DP IB Geography: SL

Your notes

Resource Stewardship

Contents

Divergent Thinking on Resource Consumption

Your notes

Pessimistic Viewpoints about Resource Consumption

- There are different views regarding resource consumption and population growth
- These views are:
  - **Pessimistic:** population growth will occur faster than the resources available
  - **Optimistic:** resources will expand to meet the demand due to technology and invention
  - **Balanced:** conservation and good governance will ensure resources can meet the increasing demand

Pessimistic views on population growth

Malthus

- Thomas Malthus proposed his theory in 1798
- At this time, agricultural production was restricted as new developments in agriculture were limited
- A **pessimistic** view of the relationship between population and resources (specifically food) states:
  - Population growth is increasing at a faster rate than food supply
    - Population grows at a **geometric rate** (2,4,6,8,...)
    - Food production grows at an **arithmetic rate** (1, 2, 3, 4, etc.)

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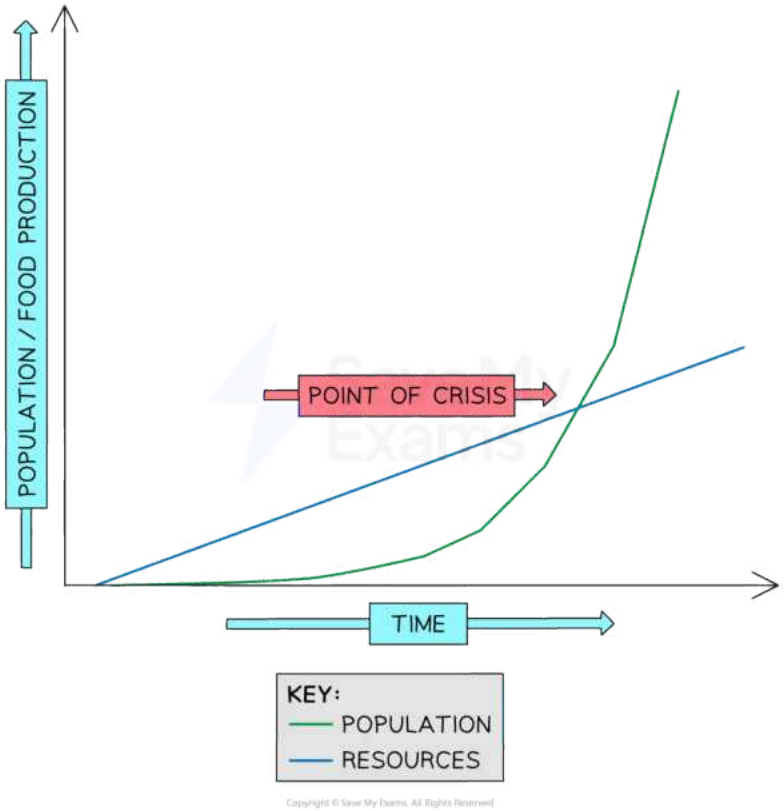

Graph to illustrate Malthus' theory

- This means that there will be times when there is not enough food to sustain the population
- As a result, there will be a **Malthusian catastrophe—**famine, disease or war
  - These are known as **positive checks** as they increase the death rate
  - When people do not have sufficient food, they are more likely to become ill or contract diseases and fertility rates will fall. It will also increase the risk of war and conflict
- Alternatively, **negative (preventative) checks** can be implemented, as recommended by Malthus
  - These aim to decrease the birth rate before the crisis point is reached
- These **limiting factors** maintain the balance between population and resources
- Malthus's predictions were incorrect as they came before much of the technological developments which have enabled food supply to increase

Neo-Malthusians

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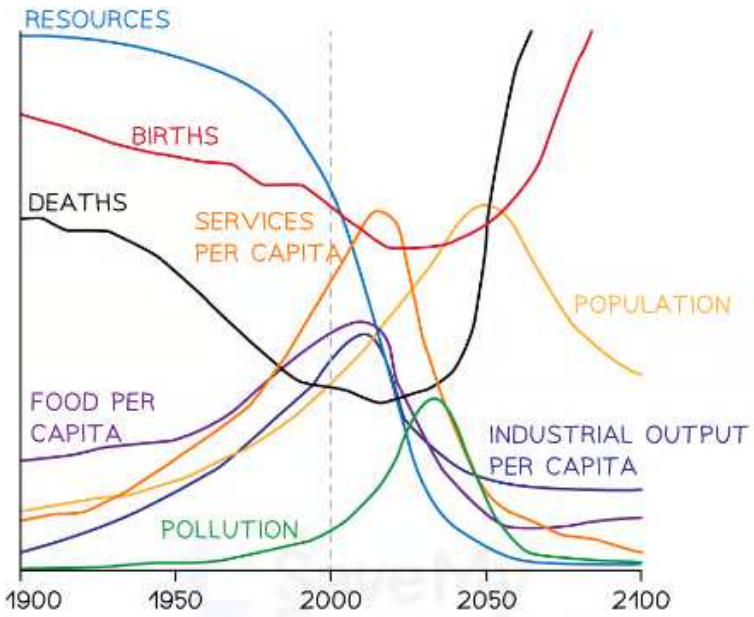
- **Neo-Malthusians** today base their views on Malthus' theory. They argue that:
  - Humans have now used most of the available agricultural land
  - The amount of fertile land is declining
  - Food prices are increasing
  - The population continues to increase
- They suggest that famines are one example of how Malthusian theory has proven to be correct
- Neo-Malthusians argue that population control is essential in avoiding a Malthusian catastrophe

