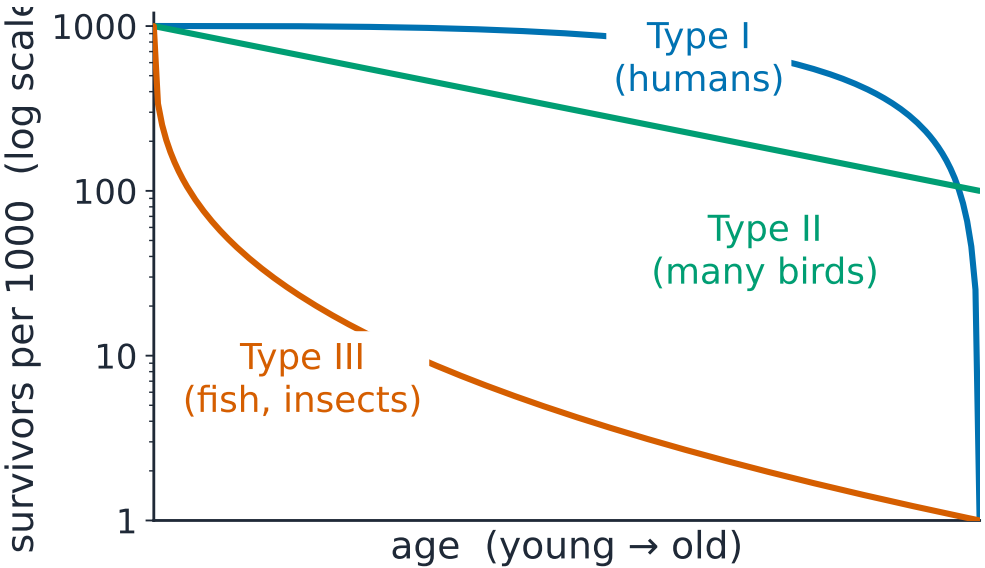
Exercise walk-through

3.8
Human Population Dynamics

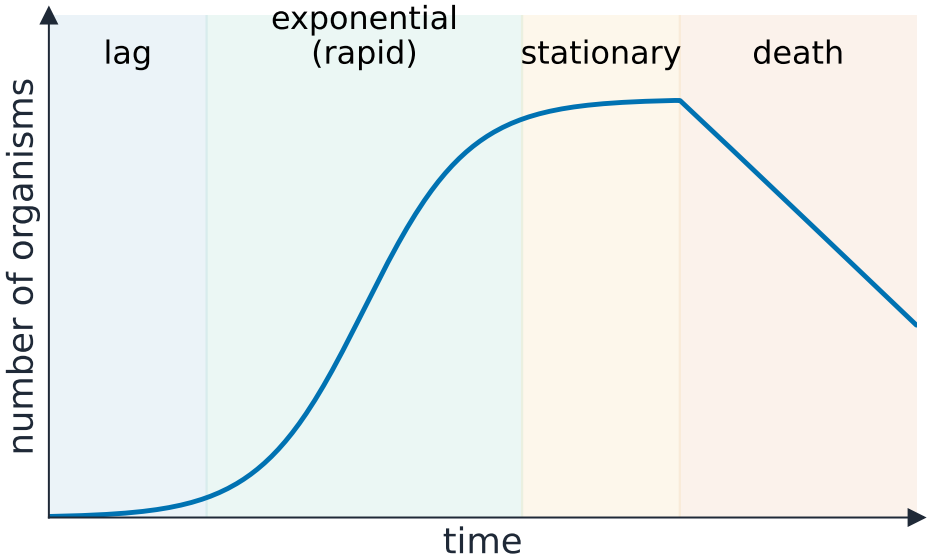
AP Environmental Science

Type I, II, and III survivorship curves



Type I, II, and III survivorship curves on a log scale

Growth levels off at the carrying capacity



Population growth levels off at the carrying capacity of the environment

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.

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Exercises 2.1–2.3

2.1 A country has CBR $= 25$ and CDR $= 5$. Find the percent growth rate. [2]

2.2 Write the rule-of-70 doubling-time formula. [1]

2.3 Find the doubling time for a 2% growth rate. [1]

Exercises 2.1–2.3

2.1 A country has CBR $= 25$ and CDR $= 5$. Find the percent growth rate. [2]

2.1

- $\dfrac{25 - 5}{10} = 2\%$

2.2 Write the rule-of-70 doubling-time formula. [1]

2.2

- doubling time $\approx \dfrac{70}{\%\text{ growth rate}}$

2.3 Find the doubling time for a 2% growth rate. [1]

2.3

- $70/2 = 35$ years

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Exercise 3.1

3.1 The doubling time for a population growing at 3.5% is about [1]

- [ ] **A** 10 years
- [ ] **B** 20 years
- [ ] **C** 35 years
- [ ] **D** 70 years

Exercise 3.1

3.1 The doubling time for a population growing at 3.5% is about [1]

- [ ] **A** 10 years
- [ ] **B** 20 years
- [ ] **C** 35 years
- [ ] **D** 70 years

3.1 B

- $70/3.5 = 20$ years

Exercise 3.2 (a)

3.2 A country has CBR = 40 and CDR = 12 per 1000.

(a) Find the percent growth rate. [2]

Exercise 3.2 (a)

3.2 A country has CBR = 40 and CDR = 12 per 1000.

(a) Find the percent growth rate. [2]

(a)

- $\frac{40 - 12}{10} = 2.8\%$

Exercise 3.2 (b)

3.2 A country has CBR $= 40$ and CDR $= 12$ per 1000.

(b) Find the doubling time. [2]

Exercise 3.2 (b)

3.2 A country has CBR $= 40$ and CDR $= 12$ per 1000.

(b) Find the doubling time. [2]

(b)

- $70/2.8 = 25$ years

Exercise 3.3

3.3 Explain how improved health care can, at first, increase population growth. [2]

Exercise 3.3

3.3 Explain how improved health care can, at first, increase population growth. [2]

3.3

- Better health care lowers the death rate (fewer people die) while birth rates stay high, so the gap between births and deaths widens, increasing growth