

3

LIFE PROCESSES – RESPIRATION AND EXCRETION IN ANIMALS AND PLANTS

I. Multiple choice questions: Tick (✓) the correct choice.

1. The process in which food is oxidised and energy is released, is called

- (a) excretion (b) respiration (c) digestion (d) transpiration

Ans. (b)

2. The process in which only exchange of gases takes place is called

- (a) respiration (b) breathing
(c) combustion (d) internal respiration

Ans. (b)

3. In earthworm, exchange of gases takes place through

- (a) water (b) gills (c) moist skin (d) spiracles

Ans. (c)

4. Alveoli are structures present in

- (a) lungs (b) bronchi (c) gills (d) all the above

Ans. (a)

5. The pigment haemoglobin is present in

- (a) white blood cells (b) red blood cells
(c) platelets (d) lymph

Ans. (b)

6. Transpiration in plants occurs through

- (a) stomata (b) leaf tips (c) shoot apex (d) roots

Ans. (a)

7. The process of removal of waste products from the body is called

- (a) transpiration (b) evaporation (c) excretion (d) respiration

Ans. (c)

8. The structures, present in kidney, which act as filters are

- (a) alveoli (b) nephrons (c) villi (d) none of the above

Ans. (b)

9. Alcohol or lactic acid is produced during
(a) breathing (b) anaerobic respiration
(c) photosynthesis (d) aerobic respiration

Ans. (b)

10. Respiration takes place in
(a) lungs (b) trachea (c) gills (d) every cell of the body

Ans. (d)

11. Following is a sound-producing organ
(a) pharynx (b) epiglottis (c) mouth (d) larynx

Ans. (d)

12. Which of the following can draw in oxygen dissolved in water?
(a) Stomach (b) Lungs (c) Gills (d) Trachea

Ans. (c)

13. In plant respiration takes place in
(a) growing bud (b) germinated seeds
(c) underground roots (d) all the above

Ans. (d)

14. All organisms get oxygen for oxidation of food by the process of
(a) respiration (b) breathing (c) digestion (d) absorption

Ans. (b)

15. In humans, at the time of inhaling, the diaphragm
(a) moves up (b) moves down
(c) remains at its position (d) moves up and down

Ans. (b)

16. The air sacs in lungs are surrounded by a network of
(a) trachea (b) ribs (c) bronchioles (d) capillaries

Ans. (d)

17. Exhaled air contains
(a) more carbon dioxide (b) more oxygen
(c) more dust (d) all the above

Ans. (a)

- 18.** Glucose is oxidised to produce ethyl alcohol or lactic acid during the process of
(a) excretion (b) aerobic respiration
(c) anaerobic respiration (d) photosynthesis
Ans. (c)
- 19.** The opening of the urinary bladder is called
(a) nephron (b) uriniferous tubule (c) urethra (d) nephridia
Ans. (c)
- 20.** Transpiration is
(a) the rise of water in the stem of a plant.
(b) the removal of water with dissolved waste products.
(c) the loss of water as water vapour from the aerial parts of a plant.
(d) the gain of water through absorption by the roots.
Ans. (c)
- 21.** Which of the following favours the fastest transpiration rate?
(a) A cool, humid, windy day (b) A hot, humid, windy day
(c) A hot, humid, still day (d) A hot, dry, windy day
Ans. (d)
- 22.** Our kidney is made of numerous small units of excretion called
(a) nephridia (b) ureter (c) sweat glands (d) nephrons
Ans. (d)
- 23.** Which of the following is not true about transpiration?
(a) It cools plant. (b) It is avoidable.
(c) It helps in ascent of water.
(d) It helps in absorption of salts.
Ans. (b)
- 24.** Quinine is the excretory product present in
(a) bark of cinchona (b) leaf of basil
(c) fruit of cinchona (d) root of turmeric
Ans. (a)
- 25.** Following are the excretory products in plant
(a) urea (b) CO₂ (c) O₂ (d) gums and resins
Ans. (d)

