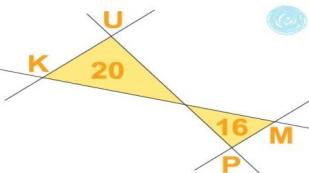


Inter@ktivna matematika

Tatjana Gulič in Amela Sambolić Beganović

OŠ Preska in ZRSS



3. mednarodna konferenca
o učenju in poučevanju matematike
KUPM 2016



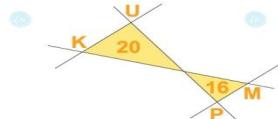
REPUBLIKA SLOVENIJA
**MINISTRSTVO ZA IZOBRAŽEVANJE,
ZNANOST IN ŠPORT**



Naložbo sofinancira Evropski socialni sklad ter Ministrstvo za izobraževanje, znanost in šport.

Povezava do predstavitve

<http://url.sio.si/rW8>



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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA IZOBRAŽEVANJE,
ZNANOST IN ŠPORT

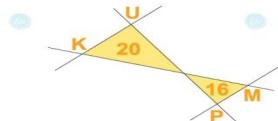


EVROPSKA UNIJA
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Cilji delavnice:

- seznanitev z izbranimi aplikacijami, ki omogočajo preverjanje (pred)znanj, učinkovito in hitro podajanje povratnih informacij ter ustvarjanje
- predstavitev smernic (didaktičnih napotkov) za uporabo IKT pri matematiki
- načrtovanje dejavnosti za učence z vključevanjem predstavljenih aplikacij in smernic z namenom razvijanja in preverjanja vsebinskih ciljev predmeta in veščin kot so npr. komunikacija, sodelovanje, ustvarjanje.



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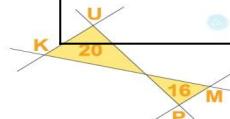


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Časovno vsebinska dinamika delavnice

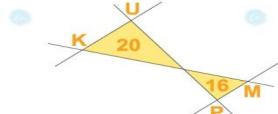
5 min	Predstavitev ciljev in poteka delavnice, organizacija in oblike dela.
10 + 20 min	goFormative (kako deluje, zakaj in kako se uporablja, kje jo najdemo, izkušnje, priporočila, izdevala lastnega primera)
10 + 20 min	Toondoo (kako deluje, zakaj in kako se uporablja, kje jo najdemo, izkušnje, priporočila, izdelava lastnega primera)
10 min	Smernice (didaktični napotki) za uporabo IKT za matematiko
10 min	Izmenjava/smiselna umestitev predstavljenih aplikacij v pouk



formative

Intervene in the moments that matter most.

GET LIVE RESULTS!



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Quick Code G

1

Build > Preview > Live Results

Assign

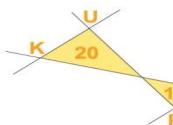
Quick Do Now (typed response)

Kako pogosto uporabljate mobilne naprave v razredu?

- nikoli
 - zelo redko
 - vsaj enkrat na mesec
 - skoraj vsak teden
 - Add a new option

 Quick Code  Link  Classroom  Embed Code

Enter this code at
<http://goformative.com/join>





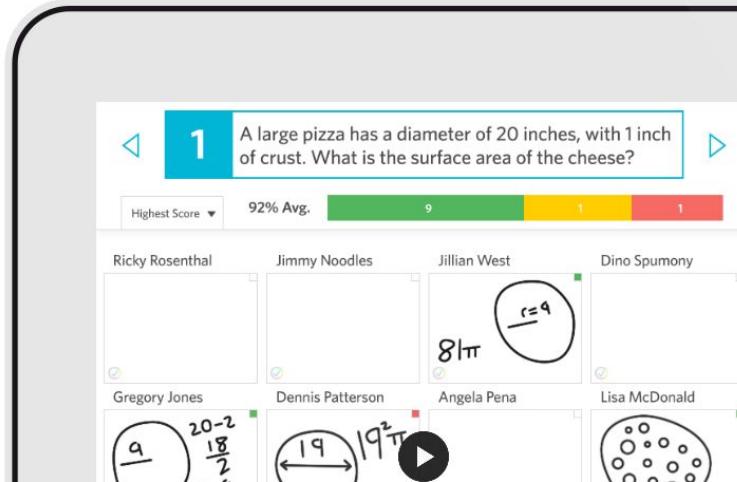
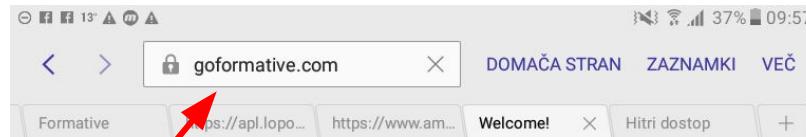
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Zavod Republike Slovenije za Sport

Kako sestaviti vprašalnik, nalogu, test....

<http://goformative.com>



ra Evropski
Ministrstvo za
inšt in šport.



checks for understanding
guarantee student growth.