The Club of Rome

- One group of academics, the '**Club of Rome**', published '**Limits to Growth**' in 1972. The report suggested
  - With the rate of population growth, positive checks on population would occur in the near future
  - That humans would soon exceed the **carrying capacity** of the Earth



Club of Rome Limits to Growth model

- The Club of Rome suggested that:
  - Population checks should be introduced to reduce the birth rate and conserve resources

- Food supplies would decrease from 2000
- Rapid resource depletion would occur from 2000


Your notes

Optimistic Viewpoints on Resource Consumption

Ester Boserup

- A Danish economist, Ester Boserup, put forward her theory regarding population growth in 1965
- In her **optimistic** view of the relationship between population and resources (specifically food), she stated that:
  - Population growth will stimulate developments in technology to increase food production
  - More efficient resources will be discovered/used
  - Renewable resources will replace non-renewable

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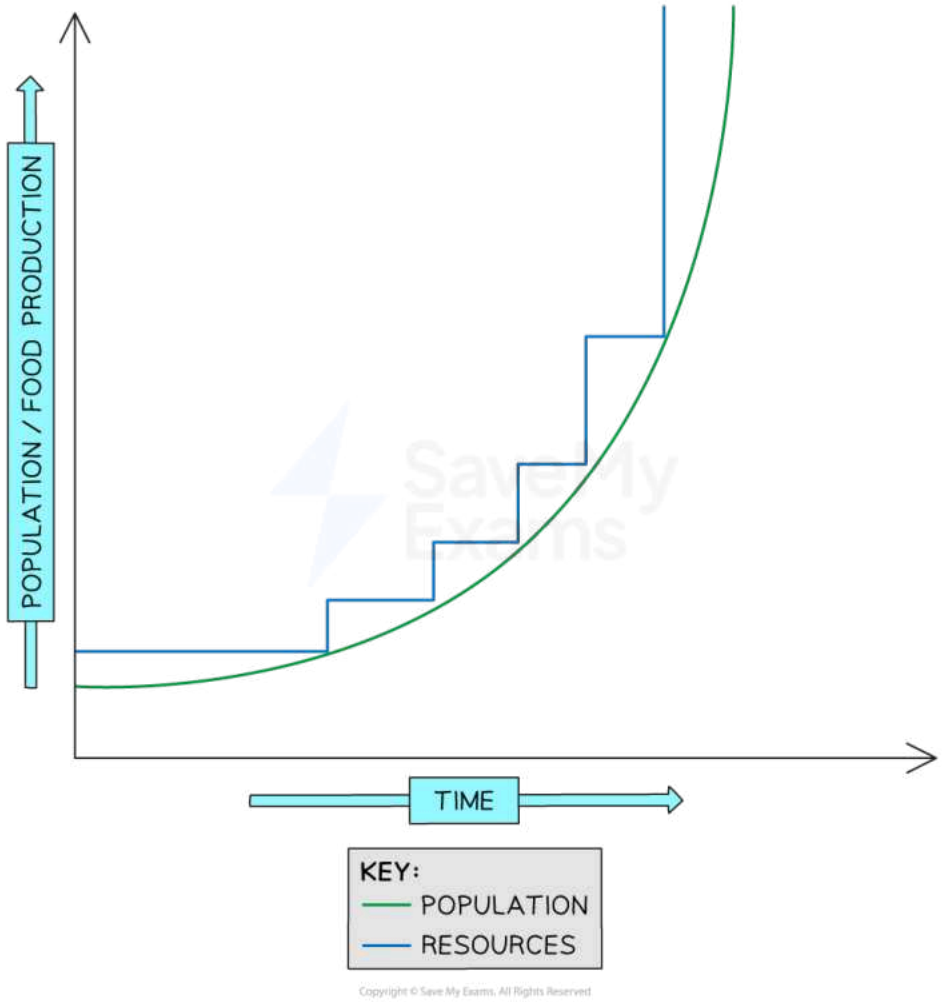

Graph to illustrate Boserup's theory on population and resources

Julian Simon

- In the 1980s, Simon's theory argued that the human mind will always solve the problem of scarce resources
- Resources will never run out because:
  - Technological innovation will reduce the scarcity of raw materials and decrease their cost
  - Food and water quality will improve

Were pessimists or optimists right?