II. Fill in the blanks.

1. During respiration, when energy is released, and are also produced.
2. The substance in red blood cells that joins with oxygen is called
3. Anaerobic respiration is carried out by
4. Excretion of wastes in unicellular organisms takes place by
5. Getting rid of waste materials in living beings is called
6. Skin helps in the excretion of water and
7. In humans, carbon dioxide is excreted through
8. Kidneys are made up of a number of filters called
9. Kidneys are connected to the urinary bladder by long tubes called
10. In insects, breathing occurs through openings called
11. Fish respire through structures called
12. Air sacs present in lungs are called
13. The waste product of respiration is
14. The process by which energy is produced for use in various functions of the body is called
15. Bronchi divide into smaller tubes called
16. is a muscular membrane present below the lungs.
17. Exchange of gases in *Amoeba* takes place by the process of
18. The movement of particles from an area of higher concentration to that of lower concentration is called
19. In human beings, exchange of gases takes place in
20. The excretory unit of a cockroach is

- Ans.** 1. Carbon dioxide, Water 2. Haemoglobin 3. Yeast 4. Diffusion
5. Excretion 6. Salt 7. Lungs 8. Nephrons 9. Ureter
10. Spiracles 11. Gills 12. Alveolar sacs 13. Carbon dioxide
14. Respiration 15. Bronchioles 16. Diaphragm 17. Diffusion
18. Diffusion 19. Lungs 20. Malpighian tubules

III. Choose the correct answer from within the brackets and rewrite the following statements:

1. At the end of locomotion, animals require energy (less/more)
2. Respiration in insects is known as (cutaneous respiration/tracheal respiration)
3. The taking in of air is called (exhalation/inhalation)
4. Fishes breathe through (gill/skin)
5. Breathing occurs in (cells/organs)

Ans. 1. More 2. Tracheal respiration 3. Inhalation 4. Gills 5. Organs

IV. Write True or False in front of the statements given below:

1. In respiration, oxygen is required and carbon dioxide is given out.
2. Diffusion of gases takes place through a small part of root surface.
3. In anaerobic respiration, complete breakdown of food takes place.
4. Earthworms absorb oxygen through moist skin.
5. Energy is released during breathing.
6. Respiration can never take place in the absence of oxygen.
7. Taking air through mouth is much better than through nose.
8. Voice box is responsible for producing sound.
9. Fishes take air from the atmosphere in order to respire.
10. The walls of alveoli are richly supplied with veins.
11. The oxidation of food to release energy and water is called breathing.
12. In insects, the openings on the sides of the body through which air enters and moves out are called spiracles.
13. The exchange of gases through the skin is called cutaneous respiration.
14. The trachea branches into two tubes called bronchioles.
15. The microscopic air sacs present in the lungs are called bronchi.
16. When we inhale air, ribs move upwards and outwards and the diaphragm moves downwards.

17. Breathing is a chemical process.
18. Exchange of carbon dioxide and oxygen in all organisms takes place by the process of diffusion through different organs.
19. Respiration and breathing are two different processes.
20. Aerobic respiration is more efficient than anaerobic respiration.

Ans. 1. T 2. F 3. F 4. T 5. F 6. F 7. F 8. T 9. F 10. T 11. F
12. T 13. T 14. F 15. F 16. T 17. F 18. T 19. T 20. T

V. Give one word for the following:

1. The process in which breaking down of food into small molecules occurs.
2. Coiled tubes acting as filters and present in kidneys.
3. Large flat muscle found in the chest cavity.
4. The respiratory organ in insects.
5. The process of removal of excess water through the leaves.

Ans. 1. Respiration 2. Nephrons 3. Diaphragm 4. Spiracle
5. Transpiration

VI. (a) Match the items of Columns A with the items of Column B.

<i>Column A</i>	<i>Column B</i>
1. Trachea	(a) Large surface are
2. Diaphragm	(b) Cartilaginous rings
3. Larynx	(c) Voice box
4. Alveoli	(d) Swallowing
5. Epiglottis	(e) Breathing

Ans. 1. (b) 2. (e) 3. (c) 4. (a) 5. (d)

B. Match the items of column A with the items of column B.

<i>Column A</i>	<i>Column B</i>
1. Amoeba	(a) body surface
2. earthworm	(b) lungs
3. fish	(c) trachea
4. cockroach	(d) gills
5. bird	(e) skin

Ans. 1. (b) 2. (f) 3. (c) 4. (a) 5. (d)

VII. Find the odd one out. Give reasons for your choice.

1. Ureter, kidney, urinary bladder, lung, urethra

Ans. Lung

Reason: Kidney, urinary bladder, ureter and urethra are the parts of urinary system while lungs are the parts of respiratory system.

