

Study & Master

Support Pack | Grade 12

CAPS

Life Sciences

Environmental studies

This support pack for the **Environmental studies** strand in the **Life Sciences Grade 12 CAPS curriculum** provides revision summaries on the topic to help prepare for the examinations. Learners can work through these individually at home or these could form the basis of a catch-up class or online lesson. You have permission to print or photocopy this document or distribute it electronically via email or WhatsApp.

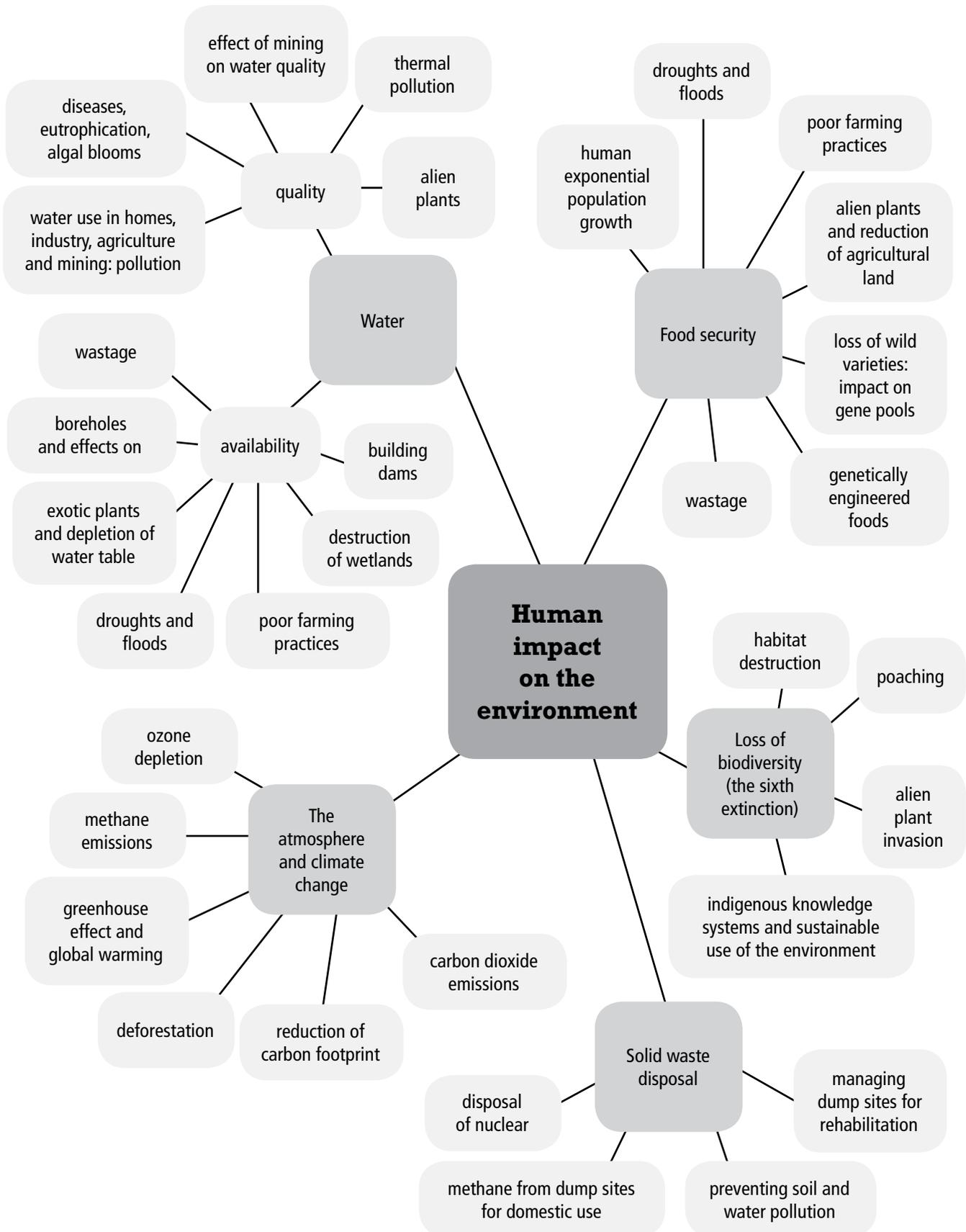
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UNIT 1 Human impact on the environment



