

Exercise walk-through

3.2

K-Selected and r-Selected Species

AP Environmental Science

Carrying capacity, and what happens past it

carrying capacity

K – the maximum population an environment can support long-term

approaching K

growth slows as resources per individual fall – the logistic curve flattens

overshoot

a population may exceed K when resources are temporarily abundant

then a die-off

the excess cannot be supported, and numbers crash – sometimes below K

what sets K

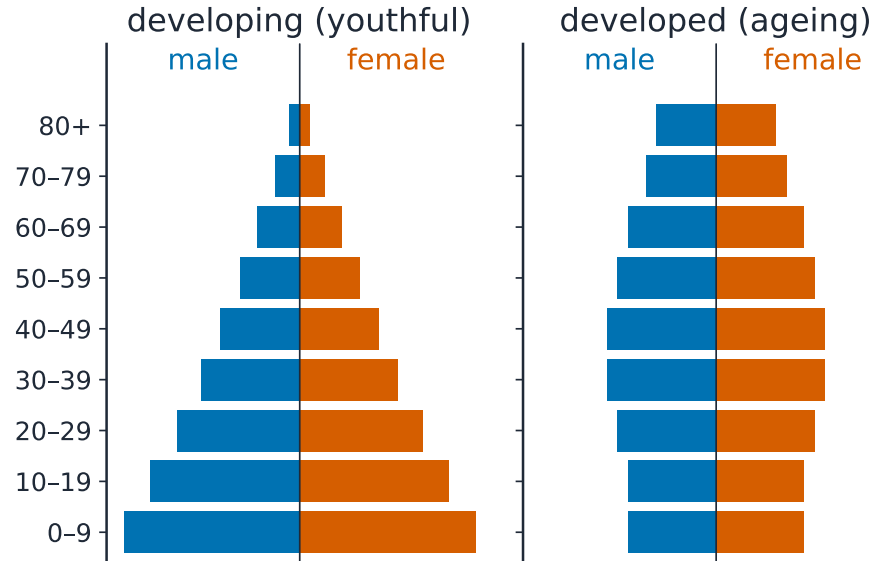
the scarcest resource: food, water, nesting sites, or space

and it moves

K is not a constant – a wet year or a new technology raises it

K is a property of the environment, not of the species. That is why a habitat's degradation lowers it even when the population has not changed.

Population pyramids of a developing and a developed country



Population pyramids of a developing and a developed country

Exam tips

- Use the **rule of 70**: doubling time $\approx 70 \div \text{growth-rate}(\%)$; a growth rate is (births — deaths) per 1000 $\div 10$.
- Read **age-structure diagrams**: a wide base predicts rapid growth, even bars a stable population.
- Contrast **r-selected** (many offspring, little care) and **K-selected** (few, much care) strategies.
- Know the **demographic transition** stages and what lowers birth rates (education, family planning, development).
- A falling **growth rate** still means growth — the population only shrinks when deaths exceed births.

Exercises 2.1-2.3

2.1 Do r-selected species have many or few offspring?

[1]

2.2 Give one example of a K-selected species.

[1]

2.3 Which type recovers faster after a disturbance?

[1]

Exercises 2.1-2.3

2.1 Do r-selected species have many or few offspring? [1]

2.1

- Many
-

2.2 Give one example of a K-selected species. [1]

2.2

- Any one: elephant, whale, human
-

2.3 Which type recovers faster after a disturbance? [1]

2.3

- r-selected

Exercise 3.1

3.1 A K-selected species typically has

[1]

☐

A many offspring and little care

B few offspring and much parental care

C a very short life

D rapid population growth

Exercise 3.1

3.1 A K-selected species typically has

[1]

☐

A many offspring and little care

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D rapid population growth

3.1 B

- few offspring and much parental care

Exercise 3.2 (a)

3.2 An insect species and an elephant species live in the same area.

(a) Classify each as r- or K-selected.

[2]

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[2]

(a)

- Insect = r-selected; elephant = K-selected

Exercise 3.2 (b)

3.2 An insect species and an elephant species live in the same area.

(b) Explain which is more vulnerable to overharvesting.

[2]

Exercise 3.2 (b)

3.2 An insect species and an elephant species live in the same area.

(b) Explain which is more vulnerable to overharvesting. [2]

(b)

- The elephant (K-selected) – it reproduces slowly, so its population cannot recover quickly from overharvesting

Exercise 3.3

3.3 Explain why r-selected species are often the first to recolonize a disturbed area. [2]

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3.3

- They mature fast and produce many offspring, so they multiply and spread rapidly to fill the empty, disturbed habitat