

# Promoting vocational education and training

**Stredná odborná škola chemická Bratislava**



# Materials

- Selected materials mentioned in this presentation are available on Google Drive.
- <https://drive.google.com/drive/folders/1tULs1eTnBE5x2XBR5ZUz6JlswgHhiNj?usp=sharing>



## Target groups

- Primary school pupils and their parents
- Secondary school graduates (higher vocational education)
- Primary school teachers (chemistry teachers and guidance counsellors)
- Employers
- School partners
- Professional community



# Promotional activities organised by SOŠCH



## Promotional activities

- Open Day
  - On-site
  - Online
  - Individual school visits and consultations
- Preparing for the Chemistry Olympiad
  - Theoretical preparation
  - Practical preparation
- Entrance exam preparation course
  - Preparation in mathematics
  - Preparation in Slovak language
- Chemical laboratory exercises
  - Flammable Chemistry
  - Fragrant chemistry
  - Alchemist Workshop
  - Forensic Chemistry (E+)
  - Colourful journey through time (E+)
  - World Water Day
  - World Soil Day
  - World Health Day
- Chemistry shows at SOŠCH
- Activities at primary schools
  - Forensic chemistry
  - Day of professions
  - Chemistry show



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## Open day (on-site)

- 4 Open days, from November to January
- Tour around the school (1 hour)
- Discussion with chemistry teachers in laboratories
- Introducing Erasmus+ activities on SOŠCH



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## Open day (on-site)

- Until 2019/2020 - Special laboratory exercises
  - Eyes catching experiments
  - Biochemistry experiments
  - Pharmaceutical analysis
- From 2022/2023 - Standard laboratory exercises
  - Attractive topics



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# Preparation for the Chemistry Olympiad

- 10 theoretical lessons (online)
  - Topics covered: Nomenclature, Chemical calculations, Chemical reactions (general), Magnesium and calcium
  - Duration: 60 min
  - 65 participants in 2023/2024
- 5 practical lessons (on-site)
  - Topics covered: Neutralisation reactions, Precipitation reactions, Redox reactions, Magnesium and calcium
  - Duration: 5 x 45 min
  - 20 participants in 2023/2024
- Topic of the current year: Magnesium and calcium



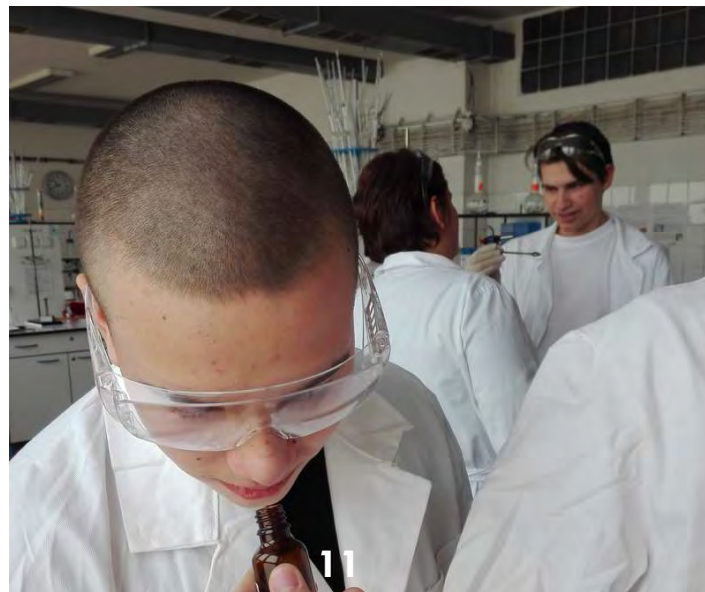
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## Flammable chemistry & Fragnant chemistry

- Flammable Chemistry - Methane Preparation, Ethene Preparation, Ethyne Preparation, Burning Hands (Butane)
- Fragrance Chemistry - Esters, Identifying chemicals by smell, Isolation of oil from citrus, cloves, cinnamon (steam distillation, extraction)
- Duration: 3 x 60 min