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The atmosphere and climate change

- Carbon dioxide emissions have risen steeply since 1950.
- Carbon dioxide is one of the greenhouse gases that contributes to climate change.
- The other important greenhouse gases are methane, nitrogen dioxide and water vapour.
- The carbon footprint is a unit that can be used to work out the cost, in terms of carbon emissions, of human activities on the environment.
- Forests are the largest terrestrial carbon sinks. Deforestation and desertification reduce Earth's ability to soak up excess carbon dioxide and other greenhouse gases in the atmosphere.
- The greenhouse effect is the name given to the fact that the long wavelengths of solar energy are reflected back to Earth as they hit the atmosphere and that carbon dioxide and other greenhouse gases trap some of this long-wave energy, forming a "blanket" around the Earth that keeps the planet at the correct temperature for life.
- Global warming is caused by increasing levels of greenhouse gases, which are causing a rise in the Earth's temperature, which is causing climate change.
- Methane emissions from landfill sites and animal manure are contributing to global warming and climate change.
- Ozone depletion is caused by reactive chemicals that react with and destroy the ozone layer in the atmosphere. This permits UV-B solar energy to reach Earth, putting all life at risk of mutations and other forms of damage.

Water

- The availability of water decreases as the human population rises.
 - Dam construction has advantages for humans but disadvantages for ecosystems.
 - Wetland destruction has a negative impact on water availability and quality.
 - Many modern agricultural practices are detrimental to the water cycle. Much water is wasted by inefficient irrigation systems used in agriculture.
 - Climate change is causing more frequent extreme climatic events such as droughts and floods.
 - The quantity and quality of water stores in aquifers is threatened by boreholes, municipal landfills, mining and lack of waterborne sewerage in informal settlements.
 - The cost of water rises as the demand increases and availability decreases.
 - Industry, agriculture, mining and poor settlement infrastructure pollute and reduce the quality of water, causing waterborne diseases and eutrophication.
 - Pollutants that decrease water quality come from a wide range of human impacts.
 - Purification and recycling of water are essential to sustain this limited resource.
 - Aquatic invasive alien plants have a negative effect on water resources and are costly to eradicate.
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Food security

- Food production has increased faster than the human population has over the past 40 years, but the availability of food per head of population has decreased, particularly in the developing world.
- Climate change in the form of frequent floods and droughts and changes to the timing of seasons decreases food security.
- Poor farming practices negatively affect food security.
- Alien plants affect food security by decreasing the amount of available agricultural land.
- Genetic vigour of domestic crops requires back-crossing with wild ancestor strains but many of these ancestral species are threatened by habitat loss.
- Genetically engineered foods may help to improve food security, but so far they have not had much impact.
- Food waste is greatest in Westernised countries.

Loss of biodiversity

- The sixth mass extinction that is occurring now is a direct result of human impact.
- Habitat destruction, which reduces biodiversity, is accelerated by human activities such as overgrazing, monoculture, mining, wetland destruction, deforestation, planting extensive exotic forests, destruction of grasslands and other biomes, expanding cities and golf courses, illegal trading of wildlife, over-exploitation of selected species, introducing invasive alien species and poaching.
- Mining has serious adverse effects on land, water and air.
- Poaching is potentially causing species to become extinct and is negatively affecting biodiversity.
- Invasive alien plants (IAPs) are rapidly replacing indigenous species of plants, at the expense of South Africa's biodiversity, water resources and soil fertility.
- Indigenous knowledge systems can provide effective strategies for conserving biodiversity, but can also perpetuate destructive myths and cultural practices that undermine biodiversity.
- South Africa's medicinal plants are in global demand and require careful management to avoid over-exploitation.

Solid waste disposal

- Human industry, technology, consumerism and irresponsibility result in an ever-increasing load of waste.
 - Waste and landfill sites have a serious impact on all parts of the environment and undermine the efficiency of ecological functions and services.
 - The management of most landfill sites in South Africa is very costly and highly inefficient in terms of energy and resource recovery.
 - The waste hierarchy outlines levels of efficiency in managing and saving energy and resources.
 - Landfill sites can be managed to generate biogas or electricity and in the process also reclaim grey water.
 - Methane from landfills can be used to generate electricity for households.
 - Nuclear waste disposal is still the major problem associated with nuclear power.
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