

We are the kids from class 4.d, A. Mihanovica elementary, Zagreb, Croatia





We are very curious





and we stick our noses everywhere





Some of us are also members of NS Dubrava ECO GROUP





**We've learnt many things  
It's time to learn about karst**







- **karst** - type of landscape where rocks are made of dolomite & calcium carbonate soluble in water. Because of that, water goes through the ground to the impermeable layer and is mostly located in karst's underground. Water shapes various karst phenomena.
- **Dinara karst** is known throughout the world as classic karst. It is estimated that karst covers 50% of Croatian territory.







- **Karst phenomena** - phenomena that appear in karst - caves and pits, ponors, springs, underwater springs, dolines, karrens, valleys, fields, canyons etc.





We visited Gacka's source







We were in Cerovačka cave



and Vrelo cave.





We saw  
Đulin ponor  
over which Milan  
cries for his  
Đula



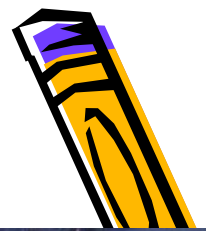


On Velebit we found out that limestone that makes it is  
Soluble in water, which makes...

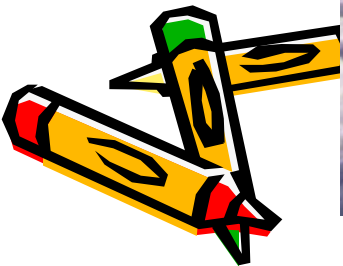




# ...dolines...

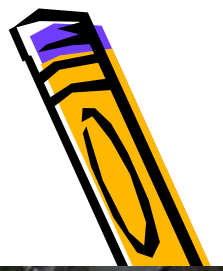


- are  
lesser, wide  
depressions  
in karst,  
with steep  
sides, like  
little  
craters.

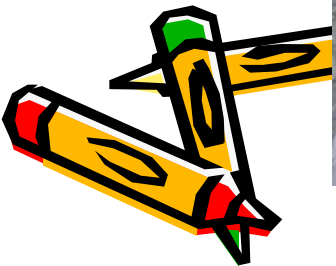




# karrens...

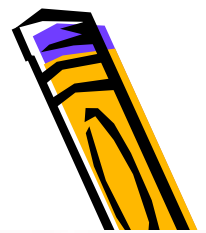


- are vertical  
grooves on  
the rock  
made by  
precipitation  
(rain), as if a  
bear  
scratched  
the rock with  
its claws



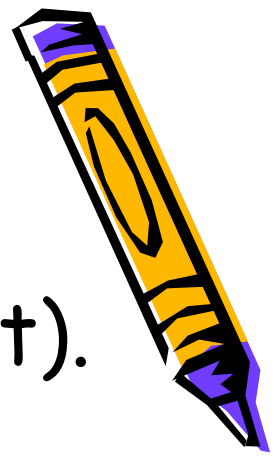


# KARST FIELDS...



- are the biggest depressions in karst. They are made by water that flows over karst rocks and dissolves them. Biggest karst fields in Croatia are Gacko, Ličko i Krbavsko.





- **Speleological object** is a natural underground cavity (mostly in karst). That term includes caves, pits and other forms of underground karst phenomena.

Caves and pits are naturally formed underground cavities in Earth's crust, longer or deeper than 5 m, in which a human can fit.