# Flammable chemistry & Fragnant chemistry

Activity	Details
<b>Flammable chemistry</b>	<p><b>Preparation of methane</b> (setting up the apparatus, developing methane). Combustion of methane, proof of combustion products.</p> <p><b>Preparation of ethene</b>, combustion of ethene. Proof of multiple bonding with potassium permanganate.</p> <p><b>Preparation of ethyne</b>, combustion of ethene. Proof of multiple bonding with potassium permanganate. Comparison of combustion of methane, ethene and ethyne.</p> <p><b>Flammable hands</b> - combustion of n-butane.</p>
<b>Fragnant chemistry</b>	<p>Preparation of carboxylic acid esters. Properties of esters.</p> <p>Recognition of chemicals by smell.</p> <p>Isolation of oil from citrus fruits by steam distillation and extraction.</p>





# Alchemist Workshop

- Laboratory exercises focused on the implementation of attractive experiments based on neutralization, precipitation and redox reactions.
- Duration: 3 x 60 min



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# Alchemist Workshop

# Alchemist workshop

Č.	Activity	Details	Time (min)
1.	<b>Welcome. Safety instructions</b>		10
2.	<b>Alchemist workshop</b>	Flammable experiments. Magic drinks	70
		<i>Group work.</i> Pupils divided into 6 groups will prepare and carry out 1 out of 6 experiments in a group of 2-4 pupils.	30
		<i>Peer learning.</i> Then, under the guidance of an assistant, they demonstrate the experiment to the whole class, or, with a higher number of pupils, to half the class. The estimated duration of the demonstration is 5-8 minutes.	40
3.	<b>Dry ice experiments</b>	Pupils carry out experiments in groups of 2-4 pupils. All groups carry out the same series of experiments.	30
4.	<b>Evaluation of activity</b>		10
	Total		120



N°	TASK	DESCRIPTION
<b>Part 1 Flammable experiments</b>		
	Method of implementation	Group work
1	Make "silver" and "gold" coins from the copper ones.	Electrochemical series of metals. Preparation of brass.
2	Prepare gunpowder.	Preparation of ammunition and its combustion.
3a	Prepare oxygen by decomposing hydrogen peroxide in a gas generator. Use the collected oxygen in the following task to prepare a "phosphorous lamp".	Preparation of oxygen by catalytic decomposition of hydrogen peroxide.
3b	Prepare the "phosphorous lamp".	Combustion of phosphorus in oxygen.
	Method of implementation	Demonstration experiment. It will be carried out if there is time in reserve.
	Prepare pyrophoric iron.	Preparation of ferric oxalate. Thermal decomposition of ferric oxalate.
	Prepare carob flies in the bank.	Catalytic decomposition of ammonia.
<b>Part 2 Magic drinks</b>		
	Method of implementation	Group work
4	Prepare colorful drinks.	The discoloration that accompanies neutralization and redox reactions.
5	Turn red wine into other beverages.	The discoloration that accompanies neutralization, precipitation and redox reactions.
6	Copper chameleon	Redox reactions
	Method of implementation	Demonstration experiment. It will be carried out if there is time in reserve.
	Prepare a coloured traffic light.	Redox reactions





## Colourful journey

- A colour journey through time via pigments from prehistoric man to Van Gogh
- Synthesis of pigments (yellow ochre, Prussian blue), their use in the creation of artwork
- STEAM
- Duration: 4 x 60 min



Task 1 Find information about pigments, their occurrence and properties.

Task 2 Prepare the pigments.



Task 3 Use pigments to create a piece of artwork.

Task 4 Find information about light. Complete the quiz on analysing the composition of pigments using optical methods.



