# D4.1 Natural selection

What the Cell · DP Biology · worksheet · SL statements D4.1.1–8

**Name** _____ **Date** _____ **Total** _____ / 36

**About 35 minutes,** or one section at a time. The number of marks shows how many separate points to make.

## Section A: Recall

6 marks

**1** **State** the original source of all new alleles. D4.1.2 **[1]**

**2** **List** two resources that may limit a population. D4.1.3 **[2]**

**3** **State** two examples of density-independent factors. D4.1.4 **[2]**

**4** **Define** fitness. D4.1.5 **[1]**

## Section B: Understanding

13 marks

**5** **Outline** how sexual reproduction creates variation. D4.1.2 **[3]**

**6** **Explain** why overproduction of offspring promotes natural selection. D4.1.3 **[3]**

**7** **Explain** why a giraffe's stretched neck would not be passed to its offspring. D4.1.6 **[2]**

**8** **Explain** why males with costly, exaggerated traits may still leave more offspring. D4.1.7 **[3]**

**9** **Explain** how an abiotic factor can act as a selection pressure. D4.1.4 **[2]**

## Section C: Working with data

11 marks

All data in this section are invented for practice, using patterns reported in real studies.

**10** D4.1.8

Guppies bred for 6 months without predators. Then ponds were given no predator or a dangerous predator. The mean number of spots per male was counted.

| Pond | Predators added | After 5 months | After 14 months |
|---|---|---|---|
| **No predators** | 10.0 | 11.5 | 12.5 |
| **Dangerous predators** | 10.0 | 9.0 | 8.5 |

a **Calculate** the percentage change in spots in the pond with no predators, from when predators were added to 14 months. **[1]**

b **Explain** the trend where there were no predators. **[2]**

c **Explain** the trend with dangerous predators. **[2]**

d **Suggest** one reason why using ponds is better than only observing wild populations. **[1]**

**11** D4.1.4, D4.1.5

The percentage of dark moths in one area was recorded as air pollution fell.

| Year | 1960 | 1975 | 1990 | 2005 |
|---|---|---|---|---|
| Dark moths / % | 92 | 70 | 31 | 8 |

a **Describe** the trend. **[1]**

b **Explain** the trend using natural selection. **[3]**

c **Suggest** why a small percentage of dark moths may remain. **[1]**

## Section D: Longer answer

6 marks

**12** **Explain** how natural selection can change the characteristics of a population over many generations. D4.1.1–6 **[6]**