WHY SHOULD WE BELIEVE MODELS?
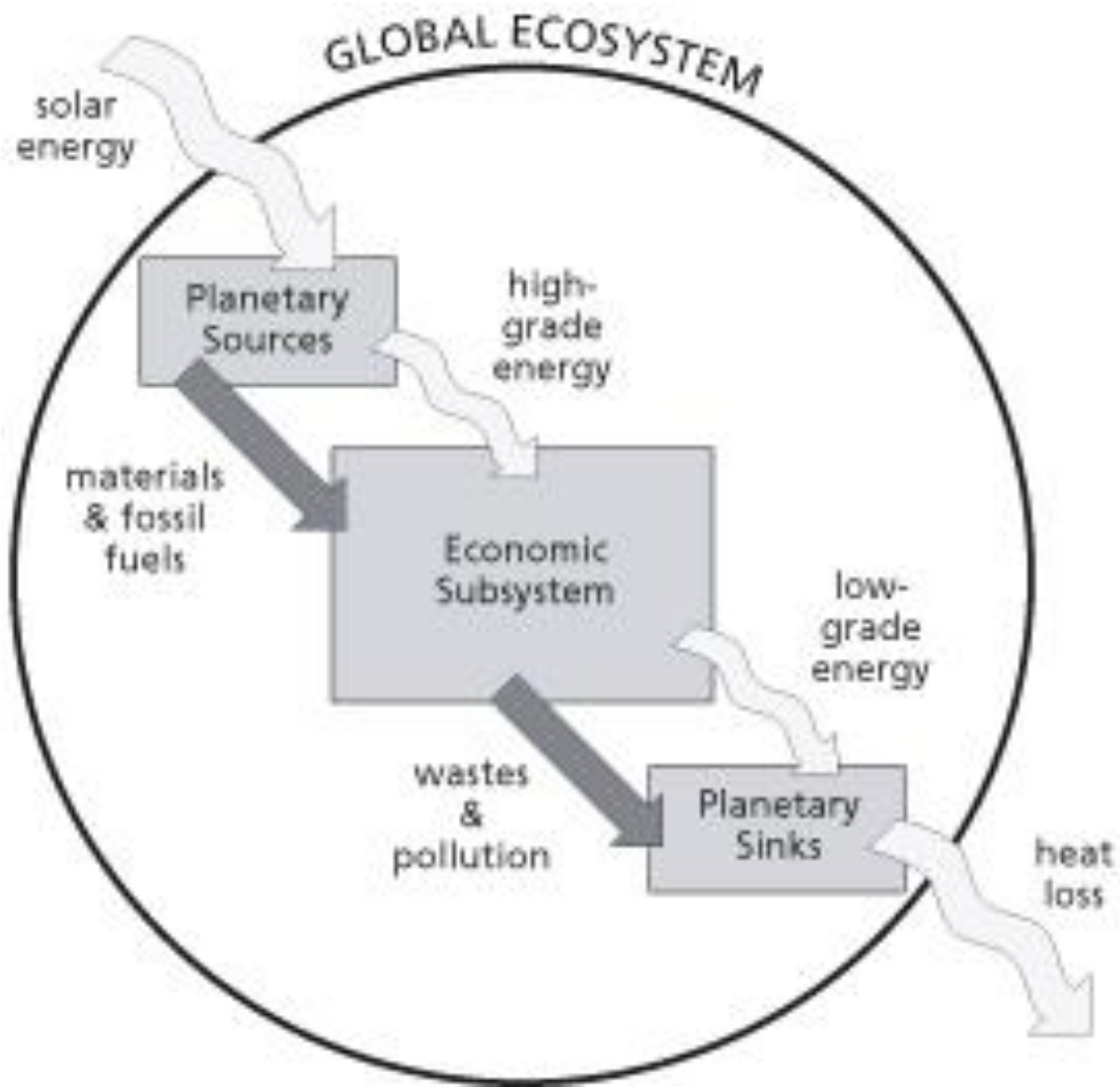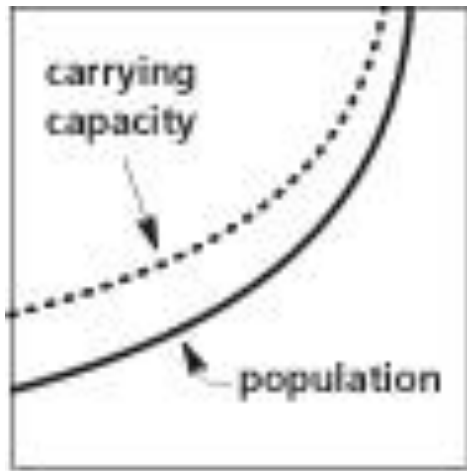
WHEN SHOULD WE BELIEVE MODELS?

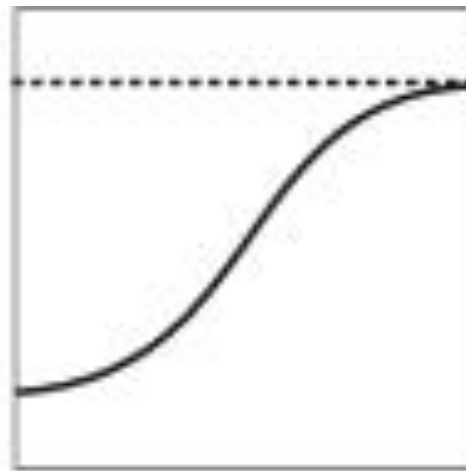# WHAT ARE THEY GOOD FOR?

WHEN ARE THEY GOOD?

GLOBAL ECOSYSTEM

solar energy

Planetary Sources

high-grade energy

materials & fossil fuels

Economic Subsystem

low-grade energy

wastes & pollution

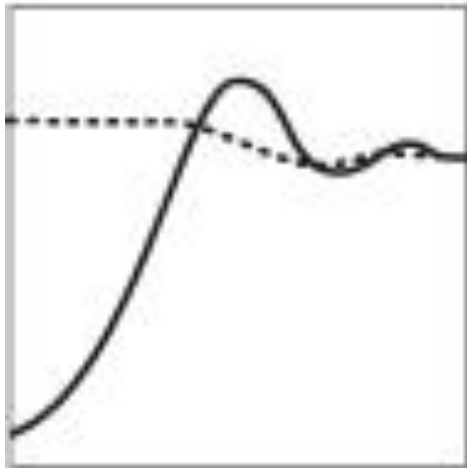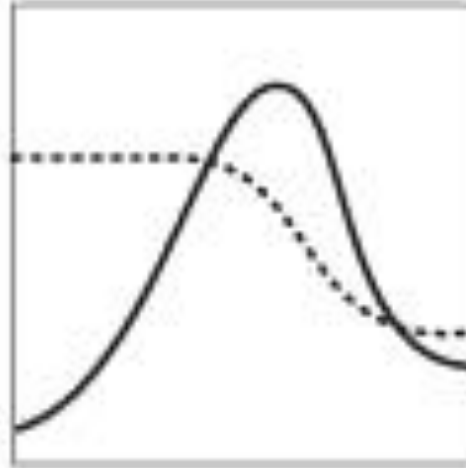Planetary Sinks

