

# **NAPOVEDNIK NACIONALNEGA DOGODKA ZA IZBOR PROJEKTOV ZA SonS festival na FINSKEM 2024**

Ljubljana, 11. april 2023

# Potek predstavitve



**Predstavitev Science on Stage**  
(mednarodna mreža učiteljev STEM)



**Napovednik nacionalnega izbora** projektov za sodelovanje na mednarodnem festivalu SonS v Turku na Finskem (12. – 15. avgust 2024)

**Kako sodelovati?**

# Science on Stage Europe (1/3)



1. Mednarodna mreža učiteljev STEM.
2. Strokovna podpora za celotno pedagoško vertikalno.
3. Platforma s primeri dobrih praks poučevanja, učnimi gradivi, eksperimenti, idejami.
4. Delavnice, nacionalna in mednarodna izobraževanja ter festivali.
5. Spodbujanje mladih k naravoslovni pismenosti in karieri v naravoslovju, IT ter tehniki.



<https://www.science-on-stage.eu/>



# Science on Stage Europe (2/3)



Zgodovina: zasnova v letu 2000, aktivno delovanje: leta 2007

PODPORNIKI MREŽE SonS – EU in donatorji iz Evrope ter drugih neevropskih pridruženih članic

Sedež SonS je v **Berlinu**.

**Science on Stage Slovenija**

<https://kemikum.splet.arnes.si>

Zavihek: **Znanost na odru**

Slovenija je članica od leta 2012.



# Science on Stage Europe (3/3)



Vsako drugo leto se učitelji STEM iz 34-ih držav srečajo na največjem izobraževalnem sejmu / festivalu (Berlin, Kopenhagen, Frankfurt, London, Debrecen, Cascais, Praga) z namenom izmenjave idej, dobrih praks, projektov ...

INOVATIVNI PROJEKTI – nagrajeni učitelji







## **Festivali Science on Stage (1/2)**

- Science on Stage Hungary, **DEBRECEN**: 29. junij – 2. julij 2017
- Science on Stage Portugal, **CASCAIS**: 2. – 5. november 2019
- Science on Stage Czech, **PRAGA**: 24. – 27. marec 2022
- **Science on Stage Finland, TURKU: 12. – 15. avgust 2024**

**Na festivalu sodeluje približno 450 učiteljev iz 34 držav**

[www.sons2017.eu](http://www.sons2017.eu) , [www.sons2019.eu](http://www.sons2019.eu) , [www.sons2022.eu](http://www.sons2022.eu)

## Festivali Science on Stage (2/2)

- **SLOVENSKA EKIPA V DEBRECENU 2017**  
Darja Silan, Ambrož Demšar, Damjan Štrus,  
Nika Cebin



- **SLOVENSKA EKIPA V CASCAISU 2019**  
Alenka Bašelj, Renata Flander, Daša Sojer,  
Branko Koprivnikar



- **SLOVENSKA EKIPA V PRAGI 2022**  
Laura Javoršek, Rok Rudež, (Renata Flander),  
Nika Cebin



# SonS festival v Pragi 2022







SCIENCE ON STAGE  
SLOVENIJA

Center  
**Kemik** Um

UTRINKI S  
FESTIVALA V PRAGI







SCIENCE ON STAGE  
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UTRINKI S  
FESTIVALA V  
PRAGI





**UTRINKI S FESTIVALA V  
PRAGI**



POSTERSKA  
PREDSTAVITEV  
PROJEKTOV

### STEM WITH ARTS

FROM TEACHERS FOR TEACHERS

Mostefa M. Mezoudi | J. Y. Cousteau secondary school | Bussy St Georges | France

#### The Fractiometer

from a new mathematical tool to applications in Music, Acoustic, Astronomy and Biology

**Project description:** In this project we have invented and constructed a new mathematical tool to perform fractional calculus in a pure geometric novel way using rectangles. We have called it the Fractiometer.

