

Federal State-funded Institution of Higher Education
«Volgograd State Medical University»
Ministry for Public Health of the Russian Federation

Department of Hygiene and Ecology

LECTURE:

Environment and health

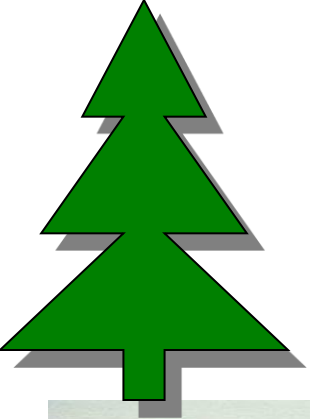


Volgograd, 2023

ECOLOGY

- is the study of the formation of biological systems and their interactions with the natural environment





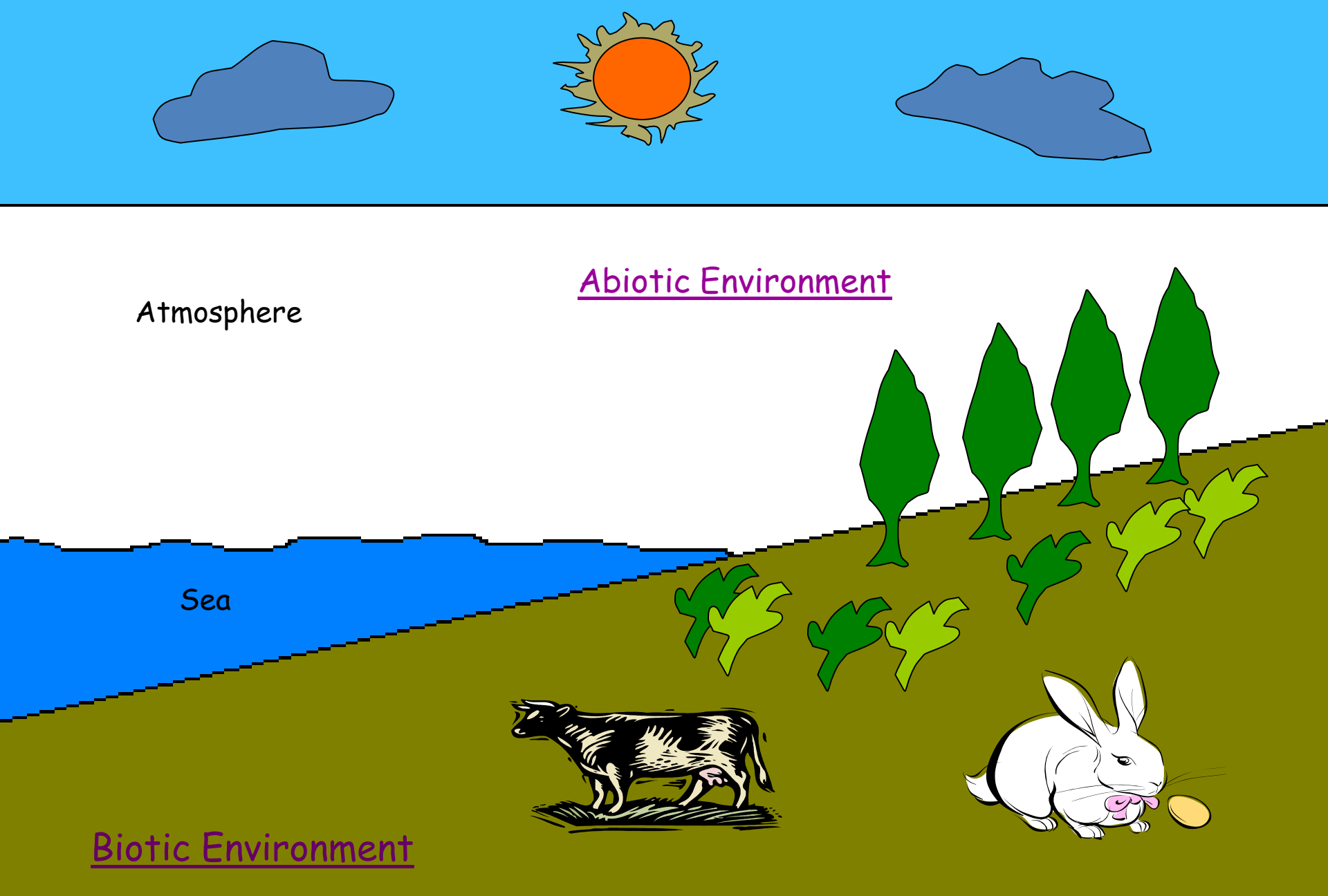
Environment



is the place where a person lives and works



That which surrounds, the total sum of the condition of the surroundings within which an organism, or group, or an object exists (including the natural as modified by human activity & the artificial).