# caves with stalactites, stalagmites and stalagmates...

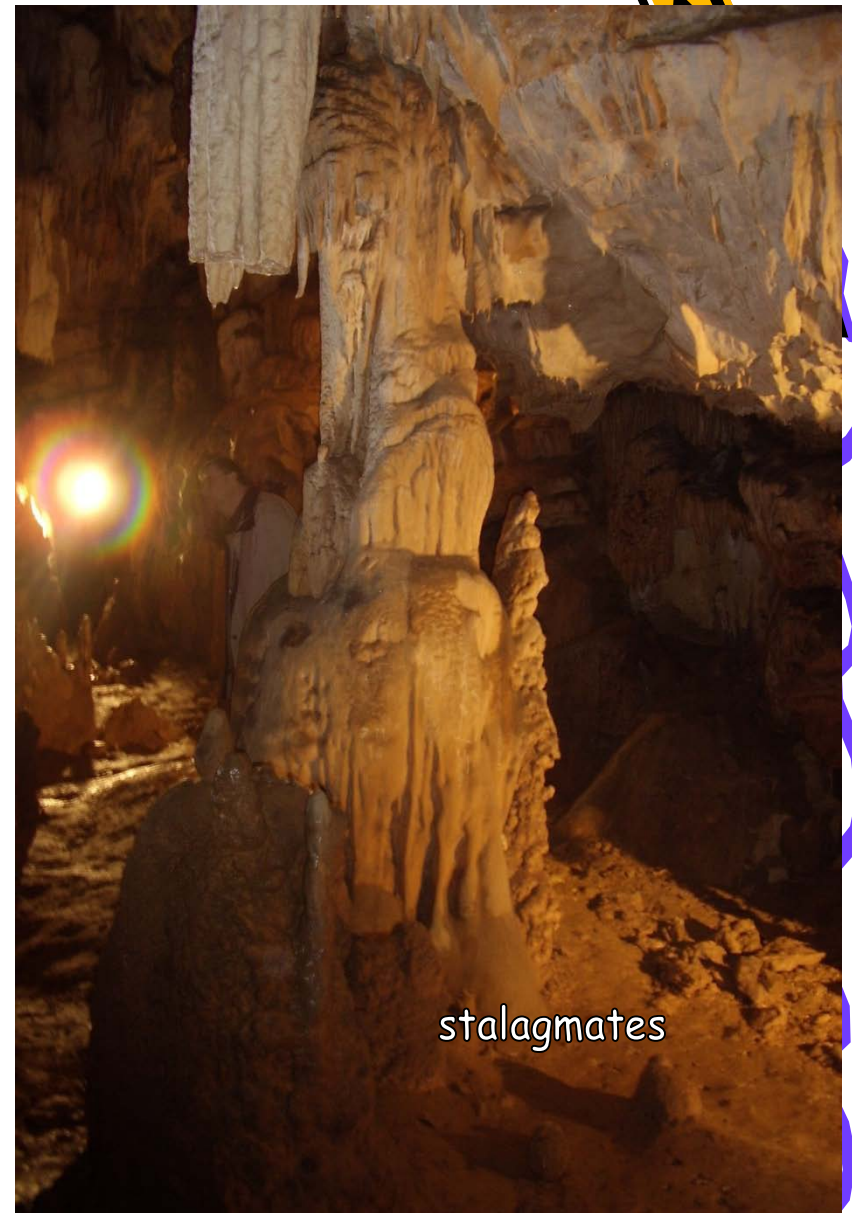


Cave is a speleological object with an average slope of the canal less than  $45^\circ$ .





Stalactites in Dinara karst are shaped by crystallization of mineral calcium carbonate which enters the cave dissolved in water. Depending on conditions during shaping there are many various types of stalactites.





curtains

stalactites

stalagmate

stalagmites

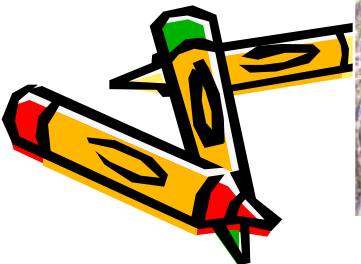




# p o n o r s : . .



- are caves or pits that have almost constant inflow of water. They are very common on borders of karst fields.

