

# BISTROUM



**26. REGIJSKO SREČANJE MLADIH RAZISKOVALCEV  
SPODNJEGA PODRAVJA IN PRLEKIJE V LETU 2018**



**ZBORNİK  
POVZETKOV  
RAZISKOVALNIH  
NALOG**

**Organizator:**

Znanstveno-raziskovalno središče Bistra Ptuj

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Tekmovanje osnovnošolcev in srednješolcev:  
Šolski center Ptuj - Elektro in računalniška šola Ptuj  
23. marec 2018

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**Statistična obdelava podatkov:**

dr. Nataša Belšak Šel

**Grafično oblikovanje publikacije:**

Kreativni laboratorij, d.o.o., CreativeLab.si

**Grafično oblikovanje zaščitnega znaka:**

studioBotas

**Naklada:**

150 izvodov

**Založnik:**

Znanstveno-raziskovalno središče Bistra Ptuj

**Zanj:**

doc. dr. Štefan Čelan

Ptuj, maj 2018

Za vsebino in jezikovno urejenost besedil  
odgovarjajo avtorji sami.

CIP - Kataložni zapis o publikaciji  
Univerzitetna knjižnica Maribor

001.89-053.6(497.4-18)(082)(0.034.44)

REGIJSKO srečanje mladih raziskovalcev Spodnjega Podravja in Prlekije (26 ; 2018 ; Ptuj)

Bistroum [Elektronski vir] : zbornik povzetkov raziskovalnih nalog v slovenskem in angleškem jeziku / 26. regijsko srečanje mladih raziskovalcev Spodnjega Podravja in Prlekije v letu 2018 ; [organizator Znanstveno-raziskovalno središče Bistra Ptuj ; uredile Nataša Belšak Šel, Rosvita Bedrač, Nataša Mršek ; fotografije Andrej Burjan, Gregor Uhan ; statistična obdelava podatkov Nataša Belšak Šel]. - Ptuj : Znanstveno-raziskovalno središče Bistra, 2018

150 izv.

ISBN 978-961-6253-48-2

1. Gl. stv. nasl. 2. Belšak, Nataša, 1984- 3. Znanstveno-raziskovalno središče Bistra (Ptuj)

COBISS.SI-ID 94569473



# KAZALO

<b>MLADIM V RAZMISLEK</b>	<b>6</b>
<b>POVZETKI RAZISKOVALNIH NALOG OSNOVNOŠOLCEV IN SREDNJEŠOLCEV</b>	<b>8</b>
<b>SKUPINA A</b>	<b>9</b>
LAHKO Z VODNIMI BOLHAMI DOKAŽEMO, DA JE VODNI KEFIR ZDRAVILEN?	10
ALI PAJKI VPLIVAJO NA NAŠA ČUSTVA?	11
ODPADNE GOSPODINJSKE VODE V LAPORJU	12
ODTISI KOT KAZALNIKI VPLIVA NA OKOLJE	13
IZKORISTEK FOTOVOLTAIČNIH PANELOV GLEDE NA LEGO	14
NAREDI SI SAM: TOLKALO CAJON	15
<b>SKUPINA B</b>	<b>16</b>
MLADINSKI VOGAL	17
HOTEL ZA ŽIVALI, FAUNA D. O. O.	18
S QR KODO PO PRAGERSKEM	19
STUDIO ZA GLASBO IN SVETLOBNE EFEKTE	20
KOMUNIKACIJA Z EMOJIJI	21
RAZISKOVANJE, NAČRTOVANJE IN IZVEDBA KRATKEGA FILMA	22
<b>SKUPINA C</b>	<b>24</b>
ALI ČEVLJARJI GREDO V KORAK S ČASOM?	24
GREMA SE ŠPILAT	25
UČIMO SE V (UČNEM) STILU	26
KO ZAPOJEJO POROČNI ZVONovi	27
ŠE MNOGO VODE BO PRETEKLO, DA BO CENJENA DOVOLJ	28
ALI JE KAJ TRDEN MOST?	29
Z ENEGA NA DRUGI BREG	30
JE SREČA ŽIVLJENJA IMETI DELO?	31

<b>SKUPINA D</b>	<b>32</b>
VREDNOTE RAZLIČNIH GENERACIJ	33
ELEKTRONSKA DROGA	34
VPLIV DRUŽBENIH OMREŽIJ NA UČENCE VIŠJIH RAZREDOV OSNOVNE ŠOLE	35
MAJŠPERK	35
KDOR IMA V PETAH, IMA TUDI V GLAVI...	36
ALI VE NAŠA PISAVA O NAS VEČ, KOT MI SAMI?	37
KO STRESA STRES	38
POVEZAVA MED DEJANJI, BARVAMI IN ČUSTVI	39
IMAŠ TUDI TI FOMO?	40
UČINEK METULJA	41

<b>SKUPINA E</b>	<b>42</b>
BONBONI BREZ ADITIVOV SO ODLIČNI	43
S TREBUHOM ZA ODBOJKARSKIM KRUHOM	44
NI VREDNO ZLOČINA	45
AUU, MOJA NOGA!	46
POVEZANOST AGILNOSTI IN UČNEGA USPEHA UČENCEV OSNOVNE ŠOLE	47
NASLEDSTVO NA KMETIJAH	48
<b>UVRSTITVE NA DRŽAVNEM SREČANJU MLADIH RAZISKOVALCEV SLOVENIJE</b>	<b>59</b>
<b>ABECEDNI SEZNAM OSNOVNIH ŠOL</b>	<b>60</b>
<b>ABECEDNI SEZNAM MLADIH RAZISKOVALCEV OSNOVNIH ŠOL</b>	<b>61</b>
<b>ABECEDNI SEZNAM MENTORJEV OSNOVNIH ŠOL</b>	<b>62</b>
<b>ABECEDNI SEZNAM SREDNIH ŠOL</b>	<b>62</b>
<b>ABECEDNI SEZNAM RAZISKOVALCEV SREDNIH ŠOL</b>	<b>62</b>
<b>ABECEDNI SEZNAM MENTORJEV SREDNIH ŠOL</b>	<b>62</b>
<b>ABECEDNI SEZNAM RECENZENTOV</b>	<b>63</b>

<b>IZVEDBO PROJEKTA SO OMOGOČILI</b>	<b>64</b>
<b>FOTOUTRINKI</b>	<b>65</b>

## MLADIM V RAZMISLEK ...



doc. dr. ŠTEFAN ČELAN, direktor ZRS Bistra Ptuj



Foto: Črtomir Goznik

Evropa je, v primerjavi z ostalimi regijami v svetu, na srečo še vedno svobodna in ekonomsko relativno stabilna. Kljub temu pa se mladi prvič po drugi svetovni vojni soočajo z resničnim tveganjem, da bodo njihove generacije živele v slabših pogojih kot njihovi starši. Nadalje je opazno, da Evropa zmanjšuje pomembno vlogo v svetu v primerjavi z ostalimi regijami. Leta 1922 smo Evropejci predstavljali 22 % svetovnega prebivalstva, trenutno pa nam zaradi neugodne natalitete grozi, da bomo v letu 2060 predstavljali zgolj 5 % svetovnega prebivalstva. Prav tako je pomembno vedeti, da je eno generacijo nazaj povprečni Evropejec imel eno službo v celotnem življenju, trenutno pa jih do konca življenja zamenja do deset. Globalizirano in digitalizirano gospodarstvo briše meje med zaposlenimi in samozaposlenimi. Mnoga delovna mesta, ki jih poznamo danes, pred dobrim desetletjem sploh niso obstajala. Generacije, ki danes vstopajo v osnovno šolo, bodo zagotovo iskale in našle zaposlitev na številnih delovnih mestih, ki danes sploh še ne obstajajo. Industrija S-4, ki bo temeljila na avtomatizaciji in umetni inteligenci, bo revolucionarno vplivala na številne poklice v zasebnem in tudi javnem sektorju. Vse te spremembe bodo zahtevale ogromne napore in naložbe v formalne in neformalne oblike izobraževanja. Stalnica slehernega, ki si bo želel zagotoviti dobro delovno mesto in s tem kakovostne pogoje za življenje in delo, bo vseživljenjsko učenje.

Naloge, ki so pred vami, bodo prvenstveno povezane z nenehnim inoviranjem, ki pa ga ni moč doseči brez vrhunskih formalnih in neformalnih znanj ter kompetenc.

Vsi tisti mladi raziskovalci, ki ste se že v rani mladosti odločili stopati po poti odkrivanja neznanega in to počnete zato, ker vam je raziskovanje ljubo, ste na pravi poti.

Ptuj, maj 2018

doc. dr. Štefan ČELAN

Regijsko srečanje mladih raziskovalcev  
Spodnjega Podravja in Prlekije:  
Šolski center Ptuj - Elektro in računalniška šola,  
23. marec 2018

## POVZETKI RAZISKOVALNIH NALOG

OSNOVNOŠOLCEV

IN

SREDNJEŠOLCEV

A

SKUPINA

- BIOLOGIJA •
- EKOLOGIJA Z VARSTVOM OKOLJA •
- ASTRONOMIJA ALI FIZIKA •
- TEHNIKA ALI TEHNOLOGIJA •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Biologija	OŠ Gustava Šiliha Laporje	Lahko z vodnimi bolhami dokažemo, da je vodni kefir zdravilen?
Biologija	OŠ Videm	Ali pajki vplivajo na naša čustva?
Ekologija z varstvom okolja	OŠ Gustava Šiliha Laporje	Odpadne gospodinske vode v Laporju
Ekologija z varstvom okolja	OŠ Kidričevo	Odtisi kot kazalniki vpliva na okolje
Astronomija ali fizika	OŠ Gustava Šiliha Laporje	Izkoristek fotovoltaičnih panelov glede na lego
Tehnika ali tehnologija	OŠ Antona Ingoliča Spodnja Polskava	Naredi si sam: Tolkalo cajon



## Lahko z vodnimi bolhami dokažemo, da je vodni kefir zdravilen?

**Raziskovalca:** Zala Klančnik, Damjan Dovnik

**Mentorica:** Barbara Čretnik

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzent:** Mitja Lah

### Povzetek:

Za to raziskovalno nalogo sva se odločila, ker sva slišala za ljudi, ki ne morejo prebavljati mlečnega kefirja in zato pijejo vodni kefir, poleg tega ga pijejo ljudje po svetu in pravijo, da je vodni kefir zdravilen. Namen najine raziskovalne naloge je bil raziskati in ugotoviti, ali je vodni kefir res zdravilen in če je to možno dokazati z vodnimi bolhami. Pri tem sva se naučila skrbeti za kefirjeva zrna in pridelati vodni kefir. Naučila sva se gojiti vodne bolhe. Pri eksperimentu sva uporabila vodne bolhe, ki sva jih poskusila razmnoževati v različnih raztopinah vodnega kefirja. Najino raziskovalno vprašanje je bilo: Ali se bodo vodne bolhe hitreje razmnoževale v raztopini z vodnim kefirjem ali brez kefirja? Domnevala sva, da se bodo vodne bolhe hitreje razmnoževale v raztopini z vodnim kefirjem. Če vodni kefir ugodno vpliva na prebavo celic, presnovo vodnih bolh, potemtako se bodo celice nekoliko hitreje delile, kar bo pozitivno vplivalo na nespolno razmnoževanje vodnih bolh, zato bo več potomcev. Hipotezo sva ovrgla, saj se vodne bolhe v raztopini z 1 ml (2 %) vodnega kefirja niso hitreje razmnoževale kot vodne bolhe v kontroli. Razmnoževanje vodnih bolh je potekalo enako hitro. Število potomcev oz. vodnih bolh pa je bilo v raztopini 2 % vodnega kefirja višje od tistih v kontroli – vse do 15. dneva eksperimenta, ko so vodne bolhe v raztopini s kefirjem zaradi sekundarne fermentacije in drugih dejavnikov poginile. Ker vodni organizmi bolj intenzivno sprejemajo vodo skozi škрге in celične membrane, skupaj z njo pa tudi strupene snovi, je smrtnost višja, kot pri ne-vodnih organizmih. Ugotovila sva, da sva na nek način izvajala test strupenosti vodnega kefirja za vodne bolhe. Dokazala sva, da vodni kefir pozitivno vpliva na naše zdravje, saj je pozitivno vplival tudi na razmnoževanje vodnih bolh, ker je bilo število potomcev višje kot v kontroli. Svoj poizkus bi lahko izboljšala tako, da bi vsakodnevno vodne bolhe prestavila v svežo raztopino vodnega kefirja iste koncentracije in bi se tako izognila sekundarni fermentaciji. Poskus bi bilo potrebno ponoviti tudi na večjem številu osebkov.

### Summary:

We have decided for this research paper on the basis of the fact that some people cannot digest dairy kefir and because of that they drink water kefir. What is more, many people around the world drink water kefir and it is said to be healing. The purpose of our research paper was to research and to find out whether water kefir is truly healing and if this could be proven with water fleas. While researching, we learnt how to take care of kefir grains and how to make water kefir. Furthermore, we learnt how to grow water fleas. For the experiment, water fleas, which we tried to reproduce in different solutions of water kefir, were used. Our experimental question was: Will water fleas reproduce faster in the solution with water kefir or without it? Our presumption was that they will reproduce faster in the solution with water kefir. Additionally, we presumed that if water kefir has a positive effect on the digestion of cells and metabolism of water fleas, the cells will therefore divide a bit quicker, which will have effect on asexual reproduction of water fleas and result in more offspring. The hypothesis was disproved because water fleas in the solution with 1 ml (2 %) of water kefir did not reproduce faster than the water fleas under control. The reproduction was equally fast. However, the number of offspring in the solution with 2 % of water kefir was larger than the one of the water fleas under control – up to the 15th day of the experiment, when the water fleas in the solution with kefir perished due to secondary fermentation and other factors. Water microorganisms receive water more intensively through gills and cell membranes and along with water also toxic substances. That is why the mortality rate is higher than with microorganisms that do not live in water. We concluded that we actually tested the toxicity of water kefir for water fleas. We proved that water kefir is healing for our health since it had a positive effect on the reproduction of water fleas; the number of offspring was higher than the one of the water fleas under control. We could improve our experiment by putting water fleas into a fresh solution of water kefir of the same concentration every day and in this way, we would avoid secondary fermentation. Furthermore, the experiment should be repeated with a larger number of water fleas.



## Ali pajki vplivajo na naša čustva?

**Raziskovalki:** Maja Ferik, Zara Muzek

**Mentor:** Davorin Horvat

**Šola:** Osnovna šola Videm

**Recenzent:** Mitja Lah

### Povzetek:

Strah je eno izmed najpogostejših čustev pri ljudeh. Pogosto se dopolnjuje z utesjenostjo. Spodbujevalci tovrstnih negativnih čustev so različni. Naju je zanimalo, zakaj se ljudje pravzaprav bojimo majhnih nedolžnih bitij, ki nam v veliki večini ne bi storile ničesar. Razen seveda takrat, ko se počutijo ogrožene. Ali je za strah pred pajki v večini kriv njihov izgled? Ker se ena od naju že od malih nog boji pajkov, sva se odločili, da bolj podrobno raziščeva njihovo biologijo – vlogo v ekosistemu. Z namenom, da morda tudi me odpraviva arahnofobijo. Raziskovanja sva se lotili tako, da sva z metodo terenskega dela v letu 2016 pričeli z zbiranjem podatkov o najdenih pajkih. Izbrali sva si ciljno območje Krajinskega parka Šturmovci. Nabrani material sva s pomočjo določevalnega ključa določili do družin, nekatere tudi do vrst. Rezultati najdenih vrst kažejo na visoko biotsko pestrost teh organizmov. Ker sva hoteli raziskati vpogled ljudi na pajke, sva v ta namen pripravili anketo, pri kateri sva pri izbranih populacijah ljudi ugotovili stopnjo poznavanja; (1) Krajinskega parka Šturmovci; (2) pajkov na splošno; (3) psiho-socialnega odnosa do teh živali. Opravljena analiza podatkov je pokazala srednjo ozaveščenost in strahospoštovanje do pajkov. Izkazalo se je, da se ljudje vse bolj zavedajo naravoslovne vrednosti Krajinskega parka Šturmovci.

### Summary:

Fear is one of the most common human emotions. Restlessness complements it frequently. The reasons for triggering these negative emotions are various. We were interested, actually, why are humans afraid of these small innocent creatures that mostly wouldn't do anything to hurt us unless they feel threatened. Is it their appearance that takes the blame? As one of us is afraid of spiders since the early childhood, we decided to explore their biology- their role in ecosystem, so that we might overcome arachnophobia ourselves. We approached the research with a method of fieldwork in the year 2016 by collecting data about spiders that we found. We chose the area of Regional Park Šturmovci. By using identification key, we identified all collected material up to families and even species. The results of found species show high biodiversity of these organisms. We wanted to explore the insight people have into spiders, so we prepared a survey. Through a chosen population of people, we established the level of knowing (1) Regional Park Šturmovci; (2) spiders in general; (3) psycho-social attitude towards these animals. The analysis has shown the stage of middle awareness and intimidation of spiders. Evaluation also showed that awareness of natural value of Regional Park Šturmovci is increasing.



## Odpadne gospodinjske vode v Laporju

**Raziskovalka:** Gaia Jelen

**Mentorici:** Aleksandra Vanček, Boža Arko

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzent:** dr. Štefan Čelan

### Povzetek:

Le nekaj ljudi v kraju Laporje ima malo komunalno čistilno napravo, iz katere bi v naravo iztekala očiščena voda. To je zelo zaskrbljujoče, saj se večina odpadnih voda iz gospodinjstev neprečiščenih odvaja neposredno v naravo in jo s tem onesnažuje. Na ta način se naravo obremenjuje s snovmi, ki ji škodujejo. Zaskrbljujoče je tudi to, da je zakonski rok, v katerem se mora to urediti, zelo blizu, to je do konca leta 2021, in zelo vprašljivo je, ali bodo v tem roku uspeli vsi namestiti male komunalne čistilne naprave.

Namen moje raziskovalne naloge je bil ugotoviti, kam krajani Laporja odvajajo odpadne gospodinjske vode, ali jih veliko že uporablja male komunalne čistilne naprave in kaj je glavni razlog, da do sedaj še niso vgradili male komunalne čistilne naprave. Želela sem tudi predstaviti naravno stranišče, ki sem ga videla med obiskom učnega poligona Dole, zato sem opravila intervju z lastnico, red. prof. ddr. Ano Vovk Korže.

V skladu z namenom sem si zastavila tri hipoteze, ki sem jih preverjala s pomočjo terenskega opazovanja v našem kraju in s pomočjo ankete, ki je bila izvedena med krajani Laporja. Moje predvidevanje, da se odpadne komunalne vode v Laporju iztekajo v potoke ali v večje jarke, se ni potrdilo. Potrjena je bila druga hipoteza, da ima malo krajanov malo komunalno čistilno napravo.

Predvidevanje, da je največja težava, da gospodinjstva še nimajo urejenih malih komunalnih čistilnih naprav, previsoka cena, se je izkazalo za nepravilno. Menim, da bi bilo dobro vse hipoteze preveriti na večjem vzorcu gospodinjstev v kraju, saj je bila sedaj raziskava narejena le na osnovi šestindvajsetih anket.

Menim, da predstavlja investicija v malo komunalno čistilno napravo velik strošek, ki si ga marsikatero gospodinjstvo v kraju težko privoščiti, čeprav občina Slovenska Bistrica ponuja sofinanciranje gradnje male komunalne čistilne naprave.

Zanimivo bi bilo raziskati še, kaj krajani menijo o tem, da bi se na eno čistilno napravo priključilo več gospodinjstev. V tem primeru bi se lahko odločili za rastlinsko čistilno napravo, saj sem pri branju literature zasledila, da stroški za njeno izgradnjo niso tako visoki, učinki čiščenja pa so zelo dobri.

### Summary:

In Laporje there are just a few people who own a wastewater treatment plant, which enables the discharge of clean water into nature. This raises a concern, because the majority of uncleaned wastewater from households is discharged directly into nature and causing pollution. Harmful substances burden the nature. The situation is alarming, because the deadline for arranging wastewater discharge is nearing. This should be done until the year 2021, and it is questionable whether all the subjects will place a small wastewater treatment plant, until then.

The purpose of this research was to identify how wastewater is treated in Laporje, in what extent the wastewater treatment plants are used, and what is the main reason for not using them. I want to present a natural toilet, which I observed during my stay in Dole "Nature's classroom". I have conducted an interview with its owner prof. ddr. Ana Vovk Korže.

The first phase of the project involved writing hypothesis, which were later checked, by field observations and interviews. My assumption, that the wastewater is mainly discharged into streams and larger ditches, was refuted. The second hypothesis that, there are just a few people, who own a wastewater treatment plant, was supported. The assumption, that the high cost of small wastewater treatment is the main reason for its scares expansion, was refuted. Due to a relative small research sample (26 households), I would suggest to conduct a research in a larger scale.

In my opinion, the building of small wastewater treatments represents a high cost for households, even though the municipality of Slovenska Bistrica offers co-financing of the projects. It would be interesting to investigate the idea of connecting more households to one wastewater treatment. In this case, the building of phytoremediation systems would be reasonable. According to the literature available, the costs of building are not as high, and the effect of cleaning is very good. their money in, how much and where do or from whom do they get it? After our analysis of information, we have found out, that our students are very social, because they spend most of their monthly pocket money for fun and parties. The most pocket money from all of our interviewed high school students are getting the students from The Secondary School of Economics – PTI program, and the least pocket money are getting the students from the Grammar School. They mostly get their clothes from Ney Yorker and they buy their foods and drink from the school area. The students are thinking with their own heads, so they don't buy what others tell them to. We think, that it would be smart to inform our youth to spend their money more wisely, so that they would have more money to save.