- During the 1800s and 1900s, food production increased faster than population growth
- This increase in food production was the result of:
  - More **intensive farming** - yields increased due to irrigation, crop rotation, fertilisers and selective breeding
  - Increasing areas of land were cultivated
  - **Technological improvements** - greater use of machines means areas can be cultivated and harvested more efficiently, development of high yield varieties, mechanised milking increases milk yields
- For developed countries, an increase in imported foods also ensured that food supplies were greater than population growth


Your notes

Balanced Views on Resource Consumption

- The future challenges relating to resource consumption include
  - Climate change
  - Water, energy and food nexus
  - Continued population increase
  - Changing population structure
  - Increasing development
  - Technological developments
- All of these will affect whether there will be sufficient food for the population

A balanced approach

- This approach aims to:
  - Conserve resources to ensure less reliance on technological innovations to provide sufficient food
  - Examine ways to address the inequality of food consumption so that food resources are shared more equally around the world
  - Encourage governments and organisations to adopt a **stewardship** approach to reducing waste and inefficient use of resources

What is stewardship?

- Stewardship combines **conservation** and **preservation**

- Conservation is the efficient use of resources with minimum waste
  - It recognises that the use of resources should ensure that future generations can meet their needs
- Preservation focuses on setting aside areas to reduce or completely ban the commercial use of land and exploitation of resources


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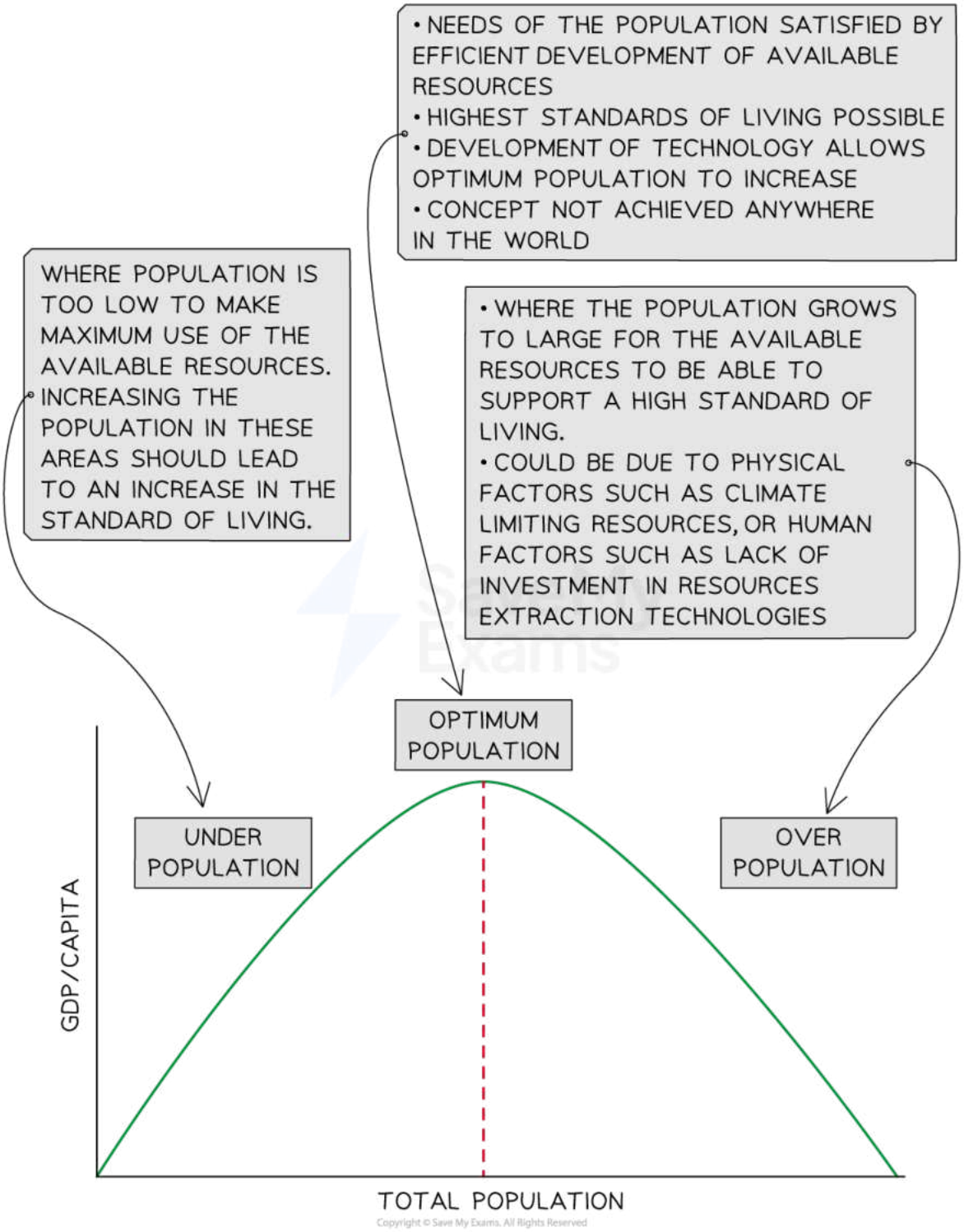
Optimum population