**Application cases in Science and Arts in Music and sound's physics:** Pythagoras linked fractions to string vibration and music.

The starting point was the transition from Pythagoras theorem to fractal calculus. The 2<sup>nd</sup> idea came from screen TV format's representation by fractions:  
4:3    16:9    21:9

The Chajon is a rectangular...  
The surface of a violin... waves are used by violin makers to tune boards.

E. Chadni presented his work on sound to Neoplaton (1808) in Astronomy — Helioscology

Original    Final result

**Conclusion:** This project shows how scientific disciplines and art are linked together. It allows to pupils to explore some exciting and funny ways to learn science.

### COLLABORATION IN STEM EDUCATION

FROM TEACHERS FOR TEACHERS

Franziska Langer and Michael Sachl | Burggenmum | Friedberg | Germany

#### The Yemen chameleon as a Teaching Subject

How long is the tongue of a chameleon actually?    How fast does the tongue shoot out?    To what extent do these measures vary across different individuals?

**Real**

- Ethogram
- Inductive inference to individual behavior in prey capture

**Digital**

- Functional use of digital media
- Own video production and analysis

**Authentic**

- Confrontation with scientific publications
- Creation of authentic problems
- Sensitization for problem-oriented learning tasks

SCIENCE ON STAGE FESTIVAL 2022

### JOINT PROJECTS

FROM TEACHERS FOR TEACHERS

SCIENCE ON STAGE SLOVENIJA

SCIENCE ON STAGE SLOVENIJA

#### Space exploration from small scale to large scale.

Understanding Solar System Stars: Analyzing Solar microstructures.

Every day on Earth, microstructures land on our roofs. The Earth, in fact, is being bombarded through particles, solar rays, other particles, with the help of the force of gravity. We developed an experimental method to detect and make microstructure collection. Efforts were interrupted by the pandemic, affecting results.

Students also examined the scale of the solar system in which these particles exist. Students in Spain and Canada presented to each other and shared cultural experiences.

**Conclusions:** Students can appreciate the benefits of models in understanding the world around us, as well as how they can foster interdisciplinary learning. They can also understand that via direct, we can make space exploration, and theoretical, like theories that come from the solar system, from space.

### DIVERSITY in STEM Education

FROM TEACHERS FOR TEACHERS

Olivera Korincic | Municipal special primary school SRC for 2+ | Metkopolje | Ukraine

#### Educational game "Aroma and K"

"Aroma and K" is a game that combines three perceptions: feelings, eating, hearing and student's sight. Due to the influence of the game, both of children's cerebral hemispheres can be developed homogeneously and therefore their individual abilities can be sensibly improved.

The purpose of the project: increasing a child's ability to perceive and organize sensory information; to develop olfactory responses using olfactory receptors, visual and auditory diagrams to develop kids' memory, attention, mental capacity, logic, speech, handwriting, improve kids vocabulary through different words.

The main areas of perception are involved in the brain; the main neural connections can be formed during learning; foods have a direct impact on the limbic system of the brain. This system plays an important role in the learning and organization of short-term and long-term memory, participates in the formation of orientation and research activities, and organizational, motivational and informational communication (language).

Using the game "Aroma and K" children will be able to think critically, compare different objects and compare them.

### Sustainable Development Goals in Education

FROM TEACHERS FOR TEACHERS

Name: NIKTARIOS KOURAKIS | School: Gel Vamou | City: Chania | Country: Greece

#### Sun path finder-Astrophysics lab tool

Solar tracker - MEASURE ALTITUDE AND AZIMUTH

An indirect way of showing the movement of the Earth around the Sun

**Conclusion:** after measurements of two days, at least 1 month apart - here January 22 and May 22 - we draw in 3D the arcs that the Sun tracks across the horizon, see below and \*

\* we interpret the results with the following information - image

Altitude and Azimuth    Place Vemos

Arctic Circle (66.5° N)    Tropic of Cancer (23.5° N)    Equator    Tropic of Capricorn (23.5° S)