2. Skin, heart, lung, liver, kidney

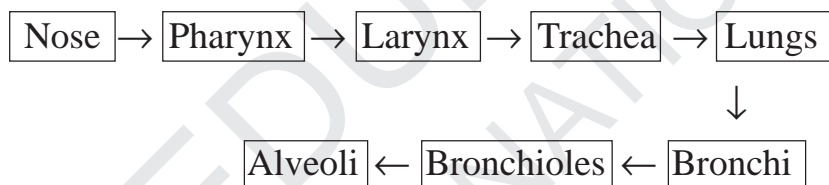
Ans. Heart

Reason: Skin, Kidney, liver and lung are the organs for excretion while heart is the part of circulatory system.

IX. Arrange the orders in the correct order to show the path of air.

trachea, nose, bronchioles, bronchi, larynx, alveoli, pharynx, lungs

Ans. Correct sequence to show the path of air:



IX. Differentiate between the following:

1. Breathing and Respiration

Ans.	Breathing	Respiration
	(1) Breathing is a physical process.	(1) Respiration is a cellular process.
	(2) In breathing only exchange of gases takes place.	(2) In respiration, food molecules are oxidised to carbon dioxide and water.
	(3) It occurs outside the cells.	(3) It occurs inside the cells.
	(4) No energy is released.	(4) Energy is released.
	(5) No enzymatic actions occur.	(5) Many enzymatic action occur.

2. Combustion and Respiration

Ans.	Combustion	Respiration
	(1) It occurs outside the body.	(1) It occurs inside the body.
	(2) It is fast process and occurs at high temperature.	(2) It is slow process and occurs at room temperature.
	(3) Energy is released in the form of heat and light.	(3) Energy is released and stored in some chemical molecules.
	(4) It is a single-step process and no enzyme is involved.	(4) It is a multi-step process and enzymatic action takes place.

3. Transpiration and excretion

Ans.	Transpiration	Excretion
	(1) It occurs in plants.	(1) It occurs in plants and animals both.
	(2) It is the loss of water in the form of water vapour.	(2) It is the process of removal of waste products from the body.
	(3) It occurs through some pore-like structures called stomata.	(3) It occurs by some special structures which are called excretory organs.

X. In an experiment four freshly-picked leaves of a plant were treated as follows: one leaf (A) was coated with vaseline on its upper surface, another (B) was coated on lower surface, the third (C) was coated with vaseline on both surfaces and fourth (D) was left uncoated. All the four leaves A, B, C and D were left in a room for about 24 hours.

(i) Which leaf would become most limp? Why?

Ans. Leaf 'C' would become most limp because this leaf was coated on both the surfaces.

(ii) Which leaf would show least limping? Why?

Ans. Leaf 'D' would become least limp because this leaf was left uncoated.

XI. Give reasons:

(i) It is difficult to show respiration in green plants.

Ans. It is difficult to show respiration in green plants because in green plants respiration as well as photosynthesis both occur at the same time. So, we can show respiration in green plants by a green leaf at night.

(ii) One should not sleep under a tree at night

Ans. One should not sleep under a tree at night because plants giving out carbon dioxide during respiration at night. This is harmful to human beings.

(iii) Soaked germinating seeds turns lime water milky

Ans. Soaked germinating seeds turns lime water milky because they only do respiration not photosynthesis.

(iv) Water droplets can be seen in a polythene cover that has covered the plant completely.

Ans. You can see water droplets in a polythene cover that has covered the plant. It is due to transpiration which is a necessary evil.

(v) You immediately have glucose and drink some water after having run 200 m race.

Ans. Sugar act as a fuel in the cells of our body that on oxidation gives energy. So we should have to take some glucose and water after having run 200 m race.

XII. Answer the following questions:

1. Mention the end products of respiration.

Ans. Respiration is of two types:

(i) **Aerobic respiration.** End products of respiration are: Carbon dioxide and water.

(ii) **Anaerobic respiration.** End products of anaerobic respiration are : Ethyl alcohol and Carbon dioxide.

2. Mention the different organs/methods of breathing in animals.

Ans. Different methods of respiration in animals:

(i) In unicellular organisms like **Amoeba** and **Paramecium** breathing occurs by simple diffusion. In **Hydra**, breathing occurs through general body surface.