## Colourful journey

- Multidisciplinary approach - chemistry, physics, history, civics, foreign languages.
- Chemical calculations
- Using information sources

# Colourful journey

Zinc oxide



Iron(III) hydroxide-oxide



Iron(III) oxide



Malachite



Verdigris



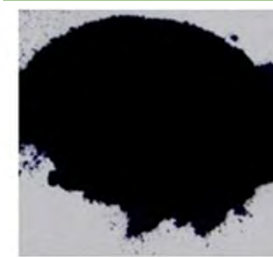
Indigo



ultramarine



Prussian blue



Iron(III) oxide

Altamira cave, Spain (18500 – 14000 BC)



Arnolfini Portrait, Jan Van Eyck, The National Gallery, London (1434)



Verdigris

Malachite, azurite

Sucevița Monastery, Romania (1585)



Starry night, Van Gogh, Museum of Modern Art, New York (1889)

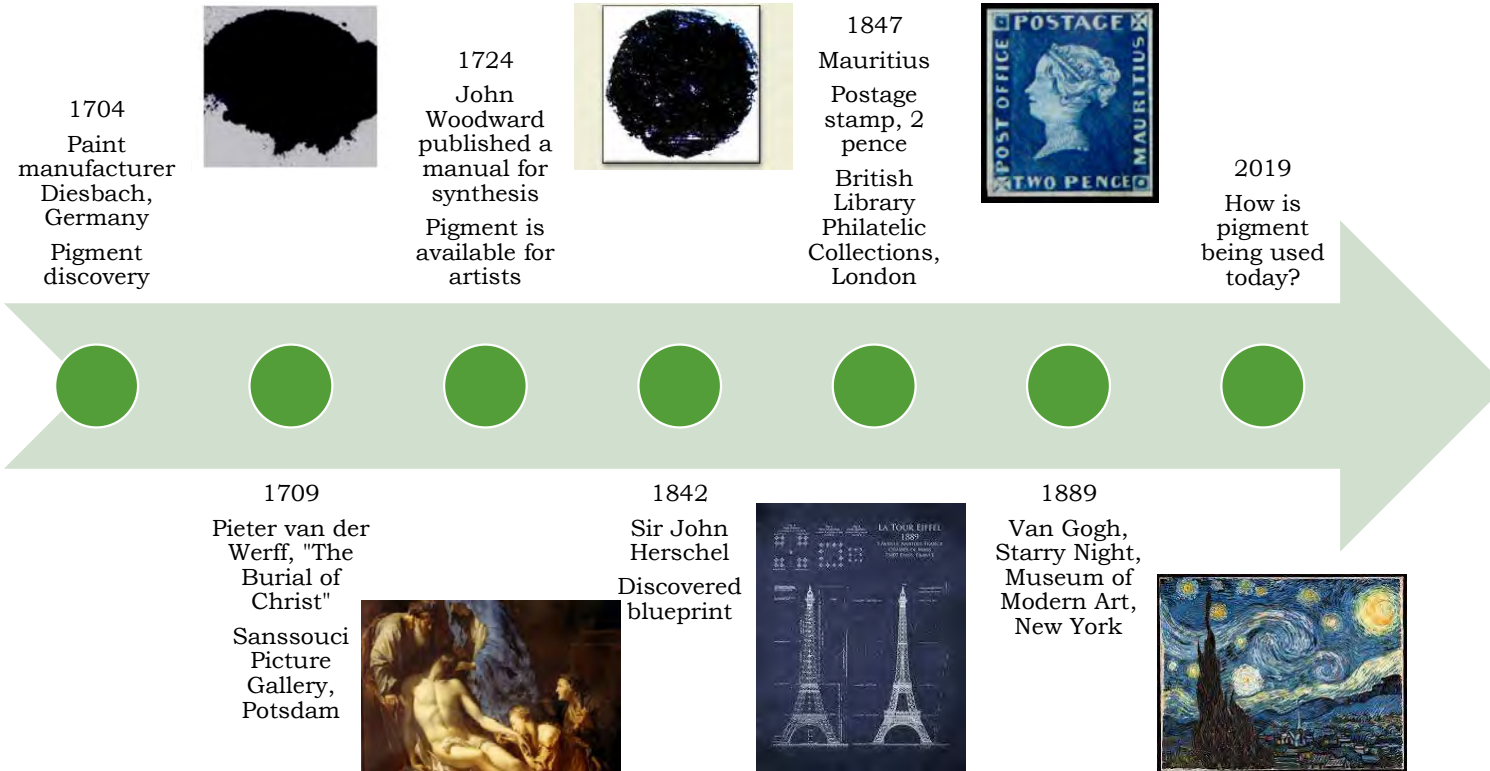


Prussian blue

## Colourful journey

- From the Stone Age to the present day

# Colourful journey



# Colourful journey



ZŠ Mierová 46  
Bratislava



ZŠ Bernoláková 5 Holič



ZŠ Vrútocká 58  
Bratislava



ZŠ Jedľové Kostolany



## Forensic chemistry

- Laboratory exercises focused on solving a criminal case using simple experiments
- Based on real story
- 2 criminal cases
- Duration: 3 x 60 min

# Forensic chemistry

**Dívka (+17) zemřela v nemocnici: Vražda draslíkem?**



**Pacientku na Bulovce zabil draslík v infuzi**

Praha /AKTUALIZOVÁNO/- Z nedbalosti je obviněna zdravotní sestra, která pacientku ošetřovala. V infuzi bylo velké množství draslíku.