- Careful **management** of **population** and **resources** is needed to ensure a balance
- Countries aim to achieve a perfect **balance** between **population** and **resources**, known as **optimum population**
- An **imbalance** between **population** and **resources** leads to **overpopulation** or **underpopulation**

Your notes



Optimum population and resources

Your notes

Examiner Tips and Tricks

Remember that places are constantly changing, meaning that the concept of optimum population is difficult for a place to achieve for any significant length of time.

Carrying capacity

- The maximum stable population size that an environment can support is known as the **carrying capacity**
- The size of the Earth's carrying capacity is determined by:
  - Size of the population
  - Level of resource consumption
  - Technological innovation
  - Level of wealth
- If resources are consumed at **sustainable** rates, a larger population may be supported
- Countries going through **industrialisation** tend to consume and waste resources at **unsustainable levels**, which leads to a **lower carrying capacity**
- Technological innovation can either lead to:
  - Increases in the supply of resources such as energy and minerals, lowering carrying capacity

OR

- Improved resource use efficiency and a higher carrying capacity
- Wealthier countries usually have a **larger carrying capacity** than poorer countries because:
  - They export waste to poorer countries
  - They import products from poorer countries
  - This means that although poorer countries use fewer resources, they are supporting the resource use of richer countries

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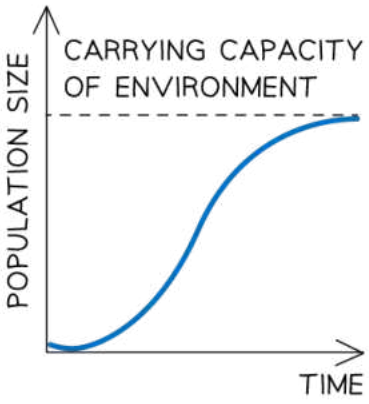
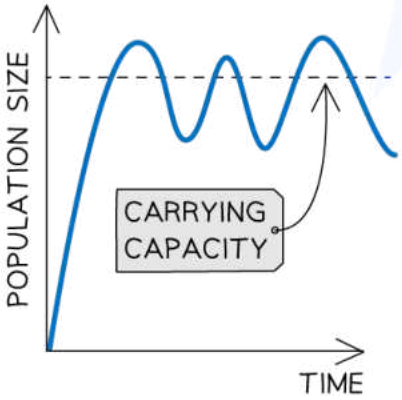


POPULATION **GROWS EXPONENTIALLY** AS IT CONSUMES RESOURCES UNTIL IT **REACHES** THE ENVIRONMENT'S **CARRYING CAPACITY**, WHEREBY IT REMAINS **STABLE** OR **FALLS**

IF AT ANY POINT THE **CARRYING CAPACITY DECREASES** ECONOMIC **DEVELOPMENT SLOWS** DOWN OR **STOPS**



POPULATION GROWS **EXPONENTIALLY** AND **OVERSHOOTS** THE LIMIT OF RESOURCES

IT LEADS TO NOT ENOUGH RESOURCES TO GO AROUND SO PEOPLE **SUFFER** AND **DEATH RATES INCREASE.** E.g. LACK OF FOOD SUPPLY LEADS TO **FAMINE**

POPULATION WILL **INCREASE** AGAIN ONCE IT **SINKS** BELOW **CARRYING CAPACITY** AND **MORE RESOURCES** ARE **AVALIABLE** PER PERSON

Two different scenarios showing population response to carrying capacity

The Circular Economy


Your notes

The Tragedy of the Commons

- **Global commons** are parts of the Earth that are not owned or managed by any single country
- They are shared **resources** that belong to everyone, and as such, they require a **cooperative** approach to management
- The principle of the **common heritage of mankind** is applied to the **global commons**
  - The idea is that resources are essential for the survival and well-being of all people
  - They are too important to be owned by one nation and instead should be managed equitably and sustainably for the benefit of everyone
- There are four **global commons** identified by **international law**