heat loss

a) Continuous Growth

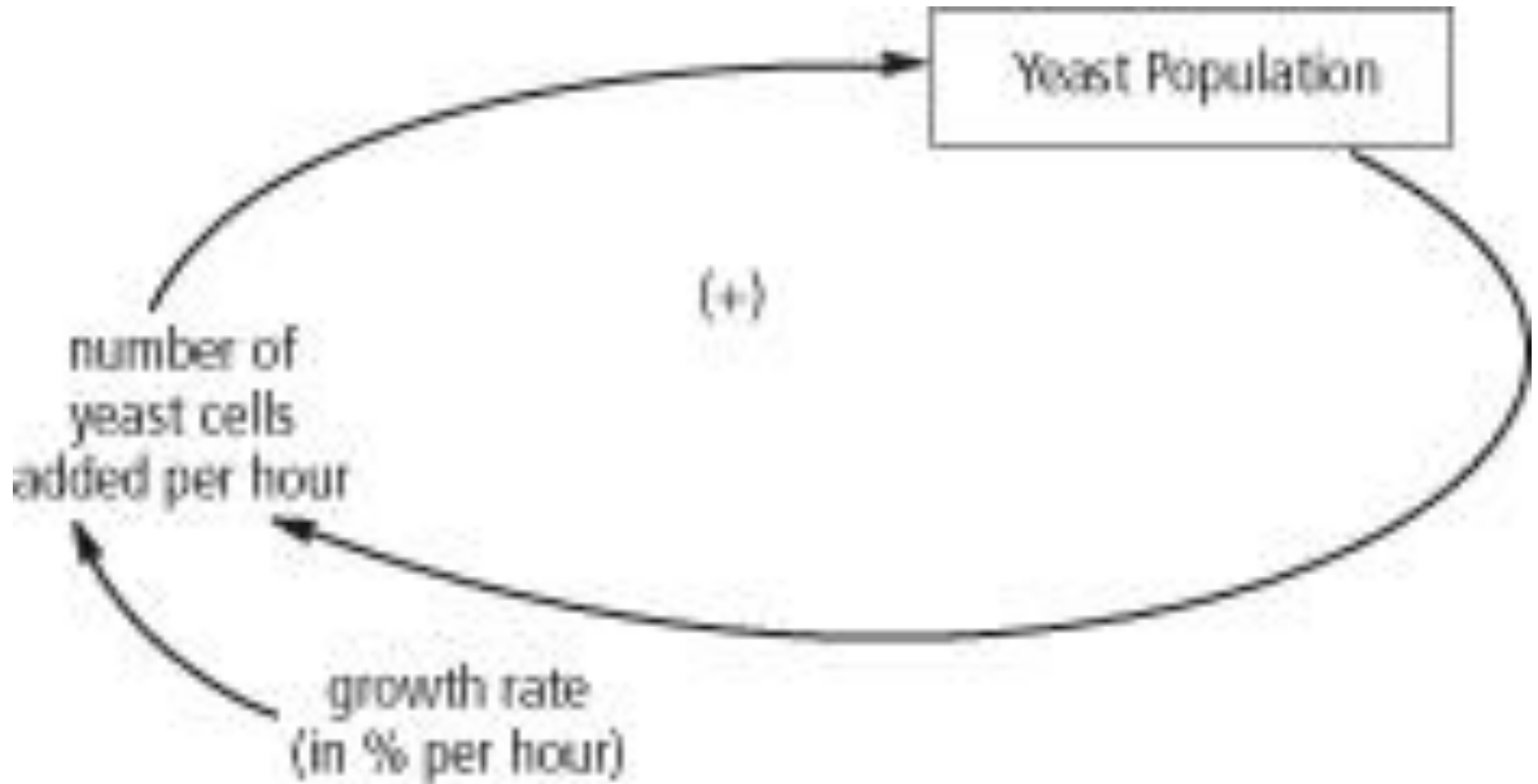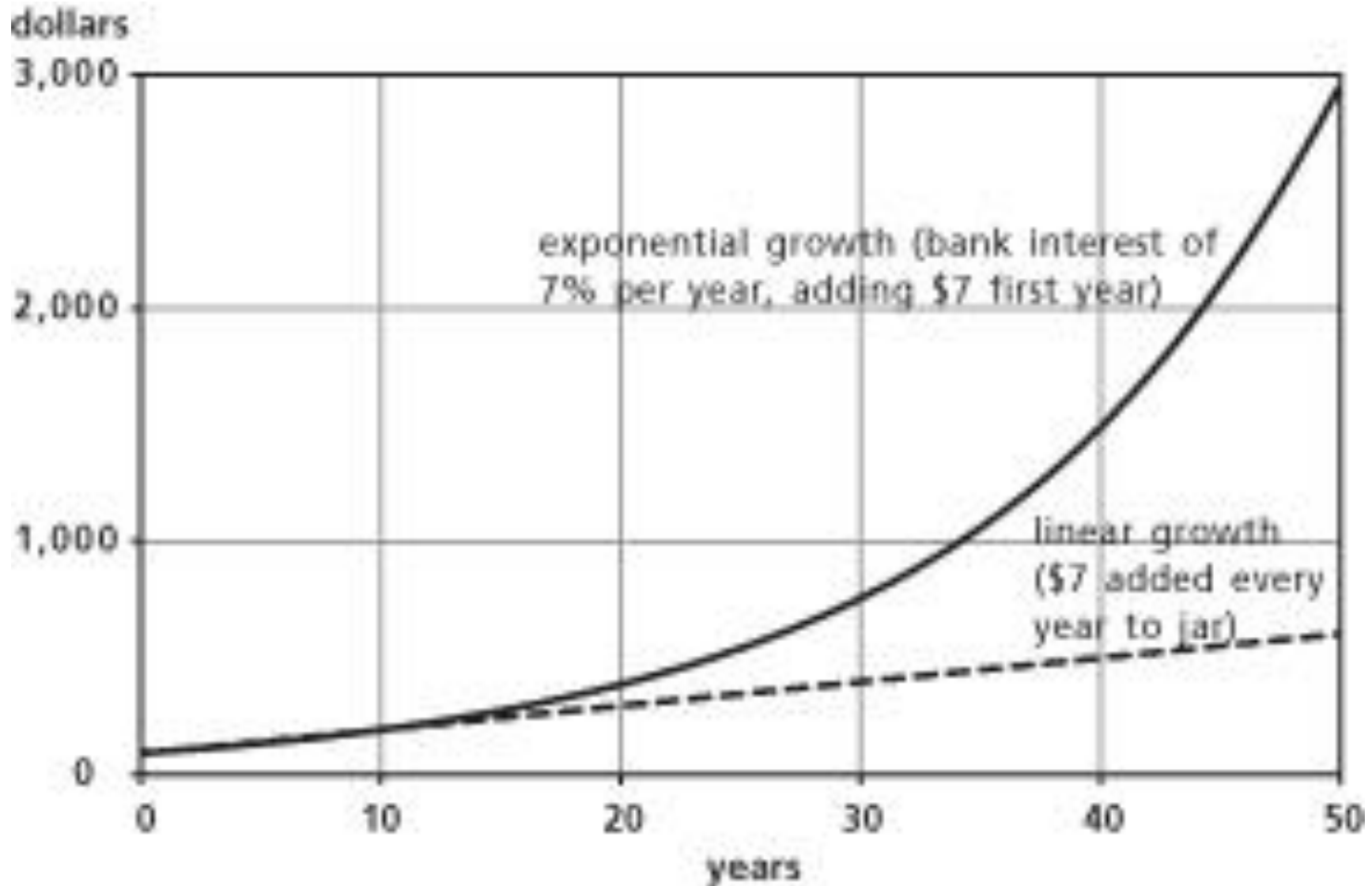b) Sigmoid Approach to Equilibrium