## Odtisi kot kazalniki vpliva na okolje

**Raziskovalci:** Lazar Raković, Gaj Bregant, Nik Mlinarič

**Mentorici:** Klavdija Murko, Tamara Mlakar

**Šola:** Osnovna šola Kidričevo

**Recenzent:** dr. Štefan Čelan

### Povzetek:

V raziskovalni nalogi smo obravnavali odtise kot kazalnike, ki prikazujejo v kolikšni meri se človeška dejanja odražajo v naravnem okolju. Že desetletja je znano, da človeštvo s svojim sodobnim načinom življenja izrablja naravne vire hitreje, kot jih lahko Zemlja obnovi, povzroča podnebne spremembe ter pretirano troši zaloge pitne vode. Na podlagi izračunov ekološkega, ogljičnega in vodnega odtisa za gospodinjstva v občini Kidričevo smo ugotovili, da so njihovi vplivi na okolje preobsežni. Ekološki odtis anketiranih gospodinjstev znaša od 4 do 6 gha na prebivalca, biološka zmogljivost Zemlje pa je le 2,6 gha. Na področju emisij toplogrednih plinov že neposredni ogljični odtis presega nosilno sposobnost Zemlje 2 t ekvivalenta CO<sub>2</sub> na leto, saj obsega 2,1 t CO<sub>2</sub> ekvivalenta na leto. Nadpovprečna, glede na slovensko povprečje, je dnevna poraba vode, ki znaša 186 litrov na dan.

Če želimo prihodnjim generacijam zapustiti ohranjeno okolje, moramo živeti trajnostno, zato pa so potrebne spremembe v miselnosti in predvsem v dejanjih. Priložnosti za zmanjšanje odtisov v anketiranih gospodinjstvih se kažejo predvsem v povečanem varčevanju z električno energijo, pogostejši uporabi javnega prevoza, neuporabi kurilnega olja, smotrni porabi vode iz vodovodnega omrežja, zmanjšanju potrošniških navad ter v upoštevanju nekaterih vsakodnevnih življenjskih navad, ki so prijaznejše do okolja.

### Summary:

In our research paper we have dealt with footprints as indicators that measure human demand on nature. It is known for decades that mankind with its modern way of life uses our natural resources faster than our Earth can reproduce. That causes climate change and waists our drinking water. Calculated on the basis of ecological, carbon and water footprints in households of township Kidričevo we have found out that environmental effects are too big. The ecological footprints per capita is 4 to 6 gha, however the Earth's biocapacity is only 2.8 gha. The carbon footprint as the total set of greenhouse gas emissions is 2.1 tons CO<sub>2</sub> /cap which exceeds Earth's capacity of 2 tons CO<sub>2</sub> /cap. The average daily water usage is also too high. It is 186 l per day.

If we want to save our environment for the future generations, we have to live sustainable. Therefore, changes in our mentality but most of all in our actions are needed. If we want to lower these footprints, we have to save electrical energy, use public transportation more often. We mustn't use fuel oil and waste drinking water. It is also important to lower our consumer habits and be friendlier to nature in our everyday life.



SKUPINA  
**A**

## Izkoristek fotovoltaičnih panelov glede na lego

**Raziskovalec:** Miha Sterkuš

**Mentorja:** Marijan Krajncan, mag. Alenka Fidler

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzentka:** dr. Dragica Pešaković

### Povzetek:

V okviru raziskovalne naloge smo želeli raziskati, kakšen je izkoristek fotovoltaičnega panela pri umetnih in kakšen pri naravnih virih energije, ugotoviti, kako vpliva oddaljenost vira energije na izkoristek, ter izmeriti najprimernejši kot postavitve fotovoltaičnega panela glede na smer vira energije. V teoretičnem delu naloge smo preučili obnovljive vire energije, posebej sončno energijo s fotovoltaiko, ki omogoča direktno pretvorbo sončne energije v električno.

Izkoristek fotovoltaičnega panela predstavlja razmerje med energijo, ki jo panel odda, in prejeto energijo, ki jo panel prejme. Ugotovili smo, da pri večji moči in čim manjši oddaljenosti umetnega svetila od fotovoltaičnega panela dobimo največji izkoristek. Meritve izkoristka fotovoltaičnega panela so ne glede na umetni oziroma naravni vir energije dale podoben rezultat ( $\eta = 12\text{--}13\%$ ).

Izmerjen in izračunan izkoristek fotovoltaičnega panela je primerljiv z monitoringom izbrane sončne elektrarne (Kioto 270 pure poly, Razgor pri Žabljeku, orientacija jugozahod, naklon  $15^\circ$ ). Orientacija in naklon sončnih elektrarn na terenu je raznolika, najverjetneje zaradi gradnje sončnih elektrarn na že obstoječe gradbene objekte. Najugodnejši naklon sončnih elektrarn se glede na letni čas spreminja. Sončne elektrarne na terenu so usmerjene tako, da imajo večje izkoristke v poletnem času.

Z raziskovalno nalogo smo dokazali, da je z izračuni izkoristka modela fotovoltaičnega panela možno na določenem geografskem področju predvideti izkoristek sončne elektrarne glede na njeno orientacijo in naklon.

### Summary:

The main purpose of this research was to investigate the efficiency of photovoltaic panel in artificial and natural sources of energy. We were interested in how the remoteness of the source of energy influences the effect. We wanted to measure the most suitable angle for placing photovoltaic panel according to the source of energy. In theoretical part, we have investigated the renewable energy sources, especially solar energy with the photovoltaic feature, which enables conversion of solar energy to electricity.

A ratio of energy, which is radiated by the panel, and collected energy, which the panel receives, presents the efficiency of the photovoltaic panel. We have discovered that the highest efficiency is extracted, at the highest power and when the panel is closest to the artificial light.

The measurements were almost the same no matter if the source of light was artificial or natural. The measurements and calculations were comparable with monitoring of chosen solar energy plant (Kioto 270 pure poly, Razgor pri Žabljeku, orientation south-west, incline  $15^\circ$ ). Orientation and incline of the solar energy plants on the field are diverse, most likely because of the fact that solar plants were installed on existing buildings. The most suitable incline changes according to the season. Solar plants are placed to produce the most energy during the summer months.

Our research has proven that it is possible to anticipate the efficiency of the solar plant according to its orientation and incline, by calculations of the efficiency of a model photovoltaic panel.

SKUPINA  
**A**

## Naredi si sam: Tolkalo cajon



**Raziskovalca:** Miha Golob, Matic Juršnik

**Mentor:** David Vodušek

**Šola:** Osnovna šola Antona Ingoliča Spodnja Polskava

**Recenzentka:** dr. Dragica Pešaković

### Povzetek:

V raziskovalni nalogi predstaviva domačo izdelavo tolkala cajon. Za to raziskovalno nalogo sva se odločila zato, ker želiva v prvi vrsti preveriti ali je izdelava takšnega glasbila doma sploh mogoča. Raziskovala sva prednosti in slabosti domače izdelave tolkala. Predmet najinega zanimanja je dostopnost sestavnih delov za izdelavo cajona. Primerjala sva doma izdelano glasbilo s kupljenim. Raziskala sva smiselnost doma izdelanega glasbila iz ekonomskega vidika, ob čemer sva uporabila tudi zavrženo gradivo in ga ponovno uporabila.

Dokazala sva, da je glasbilo cajon mogoče izdelati doma. Domača izdelava izbranega tolkala je ekonomsko smiselna, iz nekaterih vidikov morda celo boljše izbira, kot pa tolkalo kupiti. Zaradi atraktivnosti igranja na cajon v temnih prostorih ali zatemnjenem odru, sva raziskovalca izdelala prototip osvetljenega cajona. To sva dosegla z uporabo prosojne umetne snovi, obenem pa je tolkalo še vedno proizvedlo šum, primerljiv s cajoni, ki imajo osnovno stranico leseno.

Nadaljnje raziskovanje je smiselno z vidika manjšanja stroškov izdelka in s tem zmanjšanja končne cene izdelka. Preizkusili bi lahko tudi, če je tolkalo cajon lahko v celoti narejeno iz umetne snovi. Tako bi bil izdelek še atraktivnejši, saj bi bil v celoti prozoren.

### Summary:

In the research project, we present the homemade production of percussion cajon. We decided for this research task because we wanted to check whether the production of such a musical instrument is possible at home. We researched the advantages and disadvantages of the homemade production. The focus of our interest was the accessibility of components needed for cajon. We compared the homemade instrument with the purchased one. We explored the feasibility of a homemade production from an economic point of view. We also used reused discarded material. We have proven that the cajon instrument can be made at home. The homemade production of the selected percussion is economically justified. In some aspects perhaps it is even a better choice than a purchased one. As playing the cajon in dark rooms or darkened stages is very attractive, the researchers made a prototype of illuminated cajon. This was achieved by the use of transparent plastics. Illuminated percussion still produced similar sound as wooden cajon. Further research could be focused on production cost reduction and thereby reducing the final product price. The entirely plastic design could also be tested to be more attractive due to its transparency.



SKUPINA

B

- APLIKATIVNI INOVACIJSKI PREDLOGI IN PROJEKTI •
- ELEKTROTEHNIKA, ELEKTRONIKA IN ROBOTIKA •
- RAČUNALNIŠTVO ALI TELEKOMUNIKACIJE •
- DRUGA PODROČJA •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Aplikativni inovacijski predlogi in projekti	OŠ Mladika	Mladinski vogal
Aplikativni inovacijski predlogi in projekti	ŠC Ptuj Ekonomska šola	Hotel za živali, Fauna d. o. o.
Aplikativni inovacijski predlogi in projekti	OŠ Antona Ingoliča Spodnja Polskava podružnica Pragersko	S QR kodo po Pragerskem
Elektrotehnika, elektronika in robotika	ŠC Ptuj Elektro in računalniška šola	Studio za glasbo in svetlobne efekte
Računalništvo ali telekomunikacije	OŠ Anice Černejeve Makole	Komunikacija z emoji
Druga področja	ŠC Ptuj Elektro in računalniška šola	Raziskovanje, načrtovanje in izvedba kratkega filma

SKUPINA

B

## Mladinski vogal



**Raziskovalki:** Blažka Margušič, Zala Roškar

**Mentorica:** Nataša Vauda

**Šola:** Osnovna šola Mladika

**Recenzent:** dr. Dušan Klinar

### Povzetek:

Letos se je naša šola priključila projektu Teden kulturne dediščine z podnaslovom Kjer preteklost sreča prihodnost. To naju je pritegnilo in želeli sva ugotoviti in raziskati, kako bi lahko na kreativen način oživeli kulturno dediščino.

Z raziskavo želiva predlagati najine zamisli, kako bi preuredili in oživeli Vogalno zgradbo s pomočjo najinih vrstnikov.

V teoretičnem delu sva raziskali zakaj stara mestna jedra propadajo, opisali sva kulturno dediščino Ptuja, predvsem pa Mestni trg. Zanimala pa naju je Vogalna zgradba, ki leži na Murkovi ulici 2. Na to lokacijo pa sva umestili prostor za mlade, Mladinski vogal, ki bi pritegnil mlade v mesto in pripomogel k oživljanju kulturne dediščine. S pomočjo ankete sva ugotovili kaj bi najine vrstnike pritegnilo, da bi prihajali v Mladinski vogal. Njihove predloge sva upoštevali pri urejanju prostora v omenjeni zgradbi.

### Summary:

This year, our school joined the project Week of the cultural heritage with the subtitle Where the past meets the future. This project attracted our attention and we wanted to find out and explore how we can, in a creative way, bring to life the cultural heritage. With the study we wanted to propose our ideas of how to rearrange and bring to life Corner building with the help of our peers. In the theoretical part we explored why the old city cores are dying, we described the cultural heritage of Ptuj, in particular, Urban market. We were interested in Corner building which is situated on the Murkova street 2. At this location we placed the space for young people, Youth corner, which would attract young people in the city and contribute to revitalizing cultural heritage. With the help of the survey we found out which things our peers are interested in so that we could put them in Youth corner.



SKUPINA

B

## Hotel za živali, Fauna d. o. o.

**Raziskovalke:** Kaja Smolinger, Nina Bošnjak, Luka Kokot

**Mentorici:** Vesna Trančar, Vida Vidovič

**Šola:** Šolski center Ptuj – Ekonomska šola

**Recenzent:** dr. Dušan Klinar

### Povzetek:

Naša poslovna ideja je »Hotel za živali, Fauna d. o. o.«. Gre za nastanitev za male živali, ki ponuja tako dnevno kot celostno nego hišnega ljubljénčka, rehabilitacijo z živalmi, hkrati pa se osredotočamo tudi na humanitarnost. Takšna vrsta podjetniške ideje v našem okolju še ni razvita zato v njej vidimo velik potencial. Naša posebnost je, da nudimo jogo z živalmi, ki je na slovenskem trgu novost. Menimo, da se vse več ljudi sooča s problemom, »kaj storiti z ljubljénčki, ko se odpravljamo na daljšo pot«? Gre za to, da se vedno več ljudi odloča za nakup hišnega ljubljénčka, ne zavedajo pa se obveznosti, ki pridejo skupaj z njim. Problem vsekakor vidimo tudi v velikem številu brezdomnih živali, ki potrebujejo našo pomoč.

Z našo podjetniško idejo želimo združiti podjetnost in humanitarnost. Kot mladi ekonomisti in bodoči podjetniki vidimo v delu z živalmi velik potencial. S podjetniško idejo želimo pomagati vsem lastnikom živali, ki se znajdejo v težavnih situacijah, ko ne vedo kam z hišnim ljubljénčkom. Naša inovativna ideja ponuja tudi dnevno oskrbo živali, sprehajanje živali, jogo z živalmi in izobraževanje o pravilnem ravnanju z živalmi. Naše podjetje oglašujemo tako preko spleta (<https://faunaslovenia.weebly.com/fauna-zaposleni.html>) kot preko letakov plakatov in facebooka (<https://www.facebook.com/hotelfaunaslovenija/>).

### Summary:

Our business idea is Animal resort Fauna LLC. We offer accommodation for pets, daily comprehensive care of your pet and rehabilitation with animals. We also do charity work for animals daily. This kind of a business idea isn't developed yet in our environment and this is a great opportunity for us and our company. Our specialty is yoga with animals which is a new idea in Slovenia. We believe there are more and more people who are facing with the problem "what to do with animals when I travel"? A lot of people are buying pets but they are not aware of the obligations which come with them. We can also see the problem in a number of homeless animals that need our voice and help. With our unique idea, we want to combine entrepreneurship and charity. As young economists and future entrepreneur we see big potential working with animals. With our idea we want to help all the owners which find themselves in difficult situations. Our innovative idea also offers daily care with animal, walking animals, yoga with animals and education on animal handling. We advertised through internet (<https://faunaslovenia.weebly.com/fauna-zaposleni.html>), threw fliers and Facebook (<http://www.facebook.com/hotelfaunaslovenija/>).

SKUPINA

B

## S QR kodo po Pragerskem

**Raziskovalki:** Lina Kovač, Zoja Malec

**Mentorica:** Bojana Marin

**Šola:** Osnovna šola Antona Ingoliča Spodnja Polskava, podružnica Pragersko

**Recenzent:** dr. Martin Terbuc

### Povzetek:

Pridite na Pragersko! Poiščite informativne table, opremljene s QR kodami. Lahko si samo preberete osnovne informacije zapisane na tabli, lahko pa pri tem uporabite še pametni telefon. Z njim skenirate QR kodo in znašli se boste na potepu po Pragerskem. Izvedeli boste mnogo novih in zanimivih informacij o kraju ter spoznali njegove znamenitosti.

Ali morda veste, kdo je Prager? Nič hudega, če še ne poznate Pragerja, zagotovo pa poznate Kekca, kajne? Ja, zdaj se zagotovo sprašujete, kakšno vezo ima Kekec s Pragerjem in Pragerskim? Žal, tega vam tukaj ne bomo izdali, to morate odkriti kar sami.

Z raziskovalno nalogo sva želeli v najinem domačem kraju narediti nekaj novega, kar bi lahko uporabljali tako domačini kot morebitni obiskovalci. Razmišljali sva v smeri uporabe sodobne tehnologije, ki nam jo nudi pametni telefon. Najin cilj je bil, da na zanimiv in drugačen način pripomoreva k prepoznavnosti Pragerskega, predvsem pa da najino idejo tudi realizirava. Z navdušenjem jo je sprejel predsednik Krajevne skupnosti Pragersko Gaj in nama pri tem pomagal.

### Summary:

Come to Pragersko! Look for the informative boards equipped with QR codes. You can read the basic information written on the board but you can also use a smartphone. With it you scan the QR code and you will find yourself on the Pragersko sightseeing experience. You will find new and interesting information about our town and get to know its sights.

Do you know Prager? Well, it does not matter if you still have not heard of Prager but you have heard about Kekec, right? It probably makes you wonder how Kekec Pragersko and Prager are connected. Unfortunately, we will not reveal this to you, you have to find it out by yourself.

With the research paper we wanted to introduce something new in our hometown, which could be used by both locals and potential visitors. We were thinking about the use of modern technology offered by the smartphone. Our goal was to contribute in an interesting and different way to the recognition of Pragersko and above all to carry out our idea. The president of the Pragersko Gaj Local Community was enthusiastic about our idea and helped us with its realization.



## Studio za glasbo in svetlobne efekte

**Raziskovalka:** Viktorija Savič

**Mentor:** Franc Vrbančič

**Šola:** Šolski center Ptuj – Elektro in računalniška šola

**Recenzent:** dr. Martin Terbuc

### Povzetek:

Glasba v ljudeh podzavestno vzbudi misel na določene barve. Glede na študije so ljudje pokazali povezavo med žalostno glasbo z bolj temnejšimi barvami ter bolj živo, veselo glasbo s svetlejšimi, živimi barvami. Ker nas zanima glasba in barve, smo se domislili, kako bi združili omenjena efekta v eno samo napravo. Tehnološka naprava bo tako delovala na svetlobnih efektih preko glasbe, in sicer bo uporabnik preko tipk, ki bodo vidne na LCD zaslonu, izbral glasbo. Večja kot bo jakost glasbe, več led diod se bo prižgalo. Najprej smo se na tem področju lotili raziskave in se vprašali, ali že takšna naprava obstaja. Pomagali smo si s pomočjo pisnih in drugih virov. Pri sami izvedbi naprave smo morali preučiti delovanje samih komponent, kot so Arduino razvojna plošča, LCD zaslon, MP3 dekodirnik itd., kar nam je seveda vzelo veliko časa. Ob izdelavi naprave smo se naučili veliko tehničnih zadev, kot so delovanje Arduina, risanje načrtov v programu EasyEDA, programiranje v programu Arduino IDE in še veliko več. Na začetku smo bila v velikih dvomih, saj nismo vedeli, kako se lotiti gradnje studia za glasbo in svetlobne efekte. Potrebno je bilo veliko truda in vztrajnosti, kajti to je naša prva tehnološka naprava, ki je varna ljudem in okolju, kar je najpomembnejše. Da smo razumeli delovanje Arduina, smo začeli s pomočjo lažjih izvedb ter jih tako tudi nadgrajevali. S končnim izdelkom smo zelo zadovoljni, saj deluje kot smo si zadali.

### Summary:

Music in humans subconsciously arouses the thought of certain colors. According to studies, people have shown a link between sad music with more darker colors and more vivid, cheerful music with brighter, vivid colors. Since we are interested in music and colors, we have thought about how to combine these effects into one single device. The technology device will thus act on the lighting effects through music, so the user will choose the music through the keys that will be visible on the LCD screen. The greater the volume of the music, the more LEDs will turn on. [1,2] First we did a research in this field and wondered if such device already existed. We searched for informations in written sources. Firstly we had to examine operations of the components such as Arduino development board, the LCD screen, the MP3 decoder, etc... before we started making a device that took us a lot of time. During the construction of the device, we learned a lot of technical matters, such as the operation of Arduino, drawing plans in EasyEDA, Ardiono IDE programming and much more. At the beggining we were in a great doubt because we had no idea how to get started with the construction of the studio for music and light effects. It took a lot of effort and perservance because this is our first technological device that is safe for people and the environment which is most importantly. To understand the functioning of Arduino we started with constructing easier implementations of device which we were upgrading with higher level. We are very happy about the final product because it works just as we set our goals.



## Komunikacija z emojiji

**Raziskovalca:** Charlie Križanc Stojnšek, Oskar Kaljun

**Mentor:** dr. Andrej Šafhalter

**Šola:** Osnovna šola Anice Černejeve Makole

**Recenzent:** Daniel Tement

### Povzetek:

V teoretičnem delu raziskovalne naloge so predstavljena že znana dejstva o vse bolj pogostem slikovnem pripomočku v spletni komunikaciji, emojijih. Predstavljena je zgodovina razvoja uporabe tega spletnega fenomena, kaj emojiji sploh so in zakaj se uporabljajo. V raziskovalni nalogi so opisani tudi pomeni kratic, ki se uporabljajo kot okrajšave določenih besednih zvez.

V empiričnem delu so podani rezultati raziskave, ki sva jo naredila med učenci od četrtega do devetega razreda naše šole. Izdelala sva vprašalnik, da bi ugotovila, katere emojije in kratice besednih zvez učenci najpogosteje uporabljajo in če sploh poznajo njihov pomen. Z raziskavo sva tudi želela ugotoviti, kako se uporaba emojijev razlikuje glede na starost in spol ter vzrok vse večje priljubljenosti v spletnem komuniciranju.