Atmosphere

Abiotic Environment

Sea

Biotic Environment

Environment is the sum of biotic & abiotic component

The main environmental problems

- the problem of accumulation of pesticides
- the problem of accumulation of heavy metals
- carbon monoxide emissions problem
- the problem of accumulation of waste production
- the problem of accumulation of radioactive substances in the environment

Ecological factors

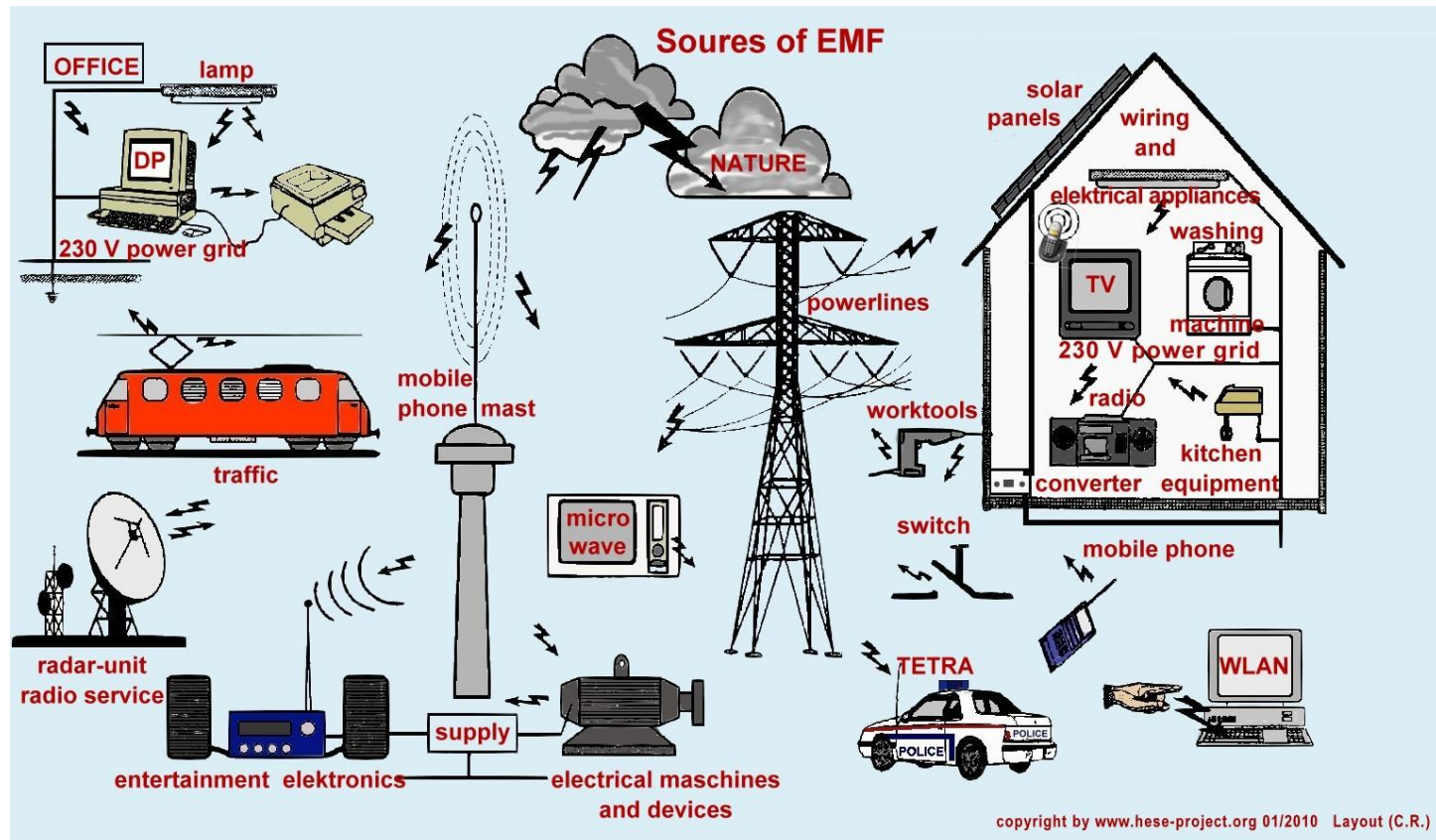
- are properties of the habitat that determine the conditions for the metabolism of an organism and biogeocenosis as a whole.
- Almost all environmental factors are characterized by significant variability in time and space.