Real-Time Intervention

Know exactly what each student needs as they learn and take immediate actions.



Formative accounts are **FREE** for teachers and students!

If you are interested in school PD or a district implementation, please [contact us!](#)

Sign up as a:

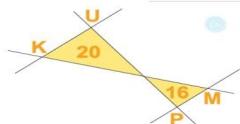
TEACHER

STUDENT



Save Time

Spend time on what matters. Say goodbye to stacks of paper to grade and manage.



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Zavod Republike Slovenije za šolo

Assignments

Profile

Classes

Sign Out

+ New Assignment!

+ New Folder

Fizika

Share | Rename
| Delete

Matematika

Share | Rename
| Delete

Pred pripravljeni-Preverjanje razumevanja

Share | Rename
| Delete

Splošno

Share | Rename
| Delete

A Sample Formative Assessment with Responses

4 Responses 7/8/15

Quick Do Now (typed response)

0 Responses 7/8/15

Quick Exit Ticket (typed response)

0 Responses 7/8/15

Quick Show Your Work (draw response or image upload)

0 Responses 7/8/15

Uvodno vprašanje - zapiši tri ugotovitve, zakone ali vprašanja iz snovi prejšnje ure.

0 Responses 10/22/16

View Tutorial Videos

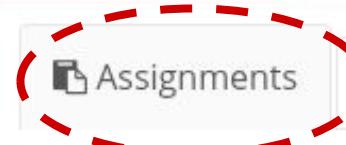
Found a Bug?

formative

Community

Quick Code

Dashboard



Profile

Classes

Sign Out

+ New Assignment!

+ New Folder

Assignments > Matematika



Enačbe

zu Response

10/16/16

Edit

Assign

Live
ResultsShare
with teachers

Izračunaj v zvezek, slikaj svoj zapisa na

16 Responses

10/16/16

View Tutorial Videos

Found a Bug?

Quick Code

GO



Build > Preview > Live Results

Assign

Untitled Formative

ADD QUESTION

ADD CONTENT

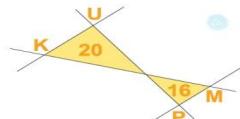
UPLOAD & TRANSFORM

Image

Text Block

View-Only Canvas

YouTube



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formative

Quick Code **GO**

T formative

36% 10:10

Build > Preview > Live Results

Assign

Build > Preview > Live Results

Assign

Untitled Formative

ADD QUESTION

ADD CONTENT

UPLOAD & TRANSFORM

Image

Text Block

View-Only Canvas

YouTube

13°

36% 10:10



Label this page of your uploaded document.



Drag a file here or click to upload.

Build > Preview > Live Results

Assign

Untitled Formative

ADD QUESTION

ADD CONTENT

UPLOAD & TRANSFORM

Multiple Choice

Show Your Work

Short Answer

True / False

ADD QUESTION

ADD CONTENT

UPLOAD & TRANSFORM

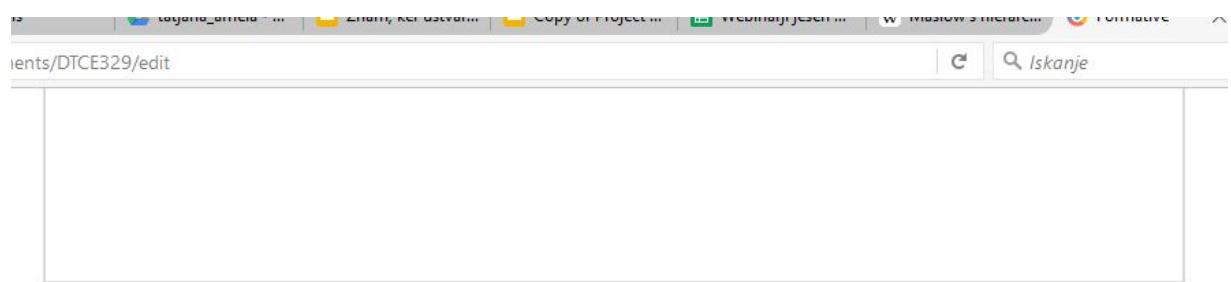
Image

Text Block

View-Only Canvas

YouTube

TG



? help text

points 10

3 Show Your Work

Type question text here...



add a background image / edit the student canvas

Currently, your students have a blank canvas to draw and/or upload images.

? help text

points 10

ADD QUESTION

ADD CONTENT

UPLOAD & TRANSFORM

NJE,



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Build > Preview > Live Results

Assign

Pregled možnosti-mat

Tatjana Gulič

Tatjana Gulič

1 Kako pogosto uporabljate mobilne naprave v razredu?

- nikoli
- zelo redko
- vsaj enkrat na mesec
- skoraj vsak teden

Podobni trikotniki.


Pregled možnosti-mat

1 Multiple Choice

Kako pogosto uporabljate mobilne naprave v razredu?

