Chapter 9: Life Processes in Animals

Exercises — Let Us Enhance Our Learning

Q1 Complete the journey of food through the alimentary canal by filling up the boxes with appropriate parts — Food → Mouth → ___ → Stomach → ___ → ___ → Anus

SOLUTION

Food enters the mouth, then moves to the oesophagus (food pipe), then to the stomach, then to the small intestine, then to the large intestine, and finally exits through the anus.

Complete sequence:
Food → Mouth → Oesophagus (Food pipe) → Stomach → Small intestine → Large intestine → Anus

Answer: Food → Mouth → Oesophagus → Stomach → Small intestine → Large intestine → Anus

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Q2 Sahil placed some pieces of chapati in test tube A. Neha placed chewed chapati in test tube B, and Santushti took boiled and mashed potato in test tube C. All of them added a few drops of iodine solution to their test tubes — A, B, and C, respectively. What would be their observations? Give reasons.

SOLUTION

Test tube A (unchewed chapati pieces + iodine):
The iodine solution will turn blue-black. Chapati contains starch, and iodine reacts with starch to give a blue-black colour. Since the chapati has not been chewed, saliva has not acted on it, so starch is still fully present.

Test tube B (chewed chapati + iodine):
The iodine solution will either not change colour or show only a very slight blue-black colour. When chapati is chewed, saliva (which contains a digestive juice) breaks down the starch into sugar. Since most or all of the starch has been converted to sugar, iodine does not give the blue-black reaction, or gives only a faint colour if a little starch remains.

Test tube C (boiled and mashed potato + iodine):
The iodine solution will turn blue-black. Boiled and mashed potato still contains starch (it has not been chewed, so saliva has not acted on it). Iodine reacts with

this starch to give a blue-black colour.

Key reason: Iodine gives a blue-black colour in the presence of starch. Saliva breaks starch into sugar during chewing, so chewed food tests negative (or weakly positive) for starch, while unchewed starchy food tests strongly positive.

Answer: A: blue-black (starch present, not broken down). B: no colour change or very faint (starch broken down to sugar by saliva during chewing). C: blue-black (starch still present in mashed potato as it was not chewed).

Q3 What is the role of the diaphragm in breathing? (i) To filter the air (ii) To produce sound (iii) To help in inhalation and exhalation (iv) To absorb oxygen

SOLUTION

The correct option is (iii) To help in inhalation and exhalation.

The diaphragm is a dome-shaped muscle located below the lungs. During inhalation, the diaphragm moves downwards. This increases the space inside the chest, allowing air to enter the lungs. During exhalation, the diaphragm moves upwards, reducing space inside the chest and pushing air out of the lungs.

Why the other options are wrong:
Option (i) — Filtering air is done by the tiny hair and mucus in the nostrils and nasal passages, not the diaphragm.
Option (ii) — The diaphragm does not produce sound; it is a breathing muscle.
Option (iv) — Absorption of oxygen occurs at the alveoli in the lungs, not at the diaphragm.

Answer: (iii) To help in inhalation and exhalation — the diaphragm moves downward during inhalation (increasing chest space, air enters lungs) and upward during exhalation (reducing chest space, air is pushed out).

Q4 Match the following — (i) Nostrils (ii) Nasal passages (iii) Windpipe (iv) Alveoli (v) Ribcage — with functions: (a) fresh air from outside enters (b) exchange of gases occurs (c) protects lungs (d) tiny hair and mucus help to trap dust and dirt from the air we breathe (e) air reaches our lungs through this part

SOLUTION

(i) Nostrils → (a) fresh air from outside enters
Nostrils are the pair of nasal openings through which we inhale and exhale air. Fresh air from outside first enters through the nostrils.

(ii) Nasal passages → (d) tiny hair and mucus help to trap dust and dirt from the air we breathe
The nasal passages contain tiny hair along with mucus that trap dust and dirt, filtering the inhaled air before it moves further.

(iii) Windpipe → (e) air reaches our lungs through this part
From the nasal passages, air travels through the windpipe to reach the lungs. The windpipe forms two branches that enter the two lungs.