Summer Solstice    Autumnal Equinox    Winter Solstice

June 21-22    September 22-23    December 21-22

Incoming solar energy greatest in Northern Hemisphere    Incoming solar energy equal in both hemispheres    Incoming solar energy greatest in Southern Hemisphere

Incoming solar energy equal in both hemispheres



# Izbor idej in poskusov s festivala 2022 v Pragi

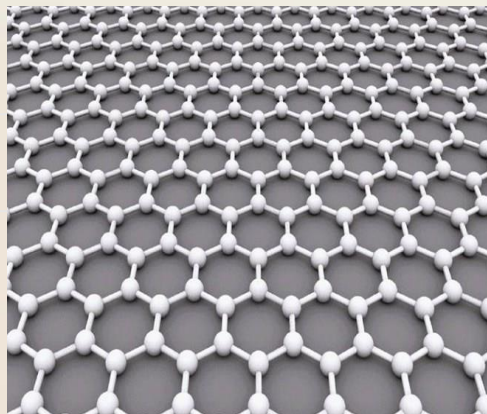
„FLASH“ PAPIR



ALADINOVA ČUDEŽNA SVETILKA

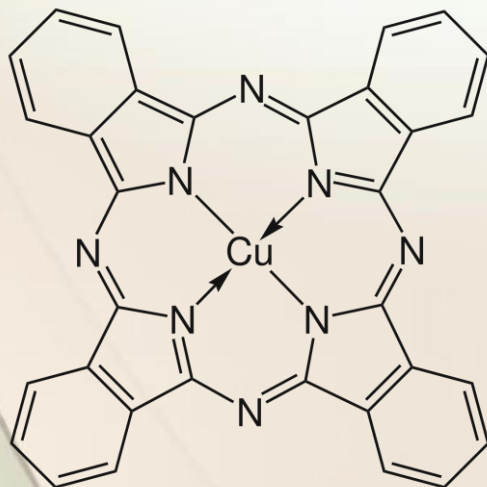


GRAFEN

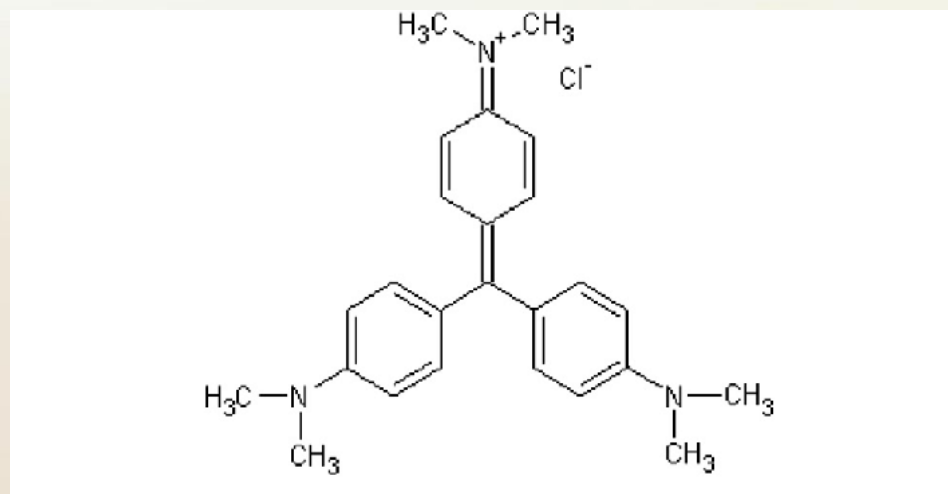


# Izbor idej in poskusov s festivala 2022 v Pragi

## NEVIDNO ČRNILO



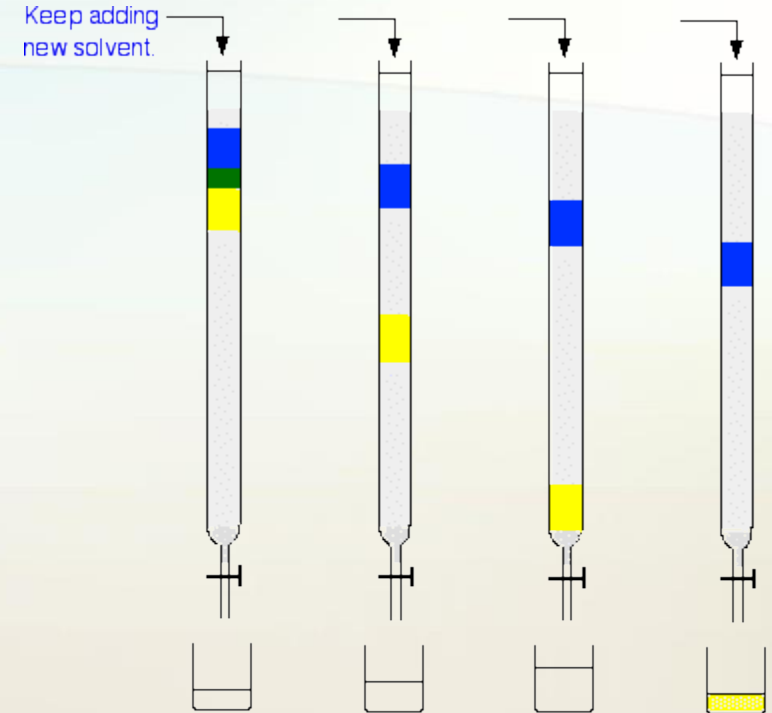
Ftalocianin modro



Kristal vijolično barvilo

# Izbor idej in poskusov s festivala 2022 v Pragi

**KOLONSKA KROMATOGRAFIJA**  
(pripravljen napitek z dodanimi  
umetnimi barvili)



Change the beaker once the  
yellow starts to drop through.



## Sustainable Development Goals in Education

Dr. Rok Rudež, | Gimnazija Kranj | Kranj | Slovenia  
Email: rok.rudez@gimkr.si

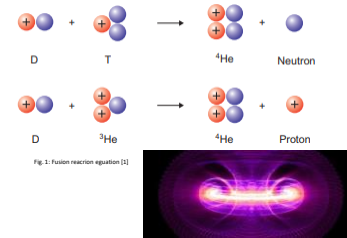


