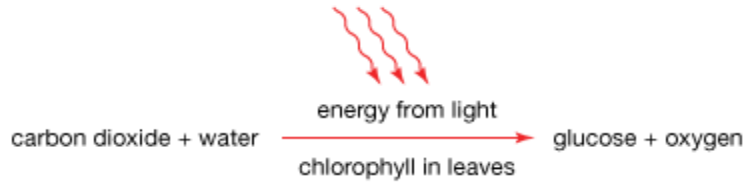
- Q1. Name and define the process depicted here?
- Q2. What is the principal source of energy input to biological systems?
- Carbohydrates from plants.
 - Light from the sun.
 - Nutrients from the soil.
 - Oxygen from the air.
- Q3. Which of the following statement is/are true about photosynthesis?
- P - Carbon dioxide is essential for photosynthesis to take place.
Q - The products of photosynthesis are simple sugars.
R - Photosynthesis occurs in the green leaves of plants.
S - Sunlight is not used as an energy source by plants to make food during photosynthesis.
- P and Q only
 - Q, R and S only
 - P, Q and R only
 - P, Q, R and S
- Q4. How does photosynthesis help to maintain the percentage of oxygen and carbon dioxide in the atmosphere?
- By giving off carbon dioxide and absorbing oxygen.
 - By giving off oxygen and absorbing carbon dioxide.
 - By releasing oxygen and carbon dioxide.
 - By absorbing oxygen and carbon dioxide.
- Q5. Observe the diagram carefully.
- Is there any process other than photosynthesis shown here?
 - Name and define it.
 - Write its importance.
- Q6. After observing the diagram, make a correctly balanced equation for photosynthesis.
- Q7. Schematically represent steps of photosynthesis.
- Q8. For photosynthesis to occur green leaves are required. But photosynthesis occurs in plants with non green leaves (croton plant) also. Do you agree or disagree? Justify.

Answer key

- Photosynthesis, Definition
- (b)

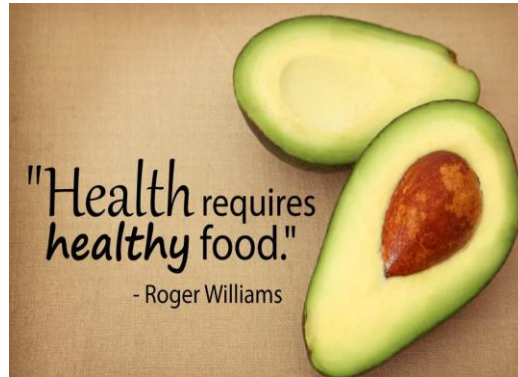
3. (c)
4. (b)
5. a) Translocation
b) Definition
c) Distribution of food

The reaction of photosynthesis



6. © 2011 Encyclopædia Britannica, Inc.
7. Light energy trapped by chlorophyll
Chlorophyll gets activated
Water dissociates.
Light energy converted into chemical energy
Reduction of CO₂ to carbohydrates
8. Yes, we agree.
Chlorophyll is present along with carotenoids and anthocyanin but is hidden under these coloured pigments.

H16. Health requires healthy food



Q1. Digestion starts as soon as you take the first bite of a meal. In fact the mouth is the beginning of the digestive tract. Chewing breaks the food into pieces that are more easily digested, while saliva mixes with food to begin the process of breaking it down into a form your body can absorb and use.

Give one reason why chapatti tastes sweet on chewing but not eggs.

- a) Because pepsin secreted in the mouth helps to convert starch into a sugar.
- b) Because amylase secreted in the mouth helps to convert starch into maltose.
- c) Because trypsin in the mouth does not act on eggs.
- d) Because the palate in the buccal cavity has pores which secretes enzymes to convert starch into sugar.

Q2. Being a teenager can be fun, but it can also be difficult as your body shape changes. These physical changes can be hard to deal with if they aren't what you are expecting. There can be pressure from friends to be or look a certain way, and this might affect the foods you eat. It's not a good time to crash diet, as you won't get enough nutrients, and you may not reach your full potential. Following a sensible, well-balanced diet is a much better option, both for now and in the long term.

It is important to eat small but frequent meals for adolescents. Why?

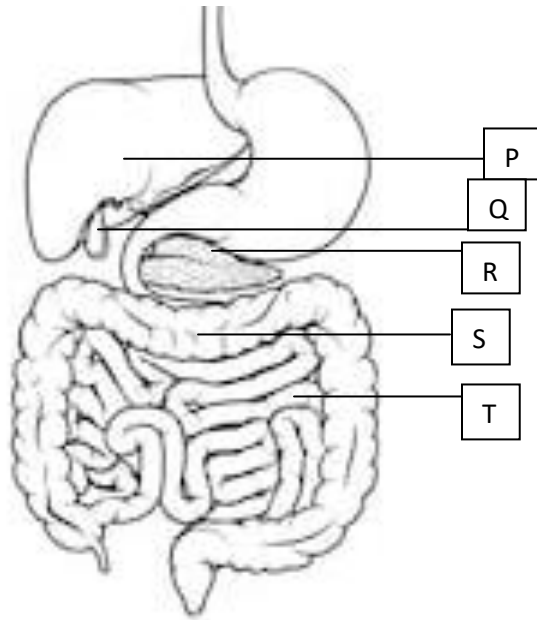
Because metabolism rate is very high in adolescents. Yes/No

Rate of catabolism is low. Yes/No

Rate of anabolism is high. Yes/No

Q3. Refer to the diagram of the human digestive system below. What would be the likely consequence of swapping S and T i.e. from the stomach food will pass through T to S?

- a) The digestive enzymes would be denatured
- b) The intestinal contents would be highly alkaline and would damage the wall of T.
- c) The intestinal contents would be too dry and unable to pass through S properly.
- d) Water absorption would be highly reduced.



Answer Key

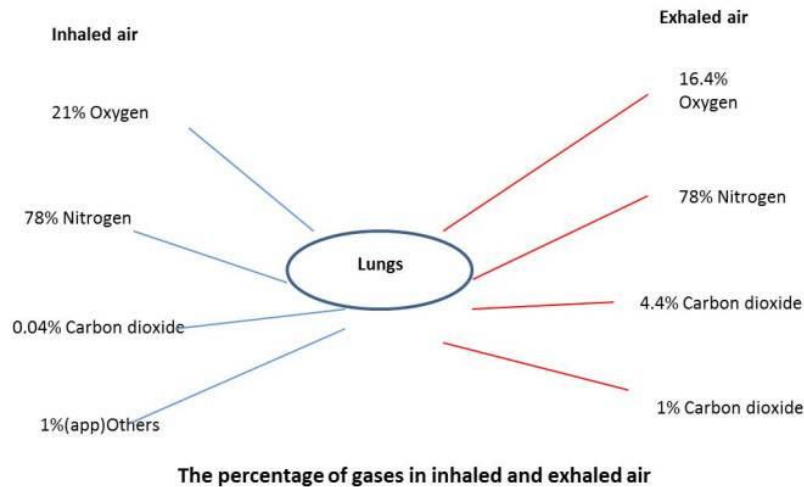
1. B

2. Yes, No, Yes

3. C

H17. Respiration

- Which of the following correctly represents the passage of air through our body?
 - Nostrils → nasal passage → trachea → bronchi → bronchiole → alveoli
 - Nostrils → bronchiole → trachea → bronchi → nasal passage → alveoli
 - Bronchiole → Nostrils → nasal passage → trachea → bronchi → alveoli
 - Alveoli → nasal passage → trachea → bronchi → bronchiole → nostrils
- Represent the given data of composition of inhaled air and exhaled air as two pie charts:



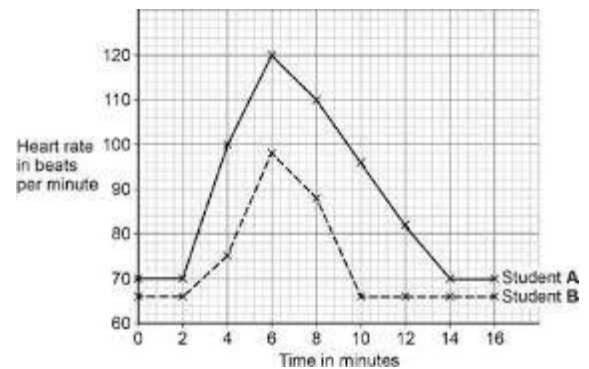
- Name the two organ systems from which the two reactants of the given equation are obtained:



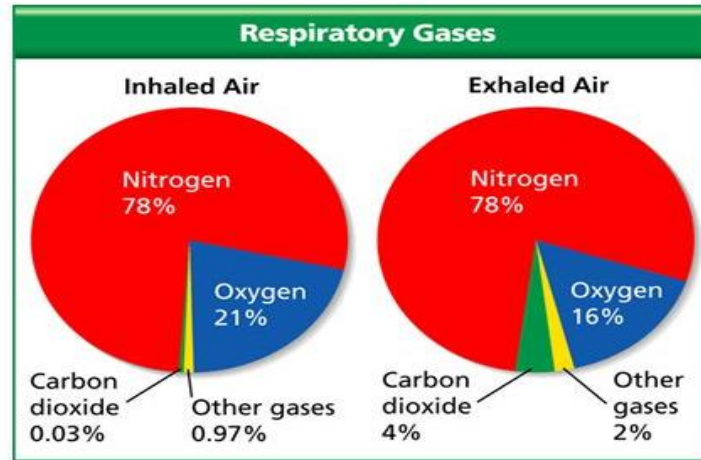
- Respiratory system, nervous system
- Digestive system, respiratory system
- Respiratory system, muscular system
- Digestive system, circulatory system

- Study the graph of two students running a race carefully and answer the following questions:

- Which student is most likely to be running faster?
- At what time did the race start?
- Who won the race?
- Why does the heart rate and breathing rate increase on running?
- At what time did student A and student B finish their races?



- Analyse the data given in the two pie charts:



- i) Compare the percentage of carbon dioxide in inhaled air with the percentage of carbon dioxide in exhaled air.
- ii) How can you account for the difference?

Answer Key:

1. a
3. ii)
4. i) Student A ii) 2 minutes iii) student B iv) Body's demand for oxygen increases during running. v) Student A: 14 minutes Student B: 10 minutes
5. i) 0.03% : 4% ii) During oxidation of food carbon dioxide is released.

H18. Respiration in insects

An insect body is covered with air holes called spiracles.

Air enters through these air holes on the body and finally reaches the trachea.

Trachea are a network of fine air tubes extending through out the body.

Trachea help in circulating the oxygen throughout the body.

The oxygen in the air diffuses into the tissues and is ultimately absorbed by the cells.

The carbon dioxide released by the cells is carried by the trachea and given out through the spiracles.

Q.1 How does air enter the body of an insect?

Q. 2 What are trachea?

Q.3 Name the process by which air reaches the tissues.

Q.4 State two advantages of the tracheal system of respiration as seen in insects.