- nikoli
- zelo redko
- vsaj enkrat na mesec
- skoraj vsak teden
- Add a new option

Select a final answer from the choices above.

help text

points 10

Pregled možnosti-mat

Enable for:

Everyone

Only Classes

 Publicly Available

Access

Anyone can respond (no login required).
Guests can't receive feedback or see their scores.

Quick Code

Link

G

Embed Code

NKFM236

Enter this code at
<http://goformative.com/join>

Build > Preview > Live Results

Assign**Export**

Testiranje možnosti-spolšno

View Single Question ▾

1 2 3

Filter All ▾

◀ Vriši vsaj dve poti raziskovalcev v času velikih odkritij.
(Vsako s svojo barvo)

[Show question details](#)

Sort Last Name ▾

A
Z

2

%



T G

Last Name	First Name	Role
Modrijan	založba, d.o.o.	Scientist
Modrijan	založba, d.o.o.	Scientist

© Modrijan založba, d.o.o.

Tatjana Gulič

© Modrijan založba, d.o.o.

Rezultati, izvoz rezultatov

The screenshot shows a web browser displaying the Formative platform at the URL goformative.com/teacher/#/assignments/CFWP967/live-results/24031618. A large red arrow points from the top-left towards the 'Export' button. The page title is 'formative'. The main content area shows a math equation being solved:

$$\frac{1}{3}x + 1 = \frac{5}{6}x + \frac{2}{3}$$
$$\frac{1}{3}x + 1 = \frac{5}{6}x + \frac{2}{3} \quad / \cdot 6$$
$$(\frac{1}{3}x + 1) \cdot 6 = (\frac{5}{6}x + \frac{2}{3}) \cdot 6$$

Below the equation, there is a note in Slovene: "S skupnim imenovalcem 6 pomnožimo vsak člen enačbe in ulomke skriji". The interface includes a 'Build > Preview > Live Results' navigation bar, a 'Single Question' view dropdown, a 'Filter All' dropdown, and buttons for 'Assign' and 'Export' (which is circled in red).

2 3 4 5 6 7

Sevanja enačbe

assignment_export_CFWP967 [Samo za branje] - Microsoft Excel

Datoteka Osnovno Vstavljanje Postavitev strani Formule Podatki Pregled Ogled Acrobat

Odp Iz Accessa Iz spletu Iz besedila Iz drugih virov Obstoječe povezave Osveži vse Lastnosti Uredi povezave Povezave Razvrsti Filter Počisti Uporabi znova Dodatno Besedilo v stolpcu Odstrani dvojnice Preverjanje veljavnosti podatkov Usklajevanje Analiza kaj če Podatkovna orodja Združi Razdrži Delna vsota Oris Pokaži Skrij p

Izl Pridobi zunanje podatke Razvrsti in filtriraj

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	first_name	last_name	total_poir	total_poir	classes	1_text	1_points	1_points	1_respons	2_text	2_points	2_points	2_respons	3_text	3_points	3_points	4_text
2	Tg	G	70	0	KakL'ne v	10	0	Ekvivalentne, identi		10	0				10	0	
3	T	G	70	17	KakL'ne v	10	0	Ekvivalentne, identi		10	0				10	10	http://goformative.co
4	Íliga	guzelj	70	0	KakL'ne v	10	0	Poznam		10	0				10	0	http://goformative.co
5	Jakob	Strml'ek	70	0	KakL'ne v	10	0	EvaÅŽbe z oklepajer		10	0				10	0	http://goformative.co
6	Zala	Pavlic	70	0	KakL'ne v	10	0	Ekvivalentne enaÅŽ		10	0				10	0	http://goformative.co
7	Kaja	Gros	70	0	KakL'ne v	10	0	Ekvivalentne enačbe		10	0				10	0	http://goformative.co
8	Ana	Kosem Íir	70	0	KakL'ne v	10	0	Linearne enaÅŽbe		10	0				10	0	http://goformative.co
9	Nina	Jarc	70	0	KakL'ne v	10	0	Ekvivalentna enacba		10	0				10	0	
10	Iuka	sarec	70	0	KakL'ne v	10	0	Ekvivalentne enaÅŽbe		10	0				10	0	http://goformative.co
11	Dasa	Potocnik	70	0	KakL'ne v	10	0	Ekvivalentne		10	0				10	0	
12	Geja	Íul'terl'i	70	0	KakL'ne v	10	0	Kovalentne enacbe ,		10	0				10	0	http://goformative.co
13	gaja	bizjan	70	0	KakL'ne v	10	0	Ekvivalentne enaÅŽ		10	0				10	0	http://goformative.co
14	Laura	Calligaris	70	0	KakL'ne v	10	0	Ekvivalentno enaÅŽ		10	0				10	0	
15	Maja	Simc	70	0	KakL'ne v	10	0	Kovalentne encbe te		10	0				10	0	http://goformative.co
16	Fzan	Dobnikar	70	0	KakL'ne v	10	0			10	0				10	0	http://goformative.co
17	Laura	Calligaris	70	0	KakL'ne v	10	0	Ekvivalentno enaÅŽ		10	0				10	0	http://goformative.co
18	Dasa	Potocnik	70	0	KakL'ne v	10	0	Ekvivalentne		10	0				10	0	http://goformative.co
19	Nina	jarc	70	0	KakL'ne v	10	0	Ekvivalentna enacba		10	0				10	0	http://goformative.co
20	Tt	Gg	70	0	KakL'ne v	10	0			10	0				10	0	http://goformative.co

lost a co
se save y

U
K 20
P 16

Kje najti primere?

