

Reproduction, Heredity and Evolution

Science · Class 10 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

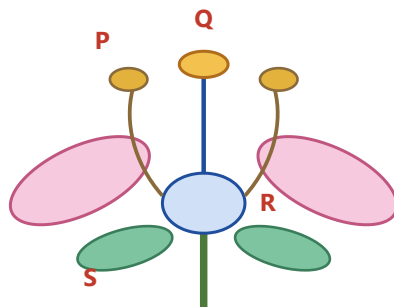
- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Study every diagram and table carefully.

Section A — Scientific Reasoning

Q1–Q8 · 1 mark each

- Amoeba* reproduces asexually by _____.
 (A) Fragmentation (B) Budding
 (C) Spore formation (D) Binary fission
- Which organism reproduces by budding?
 (A) *Plasmodium* (B) Yeast
 (C) *Planaria* (D) Bread mould
- Growing a new rose plant from a cutting is an example of _____.
 (A) Sexual reproduction (B) Spore formation
 (C) Vegetative propagation (D) Fertilisation
- The male reproductive part of a flower is the _____.
 (A) Petal (B) Carpel
 (C) Sepal (D) Stamen
- In human beings, fertilisation normally takes place in the _____.
 (A) Fallopian tube (oviduct) (B) Ovary
 (C) Uterus (D) Vagina
- Mendel carried out his classic experiments on inheritance using _____.
 (A) Fruit flies (B) Garden pea plants
 (C) Maize (D) Mice
- In human beings, the sex of a child is determined by _____.
 (A) The diet of the mother (B) The chromosome inherited from the mother
 (C) The chromosome inherited from the father (D) The age of the parents
- A gene is best described as _____.
 (A) A kind of carbohydrate (B) A type of protein found in the cytoplasm
 (C) The entire nucleus of a cell (D) A segment of DNA that carries information for a trait

9. The diagram shows the parts of a flower. Which labelled part produces pollen grains?



Parts of a flower labelled P, Q, R and S

- (A) P (B) Q
(C) R (D) S

10. In Mendel's monohybrid cross between a tall and a dwarf pea plant, the F_2 generation showed tall and dwarf plants in the ratio _____.

- (A) 3 : 1 (B) 1 : 1
(C) 9 : 3 : 3 : 1 (D) 2 : 1

11. The phenotypic ratio obtained in the F_2 generation of a dihybrid cross is _____.

- (A) 3 : 1 (B) 9 : 3 : 3 : 1
(C) 1 : 2 : 1 (D) 1 : 1 : 1 : 1

12. One row of the table below is **incorrectly** matched. Which row is it?

Row	Organism	Mode of reproduction
(A)	<i>Rhizopus</i>	Binary fission
(B)	<i>Spirogyra</i>	Fragmentation
(C)	<i>Hydra</i>	Budding
(D)	<i>Planaria</i>	Regeneration

Table 4.1 — Organisms and how they reproduce

- (A) (A) (B) (B)
(C) (C) (D) (D)

13. The forelimbs of a frog, a lizard and a bird have a similar basic structure but perform different functions. Such organs are called _____.

- (A) Analogous organs (B) Vestigial organs
(C) Homologous organs (D) Fossils

14. Which of the following is a barrier method of contraception?

- (A) Surgery (B) Oral pill
(C) Copper-T (D) Condom

15. Variation among the individuals of a species is useful because it _____.

- (A) Improves the chance that some individuals survive a change in the environment
(B) Makes all individuals identical
(C) Prevents reproduction
(D) Always produces harmful traits

Achievers Section

Q16–Q18 · 3 marks each

16. **Assertion (A):** If a person builds strong muscles through years of exercise, their children are not born with strong muscles.

Reason (R): Traits acquired during an individual's lifetime do not change the DNA of the germ cells, so they are not inherited.