- (ii) In insects like cockroach, movement of skeleton draws air in and out of the openings called spiracles. These openings are present on the body surface.
- (iii) In aquatic organisms like fish, respiration occurs by some special structures called gills. Through these gills, dissolved oxygen are used by aquatic organisms.
- (iv) Some organisms use atmospheric oxygen through their body surface. This type of respiration is called **cutaneous respiration**, e.g. Earthworms.
- (v) **Respiration**. In human beings and most of the mammals occurs through lungs. By the movement of ribs and diaphragm, animals draw air in and out of lungs through nose.

3. How does respiration occur in plants? Write a note on it.

Ans. Respiration in plants. Plants have no specific organ for breathing. So, the exchange of gases takes place by the process of diffusion. Diffusion in plants occurs in three ways:

- (i) **Through stomata.** Stomata are the minute openings on the surface of leaves through which exchange of gases takes place.
- (ii) **Through lenticels.** These are the openings present in the stem.
- (iii) **Through general body surface.** This way of exchange of gases occurs in roots. In aquatic plants also diffusion occurs through general body surface.

4. Write in short about the mechanism of respiration.

Ans. Respiration consists of two main stages:

- (i) **Breathing or external respiration.** It is a physical process in which inhalation of oxygen and exhalation of Carbon dioxide occur. This process involves only exchange of gases.
- (ii) **Cellular respiration or internal respiration.** In this process food molecules are broken down into simpler

molecules within the cells and produce energy. In this process a number of chemical reactions occur which is catalysed by some enzymes.

5. Name the organs of the respiratory system in human beings.

Ans. Respiratory system in humans consists of the following organs:

- | | |
|---------------|--------------------------|
| (i) Nose | (ii) Trachea or windpipe |
| (iii) Bronchi | (iv) Lungs |

6. Define transpiration.

Ans. The process of loss of water in the form of water vapour from the leaves in plants, is called transpiration. It occurs through minute pores, called stomata, present in the leaves.

7. Write a brief note on excretion in flowering plants.

Ans. Excretion in Plants. Plants do not have any specialised structures for excretion. In photosynthesis, oxygen comes out as an waste and in respiration, CO₂ comes out as a waste. Both of these gases are given out through stomata.

Some of the waste products of photosynthesis collect in the leaves and bark of the trees. Plants shed their leaves and bark to get rid of these wastes.

Some waste materials accumulating within cells. Calcium oxalate crystals called raphides are such wastes.

Latex, gum, resins, tannins, sandal wood oil are some excretory products which are very useful to human beings.

8. What waste products are removed by the following parts?

- | | |
|-----------|---------------------|
| (a) Skin | (b) Kidneys |
| (c) Lungs | (d) Large intestine |

Ans. Skin excretes water and salts.

Kidneys excrete urea.

Lungs excrete Carbon dioxide.

Large intestine excretes some wastes along with faecal matter through anus.

Liver excretes nitrogenous wasters from the blood.

9. Describe the importance of respiration in organisms.

Ans. Importance of Respiration.

The process by which organisms take up oxygen and discharge CO_2 in order to satisfy their energy requirement. In living organisms, energy is liberated alongwith CO_2 . The term respiration also denotes the exchange of respiratory gases (O_2 & CO_2) between the organism and the medium in which it lives and between the cells of the body and tissue fluid that bathe them.

10. Why do body cells require oxygen?

Ans. Body cells require oxygen for the oxidation of food particles. Respiration is a chemical process in which food molecules are oxidised to carbon dioxide and water and produce energy.

11. How does excretion occur in lower plants and animals?

Ans. In lower plants and animals like *Amoeba* and *Paramecium*, metabolic wastes are removed through general body surface by the process of diffusion. In lower plants and animals no specific organ for excretion is present.

12. Name the various organs of excretion in humans.

Ans. Excretion in humans. In humans, following organs are used for excretion:

(i) Lung (ii) Skin (iii) Large intestine (iv) Kidney (v) Liver

13. How does tissue respiration differ from breathing?

Ans. Breathing is a physical process in which exchange of gases takes place between atmosphere and lungs. This process occurs outside the cells and no energy is released. While tissue respiration is a chemical process in which food molecules are oxidised and produce energy. It occurs inside the cells with the help of some enzymes.