### Summary:

In the theoretical part of the research paper, the already known facts about an increasingly common image device in web communication, emoji, are presented. The history of the development of the use of this web phenomenon is presented, what emojis are and why they are used. The meanings of abbreviations used as abbreviations of certain phrases are described.

The results of the research made among pupils from the fourth to the ninth grade of our school are given in the empirical part. A questionnaire was created to find out which emojis and phrase abbreviations are mostly used by the pupils and if they know their meanings at all. We also wanted to find out how the use of emojis differs according to age and gender and the reason for their increasing popularity in online communication.



SKUPINA

B

## Raziskovanje, načrtovanje in izvedba kratkega filma

**Raziskovalka:** Anja Strelec

**Mentor:** Franc Vrbančič

**Šola:** Šolski center Ptuj – Elektro in računalniška šola

**Recenzent:** Daniel Tement

### Povzetek:

Konji so me od nekdaj pritegnili, zato sem se odločila za snemanje promocijskega videa o Kobilarni Lipica. Prav tako je bila ta izkušnja edinstvena priložnost, da se si lahko omenjeno posestvo ogledovala več dni. Vedno sem rada snemala in ustvarjala videoposnetke, vendar nikoli profesionalno.

Ker imam rada izzive, sem si zadala cilj raziskati postopke izdelave in izdelati video izdelek. Pri tem pa tudi preizkusiti svojo natančnost, vztrajnost in potrpežljivost.

V prvem delu raziskovalne naloge sem raziskala teorijo in prakso filma. Ugotovitve iz tega dela, sem uporabila pri načrtovanju in izvedbi filma – ob samem snemanju filma, sem se morala posvetiti pozornost pisanju snemalnega načrta in scenarija, ki sta ključna faktorja za nastanek filma. Brez njiju ne bi mogla ustvariti filma. Odločila sem se za načrtovanje in snemanje dokumentarnega filma, zato sem se osredotočili na značilnosti dokumentarca.

Ugotovila sem, da je postopek realizacije filma razdeljen na dva dela, in sicer na vsebinski in na postopkovni del. V vsebinskem delu sem se posvečala predvsem nastanku in pravilni razlagi zgodbe in namena snemanja. Pri postopkovnem delu pa sem osnutke zgodbe spremenila v scenarij, montažno knjigo, snemalni načrt in na koncu še v izdelek.

S pričujočo raziskavo in video izdelkom smo želeli strokovni in drugi javnosti približati, ne samo konje kot take, temveč celotni simbolni pomen Lipice, da bi se Slovenci bolj zavedali svoje kulturne dediščine, kakor tudi "lepote" raziskovalnega dela.

### Summary:

I have been interested in working with horses since I can remember. That's why I have decided to make a promo video about Stud Farm Lipica. This experience was also once-in-a-life-time chance for me to explore the stud farm estate for a several days. I always liked to make and create videos, but never professionally.

Because I like challenges, I decided to make a final product – solid video, which I could be proud of. Through the shooting of my film I learned how to be thorough, persistent and patient. I needed to focus my attention on writing the shooting schedule and scenario, which are the main factors of shooting a film. Without them I could not create my film.

I decided myself for shooting a documentary film and focused myself on the features of documentary. I found out, that the shooting procedure consists of two parts, content and procedure. In content I focused myself on making of the film, on right explanation of the story and on the purpose of shooting. In procedure I changed my film drafts into scenario, editing book, shooting schedule and finally, into product.

With my work I want to represent horses and especially represent the symbolic meaning of Stud Farm Lipica to all Slovenes, so they would appreciate their cultural heritage more.

C

SKUPINA

- SLOVENSKI JEZIK ALI KNJIŽEVNOST •
- INTERDISCIPLINARNA PODROČJA •
- RAČUNALNIŠTVO ALI TELEKOMUNIKACIJE •
- ARHITEKTURA, GRADBENIŠTVO ALI PROMET •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Slovenski jezik ali književnost	2. OŠ Slovenska Bistrica	Ali čevljarji gredo v korak s časom?
Interdisciplinarna področja	OŠ Markovci	Grema se špilat
Računalništvo ali telekomunikacije	2. OŠ Slovenska Bistrica	Učimo se v (učnem) stilu
Interdisciplinarna področja	OŠ Kidričevo	Ko zapojejo poročni zvonovi
Interdisciplinarna področja	2. OŠ Slovenska Bistrica	Še mnogo vode bo preteklo, da bo cenjena dovolj
Arhitektura, gradbeništvo ali promet	OŠ Ljudski vrt Ptuj	Ali je kaj trden most?
Arhitektura, gradbeništvo ali promet	OŠ Gustava Šiliha Laporje	Z enega na drugi breg
Interdisciplinarna področja	OŠ Ormož	Je sreča življenja imeti delo?



## Ali čevljarji gredo v korak s časom?

**Raziskovalka:** Zoja Gobec

**Mentorica:** Natalija Kovše

**Šola:** 2. osnovna šola Slovenska Bistrica

**Recenzentka:** Barbara Rižnar

### Povzetek:

Osnovni namen raziskovalne naloge z naslovom Ali čevljarji gredo v korak s časom? je ugotoviti, ali se čevljarji v Slovenski Bistrici prilagajajo hitrim spremembam, ki zajemajo njihovo delo. To sem skušala ugotoviti s pomočjo čevljarja Andreja Trunkla, ki čevlje popravlja že 31 let. Med intervjujem mi je razkazal svojo delavnico in povedal, kako uporablja določeno orodje. Na podlagi pogovora z njim, na podlagi besed, s katerimi je opisoval svoje delo, in na podlagi pisnih virov, v katerih je opisan razvoj čevljarstva, sem želela ugotoviti, če spremembe močno vplivajo tudi na čevljarjevo delo. Ugotovila sem, da se današnje delo čevljarjev razlikuje od njihovega dela v preteklosti. Prav tako sem med raziskovanjem ugotovila, kakšen odnos so v preteklosti ljudje imeli do čevljev. Če danes čevljev uničimo, ga le redko nesemo na popravilo k čevljarju, v preteklosti so pa čevljarji imeli več dela – tako z izdelovanjem kot s popravilanjem čevljev. Po pogovoru s čevljarjem sem sestavila terminološki besedno-slikovni slovar čevljarjskih besed. Med njimi je večina neprevzetih, med prevzetimi pa je največ besed nemškega izvora. Želim, da ta raziskovalna naloga pripomore k ohranitvi besed, povezanih s čevljarstvom, in predvsem pri mladih vzbudi zanimanje za odločitev za poklic čevljarja in zanimanje za ohranjanje naše kulturne dediščine, ki se zaradi načina življenja hitro spreminja ali tone v pozabo.

### Summary:

The main purpose of the research paper, titled Do shoemakers keep up with the times? is to discover if the shoemakers in Slovenska Bistrica are adapting to the quick changes that affect their work. I tried to discover that by visiting Andrej Trunkl, a shoemaker, who has been fixing shoes for the last 31 years. During the interview, he showed me around his workshop and explained how individual tools are being used. Based on the interview, how he described his work, and existing literature about the development of shoemaking I wanted to discover if the changes affect shoemakers' work. I discovered that shoemakers' work nowadays is different from what it was in the past. In my research, I discovered what relationship people had with shoemakers in the past. Nowadays, if we damage a shoe we rarely take it to the shoemaker. In the past, shoemakers had a lot more work, repairing and making shoes. Based on the interview with the shoemaker I made a word-picture dictionary with shoemaking terminology. It consists of mostly non-loaned words; however, most of loanwords originate from German. I wish that this research paper would help preserve words, connected to shoemaking. I hope that the paper inspires young people to decide to become shoemakers and to preserve our cultural heritage, which is changing and disappearing because of our way of life.



## Grema se špilat

**Raziskovalci:** Ajda Mikša, Blaž Bratuša,

Blažka Horvat

**Mentorica:** mag. Aleksandra Čeh

**Šola:** Osnovna šola Markovci

**Recenzentka:** Iva Ferlinc

### Povzetek:

A si predstavljate življenje brez igre?

Seveda ne, saj igra otroku predstavlja aktivno in nadvse zanimivo preživljanje njegovega časa. Igra je svobodna, spontana in ustvarjalna aktivnost. V igri otrok uživa in je zadovoljen. Ker sama igra, v mislih imamo igre z vrstniki, s prijatelji, nudi takšno zadovoljstvo, smo se odločili, da del tega zadovoljstva, ki so ga ob tem občutili naši dedki in babice, prav tako starši, prenesemo na mlajšo generacijo, na I. triado. Predpostavljali smo, da otroci I. triade OŠ Markovci ne poznajo več iger iz starih časov, saj prevlada računalniške tehnologije onemogoča igro s sovrstniki, zlasti na prostem, v naravi. Otroci so vse več na tablicah in mobilnih aparatih, vse manj se družijo in igrajo med seboj. Te stare gibalne igre pa tonejo v pozabo. Zato smo zbrali nam nekaj zanimivih iger in otrokom predstavili te igre ter jim razložili pravila. Ko smo se začeli igrati, so njihovi srčki zaigrali, vsak otrok je bil motiviran in nasmejan. Tudi sami so nam na koncu povedali, da je takšna igra dosti bolj zanimiva od tiste, ki se je igrajo sami doma.

Računalniške igrice in plastični junaki ne morejo nadomestiti izkušenj pridobljenih z igro na prostem v družbi vrstnikov, sosedov in prijateljev. Iz ankete smo izvedeli, da so si včasih otroci sami izdelovali igrače iz vej, cunj, kamenčkov, lesa, krede. Igrače so bile preproste in skromne, vendar ob njihovi izdelavi so otroci razvijali svojo kreativnost. Zato je pomembno, da mi, malo starejši otroci, popeljemo mlajše otroke v svet igre, katerega so poznali naši stari starši in starši. V sodelovalnem delu je moč, ki nas krepi, tako duha kot telo.

Tako kot je dejal Friderich Fröbel: »Igra je najvišja stopnja otrokovega razvoja, je spontan izraz misli in občutkov, je najčistejša stvaritev otrokovega uma.«

### Summary:

Can you imagine life without play? Of course not. Play is a child's active and pleasurable pastime. Play is a free, spontaneous and creative activity. Children enjoy playing games and it makes them happy. As playing with peers or friends is so engaging and exciting, we decided to share part of this excitement, experienced by our parents and grandparents, with younger children who attend the first learning cycle. We assumed that the children who attend the first learning cycle at Markovci Primary School are not familiar with traditional games, since the emerging supremacy of digital games over traditional ones prevents outdoor games and peer social interactions. Children spend more time playing computer games on their tablets and phones, and less time socializing and interacting with each other. Traditional games consisting of physical activities are falling into oblivion; therefore, we chose some games we considered interesting enough and showed them to the children. We also explained the rules. When they started playing, we could see how happy they became. Every child was smiling and seemed to be motivated. At the end, they said that such games are far more interesting than the ones they play alone at home. Computer games and virtual characters cannot replace experiences children get when playing outdoors with their peers, neighbours and friends. Surveys show that in the past children used to play with toys they made themselves using branches, rags, pebbles, wood, and chalk. The toys were simple and modest, but by making them children developed their creativity. Thus, it is important that we – a bit older children – take younger children into the world of games, which our parents and grandparents used to play. Social skills and human interactions provide opportunities and power, which strengthen our mind, body and soul. As Friderich Fröbel once said: "Play is the highest expression of human development in childhood for it alone is the free expression of what is in a child's soul".



## Učimo se v (učnem) stilu

**Raziskovalca:** Ana Pučnik, Juš Pešak

**Mentorica:** Tara Sinkovič

**Šola:** 2. osnovna šola Slovenska Bistrica

**Recenzentka:** Iva Ferlinc

### Povzetek:

Pomembno je, da se znamo pravilno učiti. Tega se večinoma nikoli ne naučimo v šoli, zato je dobro imeti pomoč. Zasnovali smo aplikacijo Učenje v stilu, ki pomaga, da učenje postane preprosto in zanimivo del našega vsakdana ter da se ga navadimo čim prej. Med glavnimi nalogami učenja je, da je učinkovito. Zato je pomembno, da si med učenjem vzamem odmor, se razgibamo, poslušamo glasbo ali se samo sprehajamo po prostoru in vdihavamo svež zrak. Predlagana inovacija učenca spodbuja k temu, da sprejme učenje takšno, kot je, in se z njim spoprime. Polega tega mu pomaga, da se privadi vsakdanje učne rutine, tako da mu ni mučna. Aplikacija ponuja tudi program aktivnih odmorov, ki učenju dajo dodano vrednost.

### Summary:

An important part of studying is knowing how to study. The problem is that nobody teaches us that in schools. That is why it is good to have an application like Učenje v stilu (Learning in style), to help us learn how to do that as efficient as possible. One of the key elements of successful studying is knowing when to take a break and making it an active one with moving around, listening to music and breathing in fresh air. The suggested innovation prompts the student to study in an efficient way, gives him motivation and helps him develop a learning routine. It contains a program of active breaks, to give the studying an extra treat.



## Ko zapojejo poročni zvonovi

**Raziskovalki:** Nia Krajnc, Eva Žunkovič

**Mentorici:** Jana Jerenec, Sonja Lenarčič

**Šola:** Osnovna šola Kidričevo

**Recenzentka:** Barbara Rižnar

### Povzetek:

Slovenski narod je majhen narod, a ima bogato ljudsko izročilo, zato sva si za letošnjo raziskovalno nalogo zadali cilj, da raziščeva zgodovino poroke v našem okolju oz. obudiva folklorno izročilo naših prednikov ter tako ohraniva delček bogate kulturne zapuščine.

Dela sva se lotili tako, da sva sestavili anketo, s katero sva želeli raziskati običaj »svetega« zakona po kronologiji – desetletja anketirancev.

Najine ugotovitve so naslednje: starejši kot so anketiranci, bolj preproste in tradicionalne so bile poroke.

Pari so se poročali spomladi, pozimi in jeseni, svatovali so doma ali v gostilnah, mladoporočenca sta bila vedno v središču pozornosti, za veselje in ples so skrbeli muzikanti ali ansambli. Vedno so bili navzoči sorodniki, prijatelji in sosedji, večinoma so se poročali cerkveno in civilno. Zanimiv je podatek, da je ženin lahko nevesto videl že pred obredom, kar je bilo v preteklosti prepovedano. Zaroke niso bile nujne, prav tako ne poročne pogodbe. Šranga je bila obvezna. Jedli so zanimivo poročno hrano, peciva so predstavljala status mladoporočencev.

Prstana je hranil ženin ali priča, največ so svatje mladoporočencema metalni riž, medeni tedni so bili redkost. Tudi dota je bila zanimiva: denar, hiša, travnik ...

Fantovščina in dekljščina se v 50. letih prejšnjega stoletja nista množično praznovala. Spoznavali sva najrazličnejše poročne običaje, tudi darila za svate. Takrat so še spoštovali vraže. Na koncu so nama povedali tudi »recept« za dolg in srečen zakon. Zanimalo naju je tudi poročno obredje v začetkih našega »obredovanja« in kako se ti obredi izvajajo danes pri nas in po svetu.

Žal je mnogo občanov že umrlo, zato nisva mogli slediti večjemu vzorcu porok tistega časa. Sva pa zbrali zanimive podatke v spomin bodočim rodovom.

Najino glavno spoznanje je to, da so naši pradedki, prababice, dedki in babice ter redki naši starši še spoštovali ljudsko izročilo, zato želiva, da se v najinem vzorcu raziskave poročnega obredja ohrani spomin na folkloro in spomin kulture dela slovenskega naroda, predvsem želiva prispevati najin delež raziskovanja ob evropskem letu kulturne dediščine.

Nalogo sva popestrili s fotografijami iz arhiva naših anketirancev. Marsikatera današnja poroka je rezultat skomercializiranega mišljenja oz. nezavedanja slovenskega folklornega izročila.

### Summary:

The Slovene nation is a small nation, but it has a rich folk tradition. Our goal for this year's research was to explore the history of weddings in our environment, respectively to awake the folk tradition of our ancestors and thus preserving a part of the rich cultural heritage. We started our work by conducting a survey with which we wanted to explore the custom of the "holy" matrimony chronologically - decades of the respondents. Our results are as follows: the older the respondents are, the simpler and traditional were the marriages.

Couples got married in spring, winter and autumn. Weddings took place at home or in inns, the newlyweds were always in the spotlight, musicians or ensembles catered for fun and dance. Relatives, friends and neighbors have always been present. People had a church or a civil wedding. Interesting is the fact that the groom could have seen the bride before the ceremony, which was forbidden in the past. An engagement was not necessary, nor a marriage contract. The traditional Slovene "boom gate" was obligated. Interesting festive meals were prepared and eaten, pastries were the status of the newlyweds. The rings were kept by the groom or the witness, most of the wedding guests threw rice on the newlyweds, the honeymoon was rare. The dowry was also interesting: money, a house, a meadow etc. In the 1950s, bachelor and bachelorette parties were not massively celebrated. We got to know a lot of different wedding customs, including the gifts for the wedding guests. Superstitions were highly respected. In the end we were also told the "recipe" for a long and happy marriage. We were also interested in the wedding rituals themselves in the beginnings of our "rituals" and how these ceremonies are performed nowadays in our country and around the world. Unfortunately, many citizens have already died, so we could not follow a larger sample of the marriages of that time. But we have gathered interesting data in memory for future generations. Our main result is that our great-grandfathers, great-grandmothers, grandfathers and grandmothers, and few of our parents still have respected the folk tradition, so we want to keep the memory of the folklore and the memory of the wedding ceremony culture part of the Slovene nation. In particular, we would like to contribute our part to the European Year of Cultural Heritage. We enlarged our research with photographs from the archives of our respondents. A lot of today's wedding is a result of a commercialized thinking or the unconsciousness of the Slovenian folklore tradition.



## Še mnogo vode bo preteklo, da bo cenjena dovolj

**Raziskovalka:** Mija Pipenbaher

**Mentorica:** Katja Leva

**Šola:** 2. osnovna šola Slovenska Bistrica

**Recenzentka:** Barbara Rižnar

### Povzetek:

Za raziskovalno nalogo z naslovom Še mnogo vode bo preteklo, da bo cenjena dovolj sem se odločila zato, ker sem vzgojena »zeleno, ekološko« in ker mi je mar, kako ljudje ravnamo z naravo. Želeli smo raziskati, kakšen odnos do vode imajo naši vrstniki na šoli v primerjavi s starejšo generacijo. Ker smo pri prebiranju literature spoznali, kako širok pomen na različnih področjih ima voda, smo se odločili, da raziščemo in predstavimo še področje vode v povezavi z etnologijo.

Želimo, da s pomočjo raziskovalne naloge učenci naše šole dodatno okrepijo spoštovanje do vseh voda. Prav tako želimo, da spoznajo, da je voda najboljša pijača, saj dobro vpliva na našo zdravje in počutje. Ker pa je to šolsko leto posvečeno kulturni dediščini, smo se odločili, da vodo raziščemo tudi na tem področju in predstavimo, kakšen pomen je imela voda za naše prednike, kako je bila vpeta v praznike in običaje ter zbrati pregovore, kjer se pojavlja beseda voda.

Na začetku raziskovanja smo postavili štiri hipoteze.

Hipoteza 1: Predpostavljamo, da učenci naše šole niso dovolj varčni z vodo.

Hipoteza 2: Predvidevamo, da je starejša generacija bolj varčna z vodo kot »mlajša« generacija.

Hipoteza 3: Domnevamo, da učenci poznajo malo pregovorov, ki vključujejo besedo voda.

Hipoteza 4: Predpostavljamo, da učenci ne znajo razložiti pomena pregovorov (v prenesenem pomenu).

V teoretičnem delu smo najprej predstavili vodo z različnih vidikov: geografski, kemični, zgodovinski in biološki. V nadaljevanju smo zbrali pregovore o vodi in jih razložili v prenesenem pomenu. Prav tako smo predstavili nekaj šeg in praznikov, kjer je voda imela poseben pomen. V zadnjem teoretičnem delu smo se osredotočili na dejavnike, ki onesnažujejo vodo, in do odnosa, ki ga imamo do vode.

V drugem, raziskovalnem delu smo s pomočjo anketnega vprašalnika skušala potrditi ali ovreči zgoraj omenjene hipoteze. Anketni vprašalnik so reševali učenci tretjih, šestih in devetih razredov naše šole. Prav tako smo izdelali anketni vprašalnik za starše teh učencev, da smo lahko primerjali rezultate mlajše in starejše generacije.

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S pomočjo različnih metod dela smo ugotovili, da učenci premalo varčujejo z vodo. Prav tako smo ugotovili, da učenci premalo spišejo vode. Učenci naše šole ne poznajo veliko pregovorov o vodi in jih niti ne znajo razložiti. S pomočjo zloženke, ki smo jih naredili, želimo, da se odnos do vseh voda, ne le pitne, pri ljudeh

bistveno spremenijo v pozitivno stran. Prav tako si želimo, da bi bili okrepi oziroma predlogi, ki smo jih navedli v raziskovalni nalogi za 2. osnovno šolo Slov. Bistrica, kmalu realizirani.

V sklopu raziskovalne naloge smo si zamislili geslo, ki bo učence 2. osnovne šole skozi opominjalo, da naj delujejo skrbno z vodo. Geslo je: ČUJ TI! SPOŠTUJ VODO IN Z NJO VARČUJ, DA NE BOŠ BIL TISTI, KI JE »FUJ«!

### Summary:

For this research paper Še mnogo vode bo preteklo, da bo cenjena dovolj, I decided because I was raised very "green, ecological" and because I care how people treat nature. I wanted to research the attitude towards water, that my schoolmates have in comparison with older generation. While reading the literature I realized how wide meaning water has on different areas and I decided to research and present water in relation to ethnology.

