Unit 20 · Theories of Evolution

WORKSHEET

Full marks 34

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 34

1 Key words [4]

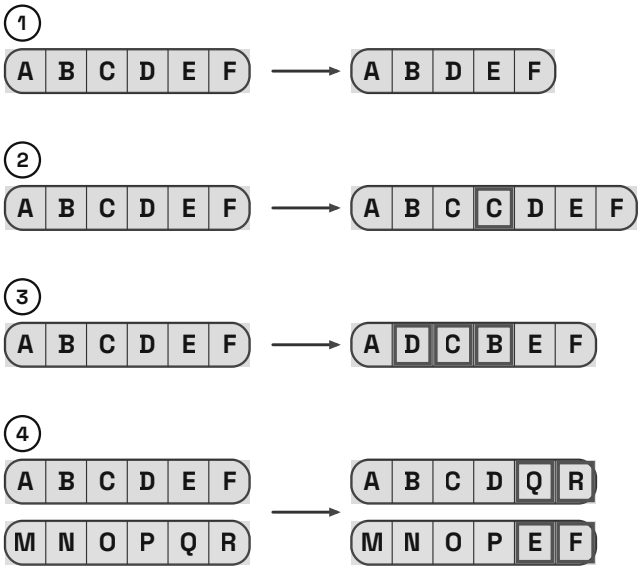
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

1809	**drift**	**germplasm**	**Herbert Spencer**	**intraspecific**	**melanism**	**mutation**	**pool**	**somatoplasm**	**sterility**

Lamarck put forward his theory in his book *Philosophie zoologique*, in _____. Weismann held that only changes in the cells that make eggs and sperm, the _____, can be inherited. The struggle between members of the same species is _____ struggle. The darkening of the peppered moths near factories is called industrial _____. The total of all the alleles of all the individuals in a population is its gene _____. The only source of new alleles is _____. A random change in allele frequencies by chance, strongest in small populations, is genetic _____. A mule, the hybrid of a horse and a donkey, is an example of hybrid _____.

2 Label the diagram [2]

The diagram shows four changes in the structure of a chromosome. Name the change shown at 1 to 4. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which of the following is NOT one of the fundamental postulates of Lamarckism? [1]

a. tendency to increase in size
b. direct environmental influence
c. inheritance of acquired character
d. struggle for existence

ii. Which experiment provided strong evidence against the inheritance of acquired characteristics? [1]

a. the Miller–Urey experiment
b. Weismann's tailless mice experiment
c. Louis Pasteur's experiment
d. evidences from embryology

iii. According to Weismann, which change could be passed to the next generation? [1]

a. muscles built up by exercise
b. a tail cut off by an accident
c. a mutation in a cell that makes sperm
d. skin darkened by the sun

iv. In Darwin's theory, "the fittest" are the individuals that: [1]

a. are the largest and strongest
b. live the longest
c. leave the most surviving young in their surroundings
d. have used their organs the most

v. A storm kills most of the snails on a small island at random, leaving ten. Their descendants are mostly yellow, though the old population was mostly brown. This change is due to: [1]

a. natural selection for yellow shells
b. the bottleneck effect
c. gene migration
d. mutation

4 Very short answers [3]

Write very short answers to the following questions.

a. Who coined the phrase "survival of the fittest"? [1]

b. Name the three ways in which genetic recombination happens. [1]

c. Why is a mule almost always sterile? [1]

5 Short answers [9]

Write short answers to the following questions.

a. What criticism did Weismann's experiment provide against Lamarckism? [2]

b. A pair of house sparrows raises 4 young a year, and every pair of young does the same the next year. If none died, how many sparrows would there be after 5 years? What does the real, nearly steady number of sparrows tell us? **[2]**

c. A gene reads THE CAT ATE THE RAT in words of three letters. Write the message after a. the C of CAT becomes B; b. an extra A is put in after the first THE. Which change does more harm, and why? **[2]**

d. Differentiate between the bottleneck effect and the founder effect, with one example of each. **[3]**

6 Long answers **[8]**

Write long answers to the following questions.

a. Explain the postulates of Lamarckism and provide examples for each postulate. **[4]**

b. Describe the five main points of Darwinism. **[4]**

7 Think [3]

From the 1950s DDT was sprayed in houses in Nepal's Terai to kill malaria mosquitoes. At first it worked very well; within some years most mosquitoes in many places were resistant. A student says, "The DDT made the mosquitoes resistant." Explain why she is wrong, and how a Lamarckian and a Darwinian would each explain the change.

8 Activity: Weismann's tailless mice (not marked)

Read about Weismann's experiment in the unit and fill in the table.

Question	Your answer
What did Weismann do to the mice?	
For how many generations?	
How many young were born?	
How many were born without a tail?	
Which idea did it test?	

Is it a fair test of what Lamarck meant? Give a reason.