c) Overshoot and Oscillation

d) Overshoot and Collapse

Resource, resource use and regeneration,

or

limits and the limited

Growth cycle

Linear and exponential

dollars

exponential growth (bank interest of 7% per year, adding $7 first year)
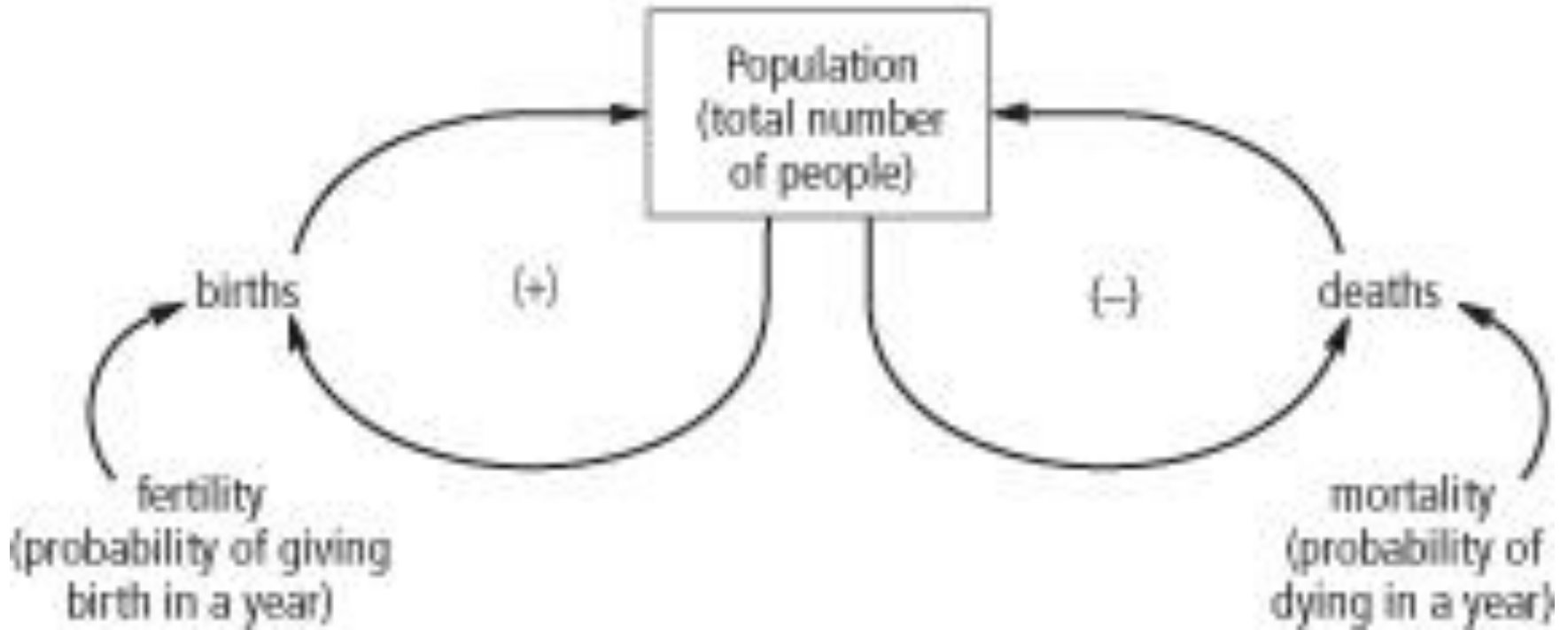
linear growth ($7 added every year to jar)
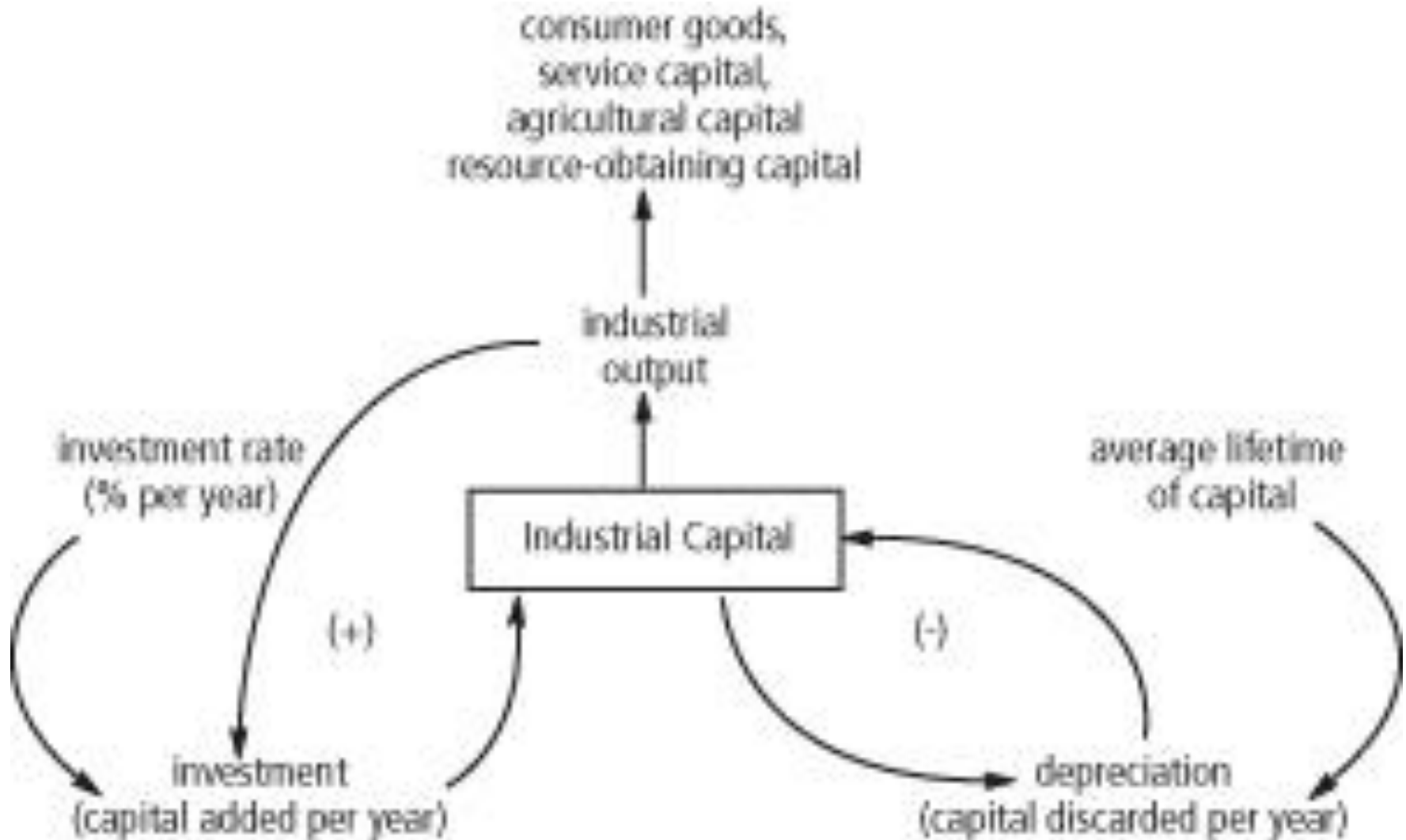
years

Exponential growth of gas demand

Produced before 2000

2000–2025

2050–2075

2025–2050

This amount of gas must be discovered and produced between the years 2075 and 2100 if the world's gas consumption continues to grow at the current rate of 2.8 percent per year.
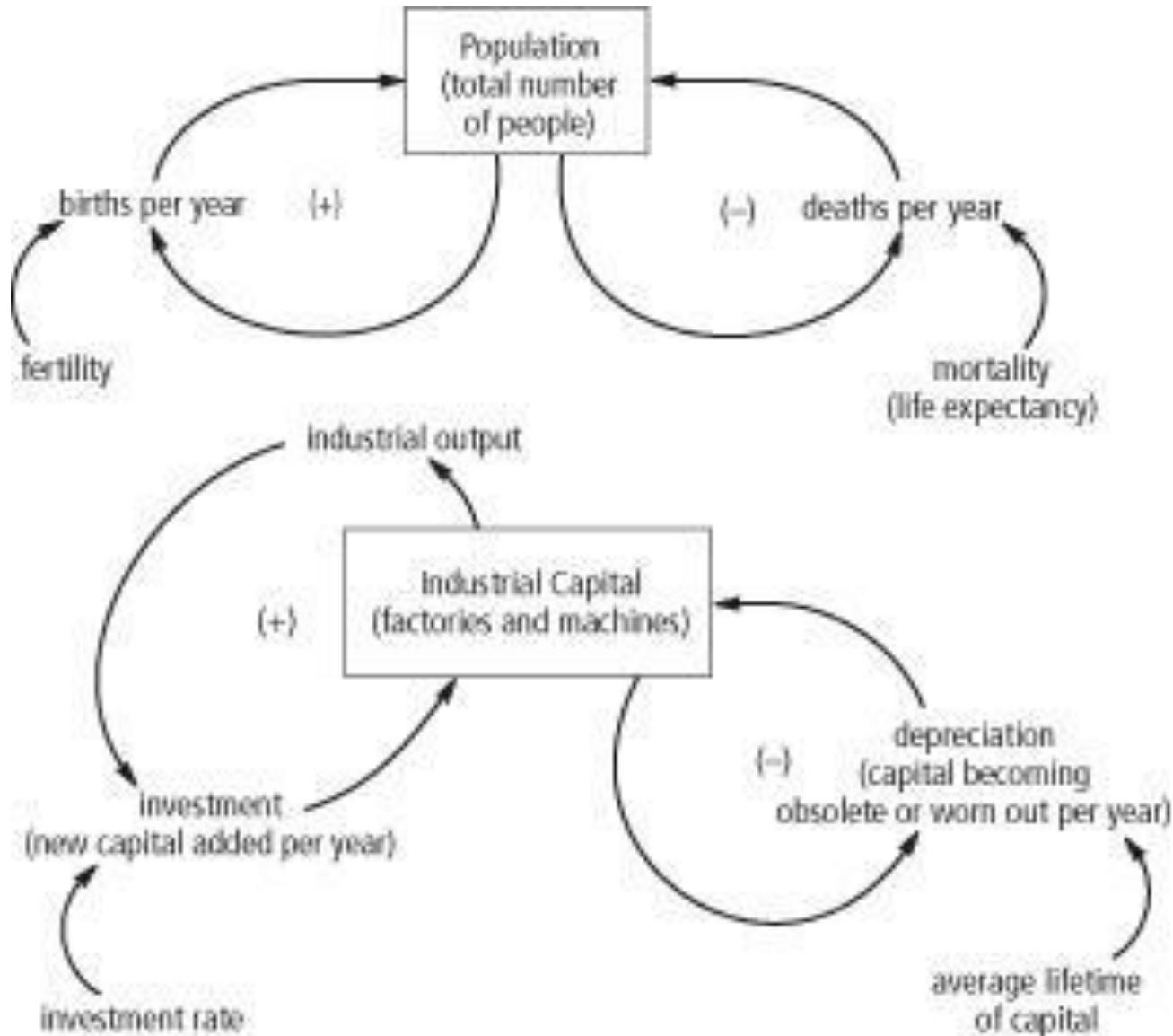
Population change