The screenshot shows a portion of the goformative.co website. At the top, there is a navigation bar with a colorful heart logo on the left. The menu items include "forum", "library" (which is circled in red), "how-to resources", "sharing formative?", "thoughts", "students grow when...", and "goformative.co". Below the navigation bar, the word "Library" is displayed in large, bold, black letters. Underneath it, the text "Grab A Formative" is visible. A large rectangular area titled "Library of Formative Assignments" contains a grid of colored boxes. The grid has three rows and three columns. The top row contains "Math" (blue), "ELA" (purple), and "Social Studies" (yellow). The middle row contains "Science" (green), "Health" (light blue), and "Music" (cyan). The bottom row contains "Spanish" (red), "German" (orange), and "French" (pink). In the bottom-left corner of the page, there is a small graphic of a triangle with letters "K", "U", "N", "P", "16", and "20" on its sides.

Library of Formative Assignments		
Math	ELA	Social Studies
Science	Health	Music
Spanish	German	French

oski
rstvo za
n šport.

Navodila za delo: Vpišite se kot **učitelj** v goFormative in

Sestavite kratek kviz s tremi vprašanji

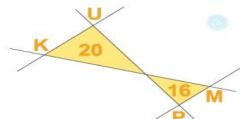
- vprašanje:** Odgovor kot tekst ali izbira z več možnostmi.
- vprašanje:** Vstavite tekst, video ali sliko kot prikaz vsebine.
- vprašanje:** Vstavite sliko ali besedilo in odgovor naj bo “pisanje po sliki”.



»Kar slišim, pozabim;
kar vidim, si zapomnim;
kar naredim sam, razumem in znam!«

<http://www.toondoo.com/>

The screenshot shows the homepage of the ToonDoo website. At the top, there is a navigation bar with links for 'Toons', 'Books', 'Dooers', 'Tools', 'Compleetoons', 'Shop', and 'Etc.,'. A search bar is located in the top right corner. Below the navigation bar, a large banner features the text 'World's fastest way to create cartoons!' and a 'Sign Up for FREE!' button. The main content area includes a call-to-action 'try Chartistic and have fun!' with a hand-drawn style, a 'Download on the App Store' button, and a section titled 'Create a story book with your toons!' showing a sample comic strip. To the right, there is a sidebar with four tools: 'ToonDoo Maker' (Create your own comics!), 'Book Maker' (Make a ToonBook!), 'TraitR' (Make a character!), and 'ImagineR' (Click here to upload!).



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1. kako deluje (udeleženci v vlogi učenca)

<http://url.sio.si/rCW>

Toons Books Dooers Tools Compleetoons Shop Etc.,

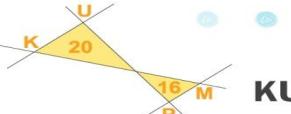
1.STRAN, 1.STRIP - BY ASAMBO

WWW.TOONDOO.COM

1 of 3

Znam, ker ustvarjam sam by asambo

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2. zakaj uporabljati



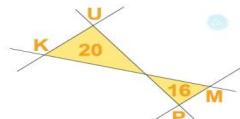
Učitelj

Učenci

IKT smernice:

<http://www.zrss.si/zalozba/digitalna-bralnica>

The screenshot shows the official website of the Zavod Republike Slovenije za Šolstvo. The top navigation bar includes links for 'ZAVOD REPUBLIKE SLOVENIJE ZA ŠOLSTVO', 'UČILNA-ZDANJA', 'RAZPOZVALNICA', 'STROKOVNE PREDVE', 'MEJEDNO KODOBLOVANJE', 'O NAS', and 'MOJEDKO SREDIŠČE'. The main content area features a sidebar with links to 'Digitalna bralnica', 'Novosti', 'Avizirala', 'Raziskave', 'Zborniki', 'Založba', 'Slovenski jezik', 'Knjižnična pomoč', 'IKT smernice', and 'Druge'. Below this is a search bar. The central part of the page displays several orange book covers representing different IKT guidelines, each with a title like 'Smernica za uporabo IKT pri predmetu ...'. A detailed description of the digital library is provided in the text below the sidebar.



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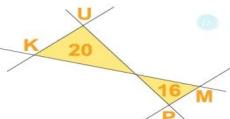
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Naložbo sofinancira Evropski socialni sklad pri Ministerstvu za izobraževanje, znanost in šport.