- (A) Both A and R are true and R is the correct explanation of A
(B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false
(D) A is false but R is true

17. Two pea plants, each heterozygous for height (Tt), are crossed. The Punnett square is shown. What fraction of the offspring will be dwarf?

		gametes from parent 1	
		T	t
gametes from parent 2	T	TT	Tt
	t	Tt	tt

Punnett square for the cross $Tt \times Tt$

- (A) None
(B) One quarter
(C) One half
(D) Three quarters
18. The wing of a bird and the wing of an insect both allow flight, but they are built on completely different plans. What does this tell us?
- (A) They are homologous organs, showing a common ancestor
(B) They are analogous organs, showing that similar needs can produce similar-looking structures independently
(C) Birds evolved directly from insects
(D) Neither structure has any evolutionary significance

Answer Key

1	D	2	B	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	A
11	B	12	A	13	C	14	D	15	A
16	A	17	B	18	B				

Solutions

1. Answer: (D) Binary fission

An *Amoeba* splits into two roughly equal daughter cells, which is **binary fission**. Budding, seen in yeast and *Hydra*, produces a small outgrowth instead.

2. Answer: (B) Yeast

In **yeast** a small bud grows on the parent cell, receives a nucleus and then separates. *Planaria* shows regeneration, and bread mould reproduces by spores.

3. Answer: (C) Vegetative propagation

A new plant raised from a piece of the parent's stem, root or leaf is produced by **vegetative propagation**. Since only one parent is involved, all such plants are genetically identical to it.

4. Answer: (D) Stamen

The **stamen**, made of a filament and an anther, produces pollen grains. The carpel, with its stigma, style and ovary, is the female part.

5. Answer: (A) Fallopian tube (oviduct)

The egg released by the ovary meets the sperm in the **fallopian tube**, and the zygote formed there travels on to the uterus, where it implants and develops.

6. Answer: (B) Garden pea plants

Mendel worked with **garden pea plants**, which have clearly contrasting traits, grow quickly and can be self-pollinated or cross-pollinated at will.

7. Answer: (C) The chromosome inherited from the father

A mother always passes on an X chromosome, while the father passes on either an X or a Y. So the child's sex depends on **the chromosome inherited from the father**: XX gives a girl and XY a boy.

8. Answer: (D) A segment of DNA that carries information for a trait

A gene is **a stretch of DNA holding the information for one characteristic**, usually by specifying a protein. Genes sit along the chromosomes inside the nucleus.

9. Answer: (A) P

P marks the anther at the top of a stamen, and it is there that pollen grains are formed. Q is the stigma, which receives pollen, R the ovary holding the ovules, and S a sepal.

10. Answer: (A) 3 : 1

All the F₁ plants were tall, and self-pollinating them gave tall and dwarf plants in the ratio **3 : 1**. The dwarf trait reappears because it was carried, hidden, through the F₁ generation.

11. Answer: (B) 9 : 3 : 3 : 1

Two pairs of independently assorting traits give the classic **9 : 3 : 3 : 1** ratio in F₂. The appearance of the two new combinations is what showed Mendel that the traits are inherited independently.

12. Answer: (A) (A)

Rhizopus, the bread mould, reproduces by forming *spores* in its sporangia, not by binary fission. So row **(A)** is wrong; the other three are correctly matched.

13. Answer: (C) Homologous organs

Homologous organs share a common basic design and a common ancestor, even where their uses differ. Analogous organs work alike but are built differently, as with the wings of a bird and of an insect.

14. Answer: (D) Condom

A **condom** physically prevents the sperm from reaching the egg, so it is a barrier method, and it also reduces the spread of sexually transmitted infections. Oral pills act on hormones and the Copper-T works inside the uterus.

15. Answer: (A) Improves the chance that some individuals survive a change in the environment

If conditions change — a new disease, a rise in temperature — variants that happen to cope will survive and reproduce. So variation **raises the chance that at least some individuals survive**, which is why sexual reproduction is so widespread.

16. Answer: (A) Both A and R are true and R is the correct explanation of A

Only changes in the DNA of the germ cells pass to the next generation. Exercise alters body cells alone, so the trait dies with the individual. Both statements are true and the second is exactly **why** the first holds, so R explains A.

17. Answer: (B) One quarter

The square shows TT, Tt, Tt and tt in equal numbers. Only **tt** lacks the dominant allele, so a dwarf plant appears in **one quarter** of the offspring, giving the familiar 3 : 1 ratio of tall to dwarf.

18. Answer: (B) They are analogous organs, showing that similar needs can produce similar-looking structures independently

Similar function with different underlying structure marks **analogous organs**. They arise because unrelated groups meeting the same demand — here, flight — evolve their own solutions, so such organs do not indicate a recent common ancestor.