Answer Key

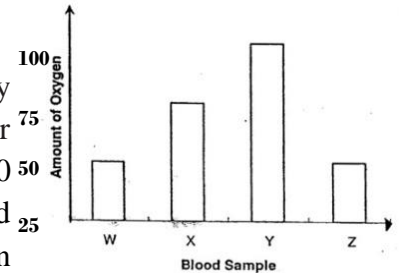
1. Through spiracles
2. Air tubes
3. By diffusion
4. 1.Simple gaseous exchange
2.During certain activities helps in maintaining high metabolic rate.

H19. Circulatory system in Human

A) Blood flows continuously in the blood vessels in our body. Arteries carry oxygenated blood from heart to the body part whereas veins carry deoxygenated blood from body parts to heart. Veins have valve to prevent the backflow of blood.

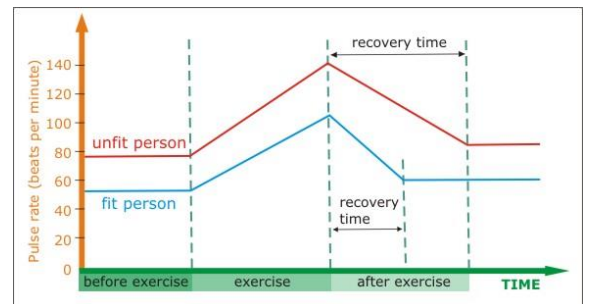
Veins have valve that allow blood to flow in one direction only. Arteries do not have any valve but blood still flows in one direction. Comment.

B) A person's blood oxygen level is an indicator of how well the body distributes oxygen from the lungs to the cells, and it can be important for people's health. A normal blood oxygen level varies between 75 and 100 millimeters of mercury (mm Hg). Different blood samples are collected from different strata and the results are shown in the graph. As you can see W and Z have low oxygen level in their blood. Explain with suitable reason.



C) In the given graph pulse rate is shown. Observe it carefully and answer the questions.

- 1) What does it indicate? Give reason.
- 2) What difference will be observed if you measure the heart rate of a smoker?
- 3) Is breathing good for heart?



D) 1) Name the only artery that carries CO₂ rich blood.

2) Why is it called artery if it does not carry O₂ rich blood?

3) Do this artery has valve?

E) (i) Blood pressure is higher in

- a) Artery b) veins c) Same in both d) capillaries

(ii) The absorption of nutrients and exchange of respiratory gases between blood and tissues take place in

- a) Veins b) arteries c) heart d) capillaries

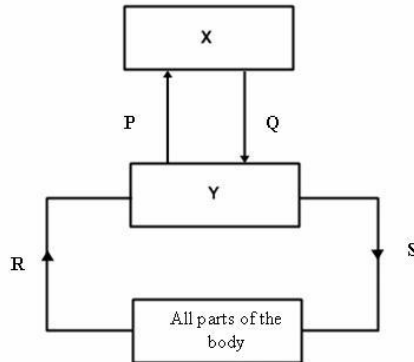
Activity 1:

Fill in the blanks by using just two words: **Arteries and Veins.**

_____ carry O₂ rich blood from heart to all parts of our body and _____ carry CO₂ rich blood from all body parts to heart. _____ have thin walls and _____ have thick walls. Blood flows at high pressure in _____. Valves are present in _____ which allow blood to flow only towards heart. _____ divide into small vessels. These vessels

further divide into extremely thin tubes called capillaries. The capillaries join up to form _____.

Activity 2: Fill the blanks in the picture below to show the circulation of the blood.



Answer Key

A) Arteries do not have valve because pressure from heart is so strong that the blood is only able to flow in one direction and also if flows with the force of gravity.

B) The oxygen level is less in the blood sample of W and Z probably due to less RBCs.

C) 1) It indicates that fit person has less pulse rate as compare to unfit person. It is because the heart of an unfit person has to work harder during this process.

2) Smoker will have high heart rate.

3) Breathing is important for heart as oxygen is required for the functioning of cardiac muscles as it has constant rhythmic motion.

D) 1) Pulmonary artery

2) Arteries carry blood away from heart. Pulmonary artery carries blood from heart to lungs for purification.

3) Yes it has valve to prevent back flow of blood.

E) i) a) artery ii) d) capillaries

H20. Excretory System

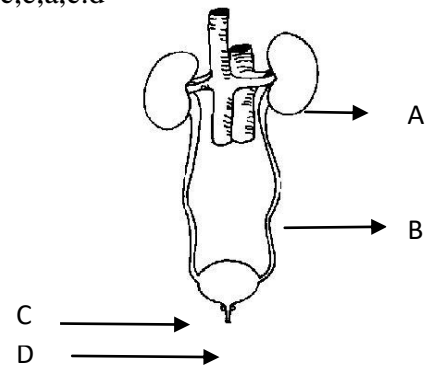
Every living organism generates waste in its body and has a mechanism to expel it. In humans, waste generation and disposal are taken care of by the human excretory system. The human excretory system comprises of a pair of kidneys, a pair of ureters, urinary bladder and urethra. Along with this skin, lungs and liver also help to remove various wastes from the body.

- Q.1 The muscular tube through which stored urine is passed out of the body is called –
- kidney
 - ureter
 - urethra
 - urinary bladder
- Q.2 In which of the following parts of human body are sweat glands absent?
- Scalp
 - Armpits
 - Lips
 - Palms
- Q.3 Aquatic animals like fish excrete their wastes in gaseous form as
- Oxygen
 - Hydrogen
 - Ammonia
 - Nitrogen
- Q.4 Arrange the following statements in the correct order in which they occur during the formation and removal of urine in human beings.
- Ureters carry urine to the urinary bladder.
 - Wastes dissolved in water is filtered out as urine in the kidneys.
 - Urine stored in urinary bladder is passed out through the urinary opening at the end of the urethra.
 - Blood containing useful and harmful substances reaches the kidneys for filtration.
 - Useful substances are absorbed back into the blood.

- i) e,b,d,c,a ii) d,b,a,c,e iii) d,e,b,a,c iv) b,c,e,a,c.d

Q.5 a) Label part A, B, C and D in the given diagram.

- b) John is undergoing dialysis. Which part of the system is not working properly?



Q.6 A doctor asks the patient to get his urine examination. What can be the reason for that?

Q.7 Name the processes and organ which help in removing the following wastes from the body.

Waste	Process	Organ
a) carbon di-oxide		
b) undigested food		
c) urine		
d) sweat		

Answer Key

1) b 2) c 3) c 4) c

5. a) A: Kidney, B: ureter, C: urinary bladder D: urethra

b) Kidney.

6. Urine examination gives an indication of the functioning of other organs in the body and helps to diagnose certain diseases related to kidneys.

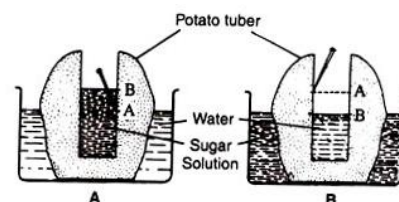
7.

Waste	Process	organ
a) carbon di-oxide	Respiration	lungs
b) undigested food	Egestion	anus
c) urine	Excretion	urethra
d) sweat	Excretion	skin

H21. Transportation in Plants

To circulate water, essential nutrients, excretory products and gases within the plants for various purposes, transportation in plants is necessary. In vascular tissues, this transportation in plant takes place. By a suction force, water and minerals are transported to various parts of the plant. Vascular tissues are normally conducting tissues. These tissues are of two types: Xylem for conducting water and phloem for conducting food.

- Q.1 In a tall tree, which force is responsible for pulling water and minerals from the soil?
a) Gravitational force b) Transportation force
c) Suction force d) Conduction force
- Q.2 They are pipe-like, consisting of a group of specialised cells. They transport substances and form a two-way traffic in plants. Which of the following terms qualify for the features mentioned above?
a) Xylem tissue b) Vascular tissue c) Root hairs d) Phloem tissue
- Q.3 Simar uprooted a rose plant from the soil but most of its root tips with root hairs left behind in the soil. She planted it in a pot with new soil and waters it regularly. Will the plant grow or die? Give reason to support your answer.
- Q.4 Two experiments A and B (based on the process of osmosis) are demonstrated to students.
In A: sugar solution is filled in potato cup and kept in water.
In B: Water is filled in potato cup and kept in sugar solution.
Level inside the cup will rise in A but lowers in B.



- a) What do these experiments show?
b) Can we relate these experiments with transportation in plants?

- Q.5 Diksha noticed water being pulled up by a motor pump to an overhead tank of a five storeyed building. She wondered how water moves up to a great height in the tall trees standing next to the building. Can you tell how it is possible?
- Q.6 Transpiration plays an important role in transporting water from roots to the upper parts of the plants. It occurs through small openings present on the leaves called stomata. These openings are surrounded by guard cells that help in opening and closing of stomata.

Statement	Agree/Disagree
a) Xylem transport water from root to the leaves.	
b) Transpiration is more on hot and humid day.	
c) Closed stomata shows the loss of water by guard cells.	
d) Minerals from soil enter through root hairs by osmosis.	
e) Energy is required for movement of water and minerals from soil.	
f) Chlorophyll is used up in the process of photosynthesis.	

Answer Key

1. c
2. d
3. The plant will die as it does not have root tips or root hairs that help to absorb water from the soil.
4. a) It shows movement of water from higher concentration to lower concentration or to dilute solution.
b) Roots absorb water from the soil by the same process as the concentration of water is high in soil particles as compare to root cells.
5. Water moves up in the plants due to transpiration that creates a suction pull that helps to move water upwards in the xylem.
- 6

Statement	Agree/Disagree
a) Xylem transport water from root to the leaves.	Agree
b) Transpiration is more on hot and humid day.	Disagree
c) Closed stomata shows the loss of water by guard cells.	Agree
d) Minerals from soil enter through root hairs by osmosis.	Agree
e) Energy is required for movement of water and minerals from soil.	Disagree
f) Chlorophyll is used up in the process of photosynthesis.	disagree

H22. Tooth Decay

Oral health is an essential component of health throughout life. The data of oral health of 12 year old children from government and private schools was collected for three consecutive years that is from 2015 to 2019.

Dental caries was recorded in both government and private schools. The difference was found to be statistically significant with high percentage of dental caries in private schools than government schools.

To find out the actual reason behind it a questionnaire was designed to evaluate oral health knowledge such as regular dental visit, brushing frequency, consumption of sweet and starch food along with fluoride usage on dentition.

It was found that private school children diet included lot of sweets, potato chips and carbonated drinks whereas government school children consumption of such food items was very less.

The cause of dental caries is bacteria that live in the mouth and transform sugar into acid that damage teeth surface.

Q.1 What is the role of bacteria in dental caries?

- a) Synthesise enamel.
- b) Synthesise sugar.
- c) Produce mineral
- d) Produce acid

Q.2 Which of the following statement is supported by the data given in the following graph?

- a) Government school children brush their teeth more frequently than private school.
- b) The more sugar the children eat the more dental caries.
- c) In recent years the dental caries have increased.
- d) In recent years the consumption of sugar and starch food has increased among the children.