With the help of the research paper I want students in our school to further reinforce their respect for water. I also wish them to realize that water is the best drink because it has a good influence on our health and mood. And because this school year is dedicated to cultural heritage I also decided to research water on that area and present what meaning had water for our ancestors and how it was involved in events and customs and collect proverbs where water appears.

In the beginning I set four hypotheses.

Hypothesis 1: I guess that the students in my school don't save enough water.

Hypothesis 2: I suppose that older generations save enough water than "my" generation.

Hypothesis 3: I suppose that students don't know much of the proverbs that include water.

Hypothesis 4: I guess that students don't know how to explain the meaning of proverbs (meaningful sense)

In the theoretical part I will present water from different aspects; geographical, chemical, historical and biological. In the following I gathered proverbs about water and will explain them in a meaningful sense. I will also present some customs and events where water played an important part. In the last theoretical part I concentrated on water pollution factors and the attitude that we have to water.

In the second, research part I forwards to confirm or deny the above-mentioned hypotheses using a questionnaire. The questionnaire was solved by students of the third, sixth and ninth grades of our school. I also made a questionnaire for parents of the students, so I could compare the results of a younger and older generation.

With the help of different methods of work I found out that the students lack water, that they do not drink enough and they do not know proverbs and do not even know how to explain them. With the help of the leaflet I have done, I want to change the attitude towards all waters in a good side.



## Ali je kaj trden most?

**Raziskovalka:** Neja Škrjanec

**Mentorica:** Simona Hajnal

**Šola:** Osnovna šola Ljudski vrt Ptuj

**Recenzent:** Robert Novak

### Povzetek:

Mostovi so del naše kulturne dediščine in pričajo o znanju in tehnični kulturi časa, v katerem so nastali. Prav zaradi tega se mostovi v preteklosti in tudi danes razlikujejo po obliki, konstrukciji, materialu in namembnosti. Njihova gradnja mora zadostiti funkcionalnim, gradbenim in estetskim kriterijem. Zgodovina nastanka prvih ptujskih mostov sega v čas Rimljanov in se nadaljuje z lesenimi mostovi v srednjem veku, ki so bili večkrat porušeni zaradi močnega toka reke Drave, pa vse do danes, kjer imamo na Ptujju čez reko Dravo kar štiri mostove. Železniški most je bil zgrajen leta 1860 in je sprva bil leseni, danes pa ima jekleno kovinsko konstrukcijo in spada med palične mostove.

Leta 1959 nastal Dravski most ali most iz prednapetega betona. To je bil prvi prosto-konzolni most v Sloveniji, ki je bil z razponom 79 metrov takrat tudi med največjimi na svetu. Pešmost je nastal leta 1997 in stoji na mestu nekdanjega starega lesenega mostu. Most ima prekladno jekleno konstrukcijo in spada v skupino grednih mostov. Arhitekta sta leta 1999 v Londonu prejela Evropsko nagrado za jeklene konstrukcije. Puhov most je bil zgrajen leta 2007 in je zasnovan kot prostokonzolna konstrukcija z dodatnimi poševnimi kabli in spada med mostove s poševnimi zategami. Dolg je 430 m in je ime dobil po Janezu Puhu ter je unikatni inženirski objekt, edini take vrste v Sloveniji in eden redkih v Evropi.

### Summary:

Bridges are part of our cultural heritage and testify to the knowledge and technical culture of the time in which they were created. Because of this, bridges vary in shape, construction, material and purpose. Their construction must satisfy the functional, construction and aesthetic criteria. The history of the formation of the first Ptuj bridges dates back to the time of the Romans and continues with wooden bridges in the Middle Ages until today, where there are four bridges across the river Drava in Ptuj.

The railway bridge was built in 1860 and was originally wooden, but today it has a steel metal structure and is one of the truss bridges.

In 1959, the Drava Bridge or bridge from precast concrete was created. This was the first free-console bridge in Slovenia, which was then one of the largest in the world with a range of 79 meters.

Pedestrian bridge was built in 1997 and stands on the site of the former old wooden bridge. The bridge has a prefabricated steel structure and belongs to the group of shaft bridges. In 1999, the architects received the European Prize for Steel Structures in London.

The Puh Bridge was built in 2007 and is designed as a freestanding construction with additional slanted cables and is one of the bridges with bevel ties. It is 430 meters long and got its name from Janez Puh. It is a unique engineering facility, the only one in Slovenia and one of the few in Europe.



SKUPINA  
**C**

## Z enega na drugi breg

**Raziskovalec:** Filip Rap

**Mentor:** Natalija Leskovar

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzent:** Robert Novak

### Povzetek:

Namen raziskovalne naloge je bil ugotoviti, kateri tip mostu zdrži največjo obremenitev ter njegovo najšibkejša točka. Cilj raziskovalne naloge je bil izmeriti, kolikšno obremenitev lahko prenese posamezna 735-gramska maketa mostu iz lesa.

Raziskavo sem izvedel tako, da sem najprej pregledal teorijo in napisal teoretični del, v katerem sem zajel zgodovino gradnje mostov; vrste mostov v naravi; mostove, ki zaradi velikosti, oblike, tipa gradnje izstopajo; zanesljivost mostov, ter vzroke za porušitev mostov. Nato sem v okviru raziskovalnega dela izdelal ločni in gredni most, okvirni most z navpičnimi stebri, okvirni most s poševnimi stebri in most s poševnimi zategami. Vsi so bili dolgi 80 cm, izdelani iz bukove vezane plošče in so tehtali 735 g. Mostove sem nato enakomerno obtežil in analiziral njihove zlome.

V raziskavi sem rušil mostove s pomočjo povečanja naravnih sil. Rušil sem pet vrst mostov, ki sem jih izdelal. V prvi hipotezi sem ugotavljal, kateri izmed petih tipov mostov zdrži največjo obremenitev in kolikšno. Sklepal sem, da bo največjo obremenitev zdržal most s poševnimi zategami, ker v literaturi omenjajo, da je mostove s poševnimi zategami težko porušiti. Sklepal sem, da bo zdržal maso 100 litrov vode. Ugotovil sem, da največjo obremenitev prenese okvirni most z navpičnimi stebri, in sicer obremenitev 130,2 kg. Moja raziskava ne potrjuje teorije, ker je most s poševnimi zategami prenesel najmanjšo obremenitev: 31,4 kg. Na podlagi omenjenih ugotovitev sem prvo hipotezo ovrgel. V drugi hipotezi sem ugotavljal, kje je najšibkejša točka mostu. Predvideval sem, da je na polovici poti čez most. Pot čez most je razdalja med enim in drugim bregom. Pri mojih mostovih je znašala 70 cm, zato ker sem za pričvrstitev mostu na vsaki strani porabil 5 cm. Polovica poti čez most je torej 35 cm, kar je 50% poti čez most. Ko sem analiziral vse zlome mostov in jim izračunal aritmetično sredino, sem ugotovil, da je najšibkejša točka mostu na 32,95 cm poti čez most, kar je 47% poti čez most iz leve proti desni. Na podlagi teh ugotovitev in izračuna sem drugo hipotezo delno ovrgel.

Za nadaljnja raziskovanja bi bilo smiselno narediti primerjavo isto težkih in velikih mostov iz različnih materialov ali različnih vrst mostov. Ena izmed možnosti bi bila tudi primerjava enako velikih mostov, izdelanih iz istega materiala in različno težkih.

### Summary:

The purpose of the research paper was to find out which type of a bridge can bear the largest weight and its weakest point. The aim was to measure, what weight can a single 735 g model of a wooden bridge bear.

The research was done by studying the theory first and writing the theoretical part, in which I included the history of building bridges; types of bridges in nature; bridges that stand out due to their size, shape and the type of construction; reliability of bridges and the causes for bridge collapses. Later on, I made an arch bridge, a beam bridge, a frame bridge with vertical pillars, a frame bridge with inclined pillars and a cable-stayed bridge in the process of my research. All of them were 80 cm long, made of beech tree plywood and weighed 735 g. The bridges were equally weighted down then and their collapses were analysed. During my research, I made bridges collapse with the help of natural forces, more exactly five types of bridges that were made by me. I was trying to find out which type of a bridge bears the largest weight and what it is. My presumption was that that was going to be the cable-stayed bridge because it is written in the literature that this type of bridges are difficult to collapse. What is more, I presumed that it will bear 100 l of water. I found out that the frame bridge with vertical pillars bears the highest weight; 130,2 kg. My research does not support the hypothesis because the cable-stayed bridge could bear only 31,4 kg. I disproved the first hypothesis based on these findings.

In the second hypothesis I was trying to find out where the weakest point of the bridge is. My presumption was that it is on the half way across the bridge. The way across the bridge is the distance between one side and the other and it measured 70 cm with my bridges because I used 5 cm on each side to fasten them. This means that the halfway across the bridge is 35 cm, what is 50% of the way across the bridge.

When I analysed all collapses and calculated their arithmetic mean, I found out that the weakest point of the bridge is at 32,95 cm of the way across the bridge, what is 47% of the way from one side to another. Based on these conclusions and calculation, the second hypothesis was partly confirmed.

My suggestion for further research would be to make a comparison of equally heavy and large bridges from different materials or different types of bridges. One possibility would be to compare equally large bridges, made of the same material and bridges with different weight.

SKUPINA  
**C**

## Je sreča življenja imeti delo?



**Raziskovalke:** Brina Voljč, Ina Voljč, Tina Voljč

**Mentorja:** Aleksander Šterman, Igor Kaučič

**Šola:** Osnovna šola Ormož

**Recenzent:** Robert Novak

### Povzetek:

V raziskovalni nalogi Je sreča življenja imeti delo?, ki govori o družinskem podjetju KEV (Kvaliteta, elan, vizija), smo se poglobile v zgodovino podjetja od njegovega začetka pa vse do danes. Sreča je stanje popolnega zadovoljstva in menimo, da ga lahko dosežemo tudi z delom. Še pred tem je potrebno pridobiti ustrezen poklic in opraviti različna izobraževanja, le-ta pa večinoma potekajo vse življenje. Torej srečo lahko najdemo tudi v delu, ki je pomemben del našega življenja vse do smrti.

V raziskovalni nalogi želimo ugotoviti, ali se imajo namen učenci devetih razredov okoliških šol zaposliti v Ormožu, torej njihovem domačem kraju, ali pa je v njihovem interesu zapustiti domači kraj. Zanima pa nas tudi, kakšni so pogoji za zaposlitev v občini Ormož. Učencem želimo dokazati, da tudi v Ormožu lahko dobijo delovna mesta, če so temu primerno izobraženi in je to v njihovem interesu.

Za vse navedeno smo uporabile različne metode dela, med drugim tudi analizo slikovnega gradiva. Pregledale in skenirale smo štiri družinske albume in izbrale najbolj pomembne fotografije za našo raziskovalno nalogo. Fotografirale smo tudi okolico družinskega podjetja KEV in priznanja ter nagrade, ki jih je podjetje prejelo v zadnjem času delovanja.

V raziskovalni nalogi smo uporabile tudi metodi intervju in anketa. Intervjuvale smo Andreja in Borisa Voljča, Damjana Štiblerja ter učenca Jakoba Majhena. Anketirale smo učence 9. razredov na OŠ Ormož, OŠ Ivanjkovci, OŠ Velika Nedelja in OŠ Miklavž pri Ormožu.

S pomočjo zaposlenih v podjetju KEV smo razvile in izdelale tudi reklamni izdelek podjetja KEV, ki je nenazadnje tudi uporaben.

### Summary:

Our research paper, named Is life happiness having work?, presents the family company KEV (Quality, vigour, vision) and its history from the beginning to present. Happiness is a condition of complete contentment, which, in our opinion, can be achieved by work. Before that, we need to gain the appropriate profession and education, which is usually life-long. Happiness can also be found in work, which is an important part of our lives till death.

The purpose of our research paper is to find out whether ninth class students at the local primary schools intend to get a job in Ormož or do they want to leave their home town. We are also interested in conditions for getting a job in Ormož Municipality. We want to prove to these students, that jobs are available in Ormož if they are suitably educated and motivated.

In order to achieve that, we used different work methods. One of them is the analysis of photo material. We looked through and scanned four family photo albums and chose the most important photographs for our research paper. We photographed the surrounding area of our family company KEV, its recognition awards and the prizes that the company has received lately.

We also used the methods of interview and survey. We interviewed Andrej and Boris Voljč, Damjan Štibler and our classmate Jakob Majhen. We sent the survey for the students of the ninth class to fill in to Primary school Ormož, Primary school Ivanjkovci, Primary school Velika Nedelja and Primary school Miklavž pri Ormožu.

With the help of the employees in company KEV, we developed and made a usable promotion product of our company KEV.



SKUPINA

D

- FILOZOFIJA ALI SOCIOLOGIJA •
- PSIHOLOGIJA ALI PEDAGOGIKA •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Filozofija ali sociologija	OŠ Velika Nedelja	Vrednote različnih generacij
Filozofija ali sociologija	OŠ Gustava Šiliha Laporje	Elektronska droga
Filozofija ali sociologija	OŠ Majšperk	Vpliv družbenih omrežij na učence višjih razredov Osnovne šole Majšperk
Filozofija ali sociologija	2. OŠ Slovenska Bistrica	Kdor ima v petah, ima tudi v glavi...
Psihologija ali pedagogika	OŠ Gustava Šiliha Laporje	Ali ve naša pisava o nas več, kot mi sami?
Psihologija ali pedagogika	OŠ Središče ob Dravi	Ko stresa stres
Psihologija ali pedagogika	OŠ Gorišnica	Povezava med dejanji, barvami in čustvi
Psihologija ali pedagogika	2. OŠ Slovenska Bistrica	Imaš tudi ti FOMO?
Psihologija ali pedagogika	OŠ Ormož	Učinek metulja

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## Vrednote različnih generacij



**Raziskovalki:** Annemarie Trunk, Maja Vogrinec

**Mentorja:** Nina Žnidarič, Stanislav Bezjak

**Šola:** Osnovna šola Velika Nedelja

**Recenzentka:** Klavdija Srša

### Povzetek:

Raziskovalne naloge z naslovom Vrednote različnih generacij smo se lotili z namenom, da bi ugotovili ali drži stereotip, da današnja mladina nima vrednot oz. ali ima popolnoma drugačne vrednote od preostalih, starejših, generacij. Zanimalo nas je tudi, ali imajo različne generacije, ki so odraščale v različnih zgodovinskih obdobjih in družbenih razmerah, enake ali drugačne vrednote ter kako so se le-te spremenile. Empirični del smo izvedli s pomočjo ankete, ki smo jo razdelili med predstavnike treh različnih generacij. Anketirance stare do 28 let smo uvrstili v generacijo Z, anketirance med 35 in 57 let so umestili med predstavnike generacije X ter anketirance stare od 75 do 96 let smo uvrstili v generacijo veteranov. Z anketo smo skušali ugotoviti, katere izmed vrednot so različnim generacijam najpomembnejše in kdo je vplival na oblikovanje vrednot pripadnikov posameznih generacij. Ugotovili smo, da je vsem predstavnikom generacij najpomembnejše zdravje, sledijo mu družinska sreča ter ljubezen in zvestoba. Največji vpliv na oblikovanje vrednot pri vseh generacijah pa imajo starši.

### Summary:

The aim of the research in Values of the different generations was to find out whether the stereotype regarding today's youth as the ones having no values or having completely different values from the remaining, older generations is true. We were also interested in whether the values of the different generations differ and how. The empirical part was conducted through a survey, distributed among the representatives of three different generations. Respondents aged less than 28 years were ranked in the generation, respondents between 35 and 57 years of age represent the generation X, and the respondents aged from 75 to 96 years are the generation of veterans. With this survey we tried to determine which values of the three different generations are the most important and who contributed to the design of values of the individual generation. We have found out that health, family happiness followed by love and fidelity are the most important values in all generations. The parents have the greatest influence on the formation of values in all generations.



## Elektronska droga

**Raziskovalca:** Neža Kavkler, Luka Perkovič

**Mentorica:** Ines Jarh

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzentka:** Klavdija Srša

### Povzetek:

Dandanes si življenja brez pametnih telefonov, računalnikov in tablic sploh ne znamo predstavljati, saj se življenje odvija kar preko spleta; če te ni tam, ne obstajaš. V tem pa tičijo tudi velike nevarnosti, ki so očem prikrite, ena od največjih je gotovo zasvojenost.

Za to raziskovalno nalogo sva se odločila, ker meniva, da je veliko najinih vrstnikov zasvojenih z elektronskimi napravami. Predstaviti želiva odvisnost od elektronskih naprav oziroma zasvojenost z njimi, saj sva prepričana, da je to velik problem sodobnega sveta.

Vedno več mladih in tudi starejših je zasvojenih z elektronskimi napravami in ravno to je problem, saj se ljudje zanašajo na tehnologijo in vedno manj uporabljajo svoje možgane, ki jim tako zmanjšujejo sposobnosti; ker se tudi manj gibajo, imajo posledično težave z zdravjem. Zaradi tega sva se odločila, da bova raziskala stanje med najinimi vrstniki.

### Summary:

Nowadays we cannot imagine life without smartphones, computers, tablets, because life happens over the Internet, if you are not there, you do not exist. But here lies also a big danger, invisible to the eye and the biggest one is addiction for sure.

We have decided to make this research paper, because we think that many of our peers are addicted to electronic devices. With this research we would like to present addiction to electronic devices, because we think it is a big problem of the modern world. More and more young and older people are addicted to them and that is the problem since people depend on technology and use their brain less and therefore decrease the brain's ability, is moving less and consequently have health issues. This is the reason we have decided to make the research amongst our peers.

## Vpliv družbenih omrežij na učence višjih razredov Osnovne šole Majšperk



**Raziskovalke:** Špela Gajšt, Nika Korez, Eva Klarič

**Mentorica:** Janja Kitak

**Šola:** Osnovna šola Majšperk

**Recenzentka:** Damjana Lah

### Povzetek:

V zadnjih nekaj letih se je vpliv družbenih omrežij na posameznike zelo povečal. Vse več ljudi je obisk družbenih omrežij vključilo v svoj vsakdan. Nastajajo nova in nova družbena omrežja, ki pa niso nujno primerna za vse starostne skupine, izpostavili bi mlajše generacije. Vse pogosteje se je na spletu začelo pojavljati nasilje na internetu v različnih oblikah. Za varno uporabo omrežij bi torej morali poznati njihovo delovanje in namen. Upoštevati bi morali tudi pravila obnašanja na spletu.

Družbena omrežja in elektronske naprave na sploh pa so naravnane tako, da od njih hitro postanemo odvisni. Zato zelo pogosto na njih preživimo veliko več časa, kot smo načrtovali. Kot posledica tega, pa nam zato marsikdaj zmanjka časa za dejavnosti, katerim bi morali posvetiti več časa, na primer druženju z realnimi prijatelji in družino ali šolskemu delu.

Kakšen vpliv imajo družbena omrežja na učence naše osnovne šole, smo z anketnim vprašalnikom preverili pri učencih od 6. do 9. razreda, saj smo mnenja, da je uporaba družbenih omrežij najbolj razširjena prav v tej skupini učencev.

### Summary:

In the last few years the impact of social media on individuals has risen. More and more people use social media on a daily basis and new social media are appearing all the time. However, they are not necessarily suitable for all age groups, we would like to expose the younger generations. These days cyber bullying of all kinds has been appearing more and more on the web. In order to use social media safely, we need to be informed about their operation and purpose. We should also follow the rules of behavior on the web.

Social media and electronic devices in general are addictive. We often spend more time using them than we planned. Consequently, we often lack time for activities that we should spend more time on, for example spending time with our friends or family, and school work.

In our opinion, the use of social media is the most widespread in the groups of students from 6th to 9th grade, therefore we performed a survey among those students. We were interested in how the use of social media impacts their life.



## Kdor ima v petah, ima tudi v glavi...

**Raziskovalca:** Danijel Gavrić, Dejan Gavrić

**Mentor:** Igor Keber

**Šola:** 2. osnovna šola Slovenska Bistrica

**Recenzentka:** Damjana Lah

### Povzetek:

Gibanje je za mladostnika pomembno, saj pozitivno vpliva na razvoj sklepov, mišic na razvoj motoričnih in finomotoričnih sposobnosti. Kljub temu da slovenska osnovna šola spodbuja gibanje, je le-tega še vedno premalo. Zaradi tega so učenci, ki potrebujejo več gibanja, velikokrat moteči za učitelja in sošolce. Učitelji se z omenjenimi težavami spopadajo na različne načine. Nekateri zaposlijo učence na drugačen način, drugi pa takšne možnosti nimajo.

Namen najine naloge je bil raziskati, ali gibanje pred, med in po pouku vpliva na učenje v šoli. Prav tako sva želela izvedeti, ali je smiselna uporaba kinestetičnih miz za učence, ki potrebujejo več gibanja.

Da sva prišla do ugotovitev, sva najprej preučila, kaj je na to temo že zapisanega. Nato sva pred poukom telovadila z učenci 1. in 5. razreda, nakar sva anketirala razredni učiteljici o učinkovitosti najine telovadbe. V okviru telovadbe naju je zanimalo tudi, ali pripomorejo plesne vaje devetošolcev k zbranosti pri pouku. Z anketo sva raziskala še, kakšno mnenje imajo učitelji in učenci o kinestetičnih mizah. Zbrane podatke sva obdelala s pomočjo programa Excell in jih interpretirala.