3. kje jo najdemo

<http://www.toondoo.com/>

The screenshot shows the homepage of the ToonDoo website. At the top, there is a navigation bar with links for 'Toons', 'Books', 'Dooers', 'Tools', 'Compleetoons', 'Shop', and 'Etc.,'. A red arrow points from the right towards the 'Sign Up for FREE!' button. Below the navigation bar, there is a large banner with the text 'World's fastest way to create cartoons!' and a search bar. The main content area features a large, hand-drawn style text 'try Chartistic and have fun!' with cartoon hands pointing at it. To the right of this text is a 'Download on the App Store' button. On the left side of the main content area, there is a green box with the text 'Create a story book with your toons!' and an image of an open comic book. On the right side, there is a sidebar with several options: 'ToonDoo Maker' (Create your own comics!), 'Book Maker' (Make a ToonBook!), 'TraitR' (Make a character!), 'ImagineR' (Click here to upload!), and 'DoodleR' (Add drawing touches!). The bottom of the page includes logos for Zavod Republike Slovenije za šolstvo, REPUBLIKA SLOVENIJA MINISTRSTVO ZA IZOBRAŽEVANJE, ZNANOST IN ŠPORT, EVROPSKA UNIJA EVROPSKI SOCIALNI SKLAD, and a logo for Naložba v vašo prihodnost.



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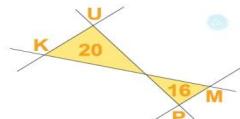


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4. kako se uporablja - kreiranje posameznih strani

The screenshot shows the ToonDoo website interface. A large red arrow points to the left sidebar menu. The menu includes options like 'Create Toon', 'My ToonDoos', 'My Favorites', 'Most Recent', 'Most Popular', 'Most Viewed', 'Editor's Pick', 'Most Fav'ed', 'Random '12'', and 'Most Redoos'. Below the menu, there are sections for 'CLICKS', 'DRAG & DROPS', and 'OWN WITH'. The main content area features a banner with the text 'Chartistic and have fun creating charts!' and an advertisement for 'CHARTISTIC' on the App Store. To the right, there's a section titled 'ToonDoo Maker' with links to 'Book Maker', 'TraitR', 'ImagineR', and 'DoodleR'. At the bottom, there's a 'Buzz @ ToonDoo' feed showing posts from users like 'itsnotris', 'bayramcan11', and 'hanh74'. On the right side, there's a 'ToonDoo Shop' section with a sign that says 'is now open!' and 'BUY printable images of your favorite Toons at Toondoo!'. Below that, there's an advertisement for 'ToonDoo SPACES' with the text 'Comics-based social network for classrooms'.



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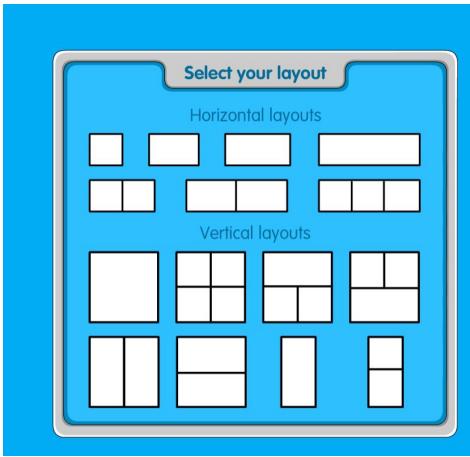
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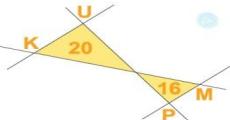
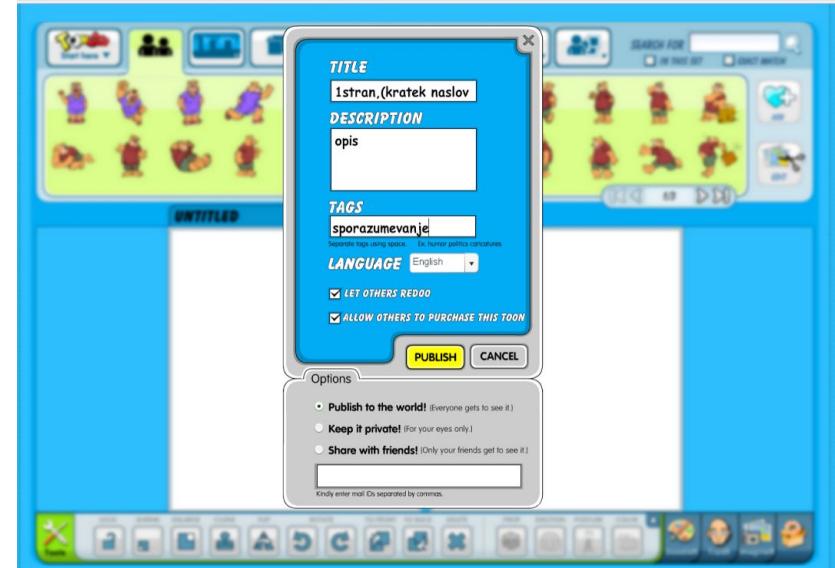
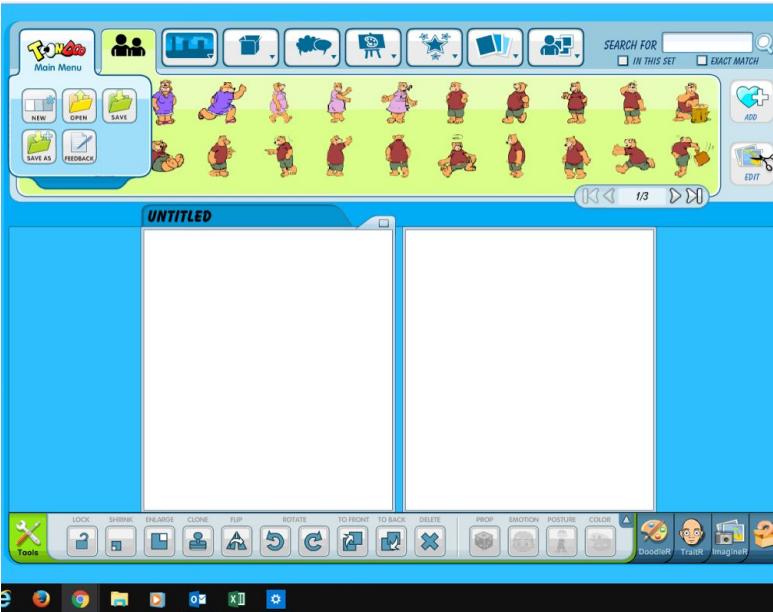
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4. kako se uporablja - kreiranje posameznih strani



