1. **Main sources of water that created our early oceans**:
   1. Water vapor from volcanic outgassing.
   2. Icy comets and asteroids delivering water upon impact[[1]](https://www.pbs.org/newshour/science/how-did-the-ocean-form-4-things-to-know-about-its-past-and-present).
2. **Explain and describe the greenhouse effect**:
   1. The greenhouse effect is the process by which greenhouse gases trap heat in Earth's atmosphere, warming the planet. These gases include carbon dioxide, methane.
3. **Name at least 4 greenhouse gases**:
   1. Carbon dioxide (CO₂)
   2. Methane (CH₄)
   3. Nitrous oxide (N₂O)
   4. Fluorocarbons
4. **Most important sources of the major greenhouse gases**:
   1. **Carbon dioxide**: Burning fossil fuels, deforestation.
   2. **Methane**: Agriculture (livestock), landfills, natural gas extraction.
   3. **Nitrous oxide**: Agricultural activities, industrial processes.
   4. **Fluorinated gases**: Industrial applications[[4]](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions).
5. **Carbonate buffering system in the ocean and why additions of CO₂ create acidic conditions**:
   1. The ocean absorbs CO₂, forming carbonic acid, which dissociates into bicarbonate and hydrogen ions, lowering pH and increasing acidity[[5]](https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification).
6. **Specific causes of sea level rise**:
   1. Melting glaciers and polar ice sheets.
   2. Thermal expansion of seawater as it warms[[6]](https://sealevel.nasa.gov/faq/12/what-causes-sea-level-rise/).
7. **What is coral bleaching and what causes it?**:
   1. Coral bleaching occurs when corals expel the symbiotic algae living in their tissues due to stress from changes in temperature, light, or nutrients, causing them to turn white[[7]](https://oceanservice.noaa.gov/facts/coral_bleach.html).
8. **Carbon mitigation strategies**:
   1. Reducing emissions through renewable energy.
   2. Enhancing carbon sinks like forests.
   3. Implementing carbon capture and storage technologies[[8]](https://net0.com/blog/carbon-mitigation).
9. **Explain carbon credits**:
   1. Carbon credits are permits allowing the emission of a certain amount of greenhouse gases. They are used by companies to offset their emissions by investing in environmental projects[[9]](https://www.investopedia.com/terms/c/carbon_credit.asp).
10. **Steps involved in how fishing a “commons” leads to commercial extinction of a species**:
    1. Overfishing due to lack of ownership and regulation.
    2. Depletion of fish stocks as each fisher maximizes their catch.
    3. Collapse of the fishery when the population cannot sustain itself[[10]](https://www.coastalwiki.org/wiki/The_Tragedy_of_the_Commons_-_The_Tuna_Example).
11. **Explain and define the EEZ**:
    1. The Exclusive Economic Zone (EEZ) is a sea zone extending up to 200 nautical miles from a country's coast, within which the country has rights to explore and use marine resources.
12. **Explain how technology accelerates overfishing**:
    1. Advanced fishing gear and techniques increase catch efficiency.
    2. GPS and sonar technology locate fish more easily, leading to overexploitation.
13. **Types of fishing gear and factory ship methods**:
    1. **Trawling**: Dragging nets along the sea floor.
    2. **Longlining**: Using long lines with baited hooks.
    3. **Purse seining**: Encircling fish with a large net.
    4. **Factory ships**: Large vessels that process fish onboard.
14. **Define and explain bycatch**:
    1. Bycatch is the unintended capture of non-target species during fishing. It often includes species that are discarded back into the ocean, dead or dying.
15. **Fishing gear resulting in the most bycatch**:
    1. Trawling and longlining are known for high bycatch rates.
16. **Ecological and evolutionary impacts of overfished populations**:
    1. Reduced genetic diversity.
    2. Altered food webs and ecosystem dynamics.
    3. Evolutionary changes like smaller size and earlier reproduction.
17. **Define sustainable fishing**:
    1. Sustainable fishing practices ensure fish populations remain healthy and ecosystems are not harmed, allowing for long-term fishing viability.
18. **Fisheries management strategies**:
    1. **Catch limits**: Setting quotas on the amount of fish that can be caught.
    2. **Marine protected areas**: Designating zones where fishing is restricted.
    3. **Gear restrictions**: Limiting the types of gear that can be used.
    4. **Seasonal closures**: Prohibiting fishing during breeding seasons.
    5. **Licensing**: Requiring permits for fishing activities.
    6. **Community-based management**: Involving local communities in decision-making.
19. **Ecosystem-based management**:
    1. An approach that considers the entire ecosystem, including human impacts, to manage resources sustainably.
20. **Aquaculture**:
    1. The farming of aquatic organisms like fish, shellfish, and seaweed. It has the potential to supplement traditional fisheries but must be managed to avoid environmental impacts.