Ugotovila sva, da bi jutranja telovadba dolgoročno zagotovo prispevala k zbranosti otrok. To so potrdili učenci in razredni učiteljici. Tudi devetošolci so se večinoma strinjali, da jim ples pomeni prijeten začetek dneva. Prav tako sva ugotovila, da kinestetične mize pripomorejo k zbranosti pri pouku. To so potrdili tako učenci kot tudi učitelji.

Nalogo sva sklenila z ugotovitvami, da so otroci med telovadbo stekali tudi prijateljstva, kar prispeva k dobrim odnosom med učenci in vpliva na dobro razredno klimo. Med telovadbo sva bila dober zgled ostalim učencem, ki bodo mogoče v prihodnjih letih raziskovali. Prav tako sva ugotovila, da delo z otroki ni lahko, saj moraš biti ves čas previden in reševati tudi morebitne konflikte.

### Summary:

Physical activity is important for adolescents, since it positively influences the development of joints, muscles and the development of motoric abilities. Despite the fact that the Slovenian elementary school encourages such activities, we believe that there is still a lack of movement in schools. Because of this, learners who need more physical activity are often disturbing for a teacher and their classmates. Teachers deal with these problems in different ways. Some try to engage students in different ways, others do not have such opportunities.

The purpose of our research was to explore whether the physical activity before, during and after school, influences learning at school. We also wanted to find out if it is reasonable to use kinesthetic desks for learners who need more movement.

First, we have studied what was already written about the topic. Then, we were exercising with the learners of class 1 and 5, and later we have interviewed class teachers about the effectiveness of our gym.

We have also been interested in whether the dance lessons of class 9 contribute to concentration in class.

With the survey, we have also investigated what kind of opinion teachers and learners have about kinesthetic desks. We have collected data using Excel and interpreted them.

Our findings have shown that morning exercise would definitely contribute to the concentration of children in the long run. This has been confirmed by learners as well as the class teachers. Learners of class 9 have also generally agreed that dancing means a pleasant start to the day. It has been agreed by both learners and teachers that kinesthetic desks contribute to the concentration in the classroom.

We have concluded the task with the following findings; children have made friends during exercise, which contributes to good relations between learners and it creates a good classroom atmosphere. During the exercise, we have set a good example to other learners who might do some research in the coming years. We have also found that working with children is not easy, because you have to be careful at all times and resolve possible conflicts.



## Ali ve naša pisava o nas več, kot mi sami?

**Raziskovalca:** Luka Urban Kitek

**Mentorica:** Saša Krajnc Bek

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzentka:** Klementina Pulko

### Povzetek:

Prvoten namen raziskovalne naloge o grafologiji je bil, da se prepričam, ali dejansko naša pisava ima nek pomen oziroma se da iz nje razbrati osebnostne lastnosti pisca. Posledično sem se skozi teorijo želel naučiti, kako poteka grafološka analiza, ter se je tudi sam lotiti oziroma jo sam opraviti. Hkrati pa sem želel spoznati razširjenost uporabe grafološke analize v praksi (npr. pri slovenski policiji).

V raziskovalni nalogi sem uporabil tri metode dela. V teoretičnem delu sem uporabil metodo dela z viri ter literaturo, nadaljeval sem z raziskovalnim intervjujem ter grafološko analizo kot analizo praktičnega primera pisave, ki sem jo prav tako zaključil z raziskovalnim intervjujem.

Ugotovil sem, da je grafologija kot način prepoznavanja osebnostnih lastnosti posameznika precej zanesljiva metoda, saj se da z njo zelo natančno določiti posamezne lastnosti pisca. Vendar njena uporaba ni razširjena npr. v policijskih krogih, saj jih pri preiskovanju kaznivih dejanj ne zanima toliko osebnostni profil storilca, kot način prepoznavanja storilcev. Zato je pri policiji bolj v uporabi forenzično preiskovanje rokopisov in podpisov. Hkrati sem iz teoretičnega dela in kasneje posledično iz rokopisa ugotovil, da mora vzorec pisave dejansko imeti vse sestavne dele, kot je predpisano, ter mora biti napisan po pravilih, da se iz njega lahko naredi relevantna analiza.

### Summary:

The initial purpose of the research paper on graphology was to find out whether our handwriting really has a certain meaning and what is more, to find out whether we can make out personality characteristics of the author from it. Consequently, my aim was to learn from the theory, how graphology analysis works and to try it myself. Furthermore, I was eager to find out the extent of usage of graphology analysis in practise. (ex. with the Slovenian Police)

Three methods of work were used in the research paper. In the theoretical part I used the method of working with resources and literature, I proceeded with a research interview and graphology analysis as an analysis of a practical example of handwriting, which I also finished with a research interview.

My conclusions are that graphology as a way of recognizing personality characteristics is a pretty reliable method, since specific characteristics of the author can be precisely determined from it. However, its usage is not widespread with the police, since the police is more interested in the way of recognizing the criminals rather than personal profile of criminals. That is why forensic investigation of manuscripts and signatures is more often used with the police.

At the same time, I could conclude from the theoretical part and later consequently from the manuscript that the sample of a handwriting must consist of all components as prescribed and that it must be written according to the rules in order to do a relevant analysis from it.



## Ko stresa stres

**Raziskovalca:** Alen Roškar, Lina Horvat

**Mentorica:** Mateja Lašič

**Šola:** Osnovna šola Središče ob Dravi

**Recenzentka:** Klementina Pulko

### Povzetek:

Raziskovalne naloge sva se lotila z namenom raziskati, kaj so glavni razlogi, da so učitelji pod stresom. To področje naju je izjemno zanimalo, saj večkrat opažava, da so učitelji, ki naju poučujejo, pod velikim stresom. Opažava, da se npr. pred počitnicami učitelji obnašajo drugače kot po njih. Po počitnicah so učitelji npr. mnogo bolj sproščeni. Zavedava se, da je vsak poklic stresen, pa vendar naju je zanimalo, kaj so glavni razlogi za stres pri učiteljih.

Skozi svoje raziskovalno delo sva tako izhajala iz osebnih predvidevanj oz. hipotez. Predvidevala sva, da so predmetni učitelji pod večjim stresom kot razredni učitelji, da so mestni učitelji pod večjim stresom kot učitelji na podeželju in da so učitelji najpogosteje pod stresom zaradi nas, učencev. Najino raziskovalno delo je bilo tako usmerjeno k raziskovanju in preverjanju teh hipotez. Po temeljitem pregledu teoretičnega dela o stresu sva se lotila raziskave s pomočjo anketnih vprašalnikov, nad rezultati le-teh pa sva bila izjemno presenečena. Ugotovila sva namreč, da učenci nismo najpogostejši dejavnik za stres pri učiteljih, da predmetni učitelji niso pod večjim stresom kot razredni učitelji, temveč je ravno obratno, in da mestni učitelji niso pod večjim stresom kot učitelji na podeželju. Skozi raziskovalno delo sva ugotovila, da stres vpliva na delo učiteljev bolj, kot sva si predstavljala, in jih zato po opravljeni raziskovalni nalogi še bolj razumeva in spoštujeva.

### Summary:

We started this research paper in order to explore the main reasons why teachers are stressed. We are extremely interested in this topic, because we often notice that our teachers are under big stress. We have noticed that for example, before holidays teachers behave differently than after the holidays. After the holidays they seem to be more relaxed. We are aware that every job is stressful, however we were still interested in what the main reasons for stress among teachers are.

During our research, we originated from our personal foresights or hypothesis. We assumed that subject teachers are under greater stress than class teachers; that teachers from towns are under bigger stress than teachers in rural areas and that teachers are most often stressed because of us, students. Our research was focused on research and verification of these hypothesis. After a thorough inspection of theoretical work about stress we began the research with the help of survey questionnaires; we were extremely surprised about the results. We have come to the conclusion that students are not the main stress factor for teachers; that subject teachers are not under bigger stress than class teachers, but it's the other way around, and that teachers from cities are not under bigger stress than teachers in rural areas. Through our research we found out that stress affects the work of teachers more than we imagined and therefore we understand and respect them better.

## Povezava med dejanji, barvami in čustvi



**Raziskovalki:** Lucija Borak, Ana Erhatic

**Mentorici:** Tina Brodnjak Kokot, Tihana Bezdrob

**Šola:** Osnovna šola Gorišnica

**Recenzentka:** dr. Martina Horvat

### Povzetek:

Raziskovalna naloga obravnava povezavo med barvami, čustvi in dejanji pri učencih od 6. razreda osnovne šole do drugega letnika srednje šole.

Naša dejanja so močno odvisna od čustev. Povezavo med dejanji in barvami pa je težje najti, težje razložimo in najdemo čustva in dejanja v povezavi z določeno barvo. V raziskovalni nalogi poizkušamo dokazati, da povezava med dejanji, čustvi in barvami zagotovo obstaja. Obstaja namreč 5 temeljnih čustev: strah, jeza, zavist, žalost in ljubezen in tri osnovne barve: rdeča, rumena in modra. Rdeča barva načeloma simbolizira ljubezen, zelena svobodo, modra predstavlja zaupanje, rumena srečo, vijolična simbolizira skrivnost, bela čistost in črna žalost. Nekaterim je vseč več različnih barv ali odtenkov enakih barv. Barvo lahko izražamo na različne načine, na primer imamo oblačila naše najljubše barve. Radi povezujemo čustva z določenimi barvami, zaradi katerih se počutimo bolje. Nekateri avtorji ugotavljajo, da je vloga, ki jo imajo barve v naših življenjih, veliko večja, kot si morda večina od nas predstavlja. Barva dobesedno vpliva na vse vidike tega, kar smo, prav tako pa barve vplivajo tudi na čustva. Občutimo neskončno čustev, vendar zmoremo prepoznati le nekaj osnovnih čustev. Ljudje čustva prikažemo navzven s smehom, jokom, ... Večino čustev pa prikažemo na nebesedni način, tudi z barvo. Z raziskovalno nalogo dokažemo, da rumeno barvo pripisujemo k srečnim dogodkom, zeleno k naravi, modro k umirjenim dejavnostim, črno k žalosti. S pomočjo že znane teorije in raziskovalnega vprašalnika pa ugotovimo, da k rdeči barvi spadajo čustva, to sta ljubezen in jeza, k modri barvi umirjenost in zaupanje, k rumeni barvi veselje, k zeleni veselje in umirjenost, k beli pa vsa pozitivna čustva, k črni barvi pripisujemo žalost, k vijolični barvi pa mešana čustva.

### Summary:

Our research describes the connection between colours, emotions and actions, with pupils from year six to year 11.

Our actions highly depend on our emotions. Finding a connection between actions and colours is hard, and explaining a connection between emotions and actions, without excluding colours is even harder. But in this research, we will try to confirm that a connection between actions, feelings and colours, does in fact exist. We recognise five basic emotions: fear, anger, jealousy, sadness and love and know three basic colours: red, yellow and blue. Red tends to symbolize love, green freedom, blue trust, yellow happiness and luck, purple symbolizes secret, white purity and black sadness. Some people like a range of different colours, whilst others like different shades of the same colour. We can show colours in many ways, most commonly by wearing clothes that have our favourite colour. We like to associate feelings with certain colours that make us feel better. Some authors are realising, that the role colours have in our lives is greater, than most of us can imagine. Colour affects all aspects of who we are, in the same way colours affect our emotions. We feel an infinite amount of emotions, but we can only recognise a few, which we show with laughter, crying, ... But we show the majority of our emotions without words, even with colour. With our research we found a connection between colours, emotions and actions. We proved that we can connect yellow with happy actions, green with nature, blue with relaxing activities, black with sadness. With the help of literature and an online questionnaire we found out that we can connect red with love and anger, blue with relaxation and trust, yellow with happiness, green with calmness, white with all positive emotions, black with sadness, purple with mixed feeling of red and blue.



## Imaš tudi ti FOMO?

**Raziskovalca:** Anže Lešnik, Zoja Gobec

**Mentorica:** Tara Sinkovič

**Šola:** 2. osnovna šola Slovenska Bistrica

**Recenzentka:** dr. Martina Horvat

### Povzetek:

Osnovni namen raziskovalne naloge Ali imaš tudi ti FOMO? je bil, da izveva, koliko časa učenci v osnovni šoli preživijo na socialnih omrežjih in kako to vpliva na njihovo vsakdanje počutje. Ta tema se uvršča med modernejše probleme mladih, saj so se v času 21. stoletja razvila socialna omrežja in pridobila na popularnosti. Zaradi tega je ta tema tudi slabše raziskana, vendar se srečujemo z njo vsak dan. Najprej sva sestavila anketo, ki so jo reševali učenci 5., 7. in 9. razreda. V njej sva poizvedovala, ali sploh uporabljajo socialna omrežja, koliko časa preživijo na njih in njihovo počutje ob uporabi le-teh. Rezultate sva nato zbrala in jih razvrstila po različnih kategorijah, da bi jih lažje preučila. Za tem sva opravila še opazovanje, ki nama je pomagalo potrditi rezultate ankete.

Rezultati so naju presenetili, saj je FOMO zagotovo prisoten, česar pa nisva pričakovala. Preden sva se lotila te raziskovalne naloge, nisva niti vedela, kaj je to in da se nekateri s tem srečujejo vsak dan.

Zagotovo bi bilo zanimivo nadaljnjo raziskovanje te teme, predvsem z opazovanjem več ljudi.

### Summary:

The main purpose of the research assignment Imaš tudi ti FOMO? (Do you suffer from FOMO as well?) is to figure out how much time students in elementary school spend on social networks and how it affects their everyday life. This topic falls under the modern teen problems, specifically in the 21st century, because social networks were developed in that time and grew on popularity. Because of that, this topic is poorly researched, even though we face it on a daily basis. First, we made a survey, which was given out to students of 5th, 7th and 9th grade. In it we asked them if they use social networks, how much time a day do they spend on them and their feelings when browsing them. We then gathered all of the results and sorted them into categories so we could study them easier. After that we also conducted an observation, which helped us confirm the survey results.



## Učinek metulja

**Raziskovalki:** Nika Horvat Sušanj, Kaja Horvat

**Mentorici:** Aleksandra Kociper, mag. Maja Korban Črnjavič

**Šola:** Osnovna šola Ormož

**Recenzentka:** Klementina Pulko

### Povzetek:

Teorija kaosa je postavljena na podlagi zamaha metuljevih kril, ki čez nekaj tednov na drugi strani sveta povzroči hurikan. Pomeni, da je metulj s krili zamahnil točno na pravem mestu, ob točno pravem času, kar je povzročilo potek te več tednov dolge verige.

Nekateri pa verjamejo, da je vse, kar se nam v življenju zgodi, naključje. Pomembno je naše videnje dogodkov in njihova razlaga. Nekateri verjamejo, da se vse zgodi z razlogom in da je to posledica nekega prejšnjega stanja in ima večji smisel, kot če rečemo, da se je vse preprosto zgodilo iz naključja.

Pomembni so začetni pogoji oz. začetno stanje, ki ga zelo težko določimo ali pa sega daleč v preteklost. Iz vseh dogodkov in okoliščin pa se je razvilo končno stanje, ki je lahko dobro ali slabo.

Na potek dogodka vplivajo različne okoliščine, ki jih ne moremo predvideti, kaj šele natančno začrtati. Dolgoročno napovedovanje vremena in drugih dogodkov ali končnih stanj bo za vedno ostalo nemogoče, saj ne moremo nadzorovati vseh metuljev in vseh ljudi (vključeno z okolico), ki dolgoročno vplivajo na neko končno stanje ali dogodek, ki bo vodil do končnega stanja.

Preteklosti ne moremo spremeniti. Dogodki, ki so se v preteklosti zgodili, vplivajo na naša življenja in na življenja v prihodnosti.

Na potek dogodkov v življenju pomembno vpliva osebnost človeka, ki se izoblikuje med odraščanjem, vpliv okolja, v katerem posameznik živi, genska predispozicija, vrstniki in vzgoja.

Teorija kaosa je zelo obširna teorija, ki se znanstveno ne da popolnoma dokazati. Metuljev efekt si predstavljamo vsak drugače. Imamo željo razumeti in nadzorovati svet, a moramo se zavedati, da ni vse v naši moči in da se vsega ne da nadzorovati.

### Summary:

The chaos theory is based on a butterfly flapping its wings, which then in a few weeks causes a hurricane on the other side of the world. It means that the butterfly flapped its wings in exactly the right place, at the right time, which led to this several weeks lasting long chain.

Some people believe that everything that happens to us in our life is a coincidence. It is important how we perceive our events and their interpretation. Some believe that everything happens with a reason and that this is a consequence of a previous state and it makes more sense than saying that everything simply happens by coincidence.

The initial conditions or the initial state is important. It is very difficult to determine it or it is a matter of the past. From all the events and circumstances, a final state has developed, which can be good or bad.

How the event will take place, is influenced by various circumstances, which can not be foreseen, let alone precisely planned. Long-term forecasting of weather and other events or final states will forever remain impossible as we can not control all butterflies and all people (including the environment), that in the long run affect a final state or an event that will lead to the final state.

We can not change the past. The events that have happened in the past affect our lives and our lives in the future.

The course of events is significantly influenced by people's personality, which is formed during adolescence, by the influence of the environment in which an individual lives, genetic predisposition, peers and education.

Chaos theory is very extensive and can not be scientifically proven in full. Each person imagines the butterfly effect differently. We have a desire to understand and control the world, but we must be aware that not everything is in our power and that everything can not be controlled.

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• DRUGA PODROČJA •  
• GEOGRAFIJA ALI GEOLOGIJA •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Druga področja	OŠ Gustava Šiliha Laporje	Bonboni brez aditivov so odlični
Druga področja	OŠ Gustava Šiliha Laporje	S trebuhom za odbojkarskim kruhom
Druga področja	OŠ Kidričevo	Ni vredno zločina
Druga področja	OŠ Ormož	Auu, moja noga!
Druga področja	OŠ Destrnik - Trnovska vas	Povezanost agilnosti in učnega uspeha učencev osnovne šole
Geografija ali geologija	OŠ Kidričevo	Nasledstvo na kmetijah

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## Bonboni brez aditivov so odlični



**Raziskovalki:** Karla Rap, Kaja Vantur

**Mentorica:** Marjana Štern

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzentka:** Julija Potisk

### Povzetek:

Glavni namen najine raziskovalne naloge je bil preveriti, ali bonboni vsebujejo aditive, ki bi lahko predstavljali tveganje za najino zdravje, in pripraviti bonbone, ki ne vsebujejo aditivov. Zanimalo naju je tudi, če bodo bonboni brez aditivov, ki jih bova pripravili ter ponudili, učiteljem in sosošolcem po okusu všeč oz. če jim bodo morda celo bolj všeč kot kupljeni bonboni podobne sestave. Pri delu sva uporabljali metodo dela z viri in literaturo, opravili sva raziskovalni intervju z gospo Čoh, po lastnem receptu in postopku sva pripravili praktični izdelek - bonbone, med učenci in učitelji Osnovne šole Gustava Šiliha Laporje sva izvedli degustacijo ter analizo in sintezo podatkov opravljene degustacije.

Pri svoji raziskovalni nalogi sva se naučili, da bonboni res vsebujejo aditive, da pa ne sodijo vsi aditivi med tiste, ki bi lahko ogrozili najino zdravje, ampak so nujno potrebna sestavina v bonbonih. Ugotovili pa sva tudi, da so nekateri aditivi na podlagi znanstvenih raziskav umeščeni v skupino aditivov, ki lahko ogroža naše zdravje, če jih bi seveda prekomerno uživali. Veseli naju, da naju je ga. Ivanka Čoh spodbudila tudi k razmišljanju o pripravi lastnih bonbonov, brez uporabe aditivov. Najprej sva se lotili priprave žele bonbonov, a nama priprava le teh ni uspela, nato sva pripravili žajbljeve bonbone z okusom limone. Ker je degustacija pokazala, da so najini bonboni degustatorjem po okusu boljši kot kupljeni bonboni podobne sestave, sva bili še posebej ponosni. Zato imava za vse otroke in odrasle, ki so sladkosnedi in se radi sladkajo z bonboni predlog, da si bonbone pripravijo sami.

Zastavili sva si dve hipotezi, eno sva na koncu ovrgli, drugo pa potrdili.

Prav tako sva dobili idejo, da bi o bonbonih lahko še marsikaj raziskali in se naučili. Razmišljali sva, da bi aditive, ki bi lahko ogrozili naše zdravje, poskusili nadomestiti z snovmi, ki nam ne morejo škoditi. Zelo dobro bi bilo, da bi vedeli, kakšno škodo lahko aditivi povzročijo v našem telesu, saj veva, da so aditivi v hrani, ki jo dnevno uživava, in ne samo v bonbonih.

### Summary:

The main purpose of this research is to identify whether there are health-threatening additives added to candies, and to prepare candies without them.

We wanted to establish, if the homemade candies without additives will taste good or even better, than those of similar ingredients, which can be bought.

Our research is based on studying different sources, interview with Ms. Čoh, practical procedure of making candies, candy tasting and analysing data after the tasting.

We have learnt that candies are full of additives, but not all of the additives are health threatening. Some of them are essential in candy making processes. Our research showed, that there are some additives, which have a potential to cause health problems if consumed excessively.

Ms. Ivanka Čop encouraged us to produce homemade, additive free candies. At first, we have tried to create jelly candies, but the attempt was unsuccessful. Then we have decided to make sage candies with lemon flavour. Analysis of data collected during tasting has showed that according to our schoolmates and teachers, homemade candies taste better than the ones we can buy.

We set two hypotheses, at the end, one was accepted and one rejected.