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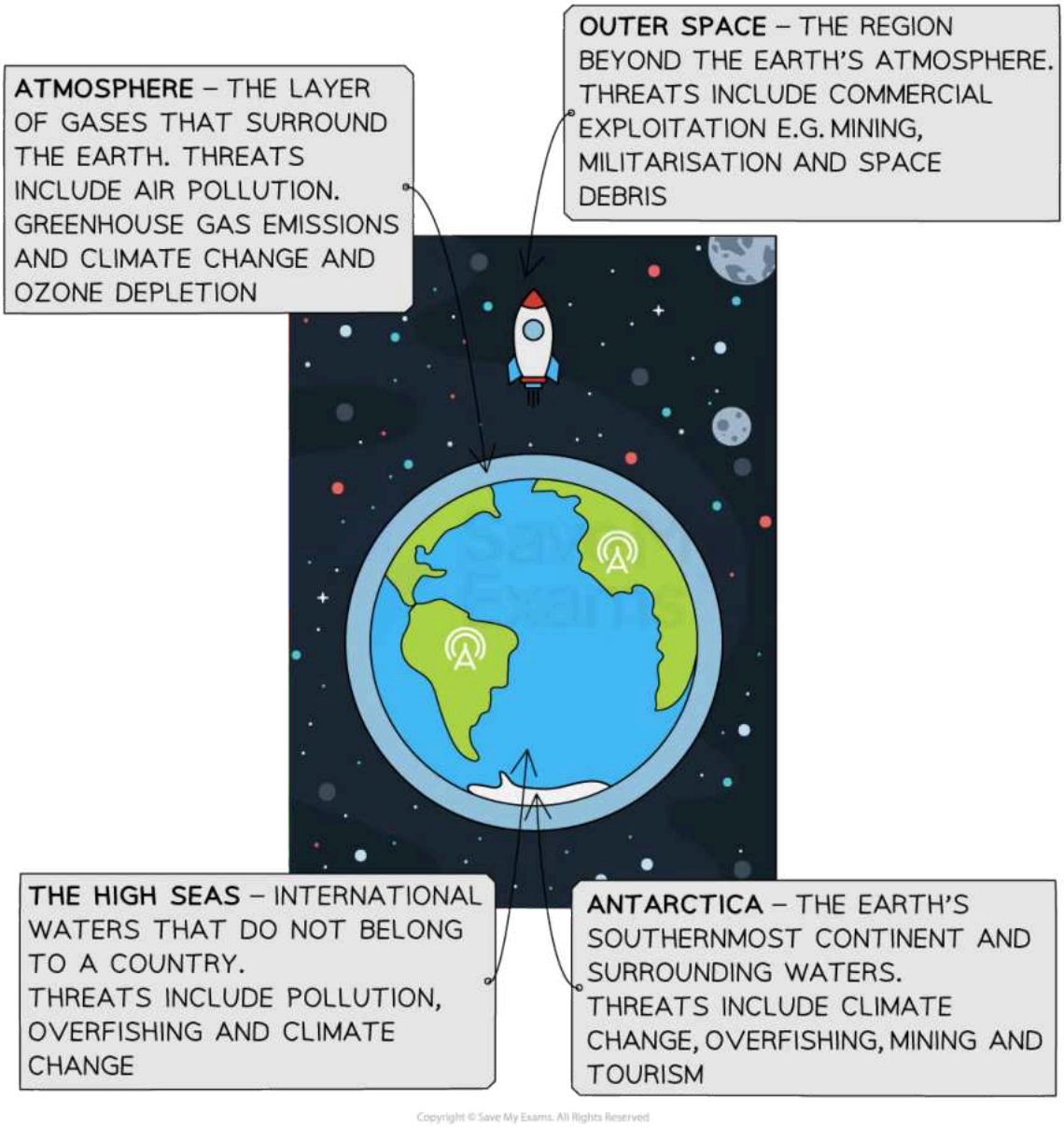


The four global commons

- The **global commons** are essential for human well-being and therefore a priority for **conservation**
- Benefits include **climate regulation**, **economic** value, e.g. through tourism and fishing, and **cultural** and **spiritual** significance
- No single country has **an exclusive right** to these **resources**, instead, they need to be managed through a **cooperative** approach to benefit everyone, now and in the future

