

Rahvusvaheline maateaduste olümpiaad 2024



IESO 2024

Liisa Pata

Tallinn

2025



Welcome
to Tallinn!

Baggage Claim

TEAM ESTONIA
IESO 2024
爱沙尼亚

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Teoria...



Praktilised tööd!











ESP – Earth System Project





How have the interactions of the spheres contributed to the origin of life?

THE PAST: how did the interaction of the spheres bring about life?

Atmosphere

How did changes in the gaseous composition of the atmosphere contribute to the origin of early life?

- Earth's atmosphere was able to contain the water unlike other atmospheres.
- This caused the hydrosphere to come into existence and eventually allow life to form.
- Furthermore the ozone layer in the atmosphere absorbed harmful radiation, protecting living organisms. (Hayes, J.M. 16 Nov 2020)

Hydrosphere

How did the presence of water contribute to the origin of early life?

- Ocean water came from comets, asteroids, and volcanic outgassing.
- This water facilitated chemical reactions to take place, such as the reduction of carbon and sulfur which provided energy for life. (Martin, et. al, 2008) (T.J. Smith, 2011)

Lithosphere

How did plate tectonics contribute to the origin of early life?

- Volcanism was an important factor in creating conditions which made the evolution of life possible.
- Hydrothermal vents, which occur at divergent plate boundaries, released minerals and heat.
- These provided suitable conditions for inorganic molecules to be converted into amino acids. This was a key factor in the evolution of early life. (Murphy, Andel, 2024)

Biosphere

THE PRESENT: how do the Earth's spheres contribute to and benefit from the habitability of Earth?

The atmosphere contains important gases, such as carbon dioxide, that are required for photosynthesis. The production of oxygen maintains an atmosphere suitable for aerobic organisms. (K. Allison-Meehan)

The atmosphere maintains the Earth's surface temperature at a level suitable for life, as ammonia and carbon dioxide insulate radiation and the ozone layer reflects it.

It also serves as a transport system for the water, nitrogen and carbon cycle, which are necessary to sustain life. (Hayes, J.M. 16 Nov. 2020)

Atmosphere

Plate tectonics is responsible for the supercontinent cycle. This cycle results in changes in climate which cause changes in biodiversity. Generally, there is less diversity on a single supercontinent compared to biodiversity across separated continents. (Murphy, Andel, 2024)

Hydrosphere

Soils are formed from parent material, which comes from the lithosphere. The formation of soils is affected by flora and fauna. Soil also has a significant impact on the biosphere as it cultivates plants. (Sposito, Gattison, 2024)

Lithosphere

Biogenic sedimentary rocks are made from organic sediments such as shell fragments, microfossils or preserved plant material. Biogenic sedimentary rocks acts like sinks in the global nutrient cycle. (Zerkle, 2018)

The biosphere and hydrosphere combine to act as weathering agents. For example, tree roots can mechanically break up rock, increasing the rate of chemical erosion by water.

The biosphere also facilitates the movement of water in the hydrosphere. Transpiration from vascular plants converts liquid water into vapour, ensuring the continuity of the water cycle. (Balasubramanian, Nagaraju, 2015)

THE FUTURE AND THE PARADOX: could the biosphere threaten the Earth's habitability?

Estimation of the world's population up to 2050 AD

Threat to the Atmosphere: Overpopulation will lead to further air pollution and faster climate change, which will result in an increased greenhouse effect. Global warming of the Earth reduces its habitability, as organisms cannot survive.

Threat to the Lithosphere: Overpopulation results in overconsumption of resources, such as fossil fuels, which are being used faster than they can be replenished. This has detrimental impacts on the lithosphere due to increased mining and disruption of the earth.

Threat to the Hydrosphere: Overpopulation leads to more garbage and dangerous chemicals which are often deposited in the ocean. This would lead to a rapid decline in the health of the oceans.