Answer Key

- 1. d
- 2. b

NATURAL RESOURCES

NR-1 ALLOYING

Besides being used in their pure form, metals are also used in the form of their alloys. Generally other elements are added to produce greater strength, hardness and to improve corrosion resistance. An alloy is a homogeneous mixture of two or more metals or a non metal. If one of the components of the alloy is mercury, it is called an amalgam.

Pure gold (also called 24-carat gold) is 100% gold. It is very soft and therefore, cannot be used for making jewellery. In order to improve its hardness, malleability and ductility, it is alloyed with small quantities of silver or copper. In India normally, 22-carat gold is used for making ornaments.

Q1. In India which of the following purity gold is normally used for making ornaments?

- a) 24-carat b) 16 carat c) 22-carat d) 8-carat

Q2. Alloying improves the following qualities-

- i) Strength ii) Hardness
iii) Malleability and ductility iv) Corrosion resistance

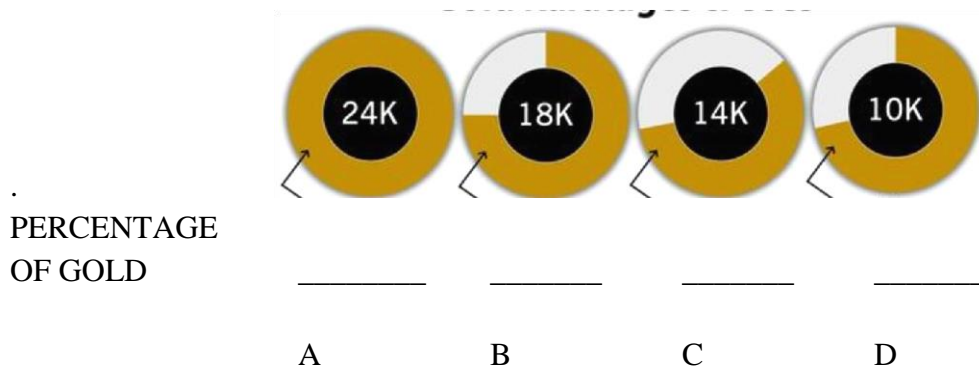
- a) i and iii b) iii and iv c) i and ii d) i, ii, iii and iv

Q3. Gold and platinum are used to make jewellery due to

- i) Shining lustre ii) resistance to corrosion iii) highly reactive iv) Malleability

- a) i b) i and ii c) iii d) i, ii and iv

Q4. a) Find out percentage of gold in each of the following.



b) From A to D, what is the correct order of price of gold?

- i) least to highest
ii) highest to least

Q4. Choose the right option:-

	Agree	Disagree	Strongly agree	Strongly disagree
(a) Alloys are preferred due to their corrosion free nature.				
(b) Alloys are homogenous mix of only two or more metals				

Q6. K stands for carat. It is a unit used to measure the purity of gold. What is the meaning of 22 K and 18k gold?

Q7. Does German silver contain any silver in it?

Answer key.

Q1. Score-2 if response is (c)

Score -0 if response is a or b or d

Q2. Score – 2 if response is d

Score – 1 if response is a or b or c or d.

Q3. Score -2 if response is d

Score -1 if response is a or b

Score- 0 if response is c

Q4 (a) A) 100%, B) 75%, C) 58.33%, D) 41.67%

(b) 10K,14K,18K,24K

Q5.(a) Agree

(b) Disagree.

Q6 24 Carat gold is considered as purest gold. 22 carats gold contains 91.67% gold alloyed with 8.33% other metals like silver, copper and Zinc.

18 carat gold contains 75% gold alloyed with 25% other metals like silver and copper.

Q7. German silver does not contain any silver in it. It is an alloy of Cu-50% ,Zn-30% and Ni-20%.

NR-2 Acid & Bases

Acids are sour in taste and bases are bitter but it is not advisable to use taste as way of testing to know if a substance is an acid or a base.

Q1 How can we identify the chemical nature of a substance?

- | | |
|----------------|-----------------------|
| a) by touching | b) by using antacids. |
| c) by tasting | d) by using litmus. |

For thousands of years people have known that vinegar and lemon taste sour and baking soda tastes bitter, but the term 'Acid' and 'Base' was discovered a few hundred years ago. Some substance like water taste neither bitter nor sour. These substances are neutral.

Q2 How does blue litmus behave in water?

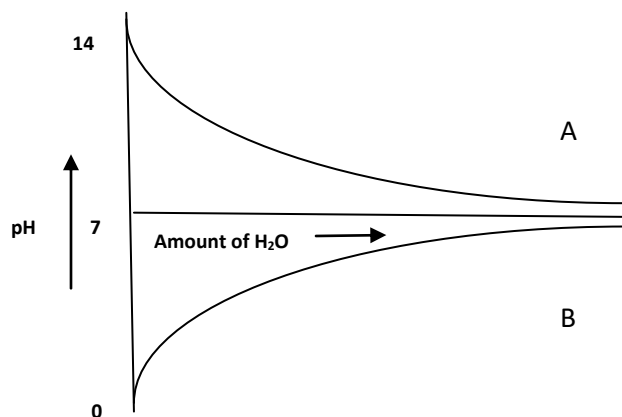
- | | |
|---------------------|-------------------------|
| a) Turns red | b) remains blue |
| c) Turns colourless | d) can show any colour. |

A few drops of phenolphthalein were added to an unknown solution 'A'. It acquires pink colour. Another solution 'B' was added to it drop wise and the solution became colourless.

Q3 Predict the nature of 'A' and 'B'. Give evidence to support your answer.

Q4 Water is added to solutions.

- What does curve 'A' and 'B' represent?
- How does increase in amount of water affect the pH of solutions?



Answer Key

Ans 1 d) by using litmus.

Ans 2 b) remains blue.

Ans 3 A is basic , B is acidic solution.

Ans 4 i) Curve A represent basic solution and curve B represent an acidic solution.

ii) On addition of water to an acidic solution, the pH value will increase. On adding water to basic solution the pH value will decrease.

NR-3 Corrosion



Corrosion is the process of slow conversion of metals into their undesirable compound by the action of the ingredients of air that are oxygen, moisture and other gases like SO_2 , NO_2 , CO_2 and H_2S and the acids formed.

When iron objects are left exposed to moist air over a considerable interval of time, the surface of iron gets covered with non-sticky reddish brown substance. This reddish brown substance is called rust and the phenomenon is called rusting. Thus the term 'rusting' is used for corrosion of iron. Rust is soft and non-sticky substance and it crumbles down exposing fresh surface for rusting and ultimately the whole of iron is lost as a brown powder. Rust is chemically hydrated ferric oxide.

Rusting occurs only when things like good quality of iron comes in contact with water in the presence of air and remain stationary.

Q1. Rust is chemically-

- a) Ferric oxide
- b) ferrous oxide
- c) hydrated ferric oxide
- d) hydrated ferrous oxide

Q2. Rusting is very fast under following condition (s)-

- i) Dry air
 - ii) Moist air
 - iii) CO_2
 - iv) Salt
- a) i b) ii and iii c) ii, iii and iv d) ii

Q3. Blood has water, oxygen and iron. It does not rust because

- a) The quantity of iron is not enough.
- b) Blood always remain in circulation.
- c) Iron is not in free state.
- d) All of the above.

Q4. Choose the correct option:-

	Strongly agree	agree	Disagree	Strongly disagree
(a) Rusting is advantageous process				
(b) Rust sticks on the surface of iron article				

Q5. Sometimes corrosion is useful. Justify

Answer Key

Q1 Score 2 if response is c

Score 0 if response is a or b or d

Q2 Score -2 if response is c

Score -1 if response is d or b

Score-0 if response is a

Q3 Score-2 if response is d

Score -1 if response is a or b or c

NR-4 Prevention of Rusting

Rusting of iron can be prevented by applying oil, painting, electro plating and by galvanisation. During galvanisation a layer of zinc which is more reactive than iron is applied over iron. Therefore zinc undergoes oxidation in preference to iron and prevents iron from rusting. Galvanised iron sheets are used for making buckets, drums and sheds

Q1. Name the metal used for making galvanised articles-

- a) Silver b) copper c) zinc d) gold

Q2. Galvanised iron does not rust because –

- i) Iron is more reactive than zinc.
ii) Zinc is more reactive than iron.
iii) Iron undergoes oxidation in preference to zinc.
iv) Zinc undergoes oxidation in preference to iron.

- a) i and iii b) ii and iv c) ii d) iv

Q3. Metal 'A' and 'B' are coated separately on iron pieces. Metal 'A' is more reactive than iron but metal 'B' is less reactive than iron. In which case the rusting is faster?

Q4. Choose the correct option:-

	Strongly agree	agree	disagree	Strongly disagree
Galvanised iron pipes are used for water supply				
Give reason to your response				

Answer Key

Q1 Score -2 if response is c
Score -0 if response is a,b or d

Q2 Score -2 if response is b
Score -1 if response is c or d
Score -0 if response is a

Q3 Rusting is faster when metal B is coated on iron

NR-5 CROP PRODUCTION & MANAGEMENT

India has two type of crops rabi and kharif. In early April, rabi crop like wheat are harvested and paddy a kharif crop is sown after June 20. After paddy harvest nearly 22 tons of straw is generated in Punjab. It has high silica content. The wheat straw produces chaff which is used as fodder. Only 1/3 of wheat residue is burnt. As compared to paddy crop yet skyline is expected to be polluted when harvesting is done with.

- Q1 Which process is being investigated in above information?
- Q2 Straw of which crop will be burnt more by farmers. Give one or two pieces of information to support your answer.
- Q3 Choose the answer and the explanation that is supported by the text given above.

Rabi Crops	Sown at end of monsoon at beginning of winter
Kharif Crops	Not affected by rain fall
Rabi Crops	May be called as summer crop
Kharif Crops	Wheat and Rice

Q4 Suppose you have a younger brother who tries to understand the meaning of above text but he does not understand the crop system, fodder, chaff, silica etc. Assume that he knows, name of months, seasons and crops like wheat and rice. Write an explanation to explain him about burning of stubble in Punjab.

Q5 A farmer does not burn the paddy stubble and spend extra cost for pulling it to side of field by tractor and keeping it under tree. What could be possible reason for this?

Q6 How much do you agree/disagree with following situations?

Situations	Strongly Disagree	Disagree	Agree	Strongly agree
Government should impose fine on burning stubble.				
Government should pay the farmer for not burning.				
Government should provide a seed sowing machine which is not jammed by straw.				
Stubble management is related to investment cost of fertilizer.				

Answer key

Q1 Partial score for agriculture / Environmental pollution

Full score Environmental pollution due to burning of stubble.

