Name: Key

Environmental Engineering and Sustainability Review

Vocabulary

Engineering - application of scientific principles to create tools, objects and systems that accomplish specified objectives

Environment - air, water, minerals, organisms and all other external factors surrounding and affecting a given organism at any time

environmental engineering application of scientific principles to improve the environment, support human needs and address human-induced effects on ecosystems

chemical engineering - engineering concerned with the design of transforming substances at a large scale for the improvement human condition

civil engineering - engineering branch concerned with design of public works.

sustainability - the ability to contine for long periods of time without permanent loss of any resources

conservation of mass - in a closed system ~~energy~~ mass cannot be created nor destroyed (exceptions nuclear fission /fusion)

conservation of energy - is an absolute → energy cannot be created nor destroyed but transformed.

food web - interconnecting food chains involving producers, consumers and decomposers

trophic level - designates all organisms at the same number of steps away from the origin of energy into the system

producers - an organism that can nourish itself using ~~the~~ energy and small molecules from the environment

consumers - an organism that obtains nourishment by eating other organisms nutrient cycle - the circulation of an element through the environment

sedimentary rocks - formed as part of the carbon cycle when carbon reacts with calcium and magnesium

geologic uplift - the rise of land to a higher elevation which leads to more rock weathering resulting in the formation of sedimentary rocks

combined biogeochemical cycles - combination or intertwining of nutrient cycles

ecological footprint - a method for determining the amount of land that is required to provide the energy and natural resources to sustain human activities (estimates the effects of environmental changes)

carbon sequestration ratio - amount of trees (forests) required to sequester the amount of carbon produced by the generation of electricity

energy intensity ratio - amount of energy required to produce and transport a given product

biocapacity - biological capacity - the ability of an ecosystem to produce useful biological materials and to absorb carbon dioxide emissions

ecosystem services - the resources and beneficial processes supplied to humans by ecosystems (example - water filtration)

"cradle to grave" design - idea that an engineer is responsible for a project from its conceptual phase to final phase and beyond.

Name two of the common tasks of environmental engineers and give examples of each.

1. Preventing, reducing or cleaning up environmental pollutants (soil remediation)
2. designing and monitoring systems to treat sewage and solid waste (design of wastewater treatment plants / Landfills)

Name three main purposes of environmental engineers:

1. improve the environment
2. support human needs
3. address human-induced effects on ecosystems

- Manage watersheds
- deal with waste
- measure the impact of human activities (impact studies)

Name 5 other sciences that environmental engineers use their knowledge of in their work.

1. Physics
2. biology
3. chemistry
4. ecology
5. geologx

computer science
mathematics

Name 5 major elements involved in living things.

1. Carbon
2. Nitrogen
3. Phosphorus
4. hydrogen
5. oxygen

Describe one of the 5 nutrient cycles.

Carbon moves from atmosphere to oceans and reacts with calcium & magnesium to form sedimentary rocks. Most carbon resides in living creatures and is recycled through decomposers and consumers. Remainder is below the earth's surface as oil coal or natural gas.

Name the 4 Key Sustainability Factors and give an example of each.

1. Manage changes in the environment (~~Maxio~~ Maximize the use of renewable resources)
2. Equity and safety of engineering activities (positive weight projects)
3. Problem solving (overall holistic approach should be taken)
4. Making good problems already caused (Reduce the use of non sustainable practices)