

18.3 Conservation

Name: _____ Class: _____ Date: _____ **Total: 26 marks**

KEY WORDS conservation 保护 • endangered species 濒危物种 • extinct 灭绝
• invasive species 入侵物种 • seed bank 种子库

Objective

Build the skills to answer exam questions on **conservation** — why species become **extinct** 灭绝, ways to conserve them, **assisted reproduction** 辅助生殖, **invasive species** 入侵物种, and the roles of **IUCN** and **CITES**.

You must be able to:

- explain the causes of extinction and reasons to maintain biodiversity
- outline conservation methods (in-situ and ex-situ) and assisted reproduction
- explain the control of invasive species and the roles of IUCN and CITES

1 Worked examples

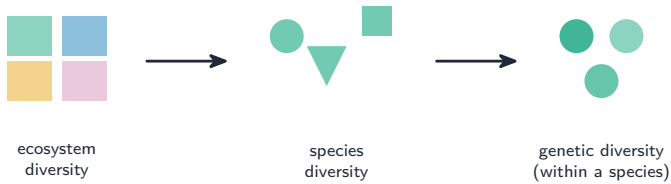
■ Extinction and conserving species

Species become **extinct** through **climate change** 气候变化, competition (often from invasive species), hunting by humans, and habitat loss. We maintain biodiversity because species give food, medicines and materials, keep ecosystems stable, and have value in themselves.

two ways to conserve a species



Conservation is in-situ (protect in the wild habitat) or ex-situ (keep and breed away from the wild)



Conservation protects biodiversity at every level

- **in-situ** 就地: protected areas — national parks, marine parks.
- **ex-situ** 迁地: **zoos** 动物园, **botanic gardens** 植物园, **seed banks** 种子库, 'frozen zoos'.

■ Assisted reproduction and invasive species

For rare mammals: **IVF** 体外受精, **embryo transfer** 胚胎移植, **surrogacy** 代孕. **Invasive species** are controlled because they out-compete native species. **IUCN** lists how threatened each species is; **CITES** controls international trade in endangered species.

2 Practice

2.1 State **two** causes of extinction. [2]

2.2 State the difference between in-situ and ex-situ conservation. [2]

3 Exam-style questions

3.1 Which is an example of **ex-situ** conservation? [1]

- A a national park
- B a marine reserve
- C a seed bank
- D a protected wetland

3.2 What is the role of CITES? [1]

- A to list how threatened each species is
- B to control the international trade in endangered species
- C to run IVF programmes
- D to remove invasive species

3.3 (a) Explain why invasive species are controlled in conservation. [2]

(b) Outline how a seed bank helps to conserve plant species. [2]

3.4 Explain **two** reasons why maintaining biodiversity is important. [2]

3.5 A large island lost 60% of its native bird species after rats arrived with visiting ships.

(a) Explain **three** ways in which an invasive species can drive native species to extinction. [3]

(b) Describe **two** methods of conserving a species **in situ** and **two** methods **ex situ**, and state one advantage of each approach. [6]

(c) Explain how assisted reproduction helps to conserve a species with a very small population. [2]

(d) Explain why maintaining genetic diversity, and not just numbers, matters in a conservation programme. [3]

Solutions

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.