NR-6 DIVERSITY IN PLANTS

BASIS FOR COMPARISON	BRYOPHYTES	PTERIDOPHYTES
Body definition	Bryophytes have leafy or thalloid plant body.	In pteridophytes plant body in differentiated into roots, stems, and leaves.
Vasculature system	No vasculature system, which means xylem and phloem absent.	Proper vasculature is present which means xylem and phloem is present.
Vascular tissue	Absent	Present
Presence of roots	No roots, instead rhizoids are present helps in anchoring	Roots are present.
Presence of stems or leaves	No true stems or leaves are present.	True stem and leaves are present.
Archegonium and its formation	Common exposure of archegonium, whose neck is formed of six rows of cells.	Partially embedded archegonium and its neck have only four rows of cells.
Antheridium	Stalked.	Sessile.
Dominating part	Gametophyte is dominating.	Sporophyte is dominating.
Cell type	It has haploid cells.	It has diploid cells.
Examples	Mosses, liverworts, hornworts.	Spikemosses, clubmosses, ferns, quillworts.
Sporophytic phase	Depends completely on gametophytic.	Saprophytic phase is an independent autotrophic.

Q1. Which of the above is having the presence of vascular bundles?

- | | |
|----------|---------------|
| a) Moses | b) Liverworts |
| c) Ferns | d) Clubmosses |

Q2. Which are known as true land plants?

- a) Algae
- b) Bryophytes
- c) Pteridophytes
- d) gymnosperms

Q3. Name the plant which is having the presence of capsule/seta?

- a) Marchantia
- b) Funaria
- c) Selaginella
- d) Riccia

Q4. Name the reproductive organs present in pteridophyta.

Q5. State the following in Yes/No

- a) Both the bryophyte and pteridophyta have alternation generation
- b) Prominent phase in the bryophyte is sporophytic
- c) Pteridophyte show heart shaped prothallus in their lifecycle
- d) True root and stem system is present in bryophytes.
- e) Rizodes are present in bryophytes

Answer Key

Q1. C

Q2. C

Q3. B

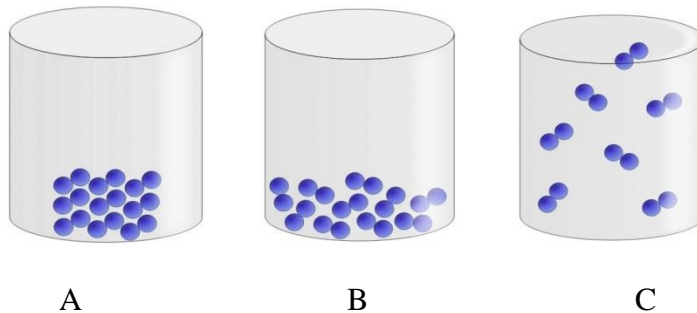
Q4. Anthridium and Archegonium

Q5. Yes, No, Yes, No, Yes

NR-7 Forms of Water

Water can be found in the forms, i.e, solid, liquid and gas. The solid form, snow and ice is present as ice caps at the poles of the earth, snow-covered mountains and glaciers. Liquid water is present in oceans, lakes, rivers and even underground. The gaseous form is the water vapour present in the air. The continuous cycling of water among to three forms keeps the total amount of water on the earth content.

- Q1 In how many forms water can be found?
- Q2 Which state of water is water vapour?
- Q3 Moltens lava pores a volcano. After a few hours, the liquid lava harders into a shiny gray rock. Which phase change has taken place?
- Q4 An unopened bottle of water is taken out of the refrigerator and placed on a table. After a while, the bottle is covered with droplets of water. What phase change has occurred?
- Q5 What phases are shown in the three images below?



- a) Image 1 is gas, image 2 is liquid & image 3 is solid
- b) Image 1 is liquid, image 2 is solid & image 3 is gas
- c) Image 1 is liquid , image 2 is gas & image 3 is solid
- Q6 What is the phase of water when its temperature 150°C ?

Answer Key

Q1 Score 2 if the response is 3

Score 1 if the response is 2

Score 0 if the response is 1

Q2 Score 2 if the response is gas

Score 0 for any other response

Q3 Score 2 if the response is Freezing

Score 1 if the response is Solid

Score 0 for any other response

Q4 Score 2 if the response is condensation

Score 1 if the response is liquid

Score 0 for any other response

Q5 Score 2 if the response is 2

Score 1 if the response is 3

Score 0 if the response is 1

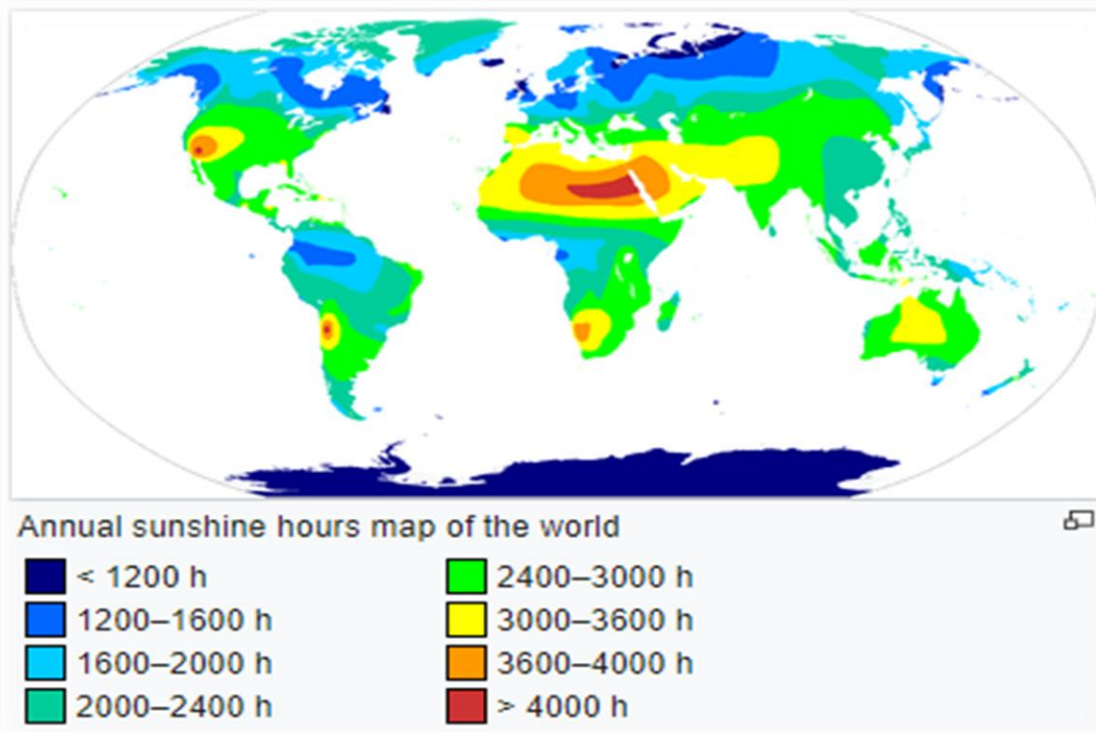
Q6 Score 2 if the response is gas

Score 1 if the response is water vapour

Score 0 for any other response

NR-8 Harnessing Solar Power

Annual sunshine hours map of the world is given above. Sunshine duration follows a general



geographic pattern: subtropical latitudes (about 25° to 40° north/south) have the highest sunshine values.

Question 1.

Name a few countries which can trap solar power by making solar farms?

Question 2.

Find out the annual sunshine hours range that is received by India?

Question 3.

Can the following conclusions be drawn from the Information given in the information provided? Circle “Yes” or “No” or each conclusion

Can this conclusion be drawn from the Database 1	Yes or No
Subtropical region suits best for windmill installation.	Yes/ No
June and July are the months having highest average sunny hours	Yes/ No
India is suitable for installation of solar plants and solar farms	Yes/No

Question 4.

Do you think India is suitable for harnessing solar power? Give argument in favour or against it?

Question 5.

How much do you agree with the following statement?

Tick only one box in each row.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Govt. should provide subsidy at a higher rate for installation of solar plants.				
Govt. should enforce strictly the installation of solar plant on roofs of the houses and buildings having areas more than 600 sq. yards.				
Subsidies on fossil fuels like diesel, LPG should continue.				

Answer Key

Scoring Q1

Full credit: Countries in the subtropical region. Mainly desert countries such as Egypt, Sudan, Libya, Chad, and Niger, India etc.

No Credit: Countries in other regions.

Scoring Q2

Full credit: 2400 to 3600 hrs

No Credit: Any other response

Scoring Q3

Full credit: No, No, Yes

No Credit: Any other response

Scoring Q4

Full credit: Argument in favour

Partial credit: Argument against it

Scoring Q4

Full credit: Strongly Agree, Strongly Agree, Strongly Agree, Strongly Disagree

Partial credit: Any Deviation From Answer

NR-9 Heat

Q1 . Suppose that a number of children are standing in a corner of a hall. They are moving around a little to talk to each other. Suddenly music is switched on. The children start dancing and moving around more. Naturally, they will spread out more and occupy a larger part of the hall.

Similarly, when we heat a substance the movement of its molecules increases. This increases the average distance between the molecules. Therefore, the space occupied by the molecules, that is, the volume of the substance, increases. We say that heat causes expansion.

- i) An example from daily life where you observe expansion.
- ii) Among the three states of matter, which state shows the maximum expansion? Give reason for the same.

Q2 . Arjun is trying to explain the concept of conductors and insulators to his younger sister Anya. He put a plastic scale, copper wire, wooden stick, pencil, iron rod in a beaker half filled with water. He heats this beaker with the help of burner for 2-3 minutes and tell his younger sister to touch them one by one.

- i) Which substances will become hot?
- ii) Which substances will remain as such?
- iii) What Anya will conclude from her observations?

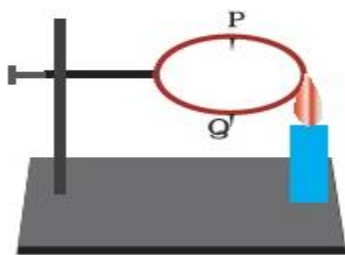
Q 3. A marble tile would feel cold as compared to a wooden tile on a winter morning, because the marble tile

- i) is a better conductor of heat than wooden tile.
- ii) Is polished while wooden tile is not polished.
- iii) reflects more heat than wooden tile.
- iv) is a poor conductor of heat than wooden tile.

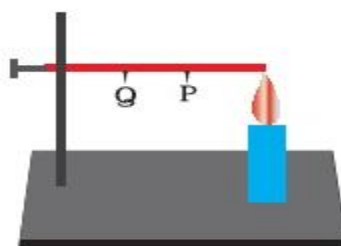
Q4. If we heat one end of spoon, its other end also becomes hot. Now bring this hot spoon in contact with the cold spoon by touching them.

- i) From which spoon heat will travel?
- ii) What will be the end result of two spoons placed in contact with each other?

Q5. In the following arrangements A and B, pins P and Q are fixed to a metal loop and an iron rod with the help of wax. In which case are both the pins likely to fall at different times? Explain.