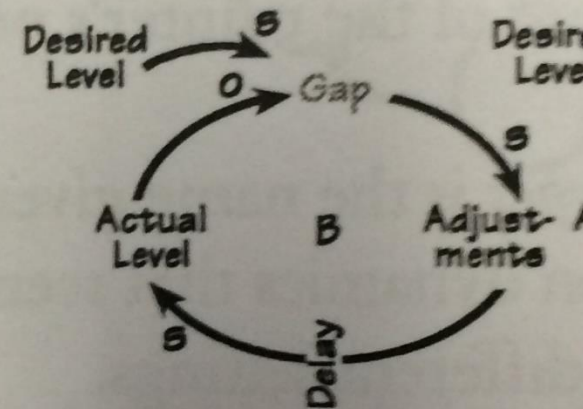# Dynamics of industrial capital

Self-reproducing stocks

The „language" of causality

A causal link between two variables,
where a change in X causes a change
in Y in the same direction, or where X
adds to Y.

A causal link between two variables,
where a change in X causes a change
in Y in the opposite direction, or where
X subtracts from Y.

R A "reinforcing" feedback loop that
amplifies change.

B A "balancing" feedback loop that seeks
equilibrium.

If there is a gap between
and the actual level, adju
until the actual equals th
starting variable is grey.
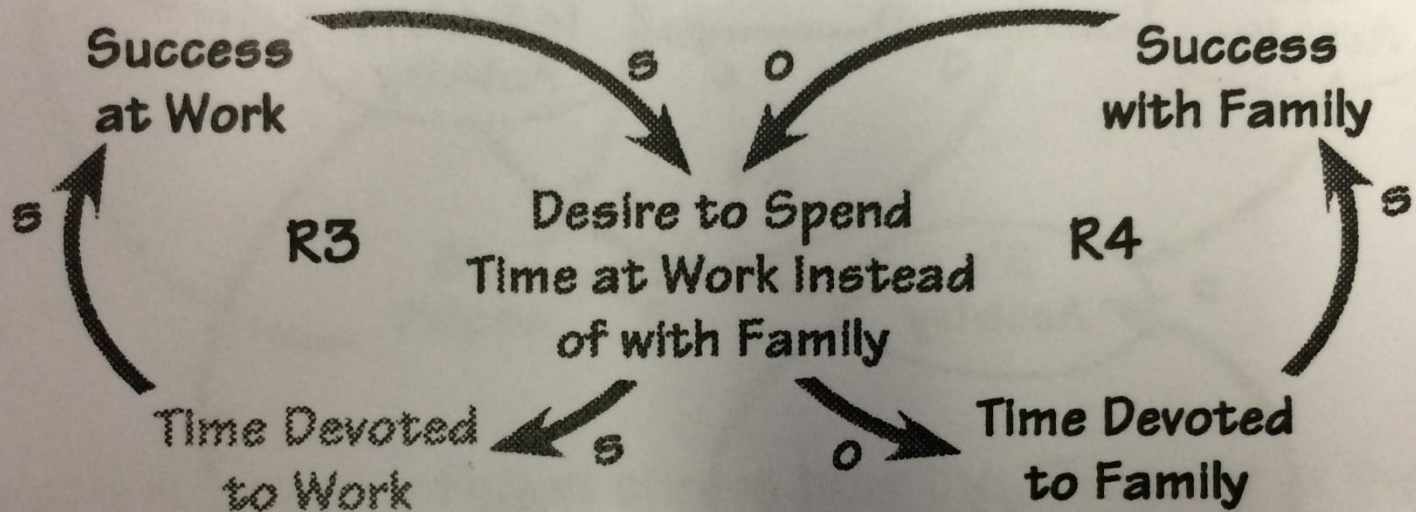
Drawing links and loops

BALANCING LOOP
EXAMPLE
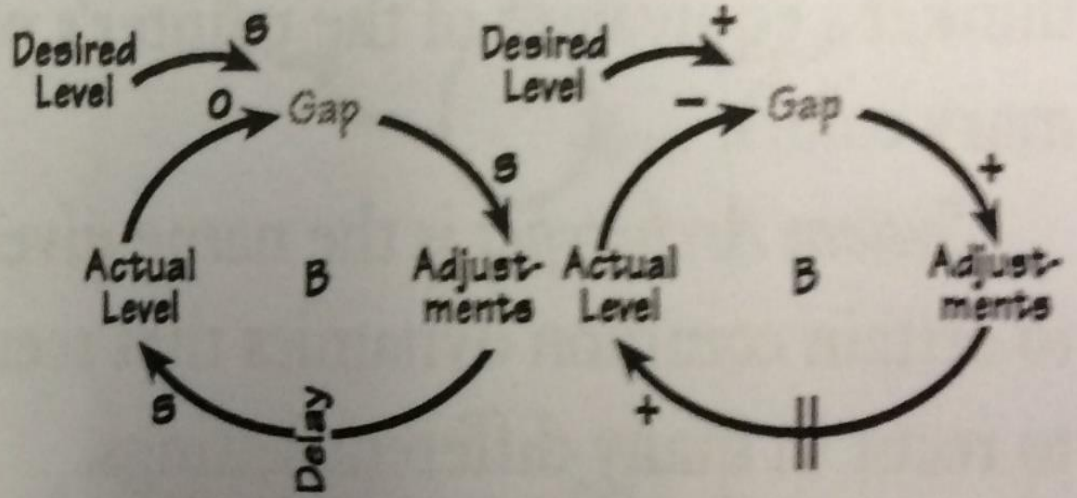
If there is a gap between the desired level and the actual level, adjustments are made until the actual equals the desired level. The starting variable is grey.

BALANCING WORK AND FAMILY

If not carefully managed, the allocation of time between work and family can fall into a "Success to the Successful" trap. Extended time away from the family (due to a large project, for example) can create tension at home, making it more desirable to spend time at work. As job success and time at work continue to build, family relationships can suffer.