Anthropogenic factors :

- Anthropogenic factors of **physical nature**
- Anthropogenic factors of **chemical nature**
- Anthropogenic factors of **biological nature**

Anthropogenic factors of physical nature

- city noise, vibrations, electromagnetic fields, etc.



Chemical anthropogenic factors

- include chemical substances synthesized and produced for certain purposes and getting into the natural environment different ways, such as through the air, water and land.



Biological anthropogenic factors

- include microorganisms modified by the action of some other anthropogenic factors, mainly chemical ones.

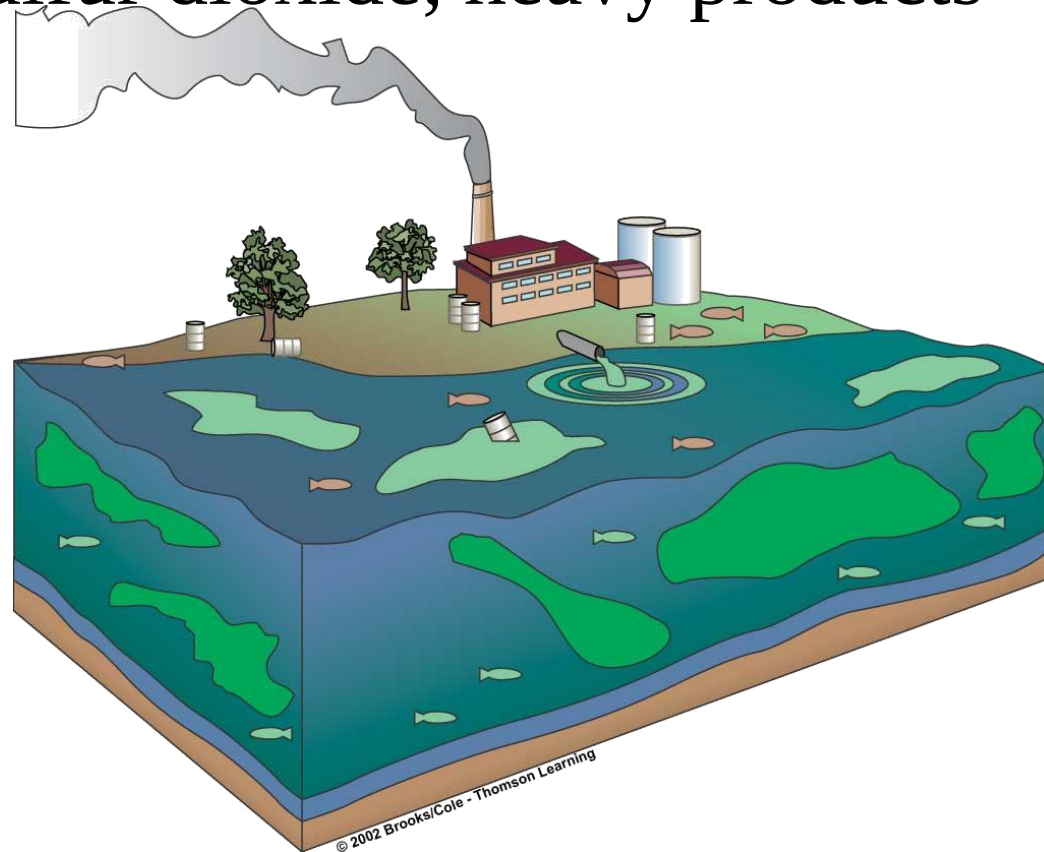


1.Modern industries

- It is metallurgical industries, chemical and oil – chemical industries, factories producing modern building materials.
- All these industries affect the natural environment producing hazardous waste which contaminate land, water and air.
- 20 – 40%

2. Enterprises of thermal energy.

- Enterprises of thermal energy (Thermal Discharges) emit carbon dioxide, sulfur dioxide, heavy products



3. Transport

- All means of **transport** which are driven with the internal –combustion engine. As the result of burning fuels tons of oxides in the form of *carbon dioxide, nitrogen dioxide, lead* and many other chemical substances added to petrol for improving its octane rating, are emitted into the atmosphere.
- An estimated 40 to 70% of all hazardous chemical substances being emitted into the air in a city, are produced by transport.