(A)



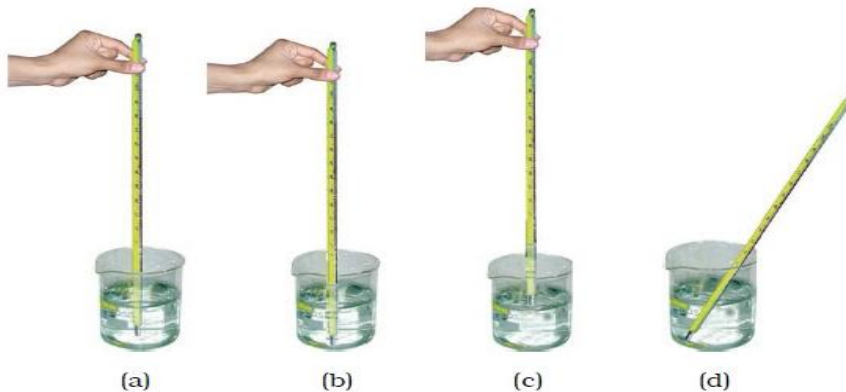
(B)

Q 6. Light a candle. Keep one hand above the flame and one hand on the side of the flame.

- i) Do your hand feel equally hot?
- ii) If not, which hand will feel hotter and why?



Q 7. Four arrangements to measure temperature of ice in beaker with laboratory thermometer are shown. Which one of them shows the correct arrangement for accurate measurement of temperature?



Q8. A beggar wrapped himself with a few layers of newspaper on a cold winter night. This helped him to keep himself warm because

- i) friction between the layers of newspaper produces heat.
- ii) Newspapers are generally warm.
- iii) air trapped between the layers of newspaper is bad conductor of heat.
- iv) newspapers are poor conductors of heat.

Q9. To keep her soup warm Nisha wrapped the container in which it was kept with a woollen cloth. Can she apply the same method to keep a glass of cold drink cool? Give reason for your answer.

Q10. At a camp site there are tents of two shades- one made with black fabric and other with white fabric.

- i) Which one will you prefer for resting in a hot summer afternoon and why?
- ii) Would you like to prefer the same tent during winters?

Q11. For setting a curd, a small amount of curd is added to warm milk. The microbes present in the curd help in setting if the temperature of the mixture remains approximately between 35°C to

40°C . At places, where room temperature remains much below the range, setting of curd becomes difficult.

- i) Suggest a way to set curd in such a situation.

Q12. Neev and Aryan both are asked to prepare a tea for the guests by their mother. Neev chooses a pan made of steel with wooden handle whereas Aryan chooses a pan with wooden base and metallic handle.

Circle yes or no for their observations:

Observations	Neev	Aryan
i) Handle will become hot	Yes/No	Yes/No
ii) Tea will be prepared earlier	Yes/No	Yes/No
iii) Clear with the concept of conductors and insulators	Yes/No	Yes/No

Q13. Janvi is not feeling well. She pick up the clinical thermometer to note her body temperature. Circle yes for her correct handling of thermometer and no for the wrong handling:

Handling of thermometer	Yes/No
i) Did not hold thermometer from bulb	Yes/NO
ii) Kept the level of mercury along the line of sight	Yes/No
iii) Did not washed the thermometer with antiseptic solution before and after use	Yes/No
iv) Mercury inside it is good for health	Yes/No

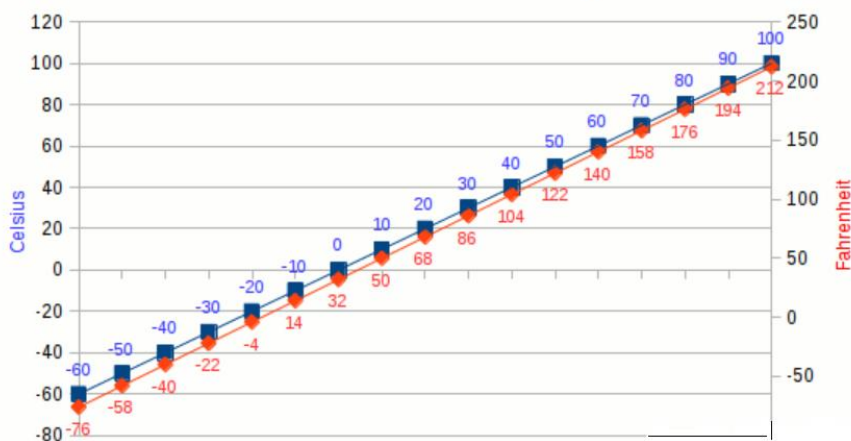
Q 14. During the day, land heats up more than water. The air over land becomes hotter and lighter and rises up. The air from the sea which is cooler and heavier, rushes to take the place created by hot rising air.

- i) Which mode of heat transfer is talked about in the above paragraph?
 ii) Name the type of breeze.
 iii) What will happen during the night?

Q 15. The following graph represents how Celsius and Fahrenheit scale of thermometers are related . Observing the graph carefully answer the following questions:

- i) Temperature at which ice freezes in Fahrenheit.
 ii) Boiling point of water in both scales.
 iii) Normal human body temperature in Celsius and Fahrenheit.

Celsius and Fahrenheit compared



Answer key

1. i) Railway tracks expand in summers.
ii) Gases expand the most as they have more intermolecular spaces between them.
2. i) Copper wire
ii) wooden stick, pencil, glass rod, scale.
iii) She will come to the conclusion that substances which becomes hot on heating are known as conductors and which do not become hot on heating are known as insulators.
3. a) Marble tile is better conductor of heat than wooden tile.
4. i) Heat will travel from hotter spoon to colder one.
ii) At end, both spoons will acquire the same temperature.
5. In fig B , pins will fall at different time as pin Q is farther from pin P and heat will take time to reach there.
6. i) No
ii) Hand which is above the flame will feel more hot because of convection.
7. (a)
8. iii)
9. Yes cold drink will remain cooler for sometime with woollen cloth as wool is a poor conductor of heat and thus will not allow the heat of surroundings to attack cold drink.
10. i) Tent made of white fabric as white colour is reflector of heat and thus heat will not be absorbed in tent.
ii) No, during winters I will prefer black one.
11. Bring milk to boil and then let it cool to the temperature between 110-115⁰F
- 12.

Observations	Neev	Aryan
i) Handle will become hot	NO	Yes

ii)	Tea will be prepared earlier	Yes	NO
iii)	Clear with concept of conductors and insulators	Yes	NO

13.

i) Yes ii) Yes iii) No iv) No

14. i) Convection ii) Sea breeze iii) Land breeze will take place.

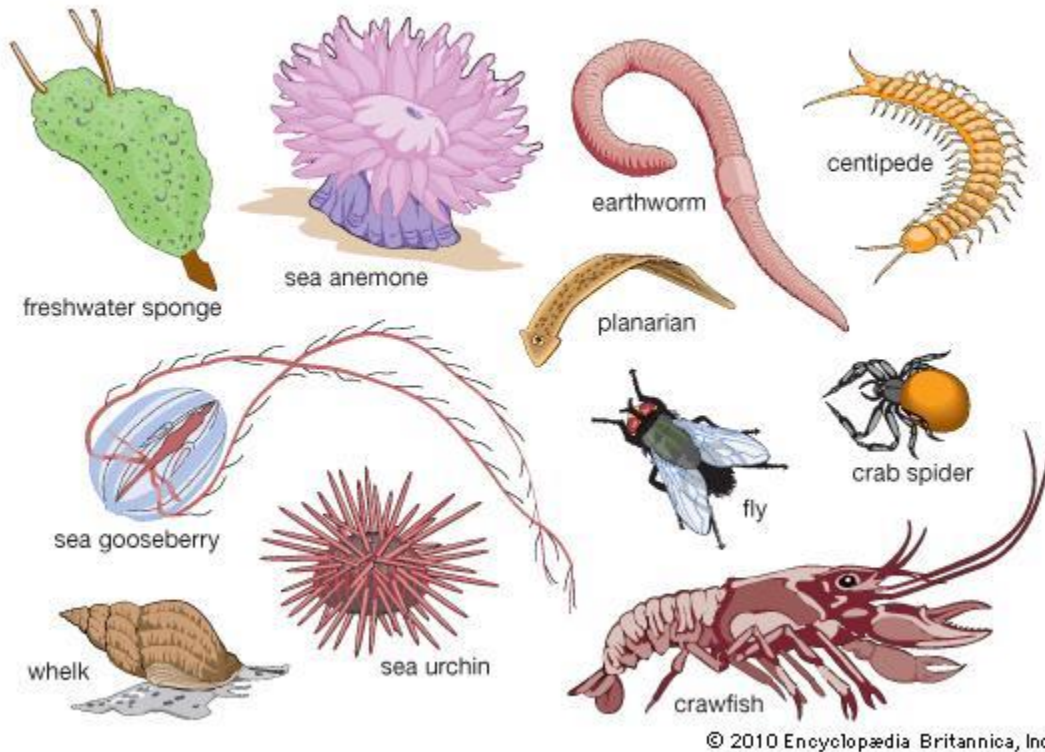
15. i) 32°F

ii) 100°C , 212°F

iii) 37°C , 98.6°F

NR-10 INVERTEBRATES

Animals without backbones



Invertebrate, any [animal](#) that lacks a [vertebral column](#), or backbone, in contrast to the cartilaginous or bony vertebrates. More than 90 percent of all living animal species are invertebrates. Worldwide in distribution, they include animals as [diverse](#) as sea stars, sea urchins, earthworms, sponges, [jellyfish](#), lobsters, crabs, insects, spiders, snails, clams, and [squid](#). Invertebrates are especially important as agricultural pests, parasites, or agents for the transmission of parasitic infections to humans and other vertebrates. Invertebrates serve as food for humans and are key elements in food chains that support birds, [fish](#), and many other [vertebrate](#) species.

Q1. What percentage of living organisms are invertebrates?

- a) 20% b) 40% c) 60% d) 90%

Q2. Which phylum has the largest member present in it?

- a) Platyhelminthes b) Insecta
c) Annelida d) Mollusica

Q3. Which animal has a feature to secrete a protective shell around it?

- a) Nematodes b) Insect
c) Mollusica d) Echinodermata

Q4. Most of the animals of this group are present in the sea and have water canal system

- a) Echinodermata b) Coelentrata
c) Insect d) Annelida

Q5. Do you agree/disagree to the following?

- a) Sponges show cell aggregate body plan
- b) Centipede and millipede belong to Insecta
- c) Pinworms and roundworms are endoparasites
- d) Skeleton of the earthworm is made of water
- e) Silverfish is a fish

Answer Key

Q1. D

Q2. B

Q3. C

Q4.A

Q5. Agree, Agree, Agree, Agree, Disagree.