23

# Forensic chemistry



White powder in the envelope



Lethal infusion



Industrial espionage in a pharmaceutical laboratory



Damaged ear



Dangerous barrels



Imprint - a trace left behind

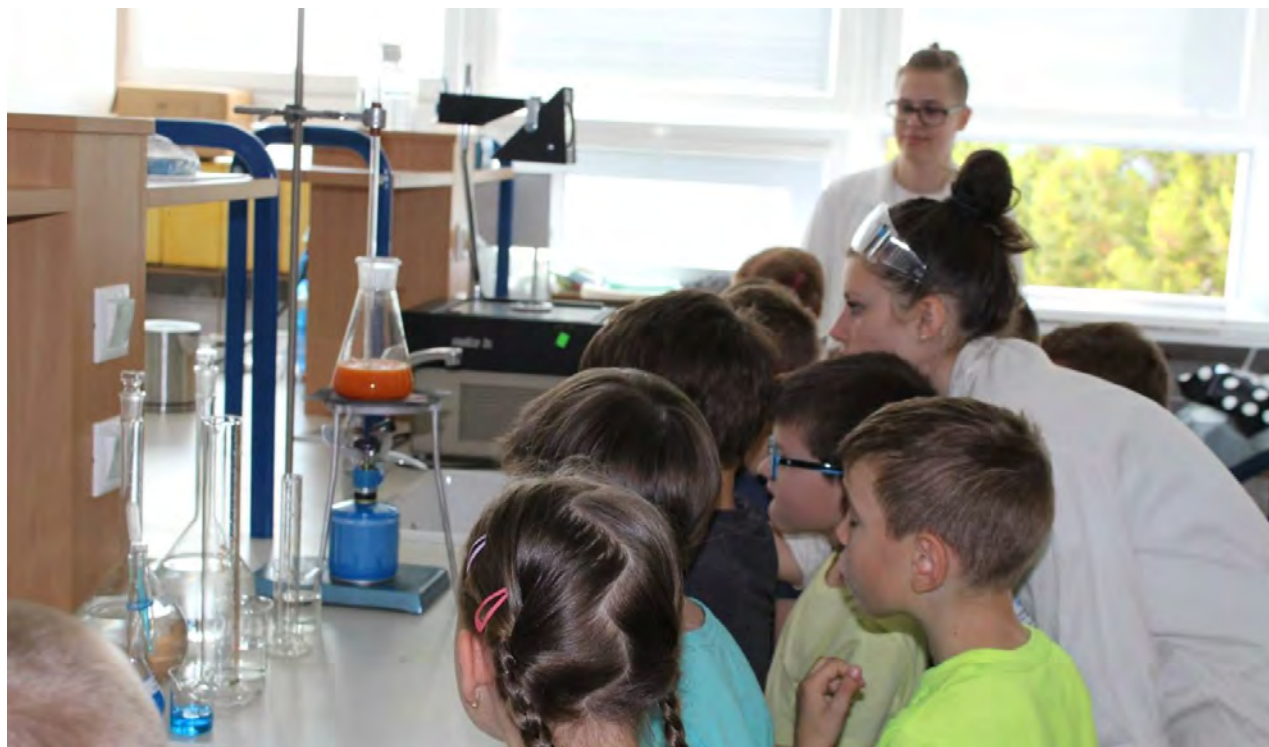


# Chemistry show

- Workshop day in elementary school (Základná škola Fándlyho 11 Pezinok)
- Forensic chemistry
  - Presentation of a criminal case
  - Quiz
- Chemistry show
  - Flammable experiments (Fingerprints)
  - Colourful experiments (Secret message)
  - Dry ice experiments
- 3 x 60 min cycles



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# Chemistry show

Science day in elementary school (ZŠ Rajčianska 3, Bratislava)

# Chemistry show

N°	ACTIVITY	TIME (MIN)
1	<b>Introduction</b>	2
2	<b>Lethal injection case</b>	10
	Presentation <i>The Lethal Infusion Case</i> . Quiz	3
	Flame show with ethanol solutions of group 1 and 2 metals.	4
	Homemade sparklers (pre-prepared)	3
3	<b>Alchemist's Workshop. Fire experiments</b>	10
	Production of "silver" and "gold" coins from the copper	3
	Flammable mixtures	4
	Gunpowder	3
4	<b>The case of industrial espionage</b>	8
	Presentation <i>The case of industrial espionage</i> . Quiz	3
	Invisible inks - neutralization reactions, complexing reactions.	5



# Chemistry show

N°	Activity	Time (min)
<b>5</b>	<b>Sherlock Holmes in the chemistry lab.</b> The experiments are carried out by primary school pupils under the guidance of assistants	<b>3</b>
	Presentation The Prints Case - the trace left behind. Quiz	Reserve
	The chemical development of fingerprints	Reserve