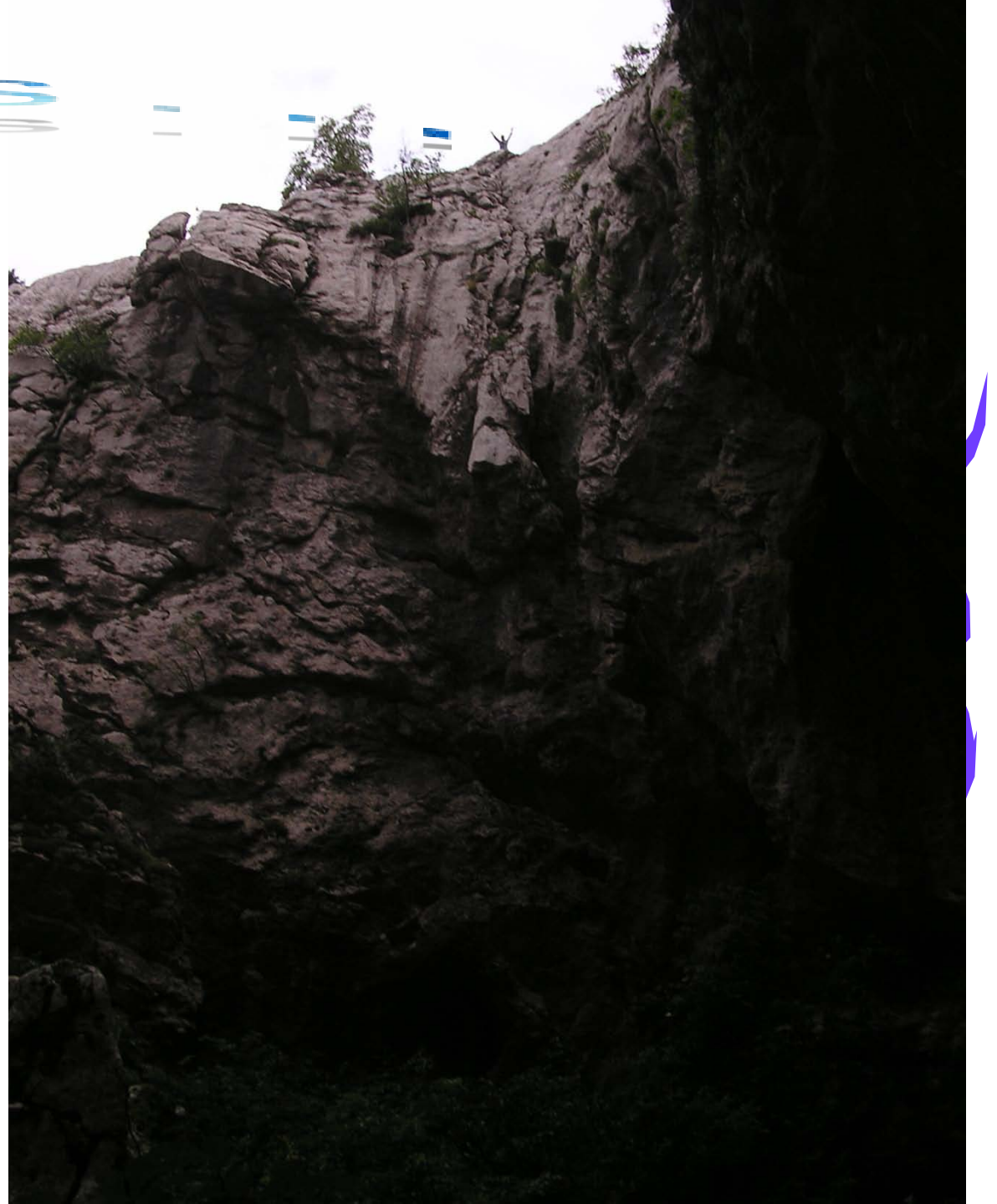




# p i t s -

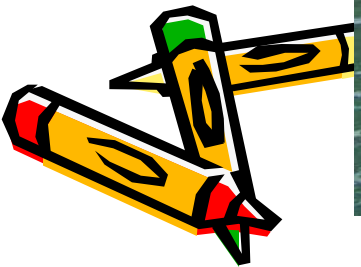


...are speleological  
objects with main  
canal slope greater  
than 45°



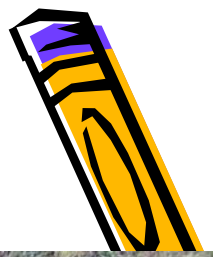


# lakes and falls...





# canyons...



- are deep narrow valleys cut into rocks, through which rivers and streams flow. They are shaped by water.