NR-11 विषयवस्तु – पर्यावरण,संश्लिष्टपदार्थ (Environment, artificialmatter)

आपनेअक्सरकचरेकेढेरदेखेहोंगे।इसकचरेकोखातेहुएपशुओंखासकरगायकोदेखाहोगाजोकचराखार
हीहोगी।खाद्यअपशिष्टखातेसमययेपशुपॉलिथीनकीथैलियोंऔरखाद्यपदार्थोंकेरैपरभीनिगललेतेहैं।जिस
कादुष्परिणामहमसोचभीनहींसकते।प्लास्टिकपदार्थइनपशुओंकेश्वसनतंत्रमेंकंठरोधउत्पन्नकरतेहैंअथवा
आमाशयमेंएकअस्तरबनातेहैंऔरअंततः यहउनकीमृत्युकाकारणबनसकतेहैं।लापरवाहीसेइधर-
उधरफेंकीगयीपॉलिथीनकीथैलियांनालियोंकोरोकदेतीहैं।येकईबारबाढ़काकारणभीबनतीहैं।



(Process 1 - Recognizing scientifically investigative question)

प्र 1 यहाँमुख्यतौरपरकिसवस्तुसेहोनेवालेनुकसानकावर्णनकियागयाहै?

(Process 2- Identifying evidence needed in a scientific investigation.)

प्र. 2 पॉलिथीनकीथैलीखानेसेगायकोकिसप्रकारनुकसानहोताहै?

(Process 3- Drawing or evaluating conclusions.)

प्र. 3 इससारणीकोध्यानसेदेखो :

अपशिष्ट के प्रकार	अपहासित होने में लगने वाला लगभग समय	पदार्थ की प्रकृति
सब्जी और फलों के छिलके, बचा हुआ भोजन, आदि	1 से 2 सप्ताह	जैव निम्नीकरणीय
कागज	10 से 30 दिन	जैव निम्नीकरणीय
सूती कपड़ा	2 से 5 माह	जैव निम्नीकरणीय
लकड़ी	10 से 15 वर्ष	जैव निम्नीकरणीय
ऊनी वस्त्र	लगभग 1 वर्ष	जैव निम्नीकरणीय
टिन, ऐलुमिनियम और अन्य धातुओं के डिब्बे	100 से 500 वर्ष	जैव अनिम्नीकरणीय
प्लास्टिक थैलियाँ	कई वर्ष	जैव अनिम्नीकरणीय

पॉलिथीन(प्लास्टिक) कीथैलीइतनानुकसानकैसेकरलेतीहै?

Process 4-Communicating valid conclusions.

प्र. 4

दीगयीअवस्थाओंकेलिएआपसहमतहैं,बिलकुलसहमतहैं,असहमतहैंयाबिलकुलअसहमतहैं?,सहीकेनीचे/कानिशानलगाएँ

क्रम स.	अवस्था	सहमतहैं	बिलकुलसहमतहैं	असहमतहैं	बिलकुलअसहमतहैं
1	हमेंपॉलिथीनकीथैलीकाइस्तेमालकरनाचाहिए				
2	उपयोगकरनेकेपश्चातपॉलिथीनकीथैलीकोइधरउधरफेंकदेनाचाहिए				
3	हमेंपॉलिथीनकीथैलीकाइस्तेमालनकरकेकपड़ेकेथैलोंकाउपयोगकरनाचाहिए				

(Process 5- Demonstrating understanding of scientific concept or Scientific attitude)

प्र. 5 हाँयानहींमेंउत्तरदीजिये :

क) हमेंप्लास्टिकटिफिनकेस्थानपरस्टीलकाटिफिनइस्तेमालकरनाचाहिए - हाँ/नहीं

ख) क्यूंकिहमारेदेशमेंस्वच्छभारतअभियानचलरहाहैइसलिएपॉलिथीनकीथैलीउपयोगके

पश्चातइधरउधरनहींफेंकनीचाहिए - हाँ/नहीं

ग) कागज़केलिफाफेकाउपयोगकरनाचाहिए - हाँ/नहीं

उत्तरमाला

प्र 1 यहाँमुख्यतौरपरकिसवस्तुसेहोनेवालेनुकसानकावर्णनकियागयाहै?

उ. पॉलिथीनकीथैली

प्र. 2 पॉलिथीनकीथैलीखानेसेगायकोकिसप्रकारनुकसानहोताहै?

उप्लास्टिकपदार्थइनपशुओंकेश्वसनतंत्रमेंकंठरोधउत्पन्नकरतेहैंअथवाआमाशयमेंएकअस्तरबनातेहैंऔरअंतततः यहउनकीमृत्युकाकारणबनसकतेहैं।

प्र. 3 पॉलिथीनकीथैलीइतनानुकसानकैसेकरलेतीहै?

उ. क्यूंकियहआसानीसेगलतीनहींअथवाजैवअनिम्नीकरणीयहैं।

प्र. 4

दीगयीअवस्थाओंकेलिएआपसहमतहैं,बिलकुलसहमतहैं,असहमतहैंयाबिलकुलअसहमतहैं?,सहीकेनीचे√
कानिशानलगाएँ

क्रम सं.	अवस्था	सहम तहैं	बिलकुलस हमतहैं	असह मतहैं	बिलकुलअस हमतहैं
1	हमेंपॉलिथीनकीथैलीकाइस्तेमालकरनाचाहिए				√
2	उपयोगकरनेकेपश्चातपॉलिथीनकीथैलीकोइधरउधरफेंकदेनाचाहिए				√
3	हमेंपॉलिथीनकीथैलीकाइस्तेमालनकरकेकपड़ेकेथैलोंकाउपयोगकरनाचाहिए	√			

प्र. 5 हाँयानहींमेंउत्तरदीजिये :

क) हमेंप्लास्टिकटिफिनकेस्थानपरस्टीलकाटिफिनइस्तेमालकरनाचाहिए - हाँ

ख) क्यूंकिहमारेदेशमेंस्वच्छभारतअभियानचलरहाहैइसलिएपॉलिथीनकीथैलीउपयोगनहींकरनीचाहिए -
नहीं

ग) कागज़केलिफाफेकाउपयोगकरनाचाहिए – हाँ

Reference: Pls. Refer NCERT Vigyan class 8 pg. 39

Have you ever seen a garbage dump where animals are eating garbage? In the process of eating the food waste they swallow materials like polythene bags and wrappers of food. Can you imagine the consequences? The plastic material chokes the respiratory system of these animals, or forms a lining in their stomachs and can be the cause of their death.

The polybags carelessly thrown here and there are responsible for clogging the drains, too. Sometimes we are very careless and throw the wrappers of chips, biscuits and other eatables on the road or in parks or picnic places. Should we not think twice before doing so ? As a responsible citizen what measures do you suggest to keep public places clean and free of plastic?

NR-12 MONOCOTS



Monocots are a flowering plant group whose members usually contain only one cotyledon or embryonic leaf. Monocots are divided into several taxonomic ranks and include approximately 60,000 species. The beautiful orchids belong to the monocotyledons' group, and so do grains, bananas, bamboos and various delicious spices used in Asian cuisine, such as turmeric, ginger and cardamom.

DICOT



Dicots have two cotyledons – or embryonic leaves – in their seeds. The group contains somewhere around 200,000 species. They usually have a taproot system, their stems typically spread to the outside, and their flowers have four or five petals. Examples of dicot include mint, lettuce, legumes, daisies, tomatoes and even oaks.

Q1. Trimarous flowers are present in the following

- a) Lilly
- b) Petunia

c) Sunflower

d) Rose

Q2. Parallel venation is present in:

a) Wheat

b) Maze

c) Banana

d) All the above

Q3. What are cotyledons?

a) Seeds

b) Grams

c) Food laden leaves

d) None of the above

Q4. Most of the pulses belong to the:

a) Monocots

b) Dicots

c) Pteridophytes

d) Algae

Q5. Do you agree/disagree to the following?

a) Dicots have tap root system and reticulate venation.

b) Grass is a monocot plant

c) Parallel venation is present in petunia

d) Two cotyledons are present in wheat

e) Most advanced types of plants are monocots

Answer Key

Q1.A

Q2.D

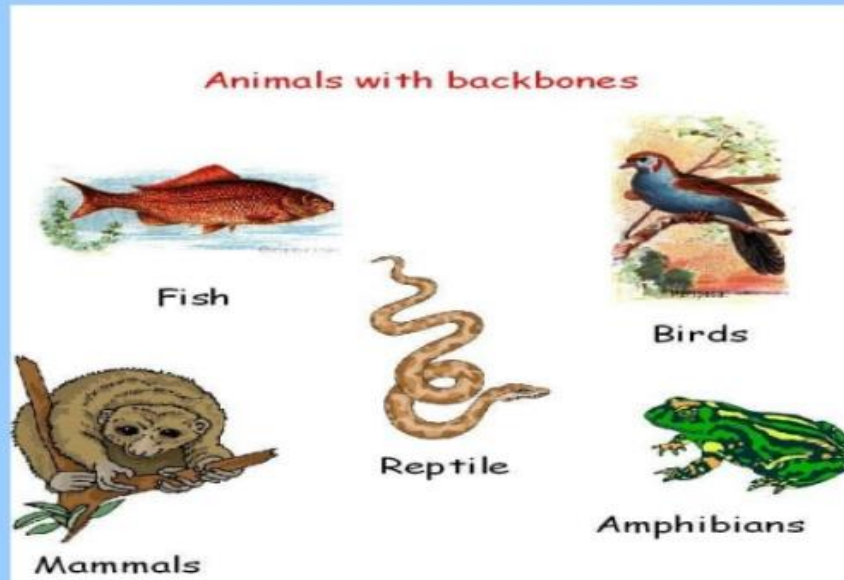
Q3.C

Q4. B

Q5. Agree,agree,disagree,agree.

NR-13 VERTEBRATE

VERTEBRATE ANIMALS



Vertebrate, also called **Craniata**, any [animal](#) of the subphylum Vertebrata, the predominant subphylum of the phylum [Chordata](#). They have backbones, from which they derive their name. The vertebrates are also characterized by a muscular system consisting primarily of bilaterally paired masses and a central nervous system partly enclosed within the [backbone](#).

- Q1. What are the two identifying features of vertebrates?
- Q2. Name the non-aquatic animals from the above picture
- a) Frog
 - b) Birds
 - c) Mammals
 - d) Lizards
- Q3. Which of the above have pneumatic bones?
- a) Snake
 - b) Pigeon
 - c) Frog
 - d) Fish
- Q4. Mammary glands and hair are present on the body of
- a) Crocodiles
 - b) Salamander
 - c) Crow
 - d) Dogs

Q5. Answer the following in yes/no

- a) Fishes have two-chambered heart
- b) Frog lives in water and also on land
- c) Fore limbs of birds are modified into wings
- d) Bat is a flying mammal

Answer Key

Q1. Vertebral column, Muscular system

Q2. B

Q3. B

Q4. D

Q5. Yes, No, Yes, Yes

NR-14 Water –A Precious Resource

22nd March is celebrated as the World Water Day. We celebrate water day every year to attract the attention of everybody towards the importance of conserving water. The amount of water recommended by UN for drinking, washing, cooking and maintaining proper hygiene is a minimum of 50 l per person per day. It amounts to 2.5 buckets of water per person per day. In some places there is an acute shortage of water. Taps run dry, long queues of water, fights, marches and protest of demand of water has become a common sight especially during summers.