Dying for a cup…
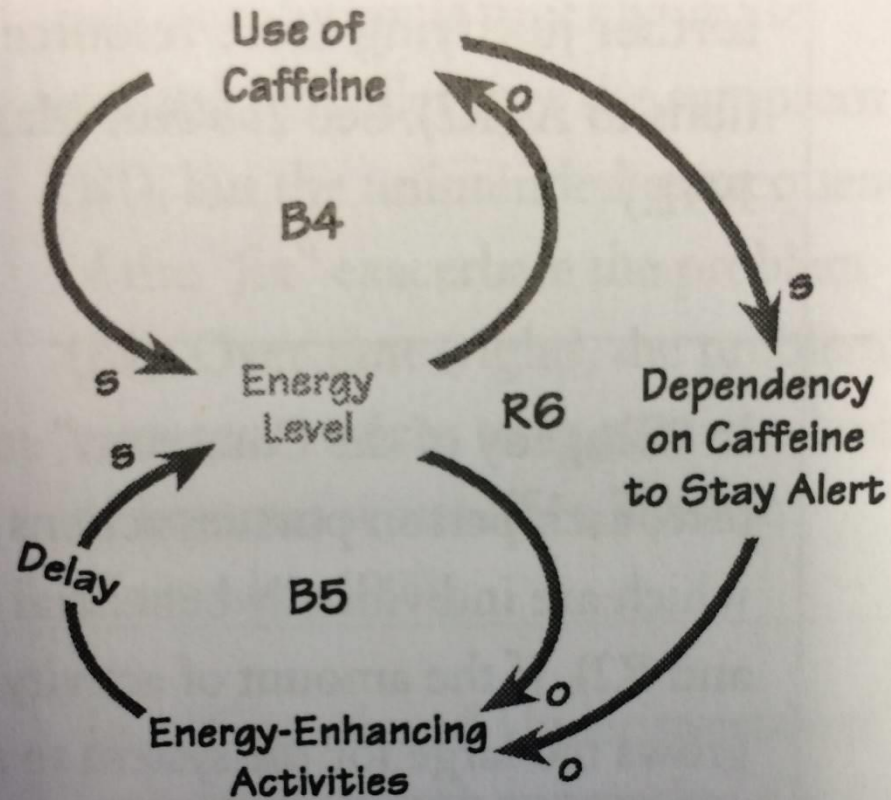
Low energy can be counteracted by more sleep or exercise—but that takes time (B5). A cup of coffee immediately restores energy (B4). But it also lease to a dependence on caffeine to stay alert, which takes attention away from long-term energy-booster (R6).
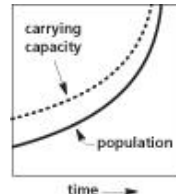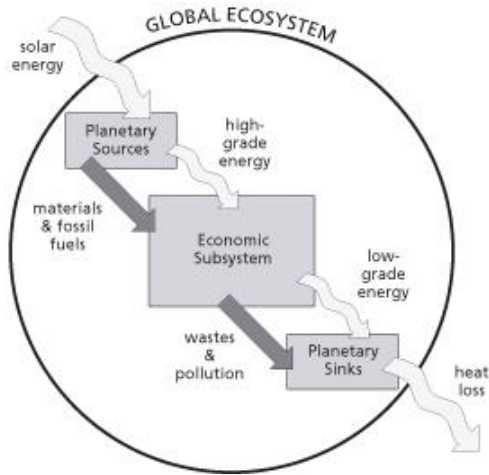
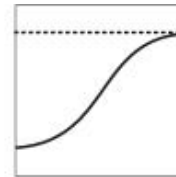# WHY SHOULD WE BELIEVE MODELS?

WHEN SHOULD WE BELIEVE MODELS?

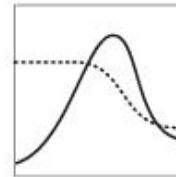# WHAT ARE THEY GOOD FOR?

WHEN ARE THEY GOOD?

The World3 model

2011 október 13.

GLOBAL ECOSYSTEM

solar energy

Planetary Sources

high-grade energy

materials & fossil fuels

Economic Subsystem

low-grade energy

wastes & pollution

Planetary Sinks

heat loss
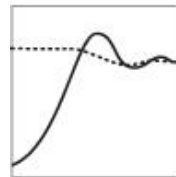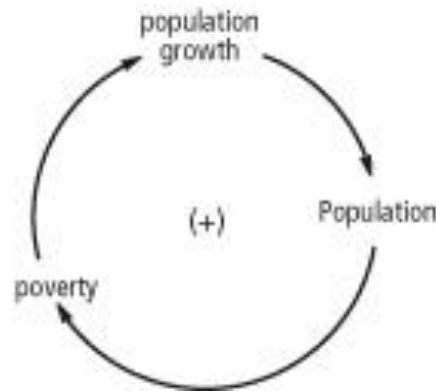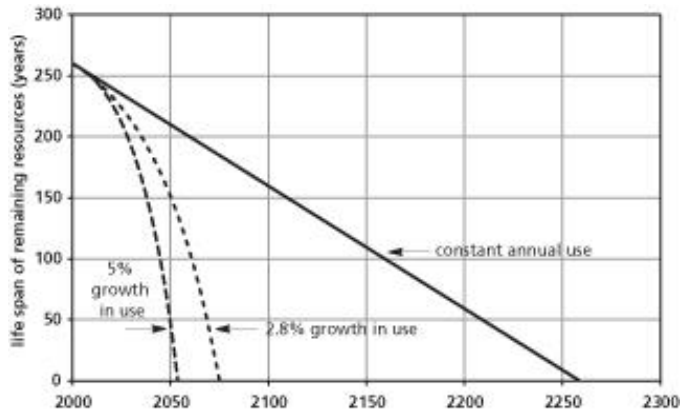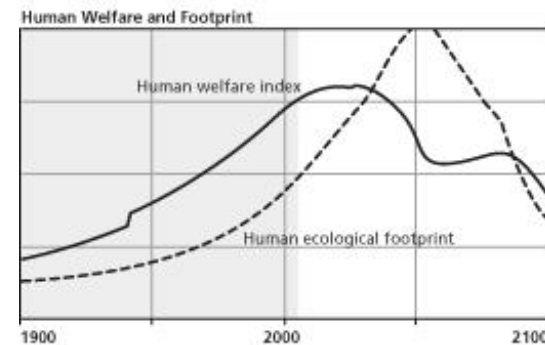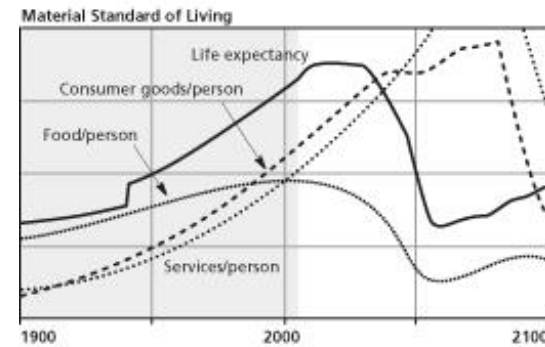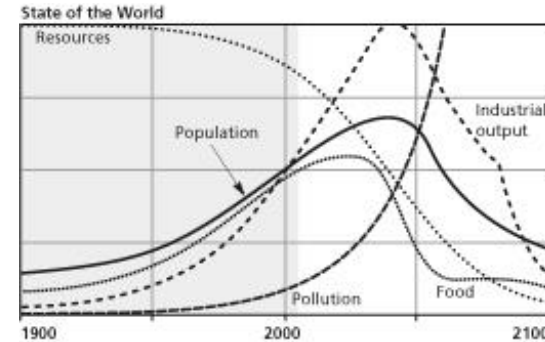
Flow of industrial output

Gas consumption and remaining stocks

Oil consumption flow

Fossils to CO2

Solution cycles for resource scarcity and pollution

A vicious cycle

Other vicious cycles?

Success and quality

Methane in air vs in permafrost

Melting and freezing (seasons!)

Positive and negative feed-backs – Why these names?