And then, one day, professor Marjanac came to us...





suggesting we made a model of karst





# There were also...



Anamarija

prof  
Ljerka Marjanac

prof  
Tihomir Marjanac



We put a layer of clay into the tub (impermeable layer)





We carved channels for underground water into that clay





Water will flow underground, over the impermeable layer  
until it reaches the source





# Onto clay came styrofoam = karst





We made cracks



for springs and ponors

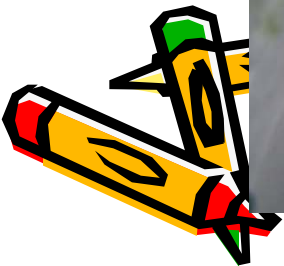


...Covered everything with gauze and poured over with gypsum





...impressed the karrens





and put Velebit to life with animals and plants





...and the model of harsh karst, southern Velebit, is done.





Just like a model of not-so-harsh karst, northern Velebit.





From leftover clay we made a model of a cave

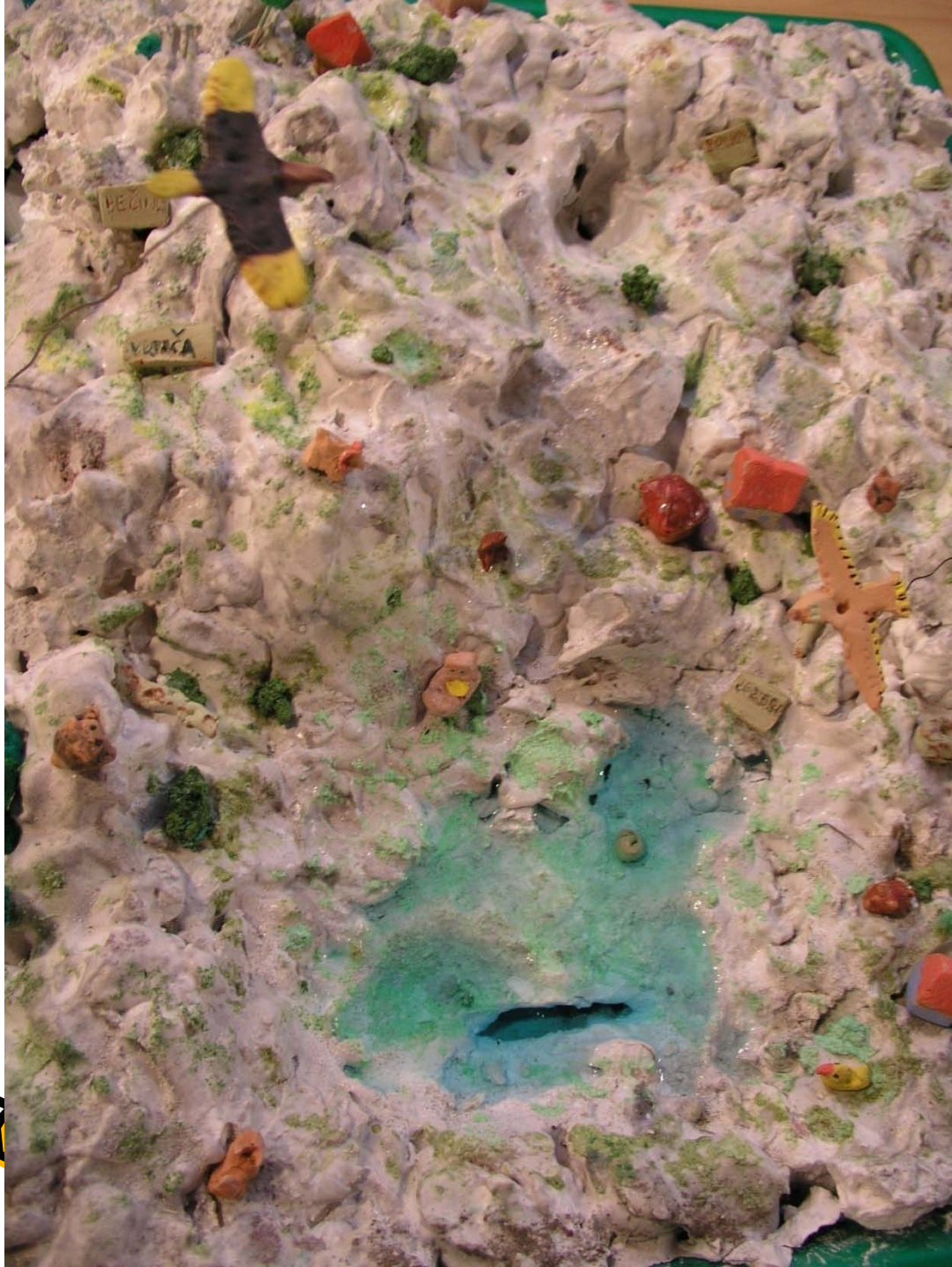






We took all that to Festival of science...