Q1. Which day is celebrated as World Water Day?

Q2. In which season water shortage is mostly observed?

Q3. Why do we celebrate World Water Day?

Q4. According to UN what is the minimum amount of water required per person per day for maintaining proper hygiene? What is the full of UN?

Q5. What could be the possible effects of water shortage.

Answer Key:

Ans1. 22nd March

Score 2 for correct ans

Score 0 for incorrect ans

Ans2. Summers

Score 2 for correct ans

Score 0 for incorrect ans

Ans3. To attract the attention of everybody towards the importance of conserving water.

Score 2 for correct ans

Score 1 for any other relevant ans

Score 0 for incorrect ans

Ans4. a) 2.5 buckets (50 l)

b) United Nations

Score 2 for correct ans

Score 0 for incorrect ans

Ans5. Drinking, washing, cooking, bathing, agriculture and transportation.

Score 2 for four correct uses

Score 0.5 per use

Ans6. Taps run dry, long queues of water, fights, marches and protest of demand of water.

Score 0.5 for every correct point

NR-15 Water – A Precious Resource

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Q5. What could be the possible effects of water shortage.

Answer Key:

Ans1. 22nd March

Score 2 for correct ans

Score 0 for incorrect ans

Ans2. Summers

Score 2 for correct ans

Score 0 for incorrect ans

Ans3. To attract the attention of everybody towards the importance of conserving water.

Score 2 for correct ans

Score 1 for any other relevant ans

Score 0 for incorrect ans

Ans4. a) 2.5 buckets (50 l)

b) United Nations

Score 2 for correct ans

Score 0 for incorrect ans

Ans5. Drinking, washing, cooking, bathing, agriculture and transportation.

Score 2 for four correct uses

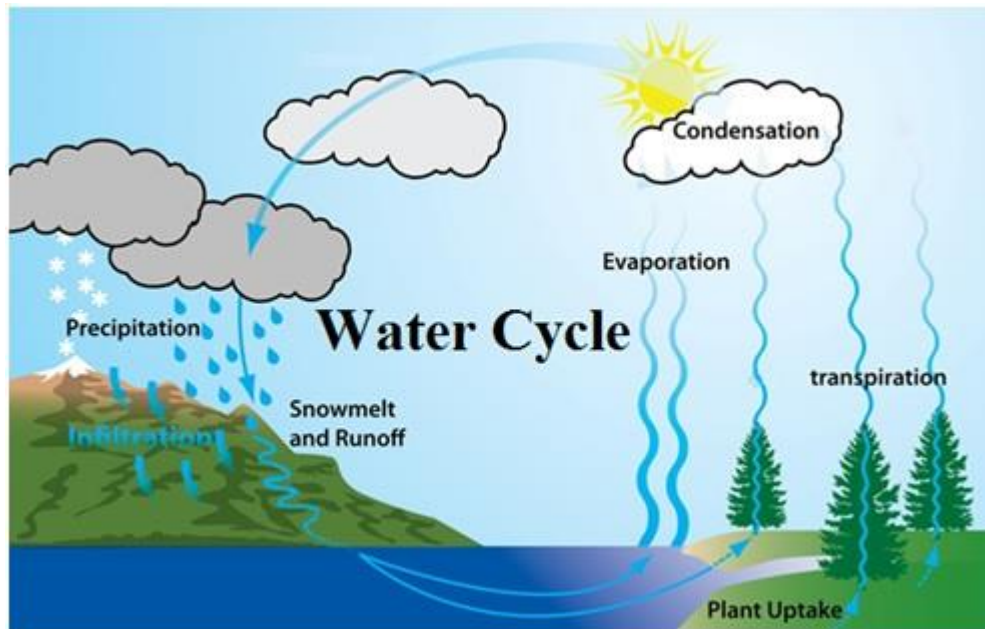
Score 0.5 per use

Ans6. Taps run dry, long queues of water, fights, marches and protest of demand of water.

Score 0.5 for every correct point

NR-16 Water cycle

The whole process in which water evaporates and falls on the land as rain and later flows back into the sea via rivers is known as the water-cycle.



Source: <https://www.iagraniosh.com/>

Main steps involved in a water cycle are:

- Evaporation: Water on earth changes to vapour due to sun's heat and rises above.
- Transpiration: Plants absorb water through the roots and then give off excess water in the form of vapour through pores in their leaves.
- Respiration: It is a process in living organisms involving the production of energy, with the intake of oxygen and the release of carbon dioxide along with water vapour.
- Precipitation: It is the process of condensation of water vapour in atmosphere into liquid which fall down in the form of rain, snow, sleet or hail.
- Percolation and Absorption: Some of the precipitation soaks into the ground to reach the underground water, some on land gets absorbed by the plants, crops and trees to grow and the rest downhill as runoff to reach the seas to complete the whole water cycle.

Question1: How do plants give off water?

- | | |
|------------------|------------------|
| a) Condensation | c) Transpiration |
| b) Precipitation | d) Evaporation |

Question2: What are the major processes of Water Cycle?

- a) Evaporation, Condensation, and Precipitation.
- b) Evaporation and condensation
- c) Respiration and transpiration
- d) None of these

Question3. What is the difference between evaporation and condensation?

Question4: Tick any one option (Agree/ disagree) in the following statements and justify.

- a) Evaporation changes water into solid state.
- b) Transpiration helps in removing excess of water.

Question5. Rainwater is the purest form of water. Comment.

Answers Key:

Answer 1.

- Score 2 if response is c
- Score 0 for any other response

Answer 2.

- Score 2 if response is a
- Score 1 if response is b
- Score 0 if response is any other

HAZARDS

HZ-1 Effect of pollution on the Respiratory system

30 percent rise in respiratory diseases:

Published 11th November 2018 10:05 am in TIMES OF INDIA

According to health experts, there is a “dose-response relationship” between air pollution and the number of patients.



Q1. What is the meaning of dose- response relationship?

Q2. a) Medical experts have advised early risers to stop going out for jogging and physical exercise, why?

b) Name the agency that has issued severe alerts.

Q3. PM refers to-

- a) Picometre
- b) Particulate matter
- c) Prime Minister
- d) Post Meridiem

Q4.

Situations	Agree	Disagree
During Diwali busy intersections are more polluted than green areas.		
It is better to exercise in the late afternoons or early evenings during winter months due to lower levels of pollution.		

Answer key:

The more the pollution, more is the no. of people falling sick.

A).Early morning sky is saturated with pollutants, there is less wind movement .

B) SAFAR

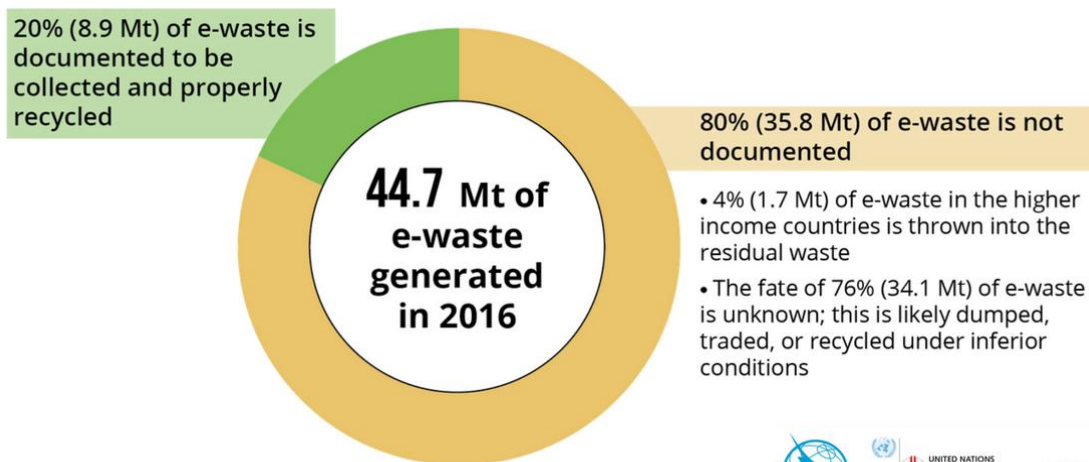
A) Picometre

Disagree

Agree

HZ-2 E-waste

Collection methods of e-waste in 2016



The Global #eWaste Monitor 2017

The advancement in technology and changing lifestyle, status or perception of consumers has driven the demand of electronic items. Consumers' dependency on information and communication technology has been increasing very rapidly. The new innovations in information technology because of the rising demand for higher efficiency and productivity in the businesses and work have become a matter of day to day life. Technologies which were new yesterday have become obsolete for today.

The increase in demand for “White Goods segment” i.e. on consumer durables such as television sets, microwave ovens, calculators, air-conditioners, servers, printers, scanners, cellular phones, computers etc. is for obvious. Thus, there can be broad range of waste electric and electronic goods which have outlived their use, ready for disposal.

These contain chemical materials considered hazardous for human well beings and natural environment. The increasing rate of waste electronic products and additionally the illegal import of junk electronics from abroad create a complex scenario for solid waste management in India.

Q1: What according to you is e-waste? (Tick the correct answer/s)

Waste generated by emails in the trash box

Waste collected in the school , home or at community level

Waste generated by electronic goods we use and throw

Waste caused due to all the electrical gadgets we use at home

Waste caused because of both electrical and electronic gadgets

1 only

2 only

3, 4 and 5

None of the above

Q2:

Can you identify some of the e-waste which are generated at school level and at your home level or at both levels and place it in the appropriate column? For one which does not cause any waste put a circle.

HAIR DYER	LCD	CHIMNEY	E-BOOKS	SOAPS
WASHING MACHINES	CFL	WOODEN BENCHES	MOBILE	
CALCULATOR	SOLAR PANNEL	TUBELIGHTS	CARS	
AIRCOOLERS	STABILIZERS	FRIDGE	ELECTRONIC BELLS	
E-MAILELECTRONIC	IRON	LAPTOP	SPEAKERS	

AT SCHOOL LEVEL	AT HOME LEVEL	BOTH LEVELS

Q3: By looking at the picture shown above can you fill in the table given below

	PERCENTAGE	METRIC/TONS
TOTAL E-WASTE GENERATED GLOBALLY		
E-WASTE PROPERLY RECYCLED		
E-WASTE NOT PROPERLY DOCUMENTED		
E-WASTE WHICH IS DUMBED		

Q4: What according to you are the possible reasons of the increased usage of white goods segment, which has contributed to e-waste globally?

Q5: Let's imagine that the total waste generated in 2020 at global level increases to 50 metric tonne. If percentage remains same of the documented and undocumented waste then find out the following

Waste generated	In percentage	In metric tonne
1. That can be recycled		
2. That cannot be recycled		

Q6: Give your suggestions which you think is appropriate related to the above given scenario:

Statement	Agree	Strongly Agree	Disagree	Don't know
We should change our life style to solve this global issue				
Every single person's Contribution will not affect				
Its a global concern which should be dealt very seriously				
We should stop using technology with immediate affect				
Recycling changes the quality of the substance				

Answer key:

Ans 1. Option C

Ans. 2. Home level: lcd, washing machines, mobile, calculator, solar pannel, cars, aircoolers, stabilizers, fridge, electronic bells, steam iron, laptop, speakers.