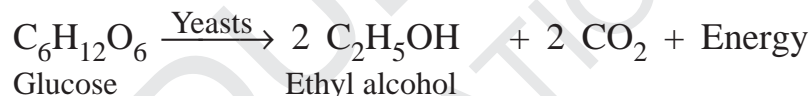
14. What are the main differences between aerobic and anaerobic respiration?

Ans. Differences between aerobic and anaerobic respiration.

Aerobic respiration	Anaerobic respiration
(1) It takes place in the presence of oxygen.	(1) It takes place in the absence of oxygen.
(2) the products are carbon dioxide, water and energy.	(2) The products are ethyl alcohol, water and energy.
(3) More amount of energy is liberated.	(3) Less amount of energy is liberated.
(4) Complete oxidation of food occurs.	(4) Incomplete oxidation of food occurs.

15. What is fermentation?

Ans. Fermentation is the form of anaerobic respiration by certain microorganisms e.g. yeast. The alcoholic fermentation of sugar by yeast is a very common example of anaerobic respiration.



16. What changes take place as the air passes through the nasal cavity?

Ans. Each nasal cavity is lined by mucus membrane. When air inspired through the nasal cavity, it becomes warm, moistened and free from dust particles.

17. What is the function of larynx?

Ans. The larynx is called voice box. It is responsible for the production of sound by the vibration of vocal cords.

18. Differentiate between inhalation and exhalation.

Ans. Differences between inhalation and exhalation

Inhalation	Exhalation
(1) It is the inspiration of atmospheric oxygen into the lungs.	(1) It is the expiration of waste gases (CO ₂) into atmosphere.
(2) During inhalation, diaphragm is in contracted position.	(2) During exhalation, diaphragm is in relaxed position.

(3) Volume of thorax increases.	(3) Volume of thorax decreases.
(4) Intercostal muscles are in contracted position.	(4) Intercostal muscles are in relaxed position.

19. What is the percentage of oxygen in the inspired air and expired air?

Ans. Percentage of oxygen in inspired and expired air:

Inspired air: 20.94% oxygen

Expired air: 16.3% oxygen

20. How does water enter and goes out from the mouth of the fish during respiration?

Ans. Gills are the breathing organs used by the fishes. These gills are associated with blood vascular system. Water enters through mouth, passes over the gills and leaves through the operculum, openings in the sides of the head. The water that entered through mouth passes over the gill filaments. Here, oxygen diffuses into blood capillaries and carbon dioxide diffuses out into the surrounding water. Now water escapes out through operculum.

21. When does a frog normally breathe with the help of skin?

Ans. The skin is effective for breathing in water or on land and continuously is in use. In frog, most of the exchange of gases takes place through skin.

22. What are the differences between respiration and photosynthesis?

Ans.	Respiration	Photosynthesis
	(1) In this process, oxygen is used and carbon dioxide is released.	(1) In this process, carbon dioxide is used and oxygen is released.
	(2) In this process, food substances are broken down.	(2) In this process, food substances are synthesised.
	(3) There is no need of sunlight.	(3) It occurs only in the presence of sunlight.

- 23.** List three modes of exchange of gases in the frog.
- Ans.** Frog can respire in three ways:
- (i) Through skin
 - (ii) Through lungs
 - (iii) Through facial cavity (mouth)
- Most of the respiration takes place through skin.
- 24.** How are lungs of birds different from the lungs of human beings?
- Ans.** Both men and birds have evolved very different respiratory systems. The mammalian lung is homogeneously partitioned and structurally uniform. In mammals, the functions of ventilation and gas exchange are shared by common structures in the respiratory bronchioles, alveolar ducts and hundred of alveoli. In contrast, the avian respiratory system is heterogeneously partitioned and completely separates the functions of ventilation and gas exchange. In birds, air sacs act as bellows to ventilate is occupied by air sacs and 10% remaining is comprised of the lungs, containing hundreds of gas exchange units called parabronchi.
- 25.** What is it better to breathe through your nose than your mouth?
- Ans.** It is better to breathe through nose because when air passes through nasal cavity it becomes warm, moist and dust particles free.
- 26.** Why happens to lime water when exhaled air is passed through it?
- Ans.** When we exhaled air is passed through lime water it becomes milky due to presence of carbon dioxide.
- 27.** What is excretion?
- Ans. Excretion.** The elimination of the waste products by a living organism that arises as a result of metabolic activities is called excretion.
- 28.** Explain the structure of a nephron with the help of a diagram?
- Ans.** Each kidney is made of millions of microscopic units called nephrones. Each nephrone consists of a cup-shaped structure

called Bowman's capsule. Each Bowman's capsule contains a network of blood capillaries called glomerulus. Bowman's capsule with glomerulus is called malpighian body. The Bowman's capsule extends into a long tubule which is surrounded by a network of renal capillaries.