... where we explained karst  
phenomena to visitors.





And took the opportunity to test caving techniques



# And equipment









- **Speleology** is a scientific discipline whose main goal is exploration of caves, pits and other underground karst phenomena. Word speleology comes from ancient greek word *spelaion* which means underground cavity.

**Speleologists** are people who explore speleological objects.

**Speleology school** - basic training needed to start doing speleology.





# Everything was ready





It rained over Velebit





Water did not remain on the surface





Where's  
the water  
gone  
???

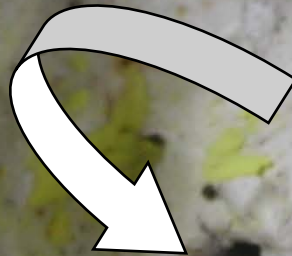
?





*It disappeared into karst*

*Sneaked into PONORS*





*Travels underneath the limestone*





In the valley, in the lake!







from estavela



- *Estavelas* are speleological objects related to karst phenomena. During rain season, as a result, **water pours** out of them and floods the field. During withdrawal of the water, water from the field **sinks** through openings of those same objects.

- *Underwater springs* are occasional and/or permanent sources of fresh water underneath the sea. On those sources water is brackish (neither salty nor fresh).





In the end prof. Marjanac gave an interview  
to our school's magazine Mihić





Story ended in *Vincek pastry shop*







For our school's day





With our projects...