School level: lcd, mobile, calculator, solar pannel, aircoolers, stabilizers, fridge, electronic bells, laptop, speakers

Not an e-waste: email, wooden bench, soaps, e-books, tubelight, cfl,

Ans 3.

	PERCENTAGE	METRIC/TONS
TOTAL E-WASTE GENERATED GLOBALLY	100	44.7
E-WASTE PROPERLY RECYCLED	20	8.9

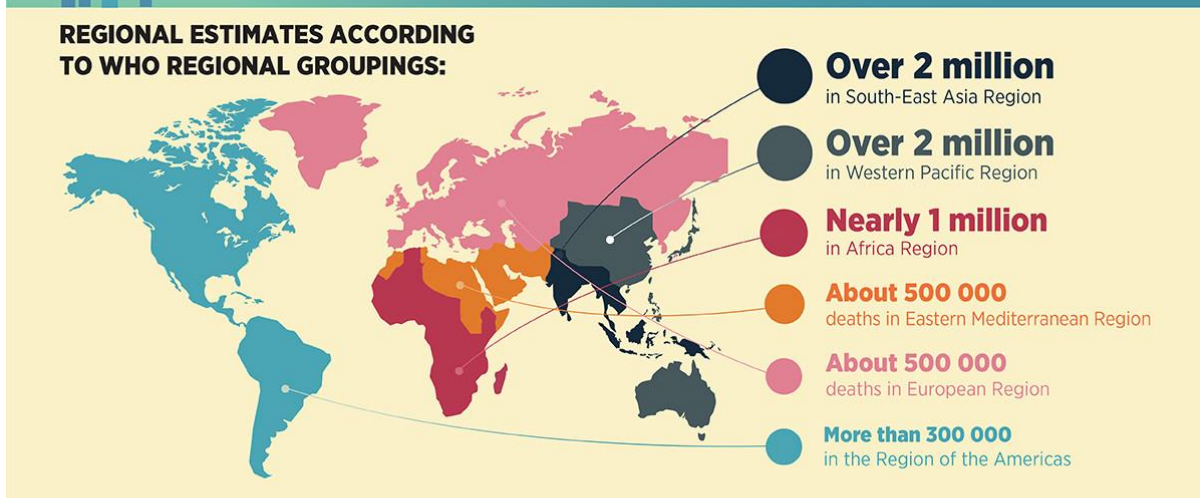
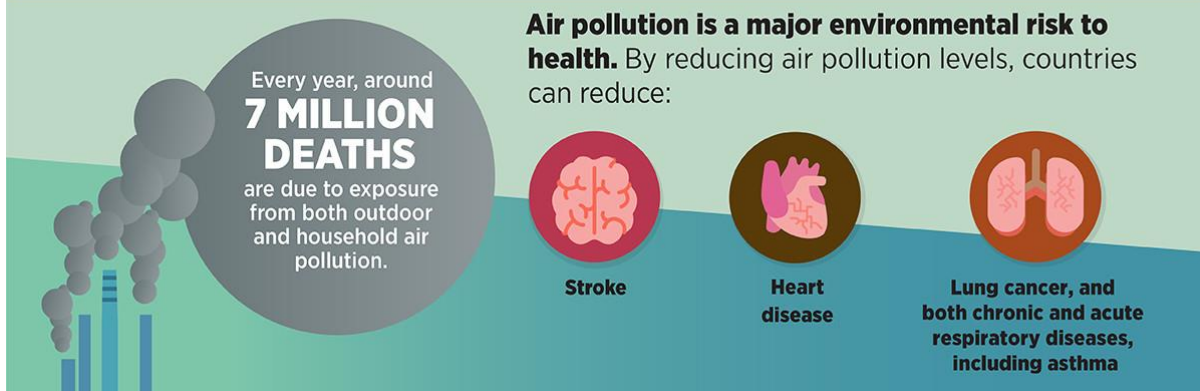
E-WASTE NOT PROPERLY DOCUMENTED	80	35.8
E-WASTE WHICH IS DUMPED	76	34.1

Ans: 4 The advancement in technology, changing lifestyle and technology getting obsolete at a very fast rate.

Ans 5.

Waste generated	In percentage	In metric tonne
1. That can be recycled	20	10
2. That cannot be recycled	80	40

AIR POLLUTION – THE SILENT KILLER



CLEAN AIR FOR HEALTH

#AirPollution



Air pollution is a mix of particles and gases that can reach harmful concentrations both outside and indoors. Its effects can range from higher disease risks to rising temperatures. Soot, smoke, mold, pollen, methane, and carbon dioxide are a just few examples of common pollutants

Sulphur Dioxide and nitrogen dioxide are the major source of pollutants from industries and causes respiratory and cardiovascular illness. It has degradable effect to the environment. Carbon monoxide , lead , particulate matter are major source of pollutant as an emission from vehicles .carbon monoxide causes headaches and weakens the cardiovascular health. Lead damages the nervous system and also kills fishes and animals

Q1. Circle from the list below the major air pollutants:

- Carbon dioxide nitrogen ozone sulphur dioxide Chlorine
mercury Sulphur monoxide lead fluorine urea pollen
nitrogendioxide Helium Mercury soot

Q2. From the data given in the picture

- a) list 2 countries which have
 1. Maximum air pollution _____
 2. Minimum air pollution _____
 3. Around 1 million air pollution_____
- b) List 2 continents which have
 1. Pollution less than 50000 million_____
 2. Pollution about 50000 million_____
 3. Pollution over 2 million_____

Q3. How do you think Indoor pollution is caused? What are the preventive measures we can take to reduce the pollution?

Q4. From the data given above can you analyze and draw the conclusion which of the cities mentioned below is under high threat of diseases like stroke etc. Also write in the increasing order of threat.

New Delhi, New York, Sydney, Peru, Beijing, Tokyo, Cairo

Answer Key:

A1. Carbon dioxide, nitrogen, ozone, sulphur dioxide, mercury, Sulphur monoxide, lead, pollen grains, nitrogen dioxide, Helium, soot

A 2:

- a) 1. Maximum air pollution :India_, bangladesh
- 2, Minimum air pollution : America, Argentina

3 Around 1 million air pollution: Uganda, Tanzania

- b) List 2 continents which has
 4. Pollution less than 500000 million:USSR
 5. Pollution about 500000 million:Part of africa
 6. Pollution over 2 million : Asia ,Europe

A3. Reasons of Indoor pollution: carpets , Paints , Perfumes , Furniture,

Preventive measure: Indoor plants, Less use of aerosols,

New York, Peru, Cairo, Beijing ,Sydney Tokyo , New Delhi,

EXPERIENTIAL LEARNING

Topic:- Air Exerts Pressure

Activity:- Water Fountain

Introduction:-You must have seen fountains in the parks. Water forms spectacular shapes that look wonderful. All of us must have wondered how it happens. This activity will help us to understand the principle behind the working of a fountain.

Material Required Empty water bottle, Straws, Water, Cutter, Candle

Procedure



- Take an empty bottle. Fill the bottle about half with water.
- Make a hole in the bottle. Pass a straw through this hole and seal it with wax.
- Similarly make a hole in the bottle lid and pass the straw through this hole and seal with wax.
- Now blow into the straw which is fixed in the lid of the bottle. Water shoots out of the other straw like a fountain.

Explanation

By blowing into the straw the air above the water is compressed. This compressed air exerts pressure on the surface of the water and due to this pressure water comes out through the other straw.

Precaution

The holes in the bottle should be properly sealed after straws are being inserted.

Relevance to daily life

The same principle is employed in Perfume Bottle, Liquid Soap Dispenser and Hand Pump.

Chemical Effects of Current

Electroplating

Process of electroplating:

In the process of electroplating, metal salt solution is taken in a container. Salt of metal is chosen which is to be coated over another metal. Metal which is to be coated is dipped in the solution and connected with negative pole. Metal for desired coating is connected with positive pole.



When electric current is passed through the solution, metal from anode is dissolved in the salt solution and deposited over the negative pole (cathode). Thus, coating of desired metal is obtained on another metal.

Figure 1

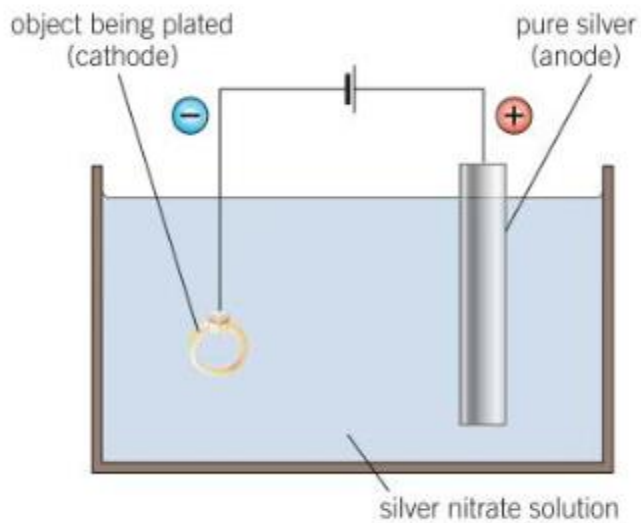


Figure 2



Figure 3

1. Referring to Figure 2 and 3, define these key words:
 - a) Electrolyte and electrolysis

- b) Identify the process taking place in these figures respectively.
2. In the electrolysis of an aqueous solution, which of the following statements is/are true?
- Electrons are lost by one of the species at the anode.
 - Oxidation takes place at the positive electrode.
 - Reduction takes place at the cathode.
 - Electrons flow around the circuit from the cathode to the negative end of the battery.
3. For an object being plated with silver using silver anode and silver nitrate solution, which of the following reactions is/are true?
- The cathode half reaction is : $\text{Ag(s)} + \text{e}^- \rightarrow \text{Ag}^+(\text{aq})$
 - The anode half reaction is : $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag(s)}$
 - The anode half reaction is: $\text{Ag (s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$
 - The cathode half reaction is: $\text{Ag(s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$
 - The cathode half reaction is : $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag (s)}$
4. Tick any one option (agree / disagree) for the following statements:
- Refining of copper is based on phenomenon of electrolysis
 - Galvanisation involves coating of copper on iron.
 - At cathode oxidation takes place in electrolytic cells.
 - During electrolysis of water , oxygen gas bubbles out at cathode.
5. The prominent effects of Electrolysis are:
- Metals may get deposited at the electrode surface.
 - Gaseous bubbles may get formed near electrodes.
 - Change of colour of solution may occur due to dissolution of different ions.
 - Refining of metal.

Answer key:

2.

Score 2 if response is a,b and c

Score 0 for any other answer

3.

Score 2 if response is c and e

Score 0 for any other answer

5.

Score 2 if response is a,b and c

Score 1 if response is a,b or b,c

Score 0 if response is d