The tragedy of the commons

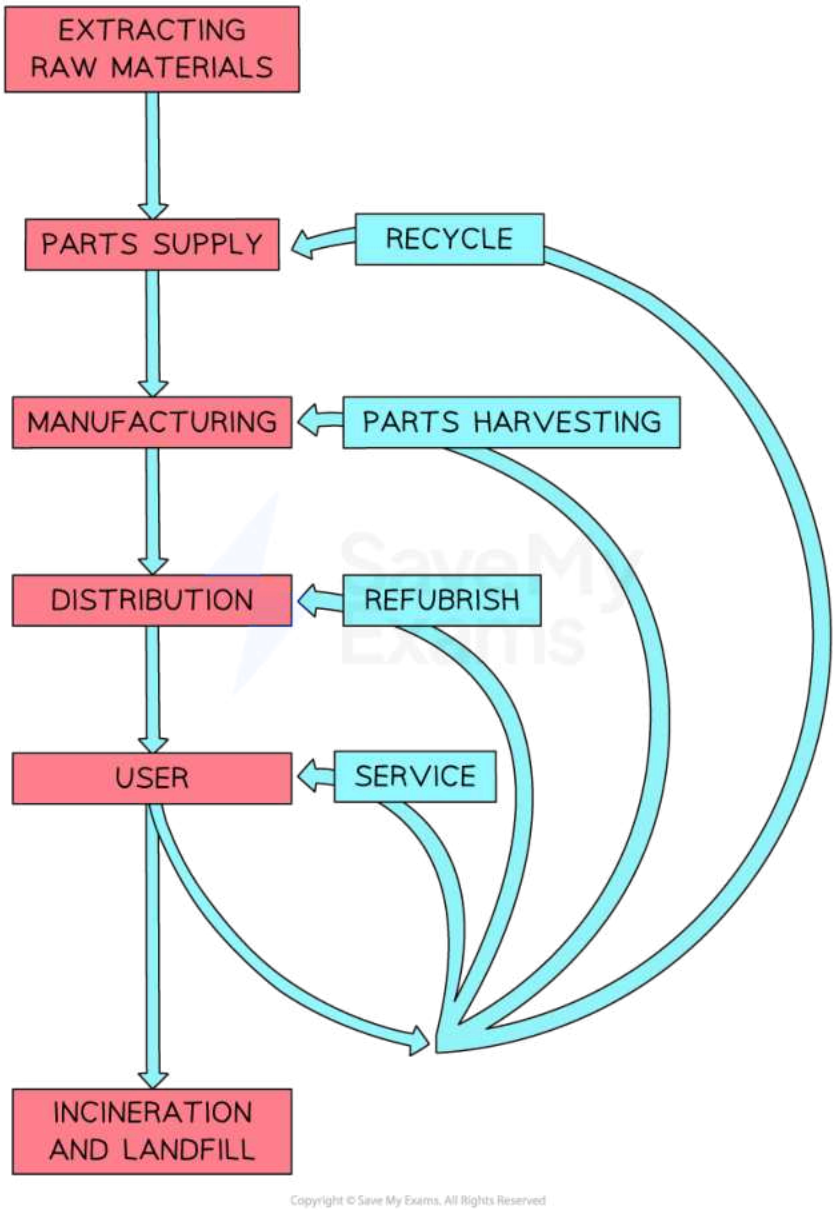

Your notes

- If individuals or countries act in their own self-interest without considering the needs of others, this could lead to the damage or depletion of a shared resource
- This is known as the **tragedy of the commons**
- The tragedy of the commons (as explained by Garret Hardin in 1968) occurs when common pool resources are used in production in an unsustainable way:
  - In the fishing industry, the more fish each country catches, the greater their profit
  - This will lead to overfishing as other countries feel the need to increase their catch to keep up
  - Potentially causing the industry to collapse and reducing resources for future generations

The Value of the Circular Economy

- Currently, most resources are part of a **linear system** where
  - Finite resources are used to make products
  - The products are used
  - At the end of their lifecycle, the products are thrown away
- This leads to increasing amounts of waste
- Recycling is considered to be the first step towards the ambitious goal of a **'circular' economy**