(iv) Alveoli → (b) exchange of gases occurs
The alveoli are small balloon-like sacs at the ends of the finest branches in the lungs. They have thin walls surrounded by fine blood vessels where oxygen passes into the blood and carbon dioxide passes into the air.

(v) Ribcage → (c) protects lungs
The lungs are protected by the rib cage.

Answer: (i)–(a), (ii)–(d), (iii)–(e), (iv)–(b), (v)–(c)

Q5 Anil claims to his friend Sanvi that respiration and breathing are the same process. What question(s) can Sanvi ask him to make him understand that he is not correct?

SOLUTION

Sanvi can ask Anil the following questions to show they are different processes:

1. 'Is breathing a physical process or a chemical process? And what about respiration?' — Breathing is a physical process (movement of air into and out of the lungs), while respiration is a chemical process that occurs inside the body.

2. 'Does breathing produce energy?' — Breathing itself does not produce energy. Respiration, on the other hand, uses oxygen to break down glucose and release

energy (Glucose + Oxygen → Carbon dioxide + Water + Energy).

3. 'Where does breathing happen, and where does respiration happen?' — Breathing involves the lungs (inhaling and exhaling air). Respiration occurs at the cellular level throughout the body, where glucose is broken down using oxygen.

4. 'Can you have breathing without energy being released?' — Yes — breathing is only the intake and release of air. Energy is released only during respiration.

These questions highlight that breathing brings oxygen into the lungs, while respiration is the process by which that oxygen is used by the body cells to break down food and release energy.

Answer: Sanvi can ask: 'Is breathing a physical or chemical process? Does breathing itself release energy? Where does each process occur in the body?' — These questions reveal that breathing (physical, lungs) and respiration (chemical, body cells) are distinct processes.

Q6 Which of the following statements is correct and why? Anu: We inhale air. Shanu: We inhale oxygen. Tanu: We inhale air rich in oxygen.

SOLUTION

Tanu's statement — 'We inhale air rich in oxygen' — is the most correct.

Explanation:
Anu says 'We inhale air.' This is partially correct because we do inhale air, but it does not specify the composition. Air is a mixture of gases including oxygen, nitrogen, carbon dioxide, and others.

Shanu says 'We inhale oxygen.' This is incorrect. We do not inhale pure oxygen; we inhale air, which contains approximately 21% oxygen along with nitrogen and other gases.

Tanu says 'We inhale air rich in oxygen.' This is the most accurate statement. The inhaled air contains nearly 21% oxygen, which is higher compared to the exhaled air (which contains only about 16–17% oxygen). So we inhale air that is relatively rich in oxygen.

Therefore, Tanu's statement correctly describes what we inhale — air (a mixture of gases) that is rich in oxygen.

Answer: Tanu's statement is correct. We inhale air (not pure oxygen), and the inhaled air contains nearly 21% oxygen — making it 'air rich in oxygen'. We exhale air with only about 16–17% oxygen.

Q7 We often sneeze when we inhale a lot of dust-laden air. What can be possible explanations for this?

SOLUTION

The text tells us that the nostrils and nasal passages contain tiny hair and mucus that help trap dust and dirt from the air we breathe. When we inhale a lot of dust-laden air, the dust particles enter the nostrils and nasal passages.

Possible explanations for sneezing:

1. The dust particles irritate the lining of the nasal passages. Sneezing is a reflex action that forcefully expels air through the nose and mouth to clear the irritating dust particles from the nasal passages.

2. When a large amount of dust enters, the filtering mechanism (tiny hair and mucus) may become overwhelmed. Sneezing helps remove the excess dust that cannot be trapped by the hair and mucus alone.

3. Sneezing is a protective response — it helps prevent dust and other harmful particles from travelling further into the respiratory system (windpipe and lungs), thereby protecting the delicate tissues of the lungs.

Answer: Sneezing is a protective reflex that forcefully expels air to clear irritating dust particles from the nasal passages, preventing them from reaching deeper parts of the respiratory system such as the windpipe and lungs.

Q8 Paridhi and Anusha of Grade 7 started running for their morning workout. After they completed their running, they counted their breaths per minute. Anusha was breathing faster than Paridhi. Provide at least two possible explanations for why Anusha was breathing faster than Paridhi.