# Nuclear fusion energy as motivation and real-life task for students and can be included in the school curriculum

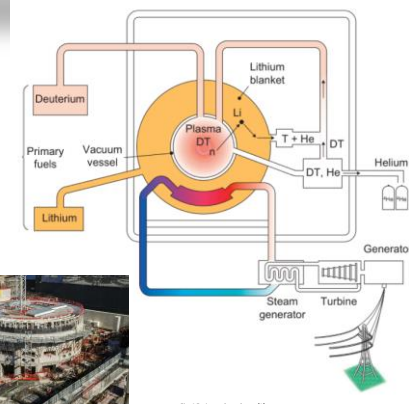
### Introduction

One of the goals of The European Commission is to reduce EU greenhouse gas emissions by 55% by 2030 compared to 1990-levels. The nuclear fusion realized through the ITER project is a promising and ambitious project to produce self-sufficient, green, and reliable (not weather dependent) energy. The fusion energy will be reviewed as a real-life task and will show where could be included in the school curriculum.

### What is fusion?



### Fusion reactor



### How to get

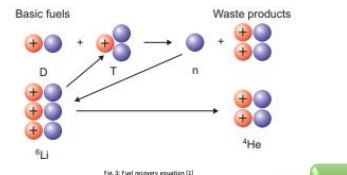


Fig. 5 ITER tokamak located in France [3]

### Conclusion:

- o student is able to construct equations for fusion reaction,
- o student can explain fusion reaction in terms of enthalpy,
- o student understands the role of the isotope in a fusion reaction and fuels recovery,
- o Student is able to compare fusion and fission reaction,
- o student can critically evaluate the risks as well as benefits of fusion reaction and fusion reactors.