Wind and melting

The food system

The services system

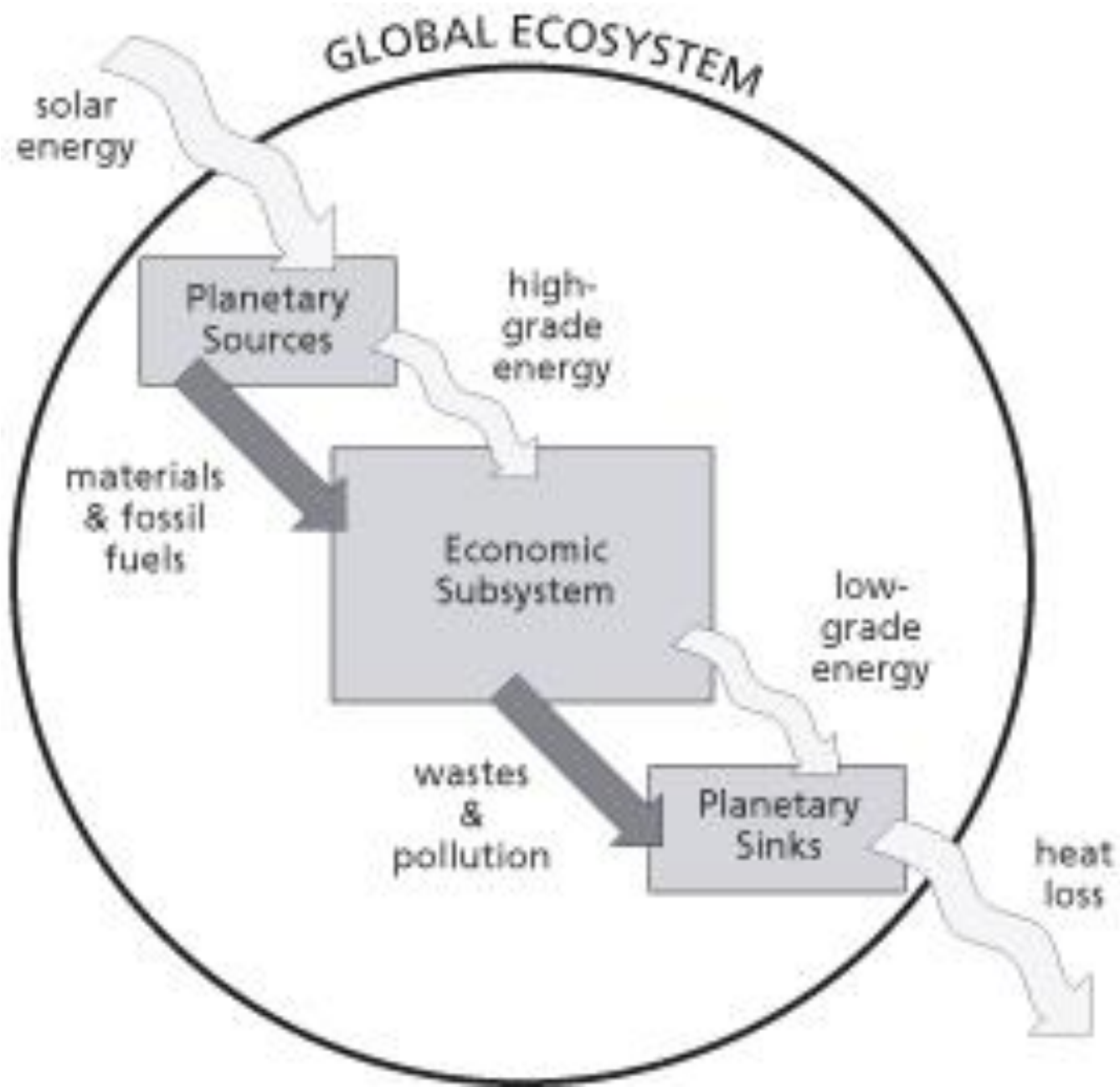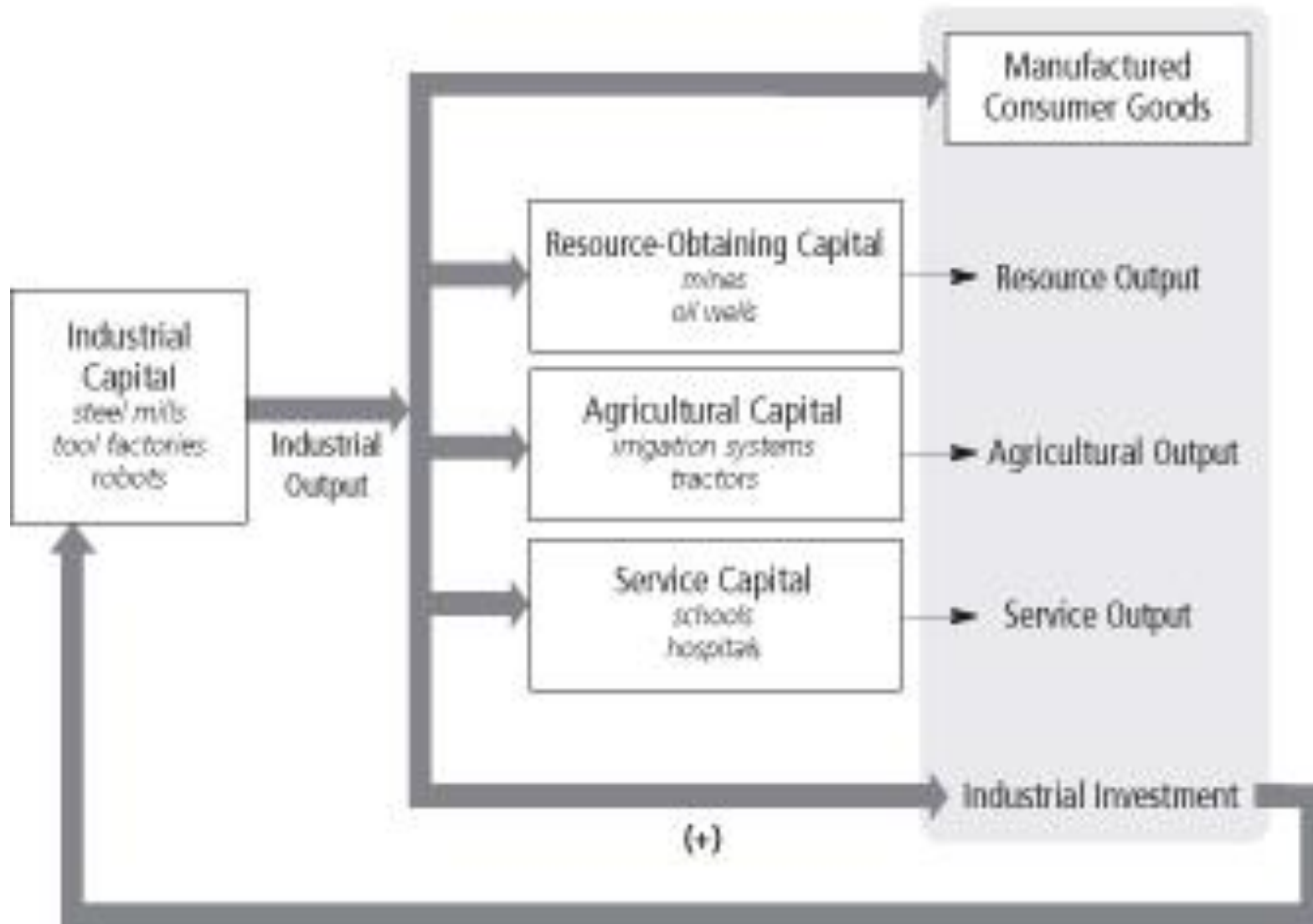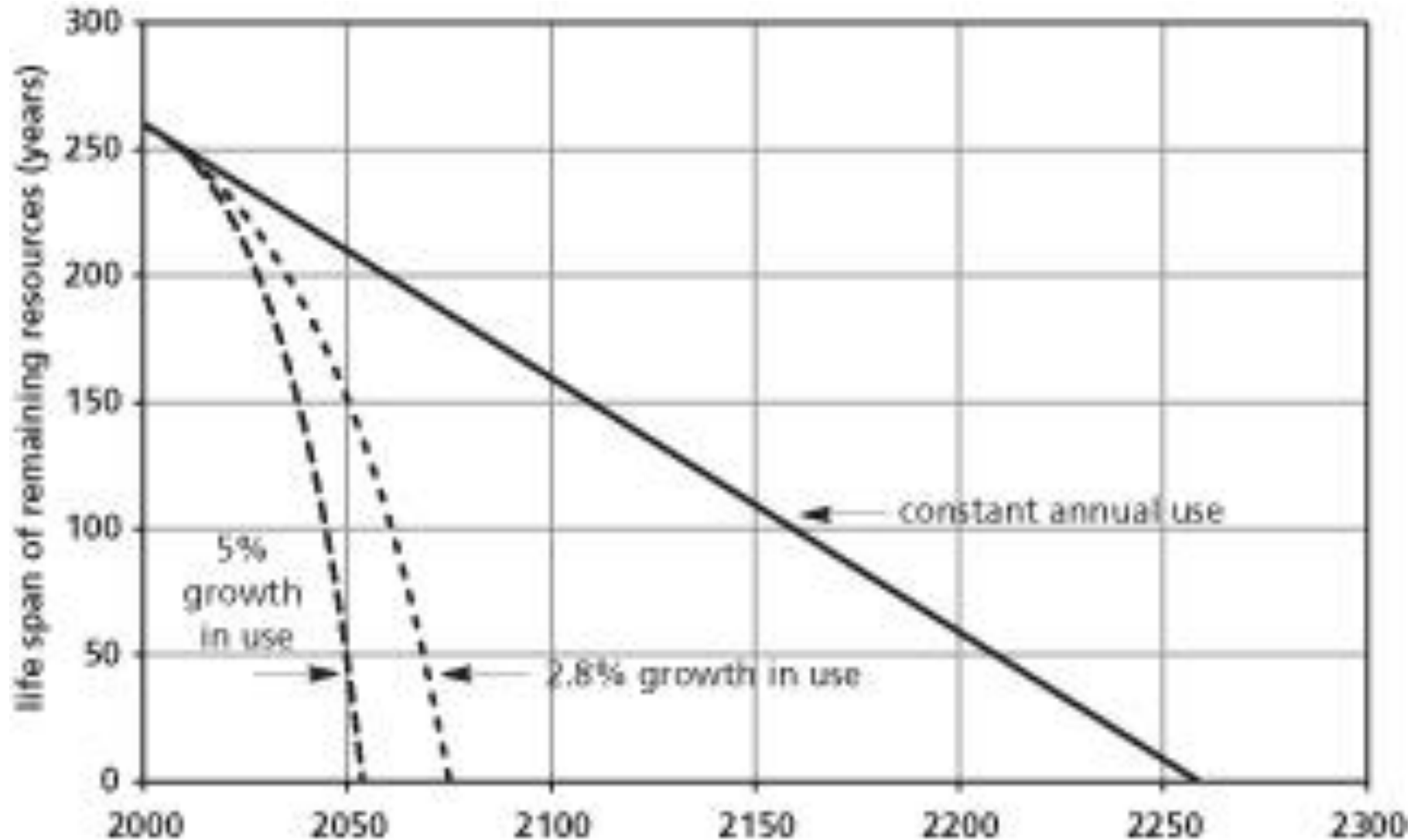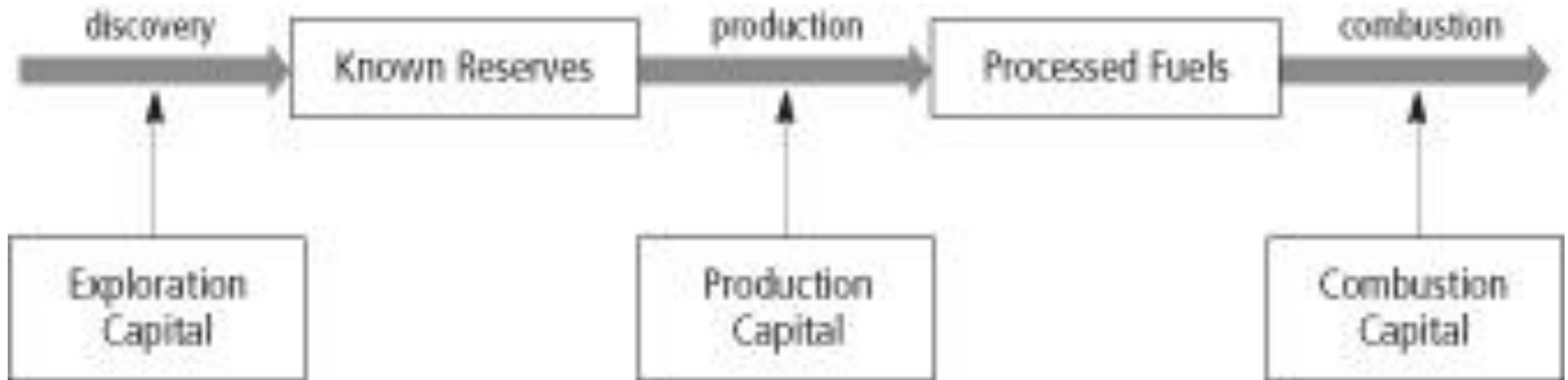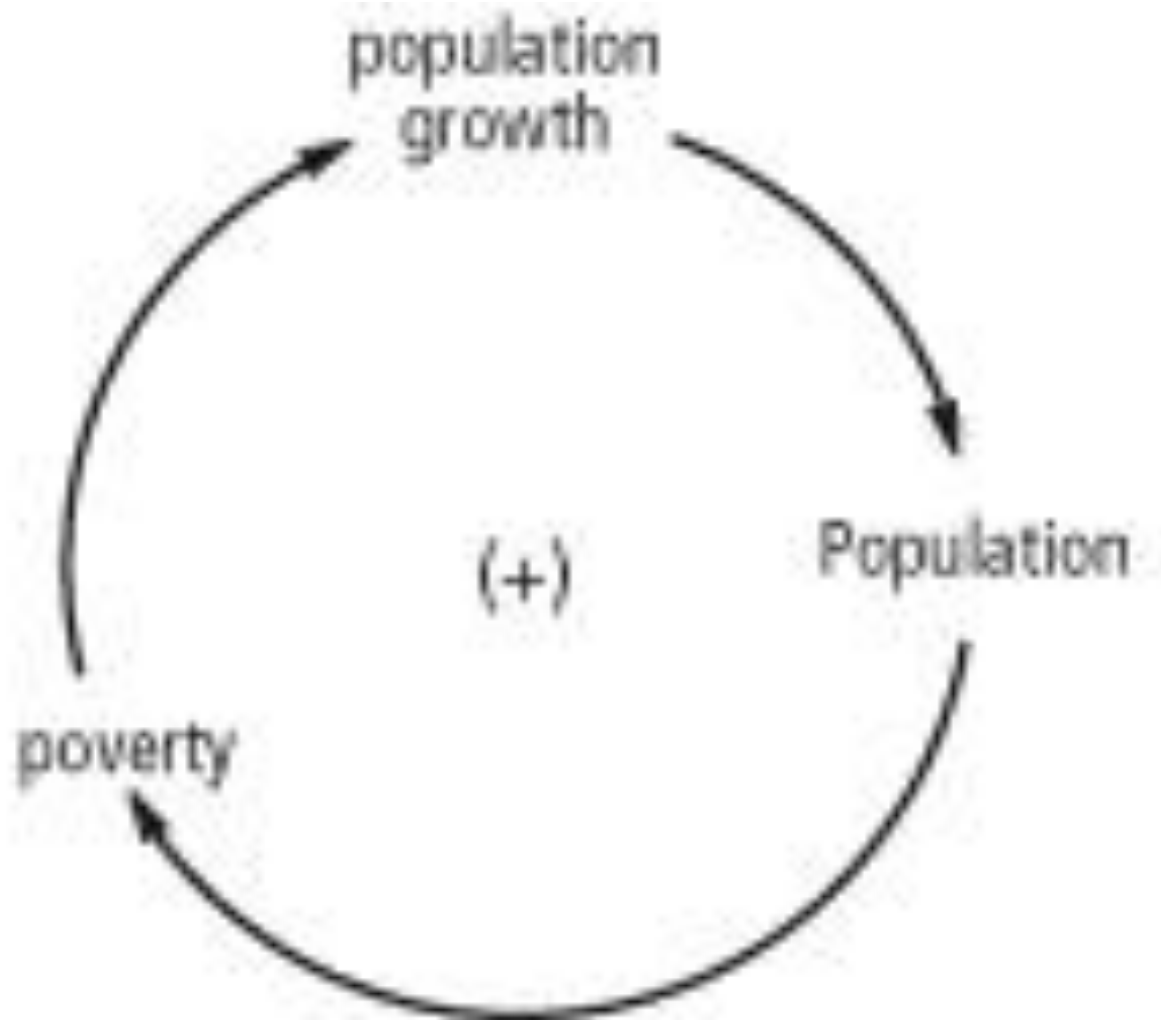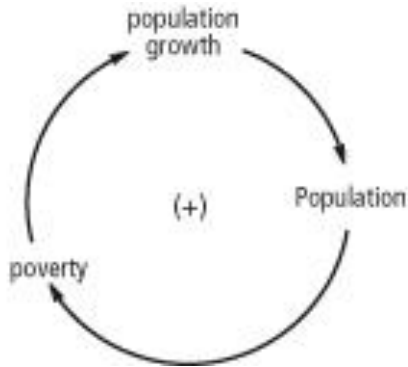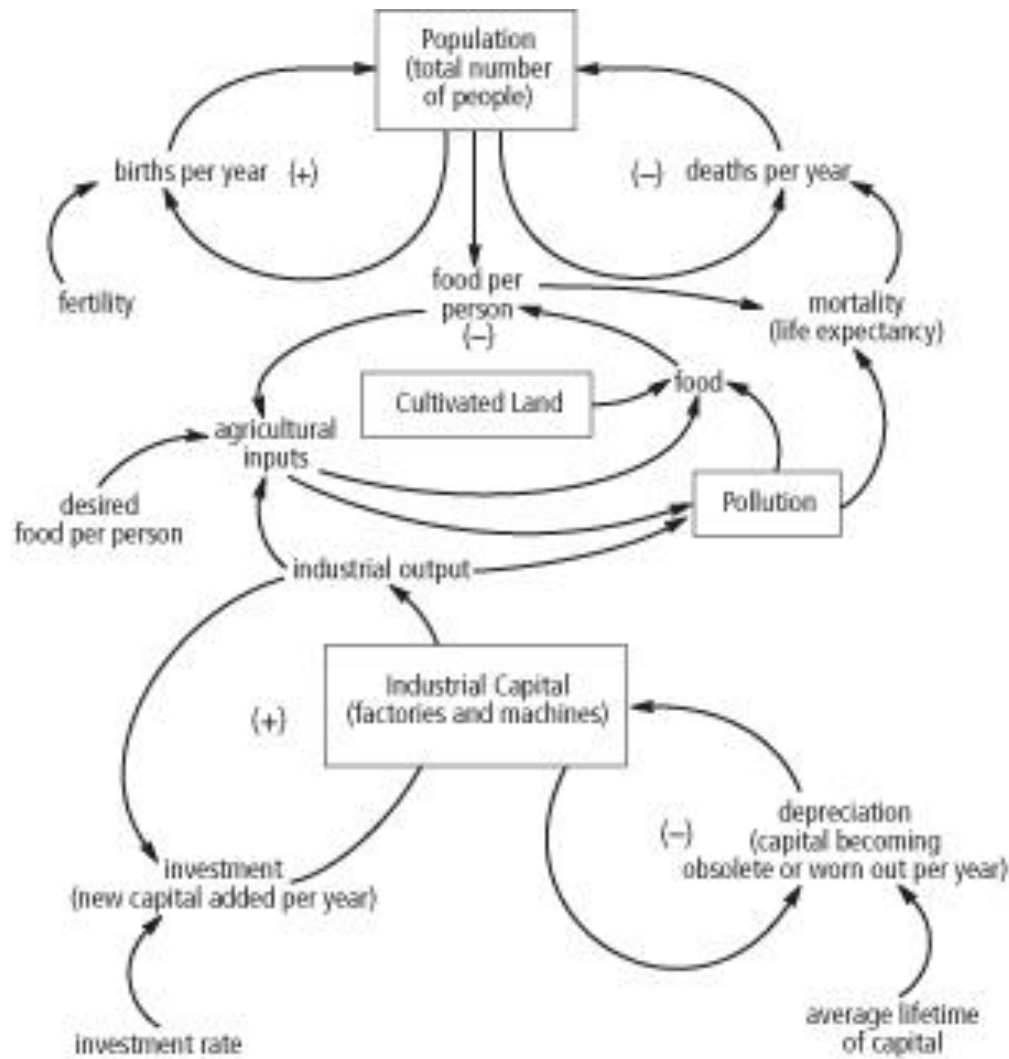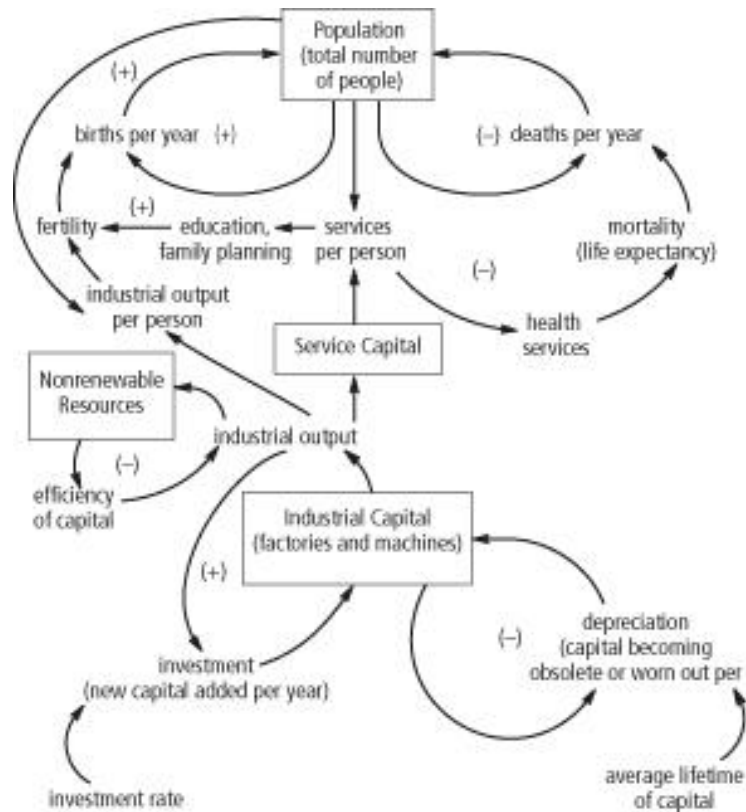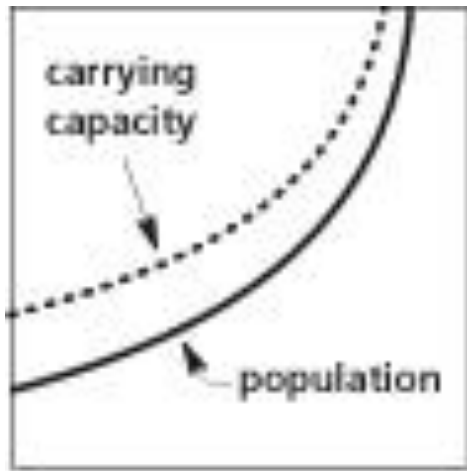