4. Agricultural human activities

which widely use chemical substances in fighting against pests.

- **5. Household chemical goods**
which include detergents, dyes,
preparations for fighting against
insects.

6. Chemical, pharmaceutical and cosmetic goods

- Chemical substances which are being emitted into natural environment may spread over large distances. This is called **migration of chemical substances** .



- *The **greatest migration*** is accomplished through the air .
- *The **least migration*** of chemical substances is possible through land.(as soon as they get into land,they remain there for quite a long period of time).

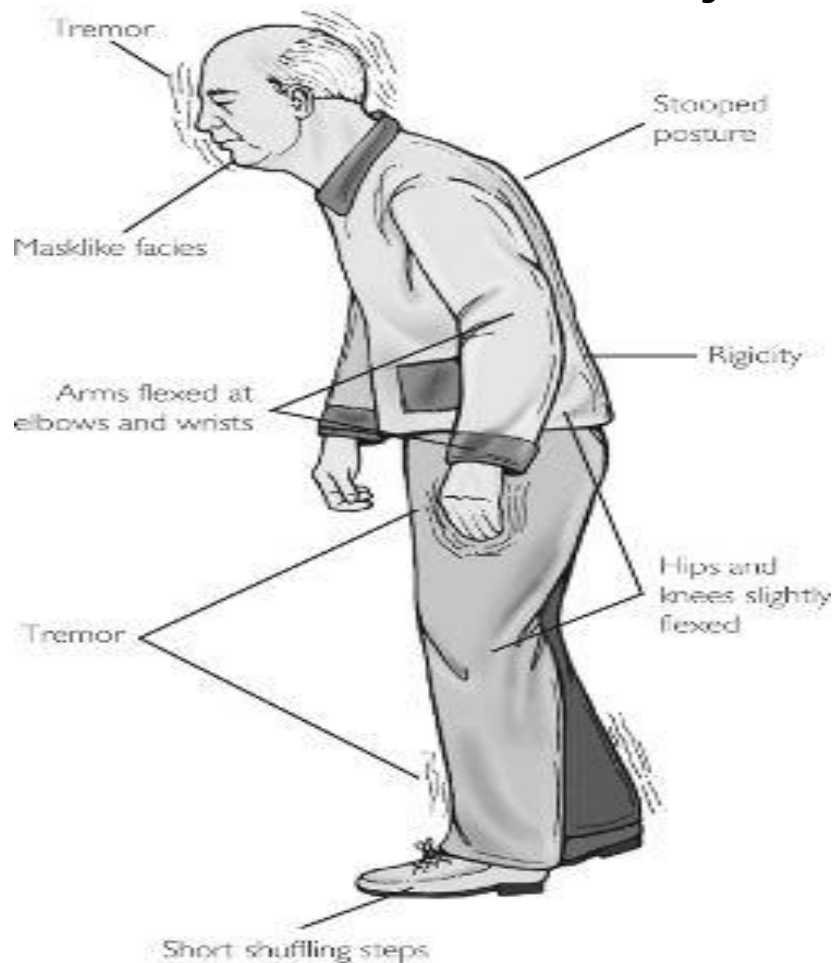
Air Pollution Effects

We can distinguish between

- *short-term acute effects* and
- *long-term chronic effects* of air pollution.
- Air pollutants enter the body primarily through the respiratory system which thus becomes their main victim.
- Each air pollutant exerts their own specific adverse impacts, ranging from mild to really damaging.

Minimata disease:

is determined by polluted sea and river fauna with mercury.



Cadmium poisoning

The cadmium and other heavy metals accumulated in the water of the river. This water was then used to irrigate the rice fields. The rice absorbed heavy metals, especially the cadmium. The cadmium accumulated in the people eating contaminated rice. The cadmium poisoning caused *softening of the bones and kidney failure*.



Itai-itai disease ■

- is conditioned by high level of cadmium in water which is used to water the rice fields
- was caused by cadmium poisoning due to mining in the mountains in Toyama Prefecture



Classification of environmental situations

- 1.Catastrophic (area of ecological disaster)
- 2.Crisis (area of extreme environmental situation)
- 3.Critical
- 4.Unsatisfactory
- 5.Relatively satisfactory