# On birds







BIRD HOUSES

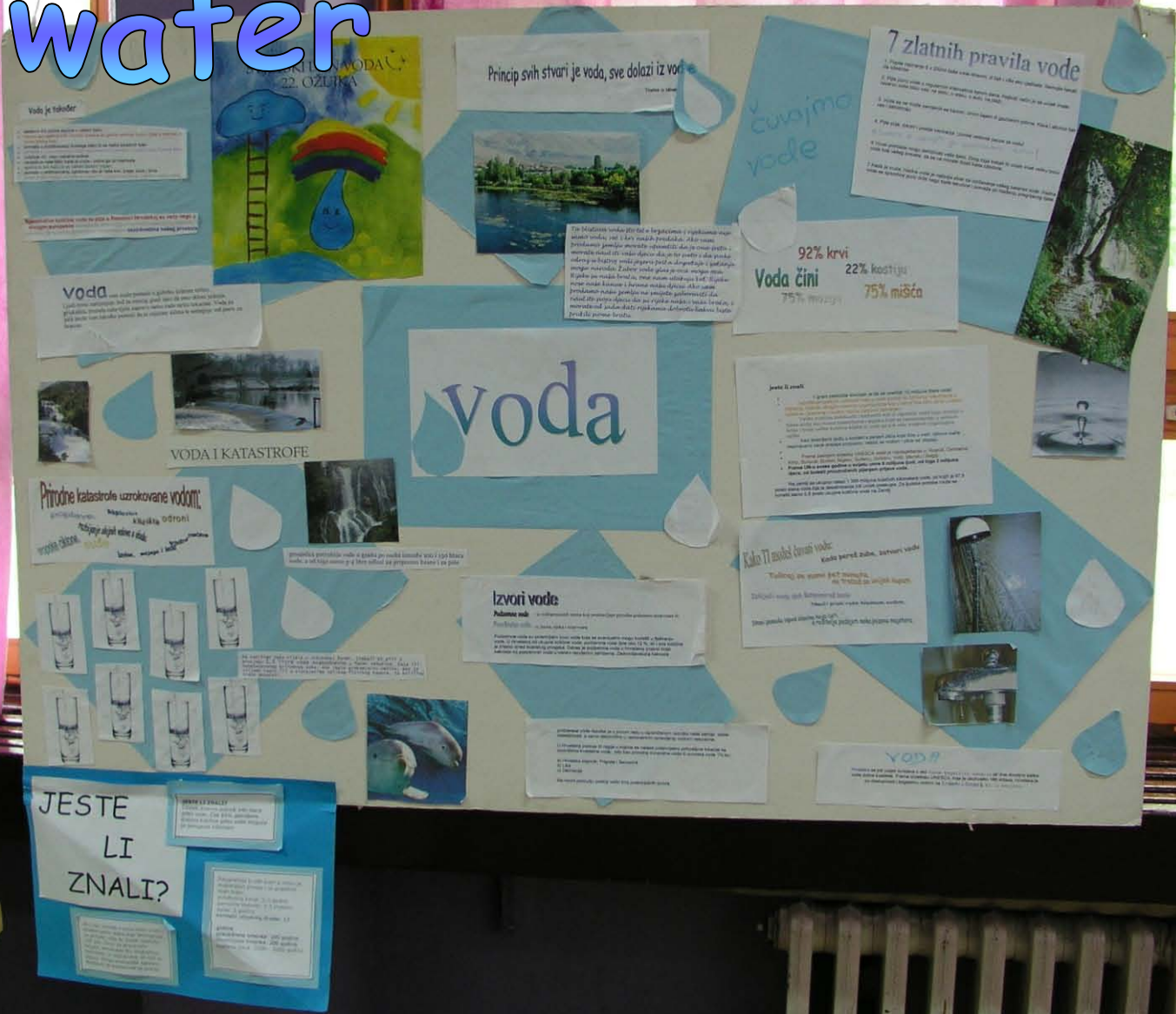


# Bird feeders

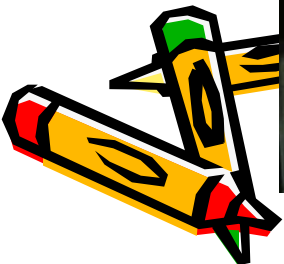




water







# Mushrooms





Clay modeling



# We presented a project





# WHERE THE KARST WATERS FLOW





# Many came to hear the story







It was exhausting, but great fun!





Sincerely yours



Before the end:

Did you know???

*The deepest pit is Voronja*  
(Arabika Massif, Abkhazia),  
exploration in 2007.  
reached Kruber depth  
-2190 m.

*The longest cave in the world*  
is Mammoth Cave System over  
590 km long.

*Average age of caves* is  
from a few to tens of  
millions of years.





Before the end :

Did you know???

*The deepest pit (jama) in Croatia*

is Lukina jama-Trojama pit system 1392 m deep.

Two more pits in Croatia are deeper than 1000 m, Slovačka jama (-1320 m) and Velebit pit system (-1026 m).