A screenshot of the ToyWoo software interface. A large green arrow points downwards from the layout selection screen to this interface. The top bar includes the ToyWoo logo, a search bar, and various tool icons. Below the bar is a grid of cartoon character icons, each with a different pose or activity. The main workspace is titled 'UNTITLED' and features two large, empty panels for creating individual pages. Along the bottom, there is a toolbar with various editing tools like 'Tools', 'LOCK', 'SHRINK', 'ENLARGE', etc., and a row of icons for 'DoodleR', 'TraitR', and 'ImagineR'.

4. kako se uporablja - shranjevanje posameznih strani



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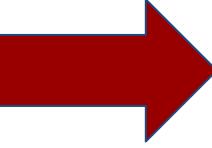
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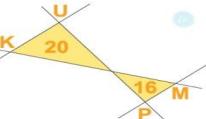
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4. kako se uporablja - kreiranje knjige



The screenshot shows the ToonDoo website interface. At the top, it says "Hi, asambo" and "World's fastest way to create cartoons!". There is a "CREATE" button with a color palette icon. Below the header, there is a navigation bar with tabs: Toons, Books (which is currently selected), Dooers, Tools, Compleetoons, Shop, and Etc.,. A sidebar on the left has a "Create Book" menu with options like "My ToonBooks", "Most Recent", "Most Popular", "Most Viewed", "Editor's Pick", and "Most Fav'ed". The main content area features a cartoon hand pointing at a chart with the text "ic and have fun creating charts!". It also includes a "CHARTISTIC" advertisement with an "App Store" download link. Below this, there is a section titled "ToonDoo Maker" with sub-options: "Book Maker", "TraitR", "ImagineR", and "DooderR". Further down, there is a "Buzz @ ToonDoo!" section showing user profiles and their first Toons, and a "ToonDoo Shop" section with a banner saying "is now open!" and "BUY printable images of your favorite Toons at Toondoo!".



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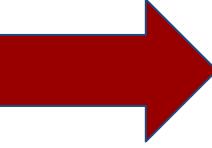
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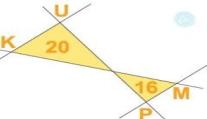
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4. kako se uporablja - kreiranje knjige



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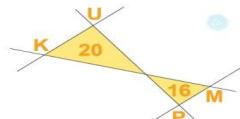
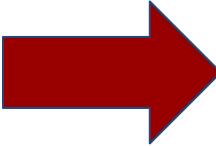
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4. kako se uporablja - kreiranje knjige