	Odour as a trace.	3
<b>6</b>	<b>Dry ice experiments</b>	<b>15</b>
	Sublimation of dry ice	
	Colour changes of indicators (Indicator rainbow)	
	Combustion of magnesium in carbon dioxide	
	Generator of bubbles	
	Dry ice makes sounds	
	Fire extinguishing with carbon dioxide	Reserve
	<b>Home pharmacy. Biotechnology is changing the world.</b>	<b>10</b>
	Cream preparation	5
	Sample cultures of microorganisms ( inoculated in advance)	5
	<b>Summary</b>	<b>2</b>
	<b>Total</b>	<b>60</b>



# Forensic chemistry

- Parts of the project:
  - Introduction of the criminal case
  - Forensic analysis
  - Court hearing
- 3 days in total
- Forensic analysis:
  - Test for cations
  - Test for functional group
  - Volumetric analysis
  - Spectrophotometry, colorimetry
- Supported by petrochemical company SLOVNAFT







## Word Water Day

- Analysis of water in own samples - pH, conductivity, chlorides, ammonium ions, chemical oxygen demand, water hardness, water neutralization capacity
- Information on the occurrence of the constituent to be determined in natural waters, its significance, indication of pollution and its negative impact on the human body
- Information adapted to the specific year's theme
- Duration: 3 x 60 min



## Word Health Day

- The motto "We are what we eat!,,
- Evidence of protein, carbohydrates and fats in food
- Determination of protein in food.
- Determination of carbohydrates in energy drinks.
- Determination of cholesterol in lard
- Myths and the truth about food
- Duration: 3 x 60 min