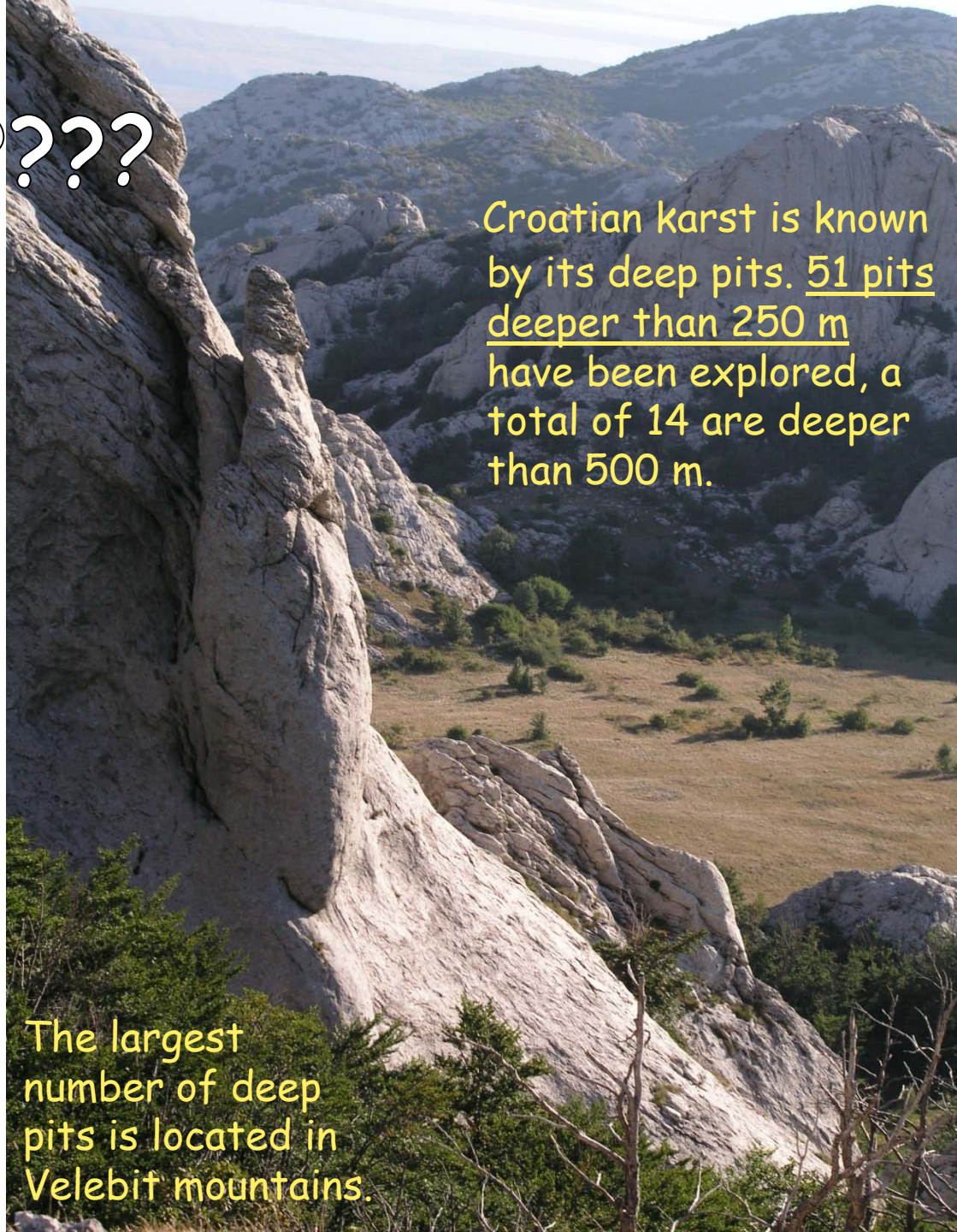
All three pits are located in Sjeverni Velebit (Northern Velebit) national park

*The longest cave in Croatia* is Đulin ponor-Medvedica cave system, 16,4 km long.



Croatian karst is known by its deep pits. 51 pits deeper than 250 m have been explored, a total of 14 are deeper than 500 m.

The largest number of deep pits is located in Velebit mountains.

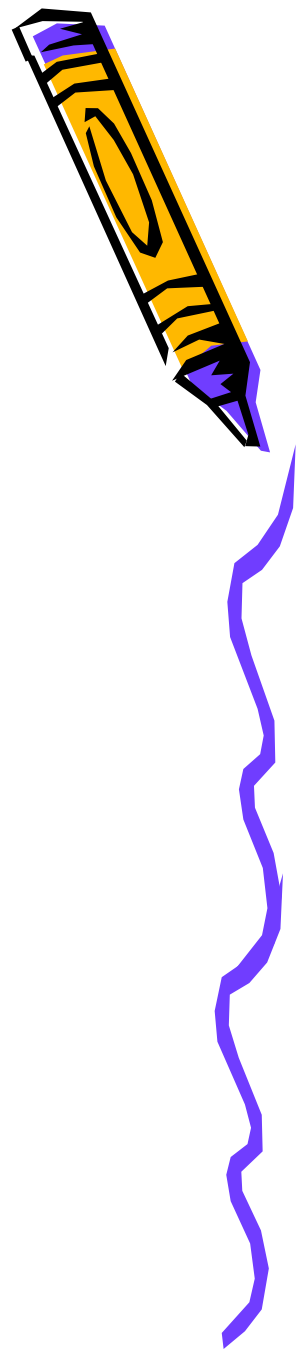




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EKO KLUB, NS DUBRAVA;  
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