SOLUTION

The text explains that respiration uses oxygen to break down glucose and release energy, and that breathing brings oxygen into the body and removes carbon dioxide. During physical activity, the body needs more energy, which requires more oxygen and produces more carbon dioxide.

Possible explanations for Anusha breathing faster than Paridhi:

1. Anusha may have run a greater distance or at a higher speed than Paridhi, so her body used more energy. This required more oxygen for respiration, making her breathe faster to meet the increased oxygen demand and remove the extra carbon dioxide produced.

2. Anusha's physical fitness level may be lower than Paridhi's. A person who is less fit tends to use oxygen less efficiently, so their body needs to breathe faster to supply enough oxygen to the muscles during and after exercise.

3. Anusha may be smaller or have a lower lung capacity than Paridhi, so she needs to take more breaths per minute to inhale the same amount of oxygen.

Note: Any two of the above explanations are sufficient.

Answer: Two possible reasons: (1) Anusha ran faster or farther, using more energy and requiring more oxygen, so she breathed faster. (2) Anusha may be less physically fit, making her body less efficient at using oxygen, requiring a higher breathing rate.

Q9 Yadu conducted an experiment to test his idea. He took two test tubes, A and B, and added a pinch of rice flour to the test tubes, half-filled with water and stirred them properly. To test tube B, he added a few drops of saliva. He left the two test tubes for 35–45 min. After that, he added iodine solution into both the test tubes. Experimental results are as shown in Fig. 9.15 (test tube A turns blue-black, test tube B does not change colour). What do you think he wants to test?

SOLUTION

Yadu wants to test whether saliva breaks down starch (the carbohydrate present in rice flour) into simpler substances (sugar).

Reasoning from the text:
Saliva contains a digestive juice that breaks down starch into sugar. Iodine gives a blue-black colour in the presence of starch but does not change colour when starch is absent (i.e., when it has been converted to sugar).

Test tube A (rice flour + water, no saliva): starch is still present → iodine turns blue-black.
Test tube B (rice flour + water + saliva, left for 35–45 min): saliva has had time to break down the starch into sugar → iodine does not turn blue-black (no colour

change).

Therefore, Yadu's experiment tests the idea (hypothesis) that saliva has the ability to digest/break down starch. The result confirms that saliva does break down starch, as test tube B (with saliva) shows no blue-black colour while test tube A (without saliva) does.

Answer: Yadu wants to test whether saliva can break down starch into sugar. Test tube A (no saliva) turns blue-black with iodine (starch present), while test tube B (with saliva) shows no colour change (starch broken down), confirming that saliva digests starch.

Q10 Rakshita designed an experiment taking two clean test tubes, A and B, and filled them with lime water. In test tube A, the surrounding air that we inhale was passed on by sucking air from the pipe, and in test tube B, the exhaled air was blown through the pipe (Fig. 9.16). What do you think she is trying to investigate? How can she confirm her findings?

SOLUTION

What Rakshita is trying to investigate:
Rakshita is trying to investigate whether exhaled air contains more carbon dioxide than the air we inhale (the surrounding air). She wants to compare the amount of carbon dioxide in inhaled air versus exhaled air.

Expected observation:
The text states that lime water turns milky when it reacts with carbon dioxide. Test tube A (inhaled/surrounding air) will show little or no change in the lime water. Test tube B (exhaled air) will turn the lime water milky or cloudy, because exhaled air contains more carbon dioxide (about 4–5%) than the inhaled air (about 0.04%).

How she can confirm her findings:
1. She should repeat the experiment multiple times and record whether test tube B consistently turns milky while test tube A does not.
2. She can also ask other students to repeat the experiment and compare results to ensure it is not specific to one person.
3. She can measure the degree of cloudiness — a stronger milky appearance in test tube B compared to test tube A further confirms that exhaled air contains significantly more carbon dioxide.

Conclusion: The experiment confirms that the air we exhale contains more carbon dioxide than the air we inhale.

Answer: Rakshita is investigating whether exhaled air contains more carbon dioxide than inhaled air. Lime water in test tube B (exhaled air) turns milky, while test tube A (inhaled air) shows little or no change — confirming exhaled air is richer in carbon dioxide. She can confirm by repeating the experiment multiple times.