Your notes



Recycling system

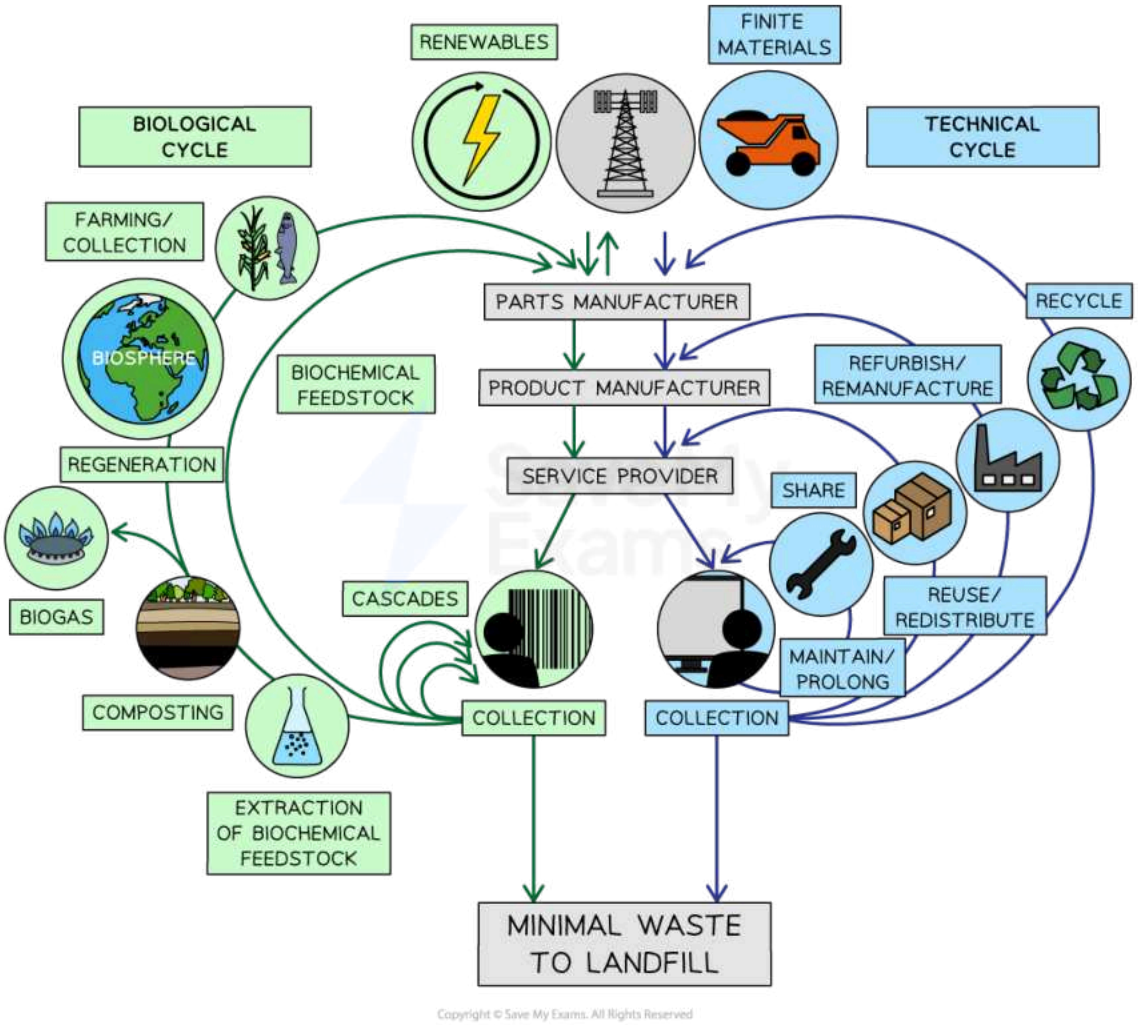
What is the circular economy?

- The circular economy is a sustainable management concept
- It has its origins in the '**cradle to cradle**' concept developed by William McDonough in 2002
- It is based on three principles:

Your notes

- Ending waste and pollution
- Reusing products and materials
- Regeneration of nature

- The aim is that a circular economy will lead to both sustainable environmental and economic development
- Within the circular economy, there are two cycles
  - The **technical cycle** where products are recycled, reused, repaired or remanufactured
  - The **biological cycle** is where the biodegradable products are returned to the natural environment



The circular economy

How does the circular economy work?


Your notes

- All waste is considered to be a resource
  - The design of products considers how the components will be reused or recycled when the item reaches the end of their lifecycle
  - Food waste is all composted and returned to the biological cycle to support new growth

The circular economy on a global scale

- The **Ellen McArthur Foundation** leads the way on the circular economy concept
- The **Sustainable Development Goals (SDGs)** include the reduction of waste from food systems (Goal 12)
- The **European Circular Economy Action Plan (CEAP)** was first adopted in 2015, and then the New Circular Economy Action Plan (CEAP) was adopted in 2020. It aims to:
  - Ensure less waste
  - Make sustainable products the norm
  - Focus on increasing circularity in sectors that use large amounts of resources
  - Promote the circular economy internationally
- The **United Nations Conference on Trade and Development (UNCTAD)** started work on circular economy in 2015, encouraging discussions on consumer awareness and innovation in business

The circular economy on a national scale

- In 2016, France made it illegal for retailers to throw away food
- China introduced a law in 2021 which banned competitive eating and the sharing of binge-eating videos

The circular economy on a local scale

- Malmö in Sweden is piloting a circular economy approach
  - The pilot began in 2018
  - The bus fleet runs on biogas and CNG, which reduces emissions
  - It is compulsory for households to sort food waste
  - Household waste is recycled and reused (98%)
  - Recycling and repair of IT equipment by the local government have more than doubled

- Local construction companies have signed up to the Climate Neutral Building partnership which focuses on using recycled and upcycled materials
- Water recovery systems have been installed


Your notes

Sustainable Development Goals

Your notes

The Role of the UN Sustainable Development Goals

What is sustainable development?