29. What are the other organs of excretion besides kidneys in human beings?

Ans. Besides kidneys, human beings are also have some other organs for excretion. These are as follows:

(i) Skin (ii) Lungs (iii) Liver (iv) Large intestine.

Skin excretes water and salts, Lungs excrete carbon dioxide and liver excretes wastes from blood and large intestine excretes some wastes along with faecal matter.

30. What is the breathing rate of a normal resting person?

Ans. One complete breathe includes both inspiration and expiration. In a normal resting person, rate of breathing is 12-18 per minute.

31. Name the agency which transports oxygen to all parts of the body.

Ans. Oxygen of inhaled air is absorbed by the blood in the lungs where it combines with the **haemoglobin** of the RBCs forming an unstable compound oxyhaemoglobin.

32. What is the role of epiglottis during swallowing?

Ans. The front opening of wind pipe is guarded by a muscular flap called epiglottis. This epiglottis closes the wind pipe at the time of swallowing of food.

33. Rewrite these sentences by filling the blanks to complete the process of excretion.

The excretory tubules in humans filter the _____ wastes from the blood to form _____ which is drained out of _____ and collected in the _____, and is removed from the body through an opening called the urethra.

Ans. The excretory tubules in humans filter the metabolic wastes

from the blood to form urine which is drained out of kidneys and collected in the urinary bladder, and is removed from the body through an opening called the urethra.

- 34.** Name four organs of human urinary system in their sequence.
Ans. Human urinary system consists of the following organs:
(i) Kidneys (ii) Ureter (iii) Urinary bladder (iv) Urethra
- 35.** Why is excretion necessary in living beings?
Ans. Excretion is necessary process in living organisms. Because if waste products left in the body and allowed to accumulate, they may cause death. Their removal, therefore, is as important as the introduction of food and oxygen into the body.
- 36.** What is meant by osmoregulation?
Ans. Osmoregulation is the control of water content and the concentration of salts in the body of an animal. Water is lost from the body in the form of sweat, urine, faeces and exhaled breath. This loss of water is prevented by some methods, e.g., anti-diuretic hormones causes the kidney tubules to absorb more water from urine, thus urine becomes more concentrated and further loss of water is reduced.
- 37.** Name the constituents of urine.
Ans. Human urine consists of following constituents:
- | | |
|--|---------|
| Water | : 95% |
| Urea | : 2% |
| Sodium chloride
and other mineral salts | : 1.6% |
| Uric acid | : 0.05% |
| Other nitrogenous compounds | : 0.2% |
- 38.** Describe in brief the function of rib-muscles and diaphragm in breathing.
Ans. Elevation of ribs and expansion of the rib cage result from the co-ordinated action of the rib cage muscles. External intercostal muscles are considered to be active mainly during inspiration and internal intercostal muscles during expiration. Involuntary movement of diaphragm make it smooth.

39. Name the gas which is expelled during expiration. Where is it originally produced in our body?

Ans. Carbon dioxide is expelled during expiration. It is formed in the cell during oxidation of food molecules.

40. Do the plants respire all day and night or only during the night?

Ans. Respiration in plants occurs during day and night continuously.

41. An apparatus as shown here was set up in sunlight for about an hour, drops of water appeared on the inside the polythene bag.

(a) Name the process which is being demonstrated.

Ans. This experiment is done to show transpiration.

(b) What were the pot and its soil left uncovered by the polythene bag?

Ans. In sunlight, with transpiration, evaporation also occurs that disturbs the experiment. So, we have to left pot and soil uncovered by polythene bag.

(c) Why was they pot left in sunlight?

Ans. In sunlight the rate of transpiration is faster, because the stomata remain open and we can see tiny droplets in polythene.

(d) Suppose the pot in this experiment was placed inside a room instead of sunlight, what difference would be noted?

Ans. In the absence of sunlight, their will be no transpiration. So, we cannot see tiny droplets in polythene.