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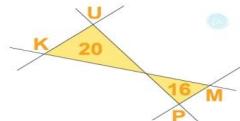
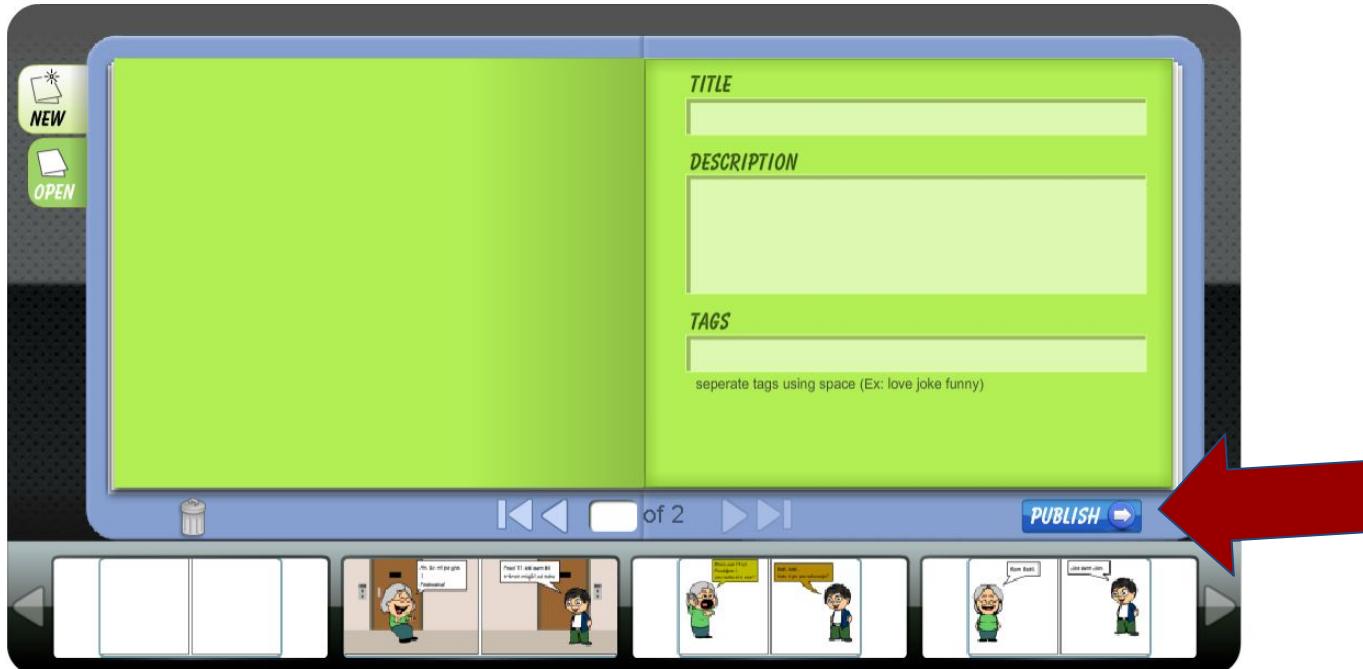


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4. kako se uporablja - objavljanje knjige

Book Maker



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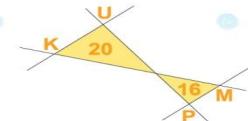


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4. kako se uporablja - deljenje knjige

The screenshot shows the ToonDoo website interface. At the top, it says "Hi, asambo" and "World's fastest way to create cartoons!". Below the header are tabs for "Toons", "Books", "Dooers", "Tools", "Completoons", "Shop", and "Etc". A search bar and a "CREATE" button are also present. On the left, there's a sidebar with options like "Create Book", "My ToonBooks", "Most Recent", "Most Popular", "Most Viewed", "Editor's Pick", and "Most Fav'ed". The main area features a cartoon hand holding a pencil over a drawing, with the text "ic and have fun creative" and "and have fun creative". Below this is a comic strip template with the text "CREATE YOUR OWN COMIC STRIPS WITH JUST A FEW CLICKS, DRAG & DROPS". The "Books" tab is selected, leading to the "My ToonBooks" section. This section displays a preview of a book titled "Znam, ker ustvarjam sam" (I know I'm creating) with two pages showing characters talking. There are buttons for "Preview", "Edit", "Delete", and "Goto Page". The page number "2nd attempt" is visible at the bottom of the book preview.



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4. kako se uporablja - deljenje knjige

The screenshot shows the 'Books' tab selected in the ToonBooks interface. Below it, there are two comic strips titled 'Znam, ker ustvarjam sam' and '2nd attempt'. A large red arrow points to the 'Edit' button for the first comic strip.

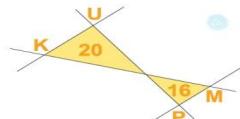
My ToonBooks

Preview Edit

Delete X Goto Page

Znam, ker ustvarjam sam

2nd attempt



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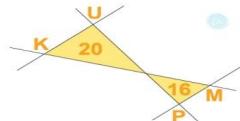


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4. kako se uporablja - deljenje knjige

The screenshot shows a digital book sharing interface. On the left, there's a profile picture of a cartoon character with the name "asambo" below it. The main title of the book is "ZNAM, KER USTVARJAM SAM" with the subtitle "DELAVNICA ZA UCITELJE V PROJEKTU ATS2020". A "TAGS: ATS2020" label is visible. The bottom navigation bar shows "0 of 3" and arrows for navigating through the book. Below the book area, there's a red box highlighting social sharing icons: eyes (5), speech bubble (0), thumbs up (0), heart (0), a double arrow (for sharing), an envelope, a bird (Twitter), and a Facebook icon. Red arrows point from the text "Delavnica za učitelje v projektu ats2020" to these icons. At the bottom, it says "By asambo on 2016-10-25 16:08 | 5 Views".