Rokov poster s festivala v Pragi

[1] Fusion: The energy of the universe, McCracken G., Scott P., Elsevier, 2012 [2] Sciencealert, online: What Is Nuclear Fusion, And Why The Hype? (sciencealert.com), 15.1.2021 [3] ITER France, online: ITER in France, 15.1.2021





# IZBOR NACIONALNIH PROJEKTOV

Konferenca:

TRAJNOSTI NAPROTI S SOUSTVARJANJEM NA PODROČJU STEAM\*  
IZOBRAŽEVANJA

Pedagoška fakulteta v Ljubljani, 20. in 21. september 2023

Več o dogodku:

[Trajnosti naproti s soustvarjanjem na področju STEAM izobraževanja.](#)

Center  
**Kemik**



## Sodelovanje s projekti, razvrščenimi v naslednje kategorije

- **ZNANOST za NAJMLAJŠE** (Science for the youngest)
- **IZOBRAŽEVANJE STEM ZA TRAJNOSTNI RAZVOJ** (STEM Education for Sustainable Development)
- **TEHNOLOGIJE V STEM IZOBRAŽEVANJU** (Digital Technologies in STEM Education)
- **RAZNOLIKOST V POUČEVANJU STEM** (Diversity in STEM Teaching)
- **STEAM V IZOBRAŽEVANJU** (STEAM in Education)
- **UPORABNI EKSPERIMENTI (z nizkimi stroški izvedbe) v STEM izobraževanju** (Low Cost Experiments in STEM Education)
- **SKUPNI MEDNARODNI PROJEKTI** (Joined projects)
- **STEM za učitelje na usposabljanju** (STEM for teacher in Training)

# PRIPRAVA PREDSTAVITVE PROJEKTOV

Priprava projekta za predstavitev:

- **na stojnici (15 minut) – obvezno za vse,**
- v obliki delavnice (45 minut),
- predstavitve na odru (15 minut).

<https://www.science-on-stage.eu/science-stage-festival-2024>

# OPREDELITEV KRITERIJEV

## PROJEKT:

### 1. vzpodbuja interes mladih za naravoslovje:

- vzpodbujanje interesa mladih za naravoslovje, tehnologijo in matematiko- vzpodbuja njihovo radovednost in željo po učenju naravoslovnih predmetov

### 2. izhaja iz vsakdanjega življenja:

- vzpodbuja postavljanje vprašanj glede naravoslovnih pojavov, ki jih poznajo mladi iz vsakdanjega življenja

### 3. ima dolgoročni učinek:

- pozitivno vpliva na dolgoročni interes mladih za naravoslovje

### 4. je izvedljiv v šolskem okolju z zmernimi vložki:

- je izvedljiv v šolskem okolju z zmernimi viri, kot npr.: uporabljen učiteljev čas, potrebni materiali in finančna sredstva za pridobitev dodatnih materialov in storitev

### 5. spodbuja učenje z raziskovanjem:

- spodbuja aktivni pouk, ki izhaja iz postavljanja vprašanj, problemov, scenarijev- v nasprotju s tradicionalnim frontalnim poukom na osnovi predstavitev in dejstev. Vključuje problemsko učenje in je tesno povezano z razvojem in uporabo miselnih procesov na višjih taksonomskih stopnjah pri mladih





**HVALA ZA VAŠO POZORNOST!**

Naj nas vsebine in aktivnosti STEM-a povezujejo.  
S sodelovanjem rastemo in se razvijamo – kot posamezniki in kot skupnost učiteljic in učiteljev naravoslovja, ki izobražuje in vzgaja za trajnostno sedanjost in prihodnost.

# Kontakt

Nika Cebin, koordinatorica SonS za Slovenijo

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KemikUm /Znanost na odru Slovenija

<http://kemikum.si/>