

Solutions

Each answer shows the steps, then the **result**.

2.1

- any two: climate change; competition / invasive species; hunting by humans; habitat loss/degradation

2.2

- in-situ — conserving a species in its natural habitat; ex-situ — keeping and breeding it away from the wild

3.1 C

- A seed bank keeps species away from the wild — ex-situ

3.2 B

- CITES controls international trade in endangered species

3.3

(a)

- invasive species out-compete native species for resources, reducing native populations / biodiversity

(b)

- seeds are stored (frozen/dry) for the long term; they can be grown later to restore a species if it is lost from the wild

3.4

- any two reasons explained: species provide food/medicines/materials; they keep ecosystems stable; they have intrinsic value

3.5

(a)

- It preys directly on natives that have no evolved defence against it; it competes for the same food, nest sites or light, and may outcompete them because it has no local predators or parasites; it introduces diseases or parasites to which native species have no immunity

(b)

- *In situ*: protected areas such as national parks and reserves, and control or removal of the invasive species. *Ex situ*: captive breeding in zoos, and seed banks or frozen gametes and embryos. *In situ* keeps the species in its own habitat, so it stays adapted to it and the whole community is conserved; *ex situ* protects individuals from the very threat that is destroying the wild population, and allows breeding to be managed

(c)

- Techniques such as artificial insemination, IVF and embryo transfer let animals that will not or cannot breed naturally still reproduce; gametes can be moved between distant populations, which raises the number of offspring and widens the gene pool without transporting the animals

(d)

- Genetic diversity is the raw material of natural selection — without it a population cannot adapt to a new disease or a changing climate; a small population loses alleles by genetic drift and suffers inbreeding, which raises the frequency of harmful recessive conditions; so a large but genetically uniform population can still go extinct when conditions change