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Navodila za delo: Predstavi s stripom / v stripu

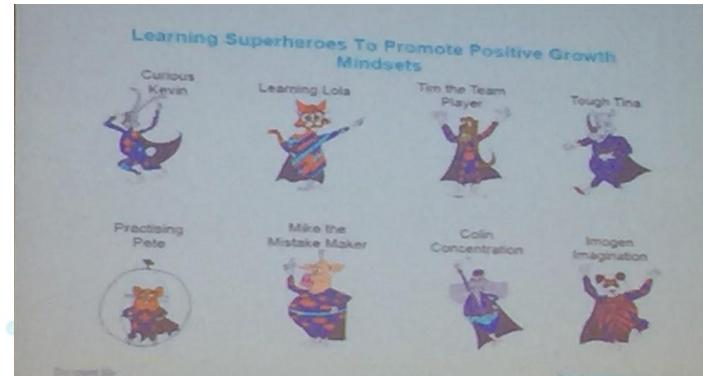
1. Besedilno naloge predstavite v stripu
2. Izberite eno anekdoto o znanih matematikih/fizikih.
3. Spomnite se ene šale - zabavne situacije iz razreda.
4. Naredite "Learning SuperHeroes"

»Kar slišim, pozabim;
kar vidim, si zapomnim;
kar naredim sam, razumem in znam!«

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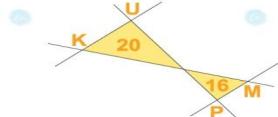


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Predstavitev “izdelkov” in izmenjava idej in izkušenj



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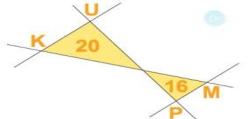


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O Scientix-u:

- **KAJ JE SCIENTIX?** Skupnost za naravoslovno-matematično (NAMA) izobraževanje v Evropi - „Science“ v Scientix = STEM (*science, technology, engineering and mathematics*)
- **ZA KOGA JE SCIENTIX?** Za učitelje (učencev od 4 – 21 let), raziskovalce, načrtovalce politike, starše in vse, ki jih zanima NAMA izobraževanje
- **ZAKAJ JE NASTAL SCIENTIX?** Z namenom vzpodbujati, razširjati in izmenjevati izkušnje, gradiva, najboljše prakse, raziskave, obvestila ... NAMA izobraževanja v EU
- **KDO UPRAVLJA SCIENTIX?** European Schoolnet (EUN) – mreža 30-ih Ministrstev za izobraževanje v Evropi v imenu European Commission (DG Research)
- **KAJ PONUJA SCIENTIX?** ...v nadaljevanju... s poudarkom na matematiki
- **KJE JE SCIENTIX?** <http://www.scientix.eu/>



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Projekti – formative assessment



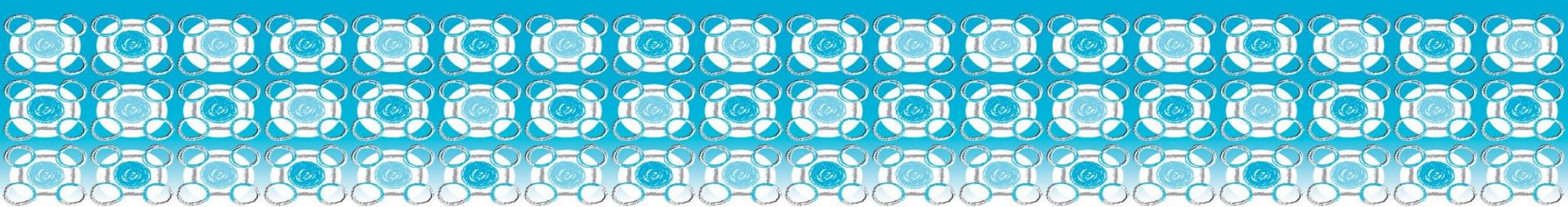
**Formative Assessment in
Science and Mathematics
Education (FaSMEd)**

<https://research.ncl.ac.uk/fasmed/>

ASSIST-ME is an abbreviation
for *Assess Inquiry in Science,
Technology and Mathematics
Education.*

<http://assistme.ku.dk/>

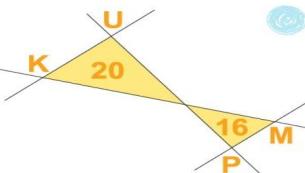




Hvala, da ste prišli na najino delavnico

Tatjana Gulič in Amela Sambolić Beganović

OŠ Preska in ZRSS



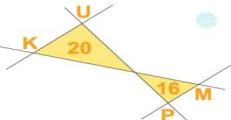
3. mednarodna konferenca
o učenju in poučevanju matematike
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