ITFI – International Team Field Investigation



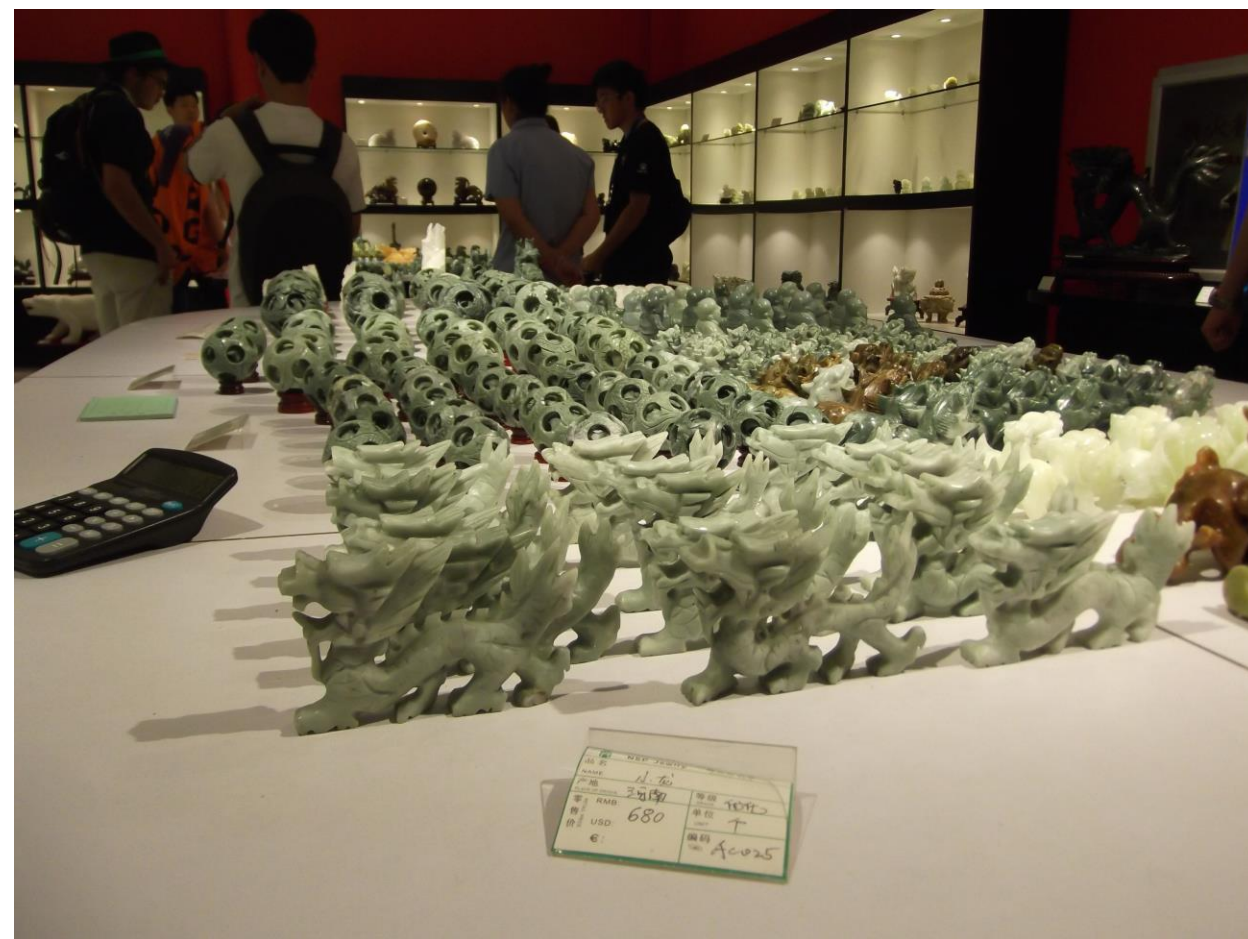




Ekskursioonid!









Giid



Elutingimused







LET'S
BUILD THE
BIGGEST
PYRAMID
(FROM BOTTLES)





MEDALISADU!!!







Konspekt

- Hiina, Peking
- 7. august – 16. august
- Ülesanded inglise keeles (riik saab valida, kas tõlkida või mitte)
- Tiimis neli liiget
- Kaks teooria testi, viis praktilist tööd
- Peamiselt aitab ülesandeid lahendada loogika, valikvastused
- Üldine arusaamine Maa süsteemidest (litosfäär *kivimiringe, atmosfäär *tuuled, *kliima, hüdrofäär, *biosfäär*) -> järeldused oma teadmiste ja teksti põhjal
- ESP ja ITFI - rahvusvaheline meeskonnatöö
- Telefonid korjati ära, suhtlemine samasuguste nohikutega teistest riikidest
- OLI VÄGA TORE JA VÄÄRT KOGEMUS!
- Kõigepealt tuleb osaleda Eestis maateaduste olümpiaadil ja enne seda kindlasti õppepäeval!