We got an idea that there is a lot more to learn and find out about the candy production. We thought about which ingredients to use to replace harmful additives. We believe that we all should be aware of the harm that additives can cause to our body, and that not only candies, but also the food we consume on a daily basis contains additives.



## S trebuhom za odbojgarskim kruhom

**Raziskovalec:** Rok Stupan

**Mentor:** Nejc Korošec

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzent:** Boštjan Koletnik

### Povzetek:

Kot navdušen športnik sem zelo ponosen, da osebno poznam Alena Šketa, vrhunskega odbojkarja, zato sem si njegovo športno pot izbral za predmet te raziskovalne naloge. Cilj naloge je raziskati napredek Alena Šketa, odkar je svojo odbojgarsko kariero usmeril v tujino.

Vrhunec v Sloveniji je dosegel v sezoni 2012/2013, ko je v 1. državni odbojgarski ligi dosegal povprečno 6,2 točke na niz. Naslednjo sezono je prestopil v italijanski klub Casa Modena, kjer je njegova statistika doseganja točk na niz strmoglavila, saj je v povprečju dosegal le 1,7 točke na niz. Sezono za tem je prestopil v Pallevolo Molfetta, kjer je izboljšal svojo statistiko v napadu in na niz dosegal povprečno 3,5 točke. V Top Volley Latina, kjer je igral naslednjo sezono, je dosegal povprečno 3 točke na niz, zablestel pa je v prihodnjih dveh sezonah v turškem Fenerbahçeju, kjer je prvo sezono dosegal povprečno po 4,2, drugo sezono pa po 4 točke na niz. Slednja sezona v času pisanja te naloge še ni končana, torej podatki veljajo le za tekme, odigrane do meseca marca 2018.

Ugotovil sem, da obstaja velika razlika med slovensko odbojko in odbojko v Italiji in Turčiji, kjer je konkurenca neprimerno večja in zatorej Alenova statistika doseženih točk na niz slabša, kot jo je dosegal v sezonah, ko je še igral v Sloveniji.

Hipotezo, da vsak športnikov prestop prispeva k izboljšanju njegove igre, sem deloma potrdil. Vsaj v Alenovem primeru je temu tako, kar v intervjuju potrjuje tudi Alen sam.

Za raziskovanje napredka v Alenovi karieri sem se omejil na njegov napad v igri, kar pa ni edino merilo uspešnosti, zato je za nadaljnje raziskave odprtih še mnogo možnosti, na primer uspešnost v obrambi, bloku, servisu ipd.

### Summary:

As a sport enthusiast I am glad to know Alen Šket, who is a professional volleyball player with top achievements. Therefore I have chosen his career as a theme of my research paper. The main goal of my research was to research the improvement of Alen Šket, since his career path abroad.

His top achievement in Slovenia was season of 2012/2013, where he in average achieved 6, 2 points in a series. Next season he made a transfer in Italian club Modena Volley, where his statistics dropped dramatically. He achieved only 1.7 points in a series. The season after that he transferred to Pallevolo Molfetta, where he improved his offence statistics to 3,5 in a series. In Top Volley Latina, where he played the next season, he achieved 3 points in average, but his career took off in the next 2 seasons when he played for Turkish Fenerbahçe. In the first season he achieved 4,2 points in average. This season his average is 4 points, but the season hasn't finished yet (the score applies for games played until March 2018).

I have discovered that there is a mayor distinction between playing volleyball in Slovenia, Italy or Turkey. The competition abroad is fiercer, and as a consequence Alen's statistics is not as high as in Slovenia.

In Alen's case, the assumption that every transfer contributes to better results and the way an athlete plays was partially affirmed.

For the improvement of his game I have focused on the offensive part of his game, which is by far, not the only criteria of success. For further research I would recommend investigation of other aspects of the game (defence, block, serve.).



## Ni vredno zločina

**Raziskovalki:** Tanaja Čeh, Zoja Topolovec

**Mentorici:** Ankica Pikula, Tamara Mlakar

**Šola:** Osnovna šola Kidričevo

**Recenzent:** Boštjan Koletnik

### Povzetek:

Najstniki smo v sodobnem času izpostavljeni številnim pastem na poti odrasčanja. Živimo v hitro spreminjajoči se družbi, hitri tehnološki rasti na vseh področjih življenja, vsak dan smo neločljivo povezani z različnimi mediji. Na žalost se v sodobnem času dogaja veliko nedovoljenih dejanj, zlorab, kršenja posameznikovih pravic in različnih t.i. kriminalnih dejanj. Vse to je večkrat zajeto na filmskih platnih v akcijskih in detektivskih filmih, posnetih po resničnih dogodkih. Posebej zanimivo je prikazano delo detektivov, policistov in usposobljenih forenzikov, ki v večini primerov rešijo še tako zapletena in premišljena izpeljana nedovoljena kazniva dejanja. Navadno je v filmu v vlogi enega detektiva zajeto delo več strokovnjakov. V vsakdanjem življenju pri delu policistov in ostalih strokovnjakov se raziskovanje kaznivih dejanj velikokrat ne razreši in storilec ostane nekaznovan.

Sami sva želeli v raziskovalni nalogi osvetliti predvsem poklic forenzika. Forenziki so pogosto omenjani v filmih in zanimalo naju, je kako lahko postaneš forenzik, kakšno delo opravlja forenzik.

Poiskali sva različne vire in v nalogi na kratko predstavili osnovne pojme, povezane z nedovoljenimi kaznivimi dejanji; predstavili kratko zgodovino razvoja forenzike, veje forenzike, potek šolanja in možnosti zaposlitve v Sloveniji. Predstavili sva tudi nekaj zanimivih dejstev pri razreševanju kaznivih dejanj v preteklosti, ko še ni bilo na razpolago toliko tehnično natančnih pripomočkov, kot jih pri delu uporabljajo forenziki danes.

V raziskovalnem delu naloge sva med devetošolci izpeljali opazovalno metodo govornice telesa, ki so jo pred razvojem naprednih pripomočkov strokovnjaki uporabljali pri odkrivanju storilcev kaznivih dejanj. Osmošolci in devetošolci so odgovarjali tudi na vprašanja odprtega tipa, s katerimi sva želeli preveriti njihovo predznanje in poznavanje dela forenzika, njegove strokovnosti, zahtevnosti dela in zahtevano izobrazbo.

Sklepna ugotovitev naše naloge je ta, da osnovnošolci o poklicu forenzika vemo zelo malo, čeprav je izraz forenzik zelo pogost termin v filmih. Prav tako sva v raziskovalnem delu preverjali metodo opazovanja govornice telesa. Presenečeni sva ugotovili, da je tako preprosta metoda lahko dober pokazatelj pri določanju resnice ali laži.

### Summary:

Nowadays, teenagers are exposed to many traps on the way of their growing up. We live in a rapidly changing society, in a rapid technological growth in all areas of life and every day we are inextricably linked to various media. Unfortunately, in modern times, there are many illegal actions, abuses, violations of individual rights in various cases, the so-called criminal acts. All of this has been captured on film screens in action and detective movies shot after real events. Particularly interesting shown is the work of detectives, police officers and trained forensic scientists, who in most cases solve even complicated and deliberately committed illicit offenses. Usually, the work of several experts is involved in the role of one detective. In the real daily life of police officers and other experts, the investigation of criminal offenses can often not be solved and the offender stays unpunished.

In our research paper we especially wanted to highlight the work of a forensic scientist. They are often mentioned in movies and we were interested in how to become a forensic scientist, what kind of work he or she does.

We were searching for various sources and the following issues are briefly presented: the basic concepts related to illicit crimes; the history of the development of the forensics; branches of the forensics; the course of education and possibilities of employment in Slovenia. We also presented some interesting facts in dealing with criminal offenses in the past, when there were not so many technical precise devices available as they are today.

In the research part of the paper, we used the observatory method of body language among the ninth graders that was used by experts to identify the criminals before developing advanced tools. The eighth as well as the ninth graders also answered questions of the open type, with which we wanted to check their prior knowledge and if they know what the work of forensic scientists is, their knowhow, the difficulty of work and the required education.

The conclusion of our task is that pupils of the elementary schools do not know much about the profession of a forensic scientist, although the term itself is very common in movies. We also examined the observatory method of body language and were surprised to find out that such a simple method can be a good indicator in determining the truth or lies.



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## Auu, moja noga!

**Raziskovalca:** Alina Planinc, Jakob Šnajder

**Mentorici:** Andreja Kolar, dr. Nataša Rizman Herga

**Šola:** Osnovna šola Ormož

**Recenzent:** Boštjan Kozel

### Povzetek:

Naše telo je ustvarjeno za gibanje. Učenci imajo veliko priložnosti za športno udejstvovanje v šoli, klubih in v prostem času. Športno aktivnim pa se lahko pripetijo razne poškodbe. Zanimalo nas je, koliko je športnih poškodb med starejšimi otroškimi osnovnošolci, kje in zakaj so se poškodovali, kdo jim je ob nezgodi pomagal, kakšno poškodbo so utrpeli ter kako je poskrbljeno za zdravje in varnost mladih športnikov.

V raziskovalni nalogi smo uporabili metodo analize virov, metodo anketiranja, dva skupinska pogovora (fokusni skupini) in intervjuje s strokovnjaki področja športa in medicine ter s starši aktivnih športnikov. Ugotovili smo, da je športnih poškodb med našimi učenci veliko. Največ športnih poškodb se pripeti v prostem času, najmanj pa v organizirani športni dejavnosti. Športne poškodbe mladostnikov so lažje in akutne. Najpogostejše so udarnine, zvini in poškodbe vezi. Pri poškodbah so jim pomagali učitelji, trenerji, starši ali soigralci. Učenci naše šole so v anketi in fokusnih skupinah izkazali velik interes za pridobivanje znanja ter veščin za nudenje prve pomoči. Prav tako bi le to v primeru nesreče bili pripravljene tudi nuditi.

Redna telesna aktivnost je pomembna za razvoj mladostnikov. Da ne bi športne poškodbe ovirale mladostnikov pri izvajanju telesne vadbe, pri športni rekreaciji ali aktivnem treniranju, je potrebno nameniti več pozornosti odpravljanju vzrokov športnih poškodb, za kar je potreben celosten pristop s strani staršev, učiteljev, vaditeljev in trenerjev.

### Summary:

Our body is created for movement. Students have many opportunities for sports activities at school, in clubs and in their leisure time. However, sport active people can suffer various injuries. We were interested in the number of sports injuries among older students of Primary school Ormož, where and why they were injured, who helped them at the time of the accident, what kind of injuries they suffered and how the health and safety of young athletes is taken care of.

Throughout the research assignment we used resource analysis method, survey method, two group discussions (focus groups) and made interviews with experts in the field of sport and medicine. We have found that the number of sports injuries is high among our students. Most sports injuries are less complicated and acute. The most common are contusions, sprains and damaged ties. At the time of injury teachers, coaches, parents or teammates offered their help. Our school's students have shown great interest through the results of the survey and during focus group for offering first aid. They would also be willing to offer first aid in the event of an accident.

Regular physical activity is important for the development of adolescents. In order that sports injuries will not prevent adolescents from doing physical exercise, sports recreation or active coaching, we need to give more attention to eliminating the causes of sports injuries, which requires a holistic approach from parents', teachers', trainers' and coaches' point of view.

SKUPINA  
E

## Povezanost agilnosti in učnega uspeha učencev osnovne šole



**Raziskovalke:** Lucija Burgar, Metka Fridl, Ines Malek

**Mentorica:** Urška Jaroš

**Šola:** Osnovna šola Destrnik – Trnovska vas

**Recenzent:** Boštjan Kozel

### Povzetek:

V raziskovalni nalogi smo preverili, kako hitrost in eksplozivna moč vplivata na boljši rezultat testa agilnosti in ugotavljali, kako sta povezana z učnim uspehom učencev. Avtorji v svojih delih različno definirajo agilnost. Eni trdijo, da je agilnost sposobnost hitrih sprememb gibanja v prostoru in času, drugi pa, da je sposobnost pospeševanja, zaustavljanja in hitrih sprememb gibanja ob optimalni živčno-mišični kontroli. Agilnost je sposobnost, ki jo sestavljajo trije sestavni deli: hitrost, moč in koordinacija (tehnika). Z učenci šestega, sedmega, osmega in devetega razreda smo opravili testiranje pri pouku športne vzgoje. Za agilnost smo uporabili t-test, hitrost smo določali pri teku na 20 m z visokim startom, za določanje eksplozivne moči pa smo uporabili skok v daljino z mesta. Pri učnem uspehu smo upoštevali ocene prvega redovalnega obdobja, pri predmetih matematika, slovenščina in glasbena umetnost. S pomočjo programa SPSS smo podatke statistično obdelali. Poleg ugotavljanja povezanosti agilnosti s hitrostjo in z eksplozivno močjo smo primerjali tudi odvisnost agilnosti od spola in starosti učencev ter povezanost agilnosti in učnega uspeha.

### Summary:

In this paper we have conducted a research on how speed and explosive power influence a better result in the agility test as well as how this is connected to the learning success. Various authors define agility differently in their works. Some state that agility is the ability to perform quick changes of movement in time and space, others claim it is the ability of speeding, stopping and performing quick changes of movement by holding an ideal control of the nerves and muscles. Agility is an ability which consists of three main parts: speed, power and coordination (technique). Therefore the students in the sixth, seventh, eighth and ninth grade have undergone a testing in Physical Education lessons. To test agility the t-test was used, speed has been measured in the 20 metres run launched by a high start, explosive power was set by performing standing long jumps. We have used the first term of the school year achievements for the school subjects Mathematics, Slovene and Music to measure learning success.

The statistical data was analysed with the SPSS programme. A connection of agility, speed and explosive power has been researched as well as whether agility is gender or age dependant and whether agility influences the learning success.





## Nasledstvo na kmetijah

**Raziskovalki:** Sonja Topolovec, Tjaša Vindiš

**Mentorica:** Klavdija Murko

**Šola:** Osnovna šola Kidričevo

**Recenzentka:** Julija Potisk

### Povzetek:

Nasledstvo na kmetiji je proces, za katerega je značilno, da njegova urejenost pomeni tudi boljši gospodarski razvoj kmetije. V raziskovalni nalogi smo proučevali urejenost nasledstva na kmetijah iz Dravskega polja in Haloze. V Halozah je kmetovanje zaradi naravnih pogojev oteženo, zato nas je zanimalo, v kolikšni meri to vpliva na urejeno nasledstvo. Pridobljeni podatki so pokazali, da omejene možnosti kmetovanja ne pomenijo nujno neurejenega nasledstva, saj imajo večje število zagotovljenih naslednikov kmetije iz območja Haloze kakor na Dravskem polju. Kljub temu pa imajo nasledniki na kmetijah iz Dravskega polja večje možnosti soodločanja na kmetiji. V prihodnje bi bilo potrebno s strani institucij, kot je Kmetijska zbornica Slovenije, okrepiti ozaveščanje kmetovalcev o pomenu načrtovanja nasledstva za uspešno predajo kmetije.

### Summary:

Heritage on the farm is a process characterized by the fact that its regulation also means better economic development of the farm. In the research project we studied the succession of succession on farms from the Dravsko polje and Haloze. In Haloze, farming is difficult due to natural conditions, so we were interested in the extent to which this affects the regulated heritage. The obtained data have shown that the limited factors of farming do not necessarily represent an unregulated succession, since they have a greater number of guaranteed successors of the farm from the Haloze region than from the Drava Plain. Nevertheless, the successors on farms from the Drava field have greater possibilities of co-decision on the farm. In the future, institutions such as the Agricultural Chamber of Slovenia should increase the awareness of farmers about the importance of planning succession for its successful surrender.

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- ZGODOVINA ALI UMETNOSTNA ZGODOVINA •
- ETNOLOGIJA •
- EKONOMIJA ALI TURIZEM •
- INTERDISCIPLINARNA PODROČJA •

RAZISKOVALNO PODROČJE	ŠOLA	NASLOV RAZISKOVALNE NALOGE
Zgodovina ali umetnostna zgodovina	OŠ Mladika	90 let PGD Spuhlja
Zgodovina ali umetnostna zgodovina	OŠ Olge Meglič Ptuj	Meduza, Versace in Olgica
Zgodovina ali umetnostna zgodovina	OŠ Hajdina	Hajdinske stopinje kulturne dediščine
Etnologija	OŠ Gustava Šiliha Laporje	Res lep je ta zakonski stan
Ekonomija ali turizem	OŠ Kidričevo	Po poteh škrate Šumarja
Ekonomija ali turizem	OŠ Antona Ingoliča Spodnja Polskava podružnica Pragersko	Financiranje vizije Strelskega centra Gaj
Interdisciplinarna področja	ŠC Ptuj Ekonomska šola	Kmetija kot poslovna priložnost



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## 90 let PGD Spuhlja

**Raziskovalki:** Tjaša Rižner, Lara Zamuda

**Mentorica:** Majda Kramberger Belšak

**Šola:** Osnovna šola Mladika

**Recenzentka:** Bojana Murko

### Povzetek:

Gasilstvo ima v naši vasi Spuhlja že 90. letno tradicijo. Raziskovalno nalogo smo naredili z namenom, da pregledamo vso staro, ohranjeno gradivo in primerjamo začetke gasilstva v naši vsi z današnjimi razmerami. V raziskovalni nalogi smo naredili primerjavo med gasilsko opremo nekoč in danes, primerjali smo gasilske domove in način financiranja društva skozi 90-letno zgodovino, sedanji požarni okoliš s starejšimi ohranjenimi. Prav tako smo pregledali število članov, predsednike ter poveljnike od začetka delovanja društva do danes. Ker je dokumentacija iz prvih let delovanja društva skrbno ohranjena, smo naredili pregled vseh ustanovnih članov društva iz leta 1928. Pregledali smo tudi statute, žige in prapore, ki so bili oziroma so v uporabi do danes. Z gasilskim veteranom smo izvedli intervju in skozi njegov pogled izvedeli, kakšni so bili začetki delovanja gasilskega društva v Spuhlji.

Ugotovili smo, da se je število članstva v PGD Spuhlja od začetnih 34 članov do danes povzpelo na 275. Ob ustanovitvi društva so gasilci največkrat pomagali pri gašenju požarov, danes pa zraven požarov pomagajo velikokrat tudi pri drugih elementarnih nesrečah. Prvo alarmiranje gasilcev je potekalo s pomočjo trobentačev, nato ročne sirene, pozneje električne sirene, danes pa s pomočjo sporočil na telefon in po potrebi s sireno. V začetku so požare gasili z vodo, ki so jo zajemali iz globljih studencev v vasi, danes se voda za gašenje uporablja iz hidrantnega omrežja. Iz ohranjene dokumentacije smo ugotovili, da so v prvih letih delovanja dajali velik poudarek na iskanju finančnih sredstev za delovanje društva, ki so jih pridobili s pomočjo prirejanj tombol in veselic ter prostovoljnimi prispevki vaščanov. Gasilska oprema in gasilska vozila so se v 90. letih posodabljali glede na tedanje zmožnosti financiranja in razvoja. Gasilski domovi so bili v začetku majhni, gradili so jih vaščani sami. Sedanji gasilski dom je sodoben in prostoren, zaradi zakonodajnih določil, ga je gradilo podjetje z usposobljeno gradbeno ekipo. Zelo naju veseli, da se število članstva PGD Spuhlja veča in da sva tudi sami članici društva.

### Summary:

The fire brigade has 90 years of tradition in our village Spuhlja. We did our research task with regard to reviewing all old, preserved material and comparing the beginnings of firefighting in our village with today's conditions. In the research project, we made a comparison between fire fighting equipment in the past and today, as well as firefighting homes and the way of financing the department through the 90-year history, the current fire environment with preserved older ones. We have also reviewed the number of members, presidents and commanders since the beginning of the society to the present. Since the documentation from the first years of operation of the Society was carefully preserved, we examined all the founding members of the society from 1928. We also reviewed the statutes, stamps and legacies that were or have been used until today. We conducted an interview with a fire veteran and learned about the beginnings of the firefighting society in Spuhlja.

We found that the number of members of PGD Spuhlja has risen, from the initial 34 members, to 275. When the society was founded, firefighters mostly helped with fire extinguishing, but nowadays they often help with other natural disasters. At first, alarming of the firefighters was carried out with trumpets, then hand sirens, later electric sirens, and today by means of messages on the phone and, if necessary, by siren. In the beginning, fires were extinguished with water, which was pumped from deeper wells in the village. Today water for extinguishing is used from the hydrant network. From the preserved documentation, we found out that in the first years, they put a lot of emphasis on finding financial means for the operation of the department, which they acquired by organizing events such as bingo, dances and voluntary contributions from villagers. Firefighting equipment and firefighters were modernized in the 1990s in consideration of the funding and development capabilities. The fire brigades were initially small, built by the villagers themselves. The current fire brigade is modern and spacious, due to legislative provisions, it was built by a company with a qualified construction team. We are very pleased that the membership of PGD Spuhlja is increasing and that we are also members of the department.

SKUPINA

F

## Meduza, Versace in Olgica



**Raziskovalec:** Tomaž Kelnerič

**Mentorici:** mag. Renata Debeljak, Tatjana Štefanič

**Šola:** Osnovna šola Olge Meglič

**Recenzentka:** Bojana Murko

### Povzetek:

Osnovno šolo Olge Meglič obiskujem deveto leto. Vsak šolski dan najmanj dvakrat vstopim in izstopim skozi velika vrata naše šole. Na prvi pogled nič posebnega, saj to počnejo vsi učenci in učitelji naše šole. Skoraj nihče izmed njih pa ni vedel do nedavnega, kaj predstavlja kamnita figura nad vhodnimi vrati. Prav zaradi tega sem se odločil za raziskovalno nalogo, v kateri sem opisal Meduzino glavo, ki varuje zgradbo. Meduza je omenjena v zgodbah iz grške in rimske mitologije. Njen lik najdemo tudi v likovni, glasbeni, gledališki in filmski umetnosti. In še marsikje drugje. Tako podobo Meduzine glave najdemo tudi pri italijanskemu modnemu oblikovalcu Versaceju. Lik Meduze je zaščitni znak njegove modne znamke. Prav zaradi tega sem raziskovalni nalogi dal malo nenavaden naslov: »Meduza, Versace in Olgica?«. Na prvi pogled se zdi, da ti trije liki nimajo prav nič skupnega.

