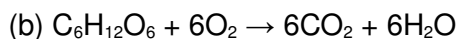


1.	<i>Aerobic</i>	<i>Anaerobic</i>
(a)	CO <sub>2</sub>	CH <sub>4</sub>
(b)	NO <sub>3</sub> <sup>-</sup>	NH <sub>3</sub>
(c)	PO <sub>4</sub> <sup>3-</sup>	PH <sub>3</sub>
(d)	SO <sub>4</sub> <sup>2-</sup>	H <sub>2</sub> S

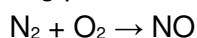
2.

(a) Carbon dioxide and water react together using energy provided by sunlight, with chlorophyll as a catalyst, producing glucose and oxygen gas.



3. The nitrogen cycle follows the movement of nitrogen (in the form of various compounds) in the atmosphere, soil, plants and animals.

Lightning provides the energy to convert N<sub>2</sub> into NO.



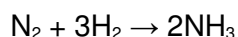
This reacts with O<sub>2</sub> to form NO<sub>2</sub>. Both oxides then react with rainwater and are washed to the ground as nitrate and nitrite, where they are absorbed by plant roots.

Nitrogen-fixing bacteria convert N<sub>2</sub> into NH<sub>3</sub>/NH<sub>4</sub><sup>+</sup>. These are converted to nitrate by nitrifying bacteria.

When plants and animals decay (decomposition of organic matter) they produce nitrate and ammonia.

Denitrifying bacteria convert nitrate into N<sub>2</sub>.

4. (a) Nitrogen gas and hydrogen gas are reacted in presence of an iron catalyst, producing ammonia.



(b) A fertiliser provides nutrients in a water soluble form, increasing the uptake through plant roots.

5. (a) The Earth's surface absorbs light from the sun and re-emits it as infra-red. Greenhouse gases in the atmosphere have polar covalent bonds which stretch and bend to absorb and re-emit the IR, keeping the Earth's atmosphere warm.

(b) The greenhouse effect keeps the Earth warm and at a steady temperature, allowing liquid water to be in liquid form, necessary for cellular function.

The enhanced greenhouse effect will increase the average global temperature. This will cause sea levels to rise, climate and weather patterns to change, glaciers and polar ice caps to melt.

(c) Human actions that could enhance greenhouse effect: Use of carbon-based fuels, deforestation, agriculture (rice paddies, sheep, fertilisers, etc).

Possible effects on human society include flooding of coastal cities, and climate change which affect water collection and crops.