- Sustainable development means meeting the needs of today whilst ensuring that future generations can also meet their needs
- Sustainable development can be divided into three categories
  - **Economic sustainability**
  - **Environmental sustainability**
  - **Social sustainability**
- Achieving environmental sustainability will require a reduction in the use of natural resources or technological advances
- The development of the UN **Sustainable Development Goals (SDGs)** were set out in 2015
- The SDGs were developed from the **Millennium Development Goals (MDGs),** which set out the challenges world leaders committed to combating, including:
  - Poverty
  - Hunger
  - Disease
  - Illiteracy
  - Discrimination against women
  - Environmental degradation
- The SDGs are the areas viewed as the world's most urgent challenges

An Explanation of the 17 SDGs (Source: UN SDGs)

2030 Goal	Explanation and current state

	End all forms of poverty by 2030, including **absolute** and **relative** poverty
	If current trends continue, only one-third of countries will achieve their targets by 2030 Almost 600 million people will still be living in extreme poverty
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
	There has been an increase in the number of people facing hunger In 2022, about 122 million more people were facing chronic hunger than in 2019
	Ensure healthy lives and promote well-being for all at all ages
	Almost three-quarters of 200 countries have met or are on track to meet the SDG infant mortality target Vaccinations have declined significantly since the COVID-19 pandemic, meaning cases of tuberculosis and malaria have increased
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
	The COVID-19 pandemic led to learning losses in 4 out of 5 countries studied in the 2023 report In 2023, only one in six countries will achieve the secondary school completion target
	Achieve gender equality and empower all women and girls
	If progress continues at the current rate, it will take: ▪ Approximately 300 years to end child marriage ▪ Over 280 years to remove discriminatory laws ▪ About 140 years for equal representation in leadership and positions of power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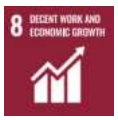
	Ensure availability and sustainable management of water and sanitation for all
	Approximately 2.2 billion people still do not have access to safely managed water Around 3.5 billion people lack access to safely managed sanitation
	Ensure access to affordable, reliable, sustainable and modern energy for all
	Approximately 2 billion people will rely on polluting fuels for cooking by 2030 Renewable energy provides almost 30% of electricity but there is still significant dependence on fossil fuels Global access to electricity has increased from 87% (2015) to 91% (2021)
	Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
	COVID-19 led to an increase in informal employment to an estimated 2 billion people The global unemployment rate decreased to 5.4% Young women are twice as likely (32%) as young men to not be in training, education or employment
	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
	In 2022, 95% of the global population could access a mobile broadband network Due to COVID-19, the growth of manufacturing fell to 3.3% (2022) from 7.4% (2021)
	Reduce inequality within and among countries
	The COVID-19 pandemic increased income inequality between countries over 4% difference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	Make cities and human settlements inclusive, safe, resilient and sustainable
	Approximately 1.1 billion people live in squatter settlements Access to public open spaces is less than 20%, the target is 45-50% Only 52% of the urban population has convenient access to public transport
	Ensure sustainable consumption and production patterns
	The material footprint (use of raw materials) is ten times higher in high-income countries than low-income countries Food waste was 931 million tonnes (2019), far above the target
	Take urgent action to combat climate change and its impacts
	The rate of global mean sea level rise has doubled since 2002 The world is currently predicted to pass the 1.5°C tipping point in 2035
	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
	The amount of plastic waste in the oceans is estimated to triple to over 50 million metric tons by 2040 There has been a continuous increase in acidification of oceans—30% higher than in pre-industrial times
	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification; halt and reverse land degradation; and halt biodiversity loss
	Global forest coverage has decreased from 31.9% (2000) to 31.2% (2020) or 0.1 billion hectares One million species are threatened with extinction


Your notes

	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
	There was a 50% increase in conflict-related civilian deaths in 2022 Almost 110 million people were forcibly displaced in 2022, an increase of 19 million from 2021
	Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development
	Debt in low-income countries has increased significantly since Covid-19 Official development assistance has increased by over 15%; much of this is due to aid to Ukraine Internet access has increased from 40% in 2015 to 66% in 2022

- In the UN 2023 report on the SDGs, it was reported that
  - Only 15% of targets were on track
  - Almost half (48%) are moderately or severely off track
  - For 37%, there is stagnation or regression in the targets


Your notes