V nalogi sem se ukvarjal z vprašanjem, kdo sploh je bila Meduza. Legende pripovedujejo, da je bila nekdanja lepa ženska, ki jo je boginja Atena spremenila v grozno pošast. Namesto las je imela na glavi kače. Njen pogled je bil tako smrtonosen, da je vsakdo, ki jo je pogledal, okamenel. Njenim grozodejstvom je naredil konec junak Perzej, ki ji je odsekal glavo. V nalogi sem raziskoval zgodbe iz antične mitologije, v katerih je omenjena Meduza in njene sestre Gorgone. Poiskal sem različne upodobitve Meduze v umetnosti in različna mitološka bitja, ki so povezana s kačami. Raziskal sem tudi, zakaj je Meduzina glava na stavbi, ki so jo zgradili pred 118 leti. V stavbi je bila najprej ptujska gimnazija, danes pa je v njej Osnovna šola Olge Meglič (Olgica na kratko). Poskušal sem najti tudi upodobitve Meduzine glave, ki so se do danes ohranile pri nas oziroma v naši bližini. Raziskal sem, kakšen vpliv je imela Meduza na poimenovanje živali in rastlin, astroloških pojavov, na film, glasbo in literaturo. Prav tako me je zanimalo, zakaj so Meduzino glavo kot zaščito postavljali na hiše in na grobove.

### Summary:

The author has been attending Primary School OŠ Olge Meglič for nine years. He has entered and exited through the school doorway at least twice every school day. Nothing out of the ordinary, as this is done by all the students and teachers of that school. However, none of them have known what the stone figure above the entrance door represented until recently. That is why he chose to do a research paper on Medusa's Head, which is protecting the building. Medusa appears in Greek and Roman myths. She has also been depicted in art, music, theatre and films. Medusa's Head can also be found in the logo of Versace, a famous Italian fashion designer. This research paper tries to ascertain who Medusa really was. Legends say that she had been a beautiful woman who was turned into a monster with snakes in place of hair by the Greek goddess Athena. Gazers upon her face would turn to stone. The paper researches the Greek myths in which Medusa and Perseus, who beheaded her, appear. It also presents her depictions in the arts and provides suggestions other legendary serpents. Furthermore, it tries to find out, why Medusa's Head is depicted on that school's building, why it was placed into tombs and where else in Slovenia it can be found. Finally, it presents the influence that Medusa has had on naming animals and plants, astrological phenomena, films, music and literature.



## Hajdinske stopinje kulturne dediščine

**Raziskovalki:** Nika Sitar, Tia Pleteršek, Niko Ogrizek

**Mentorici:** Marija Meklav, Silva Hajšek

**Šola:** Osnovna šola Hajdina

**Recenzentka:** Bojana Murko

### Povzetek:

Ko govorimo o kulturni dediščini, ne govorimo samo o neki oddaljeni zgodovini na splošno, ampak govorimo tudi o tem, kakšen odnos imamo do kulture danes in kakšna je njena usoda za prihodnost. Eno od področij, kjer ima kultura poseben pomen in veliko priložnost, je vsekakor zgodovina.

Z našo raziskovalno nalogo smo dokazali, da z ohranjanjem kulturne dediščine našega kraja mislimo zelo resno.

Stopati po prostoru, kjer so nekoč stopale rimske vojaške legije, častniki, trgovci, cariniki in s tem na vsakem koraku puščali značilnosti svojega vsakdanjega življenja, običajev in verovanj, so več kot dober razlog, da zgodbo o Hajdini ohranjamo in imena, kot so I. mitrej, Cerkev Sv. Martina in Osnovna šola Hajdina, poneseemo kolikor daleč je mogoče.

### Summary:

When we talk about the cultural heritage we don't only talk about the past in general but also about the attitude to culture and the importance of culture for the future. One area where culture has a special status and can be very prosperous is tourism.

Our project on tourism proves that we are serious about preserving the cultural heritage of our village.

Walking where Roman legions, officers, merchants and customs officers used to walk leaving the marks of their everyday lives, customs and beliefs, is a good reason, to keep the story of Hajdina alive as long as possible.



## Res lep je ta zakonski stan

**Raziskovalki:** Blažka Gradič, Karolina Leskovar

**Mentorica:** Marjetka Čas

**Šola:** Osnovna šola Gustava Šiliha Laporje

**Recenzentka:** Bojana Murko

### Povzetek:

Namen najine raziskovalne naloge je bil, da bi podrobneje spoznali šege in navade ob porokah nekoč in jih primerjali z današnjimi. Zanimalo naju je, kako je potekal poročni obred, pri katerih letih so se poročali, kako je bila oblečena nevesta in kako ženin, kako je potekalo poročno slavlje, katere jedi so postregli in kakšni so bili običaji ob porokah v naših krajih. Raziskati sva želeli, kdo je običajno igral na svatbah in kakšen je bil izbor pesmi.

Dela sva se lotili z zbiranjem virov in literature. Na terenu sva obiskali informatorje in izvedli anketo med starši in starimi starši. Zbrali sva poročne fotografije in jih kronološko uredili. Na koncu sva zbrane podatke analizirali.

Raziskovalni intervju sva opravili z gospodi Ano Gradič, Veroniko Erker in Marijo Majer ter gospodoma Albinom Majerjem in Ivanom Potiskom. Poroke in poročnega slavja so se vsi zelo radi spominjali. Povedali so nama, da je bil poročni obred v preteklosti bolj preprost kot danes. Večjo težo kot civilna poroka je imela cerkvena, saj so bili ljudje zelo verni. Oblečila so bila praznja; moški so nosili eleganten suknjič, hlače in belo srajco, ženske pa obleko ali kostim s krilom. Na glavi so neveste najpogosteje imele "šlajer" oz. tančico ali polkrožni venček iz belih rož. Hrana je bila domačega izvora, velikokrat so jo nekaj dni pred poroko prinesli povabljeni svatje. Na porokah so kuhale priznane vaške kuharice. Poseben pomen so imeli ljudski godci, ki so na porokah igrali poskočne viže.

Iz analize ankete sva ugotovili, da ljudje dokaj dobro poznajo stare običaje, povezane s poroko, vendar jih le malo ohranjajo. Zelo malo ljudi pozna ženitovanjsko pogodbo ter šenkvanje, ki sta bila nekoč na porokah ključnega pomena. V pozabo gre tudi pogostvanje ter klicanje neveste. Danes se nekateri pari poročajo samo civilno in v krogu najožje družine, nekateri celo samo s pričami. V preteklosti je poroka trajala vsaj dva dni ali več, danes pa samo še en dan. Ugotovili sva, da je bil v preteklosti poročni meni zelo preprost. Jedli so podobne jedi, kot so se na mizi pojavile ob nedeljah in praznikih. Za pripravo jedi so uporabljali predvsem živila domačega izvora.

Prišli sva do zaključka, da se ljudje zavedajo, da je pomembno ohranjati stare ljudske običaje zato, da se ohrani tradicija in da bodo tudi naši zanamci poznali bogato kulturno dediščino, povezano s porokami.

### Summary:

The aim of our research was to thoroughly investigate weddings in the past and to compare them to wedding ceremonies of today. We were particularly interested in a wedding ceremony in the past, the age of bride and groom, the wedding gowns, how the wedding was celebrated, traditional food that was served and other wedding traditions in our surroundings. We wanted to find out who played at weddings and what kinds of songs were played.

Our research has started by collecting sources of information and literature. We have visited an informer and carried out a questionnaire among parents and grandparents. At the end all the information were analysed.

We have carried out interviews with Mrs Ana Gradič, Veronika Erker, Marija Majer and with Mr Albin Majer, and Ivan Potisk. They were all glad to remember their wedding celebrations. We have found out that the wedding ceremonies in the past were much simpler. People were very religious at that time and the church weddings were more valued than the civil weddings. People were dressed very formal, men wearing elegant jackets, trousers and white shirts, while women were dressed in gowns or suits with skirts. Brides usually wore a veil or wreath made of white flowers. Food was locally produced, usually brought by wedding guests a few days before the wedding. The food was cooked by renowned village cooks. Folk musicians who performed lively music played an important part too.

Questionnaire analysis revealed that people are still familiar with old wedding traditions, but only a few of them are preserved. Very little people are familiar with "ženitovanjska pogodba" or "švenkanje", which were an important part of the wedding ceremony in the past. The traditions of "pogostovanje" and "calling of the bride" are sinking into oblivion. Civil weddings are quite common nowadays, and couples sometimes get married in a family circle, or only in presence of maid of honour and best man. In the past wedding celebrations usually lasted two days (or more) in contrast of one day wedding celebrations of today. Wedding menu used to be very simple and people served the dishes that were usually eaten on Sundays. Locally produced products were used.

We have established that people are well aware of importance of preserving old folk traditions. They think that preserving them will enable our descendants to learn about rich wedding cultural heritage.



## Po poteh škrata Šumarja

**Raziskovalke:** Neja Kupčič, Jana Aubelj,  
Kaja Muršec

**Mentorici:** Klavdija Murko, Aleksandra Vidovič

**Šola:** Osnovna šola Kidričevo

**Recenzentka:** Anja Potočnik

### Povzetek:

V evropskem letu kulturne dediščine 2018 smo mlade raziskovalke pripravile idejni turistični program, ki temelji na spoznavanju kulturne dediščine domačega kraja Kidričevo. Kulturno-turistična pot z naslovom Po poteh škrata Šumarja je predvidena v okviru enodnevnega dogodka, na katerem se po njej sprehodijo mlajši učenci. Preko iskanja stopinj škrata Šumarja, reševanja raznih nalog ter ustvarjanja v delavnicah, bodo lahko na zanimiv in razumljiv način spoznavali preteklost kraja ter njegovo nepremično kulturno dediščino. Na poti bodo izvedeli veliko novega, na koncu pa pri dvorcu Sternthal rajali skupaj s škratom Šumarjem.

### Summary:

In the European Year of Cultural Heritage 2018, we, a group of young researchers, prepared a concept of a touristic programme based on the recognition of the cultural heritage of our home town Kidričevo.

The cultural - touristic trail entitled as "On the paths of the forest gnome Šumar" is meant to be used for a one-day event, where younger pupils walk on it. Through searching for footprints of gnome Šumar, solving various tasks and creating in workshops, they will be able to learn about the past of Kidričevo as well as its immovable cultural heritage in an interesting and understandable way. On the way, they will also learn a lot of new things, and finally, at the castle of Sternthal, they will dance with gnome Šumar.



## Financiranje vizije Strelskega centra Gaj

**Raziskovalec:** Jan Mikložič

**Mentorica:** Bojana Marin

**Šola:** Osnovna šola Antona Ingoliča Spodnja  
Polskava, podružnica Pragersko

**Recenzentka:** mag. Mirjana Nenad

### Povzetek:

V raziskovalni nalogi bom predstavil zelo pomembno vprašanje vsakega podjetnika, kako financirati investicije. Financiranje je pridobivanje finančnih sredstev iz različnih virov in nam pove, od kod prihaja kapital. Financiranje je za podjetje zelo velikega pomena, saj je ključ za poslovanje in razvoj podjetja. Kot posebna oblika možnega financiranja investicij v podjetju, mi je bila zanimiva možnost financiranja s kriptovalutami. Svojo idejo sem želel preizkusiti na konkretnem primeru. Primerno podjetje za raziskavo glede možnih načinov financiranja se mi je zdel Strelski center Gaj, ki se nahaja v mojem domačem kraju. V raziskovalni nalogi bom zato najprej predstavil Strelski center Gaj, opisal njegovo poslanstvo in namen. Natančneje bom predstavil vizijo Strelskega centra Gaj, ki mi jo je zaupal direktor podjetja. Na osnovi podatkov, ki sem jih pridobil, sem izdelal zaprto finančno konstrukcijo. S pomočjo intervjujev sem raziskal, kako lahko podjetje Strelski center Gaj financira svojo vizijo. V raziskovalni nalogi sem s pomočjo ankete raziskal poznavanje vizije Strelskega centra Gaj med mojimi vrstniki ter njihovo morebitno znanje o kriptovalutah in financiranju.

### Summary:

The aim of this research paper is to present the answer to the question on every entrepreneur's mind, which is how to fund his business. The term financing means to obtain financial means from different sources and can also provide the source of the capital. Moreover, financing plays an important role in every company, since it is considered to be the key for successful business and its further development. I considered the option of funding a company's financial means with cryptocurrencies very interesting and because of that I decided to put my idea to the test on an actual case. The most suitable company in the term of financing founds in my area seemed to be the Shooting range Gaj, which is located nearby my home. In the course of my research paper I am going to present the company and describe its mission and intentions. Furthermore, I am also going to describe in detail the company's vision for the future according to its manager. Based on the data I have gained throughout my research process, I have been able to make a report on how a businessman can successfully close a deal without any missing links within the process. Moreover, I have also been able to conduct some interviews where I found out how the shooting range is going to finance its vision for the future. In addition to this, I also carried out a survey among my fellow schoolmates to test their knowledge on financing and cryptocurrencies.



SKUPINA

F

## Kmetija kot poslovna priložnost

**Raziskovalka:** Anja Babič

**Mentorici:** Patricija Koler, Petra Oblak

**Šola:** Šolski center Ptuj – Ekonomska šola

**Recenzentka:** mag. Mirjana Nenad

### Povzetek:

Področje raziskovalne naloge je interdisciplinarno. Tema povezuje kmetijstvo s podjetništvom, pomen lokalno pridelanih živil in primerjavo nekaterih podatkov s sosednjo Avstrijo. V raziskovalni nalogi sem ugotovila, da ima družinska kmetija vsekakor veliko boljše možnosti za obstoj in razvoj, če se kmetovanja loti podjetno in mladim dovoli vnašanje novih inovativnih idej.

S pomočjo ankete in analize ponudbe na tržišču ugotavljam, da so ljudje še vedno premalo osveščeni o pomenu lokalno pridelanih, domačih živil ter se preslabo zavedajo ključnega pomena samooskrbe v državi.

Naše kmetijstvo se rado primerja s sosednjo Avstrijo s predpostavko, da država kmetovalcem zagotavlja boljše pogoje preživetja. Pravzaprav pa so kupci tisti, ki se zavedajo domače pridelave in z nakupi podpirajo obstoj in razvoj domačega kmetijstva v Avstriji.

Osnovni namen naloge je bil raziskati, ali voditi kmetijo kot uspešno podjetje in postati uspešna podjetnica, ali se kot odličnjakinja zaposliti kje drugje v gospodarstvu.

Na to temo je že kar nekaj raziskanega, vendar gre v večini za splošne statistične podatke in podatke o načinu dobrega poslovanja kmetij. Raziskovala sem s pomočjo analize statističnih podatkov, primerov dobrih praks, ankete in intervjuja. Ugotovila sem, da je kmetijstvo močno povezano z različnimi področji in da je kmetijstvo pomembna gospodarska panoga, ki je v Sloveniji premalo cenjena.

Raziskovalna naloga je pripomogla k moji karierni odločitvi, saj sem spoznala, da bo organizacija dela na naši kmetiji zame pravi izziv.

### Summary:

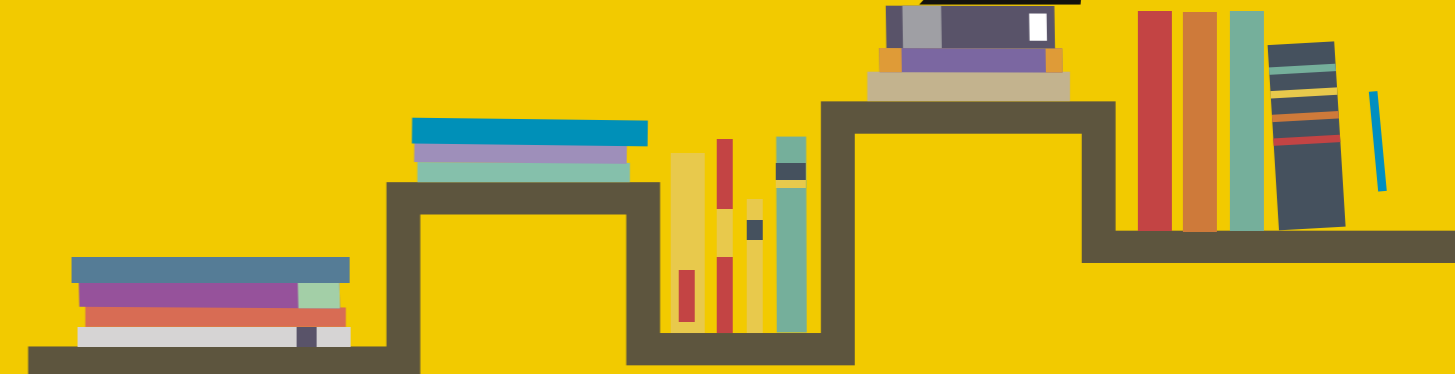
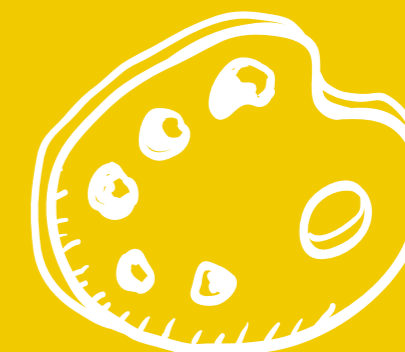
The area of research is interdisciplined. The topic connects agriculture with entrepreneurship, the meaning of locally grown food and comparison of some data with neighbouring Austria. In the research paper, I found that family farm has much better options for existence and development if the farming set onself commercially and allows young people to enter new innovative ideas.

With the help of a questionnaire and analysing market offer I found out that people are still not aware enough of the meaning of locally grown food, homemade food and they are not well aware about the vital importance of self-supply in the country.

Our agriculture likes to compare with Austria with assumption, that country provides farmers better survival conditions. Actually, the costumers are those who are aware about domestic production and with purchases they support the existence and development of domestic agriculture in Austria. Basic purpose of the task was that to investigate or to run a farm as a succesful company and become succesful entrepreneur, or as an excelletnt student work somewhere in the economy.

This topic is already quite something that has been researched, but mostly these are general statistics and good practices of farm operations. I was researching with the help of analysis of statistical data, examples of good practices, surveys and interviews. I found out that agriculture is strong connected with different areas and that it is an important industry, which is not well appreciated in Slovenia.

The research paper has aid to my career decision, because I know that organisation of work on our farm will become a real challenge for me.