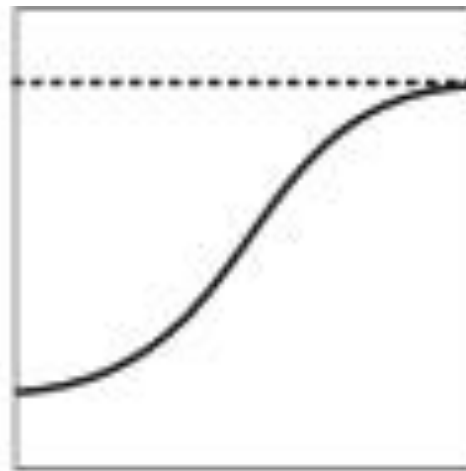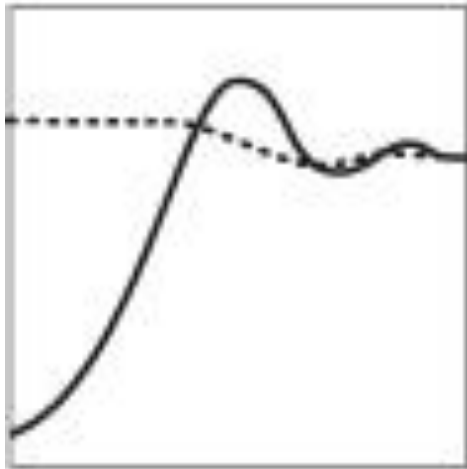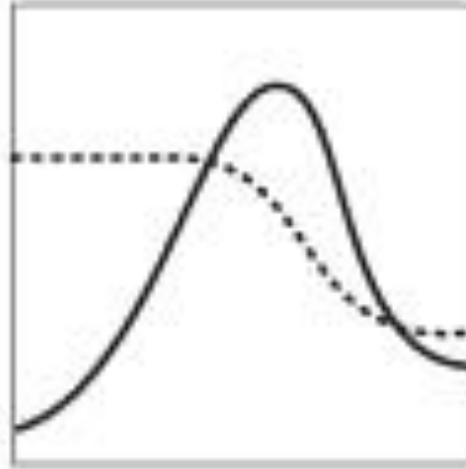a) Continuous Growth

b) Sigmoid Approach to Equilibrium

c) Overshoot and Oscillation

d) Overshoot and Collapse

Resource, resource use and regeneration,

or

limits and the limited

Assignment 3.

You may do this in groups of 2-3 students!

Please try to think about real-life examples of causal chains, loops, and webs (combined loops)!

Do draw a few of them!

Beside all causal links, indicate whether this a (+) influence, or a (-) one!

Also, in the loops, webs, indicate their nature! (+ or -)

You can draw by hand if you wish and scan the result.

2 – 4 pages, A4, TimesNewRoman 12, line spacing 1.5

Send to: csizik.zoltanne@jak.ppke.hu - by October 18th

If you use resources other than your own brain, pls reference them.

DO NOT COPY ANYTHING, pls.