# UVRSTITVE NA DRŽAVNEM SREČANJU MLADIH RAZISKOVALCEV SLOVENIJE

Murska Sobota, 14. maj 2018

## OSNOVNE ŠOLE

ŠOLA	NASLOV NALOGE	PRIZNANJE
OŠ Gustava Šiliha Laporje	Z enega na drugi breg	ZLATO
OŠ Kidričevo	Nasledstvo na kmetijah	ZLATO
OŠ Antona Ingoliča Spodnja Polskava	Naredi si sam: Tolkalo cajon	ZLATO
OŠ Ormož	Auu, moja noga!	SREBRNO
OŠ Kidričevo	Odtisi kot kazalniki vpliva na okolje	SREBRNO
OŠ Antona Ingoliča Spodnja Polskava, podružnica Pragersko	Financiranje vizije Streleskega centra Gaj	SREBRNO
OŠ Gustava Šiliha Laporje	Res lep je ta zakonski stan	SREBRNO
OŠ Kidričevo	Ko zapojejo poročni zvonovi	SREBRNO
2. OŠ Slovenska Bistrica	Ali čevljarji gredo v korak s časom?	SREBRNO
OŠ Mladika	Mladinski vogal	BRONASTO
OŠ Antona Ingoliča Spodnja Polskava, podružnica Pragersko	S QR kodo po Pragerskem	BRONASTO
OŠ Ljudski vrt Ptuj	Ali je kaj trden most?	BRONASTO
OŠ Gustava Šiliha Laporje	Izkoristek fotovoltaičnih panelov glede na lego	BRONASTO
OŠ Gustava Šiliha Laporje	Lahko z vodnimi bolhami dokažemo, da je vodni kefir zdravilen?	BRONASTO
OŠ Destrnik - Trnovska vas	Povezanost agilnosti in učnega uspeha učencev osnovne šole	BRONASTO
OŠ Majšperk	Vpliv družbenih omrežij na učence višjih razredov Osnovne šole Majšperk	BRONASTO
2. OŠ Slovenska Bistrica	Učimo se v (učnem) stilu	BRONASTO
OŠ Anice Černejeve Makole	Komunikacija z emoji	BRONASTO
OŠ Gorišnica	Povezava med dejanji, barvami in čustvi	BRONASTO
OŠ Mladika	90 let PGD Spuhlja	BRONASTO

## SREDNJE ŠOLE

ŠOLA	NASLOV NALOGE	PRIZNANJE
ŠC Ptuj Ekonomska šola	Hotel za živali, Fauna d. o. o.	BRONASTO
ŠC Ptuj Elektro in računalniška šola	Studio za glasbo in svetlobne efekte	BRONASTO
ŠC Ptuj Ekonomska šola	Kmetija kot poslovna priložnost	BRONASTO
ŠC Ptuj Elektro in računalniška šola	Raziskovanje, načrtovanje in izvedba kratkega filma	BRONASTO

## ABECEDNI SEZNAM OSNOVNIH ŠOL

OSNOVNE ŠOLE
2. OŠ Slovenska Bistrica
OŠ Anice Černejeve Makole
OŠ Antona Ingoliča Spodnja Polskava
OŠ Antona Ingoliča Sp. Polskava, podružnica Pragersko
OŠ Destrnik - Trnovska vas
OŠ Gorišnica
OŠ Gustava Šiliha Laporje
OŠ Hajdina
OŠ Kidričevo
OŠ Ljudski vrt Ptuj
OŠ Majšperk
OŠ Markovci
OŠ Mladika Ptuj
OŠ Olge Meglič Ptuj
OŠ Ormož
OŠ Središče ob Dravi
OŠ Velika Nedelja
OŠ Videm

## ABECEDNI SEZNAM MLADIH RAZISKOVALCEV OSNOVNIH ŠOL

MLADI RAZISKOVALCI
Ajda Mikša
Alen Roškar
Alina Planinc
Ana Erhatic
Ana Pučnik
Annemarie Trunk
Anže Lešnik
Blaž Bratuša
Blažka Gradič
Blažka Horvat
Blažka Margušič
Brina Voljč
Charlie Križanc Stojnšek
Damjan Dovnik
Danijel Gavrić
Dejan Gavrić
Eva Klarič
Eva Žunkovič
Filip Rap
Gaia Jelen
Gaj Bregant
Ina Voljč
Ines Malek
Jakob Šnajder
Jan Mikložič
Jana Aubelj
Juš Pešak
Kaja Horvat
Kaja Muršec
Kaja Vantur
Karla Rap
Karolina Leskovar
Lara Zamuda
Lazar Raković
Lina Horvat
Lina Kovač
Lucija Borak
Lucija Burgar

Luka Perkovič
Luka Urban Kitek
Maja Ferik
Maja Vogrinec
Matic Juršnik
Metka Fridl
Miha Golob
Miha Sterkuš
Mija Pipenbaher
Neja Kupčič
Neja Škrjanec
Neža Kavkler
Nia Krajnc
Nik Mlinarič
Nika Horvat Sušanj
Nika Korez
Nika Sitar
Niko Ogrizek
Oskar Kaljun
Rok Stupan
Sonja Topolovec
Špela Gajšt
Tanaja Čeh
Tia Pleteršek
Tina Voljč
Tjaša Rižner
Tjaša Vindiš
Tomaž Kelnerič
Zala Klančnik
Zala Roškar
Zara Muzek
Zoja Gobec
Zoja Malec
Zoja Topolovec

## ABECEDNI SEZNAM MENTORJEV OSNOVNIH ŠOL

MENTORJI
Aleksander Šterman
mag. Aleksandra Čeh
Aleksandra Kociper
Aleksandra Vanček
Aleksandra Vidovič
mag. Alenka Fidler
dr. Andrej Šafhalter
Andreja Kolar
Ankica Pikula
Barbara Čretnik
Bojana Marin
Boža Arko
David Vodušek
Davorin Horvat
Igor Kaučič
Igor Keber
Ines Jarh
Jana Jerenec
Janja Kitak
Katja Leva
Klavdija Murko
mag. Maja Korban Črnjavič
Majda Kramberger Belšak
Marija Meklav
Marijan Krajncan
Marjana Štern
Marjetka Čas
Mateja Lašič
Natalija Kovše
Natalija Leskovar
dr. Nataša Rizman Herga
Nataša Vauda
Nejc Korošec

Nina Žnidarič
mag. Renata Debeljak
Saša Krajnc Bek
Silva Hajšek
Simona Hajnal
Sonja Lenarčič
Stanislav Bezjak
Tamara Mlakar
Tara Sinkovič
Tatjana Štefanič
Tihana Bezdob
Tina Brodnjak Kokot
Urška Jaroš

## ABECEDNI SEZNAM SREDNJIH ŠOL

### SREDNJE ŠOLE

ŠC Ptuj, Ekonomska šola

ŠC Ptuj, Elektro in računalniška šola

## ABECEDNI SEZNAM RAZISKOVALCEV SREDNJIH ŠOL

### MLADI RAZISKOVALCI

Anja Babič

Anja Strelec

Kaja Smolinger

Luka Kokot

Nina Bošnjak

Viktorija Savič

## ABECEDNI SEZNAM MENTORJEV SREDNJIH ŠOL

### MENTORJI

Franc Vrbančič

Patricija Koler

Petra Oblak

Vesna Trančar

Vida Vidovič

## ABECEDNI SEZNAM RECENZENTOV

### RECENZENTI

Anja Potočnik

Barbara Rižnar

Bojana Murko

Boštjan Koletnik

Boštjan Kozel

Damjana Lah

Daniel Tement

dr. Dragica Pešaković

dr. Dušan Klinar

Iva Ferlinc

Julija Potisk

Klavdija Srša

Klementina Pulko

dr. Martin Trbuc

Dr. Martina Horvat

mag. Mirjana Nenad

Mitja Lah

Romert Novak

dr. Štefan Čelan



## IZVEDBO PROJEKTA SO OMOGOČILI:

Mestna občina Ptuj

Občina Destrnik

Občina Dornava

Občina Gorišnica

Občina Hajdina

Občina Juršinci

Občina Kidričevo

Občina Majšperk

Občina Markovci

Občina Ormož

Občina Slovenska Bistrica

Občina Središče ob Dravi

Občina Trnovska vas

Občina Videm

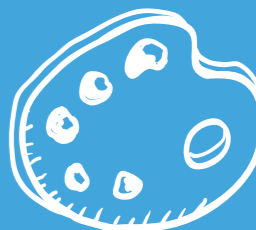
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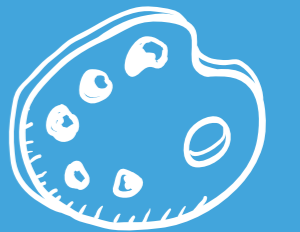
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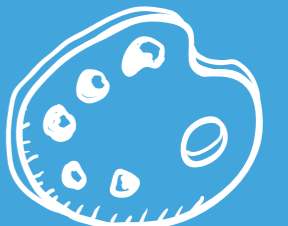
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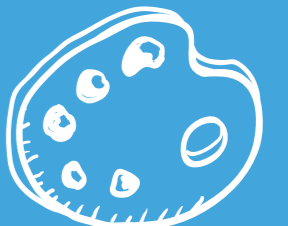


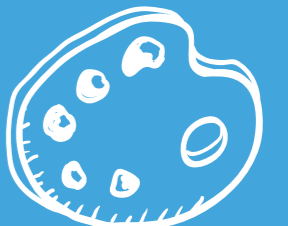




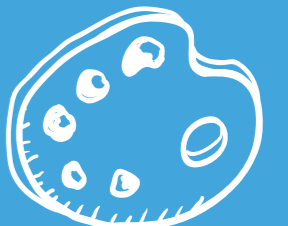


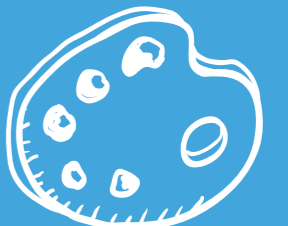


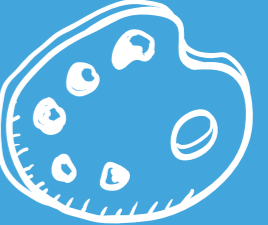


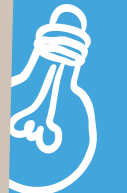
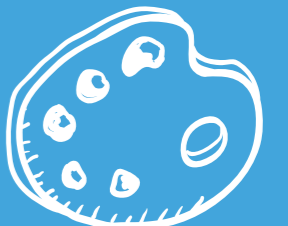


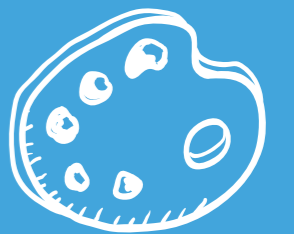
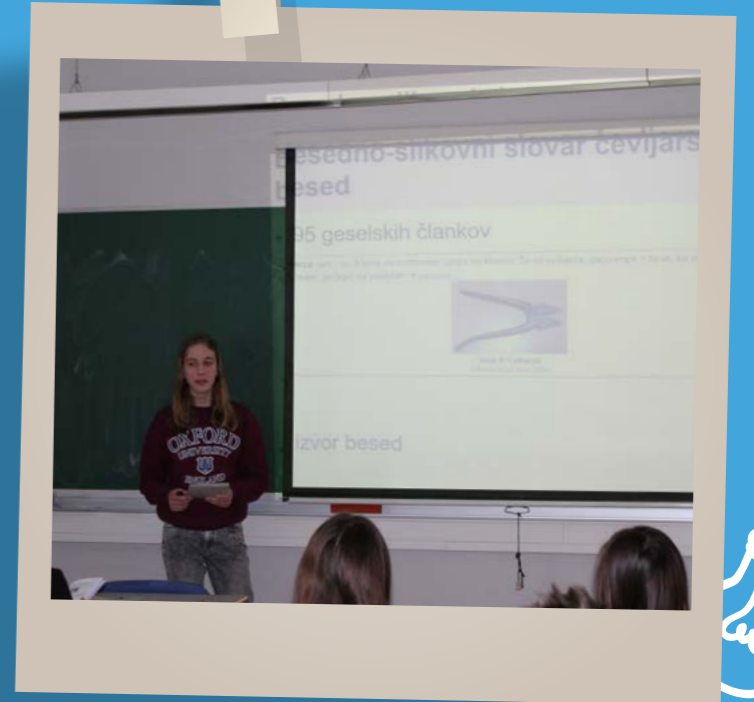






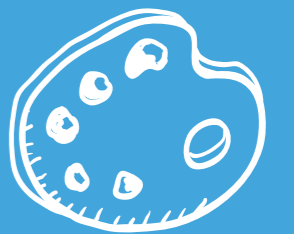
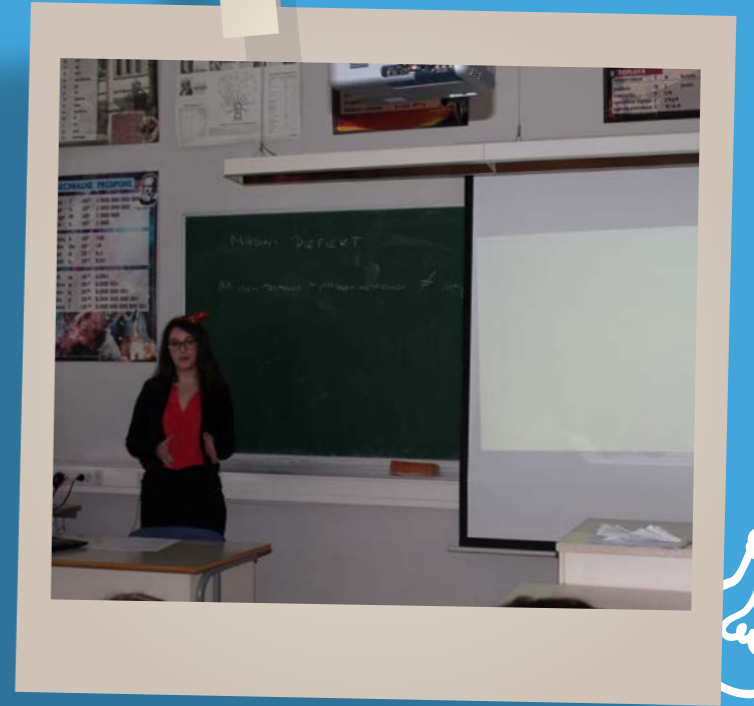






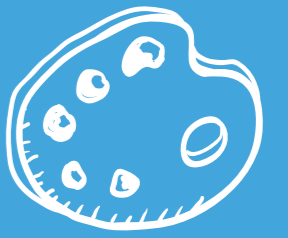








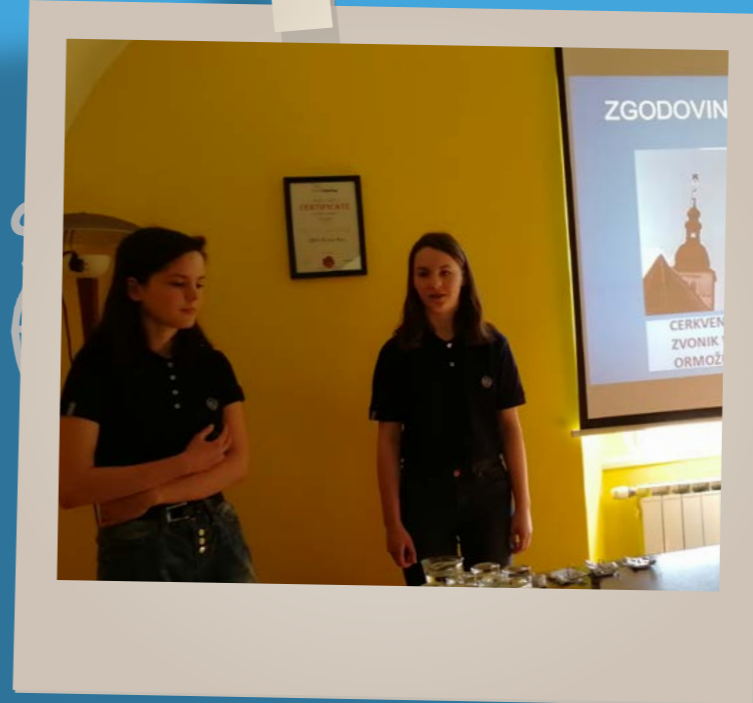






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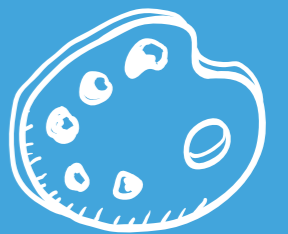
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- Mnenje drugih ljudi ne bi se
- Zavedanje zaščitnega stari

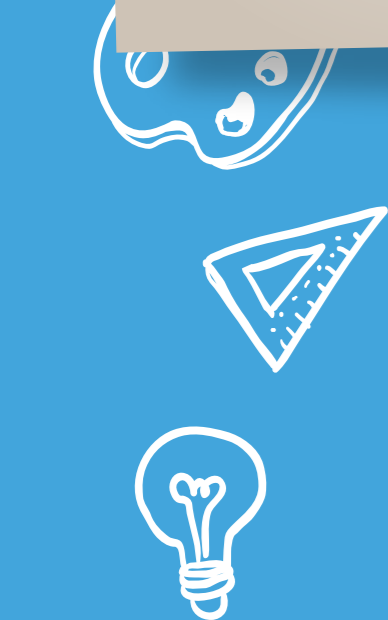
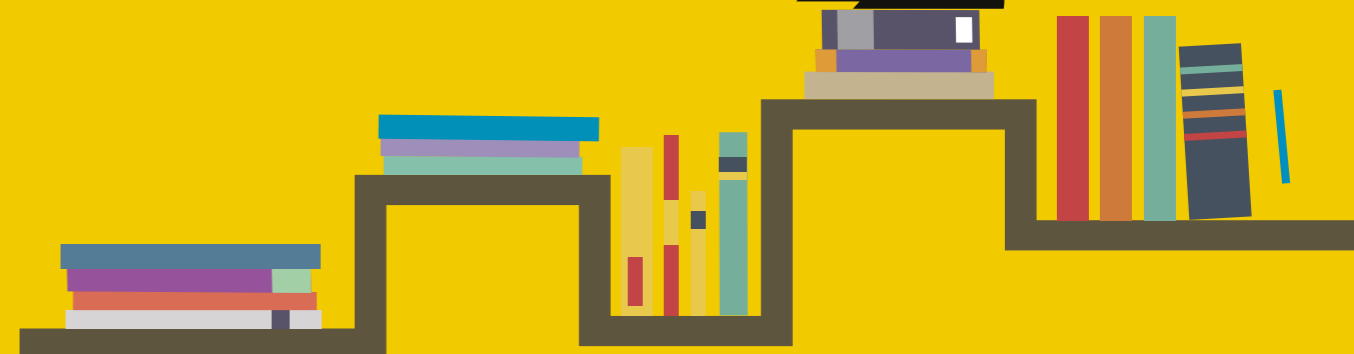
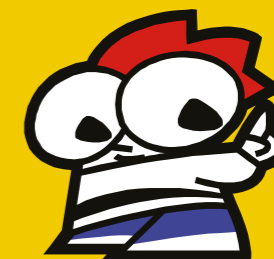
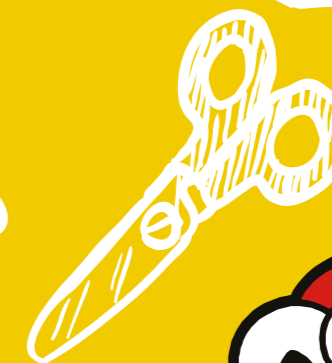
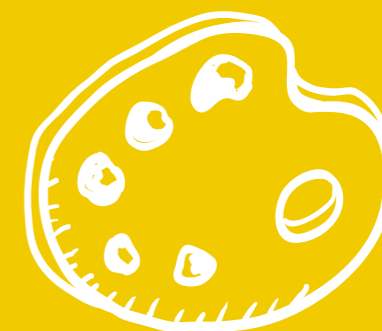
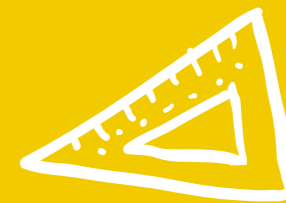


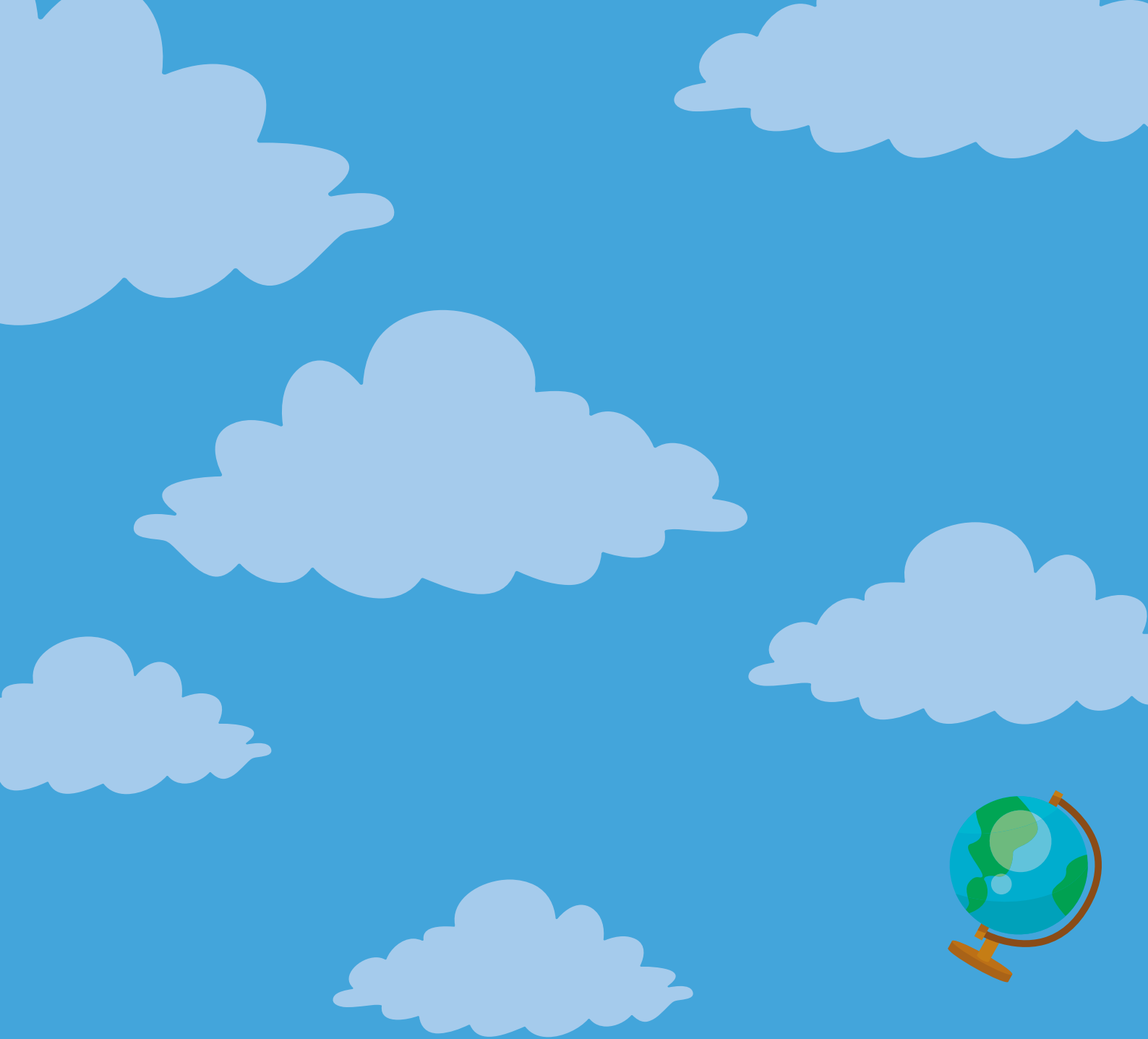
ZGODOVIN



CERKVEN ZVONIK ORMOZ







ZRS **Bistra**  
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