## Entrance exam preparation course

- Online
- Preparation in mathematics
  - Duration: 4 x 45 min
- Preparation in Slovak language
  - Duration: 3 x 45 min



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## Kids' Lab Hókus-Pókus

- Developed by chemical company BASF
- The laboratory is located in the building of SOŠCH.
- 90-minute workshop
- The workshop is aimed at young researchers aged 7-12 years old and aims to answer the research question of how water plays an indispensable role in our lives.
- Through independent experimentation, children will see how chemistry enables responsible handling of water, a precious resource.
- This year's "Water Loves Chemistry" program includes two lab experiments - water retention and water research.



## Promotional activities for teachers

- Workshop for chemistry teachers and guidance counsellors in primary schools
- Preparation for the Chemistry Olympiad
- Job-shadowing on chemistry laboratory exercises at SOŠCH
- Workshop *Chemistry of everyday life* in leisure activities
- Workshop *Environmental experiments*
- Exchange of experiences



## Workshop for chemistry teachers and guidance counsellors in primary schools

- 2005 – 2019 on-site, 2020 – 2023 online
- SOŠCH
  - Study programmes
  - Extracurricular activities
  - Projects
  - Promotional activities
- Slovak Board of Chemistry Olympiad
  - Tasks in the current school year
  - Evaluation of previous year
- BASF
  - Activities for primary schools
- Duration: 2 hours



# Science fairs and other activities



## Promotional activities

- Presentation exhibitions of secondary schools
  - County Schools Day (Bratislava region)
  - Where to go to Secondary School (Other regions)
  - Young creator
  - JUVYR (terminated)
- Science fairs
  - Night of researchers
  - Science Fair
- Christmas Market - Bratislava Self-Governing Region
- Cvernovka (Creative Centre in the former SOŠCH building)



## Activities at the exhibition

- Chemistry Show
  - Colourful experiments
  - Forensic chemistry experiments
  - Dry ice experiments
  - Liquid nitrogen experiments
- Exposition
  - Pharmacology
  - Microbiology
  - Biochemistry
  - Cosmetics
  - Forensic chemistry
- Quizzes
- Discussion
- Erasmus+



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# County schools day

- County schools day in Bratislava
- Exhibitors: More than 50 secondary schools from Bratislava self-governing region
- Activities: Demonstration of experiments
- Brochure: <https://bratislavskykraj.sk/wp-content/uploads/2023/09/broza5-2023-web.pdf>
- Website: <https://bratislavskykraj.sk/stredna-pre-mna/>

# Secondary School Presentation Exhibitions

- Target group: For pupils in the eighth and ninth years of primary school
- Exhibitors: Secondary schools, representatives of companies and firms cooperating with secondary schools in the framework of dual education
- Activities:
  - Demonstrations of students' activities
  - For undecided eighth and ninth graders there is an evaluation of their study disposition by the staff of the Centre for Educational and Psychological Counselling and Prevention





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## Secondary School Presentation Exhibitions

- Trnava region: Where to go to secondary school
- Venue: Trnava, Dunajská Streda, Senica
- Exhibitors: secondary schools from Trnava self-governing region (some schools from other regions are invited)
- Activities:
  - Demonstration of experiments
  - Pupils carry out some easy experiments



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## Science fair

- The aim is to introduce science in a playful way, especially to primary and secondary school pupils, but also to curious adults.
- Venue: Bratislava
- Exhibitors: Universities and secondary vocational schools, industrial schools, scientific institutes, interest organisations and commercial entities participating in the fair will demonstrate in their stands that science is all around us in everyday life.
- Activities:
  - Universities and secondary vocational schools will present skillful students and showcase their inventions, which have often won various awards at home and abroad.
  - Young visitors will be able to try out some of the experiments themselves or test their skills and knowledge in competitive quizzes.
  - Children will be able to verify many facts and phenomena for themselves through interactive experiments.
- Website: <http://www.vedeckyveltrh.sk/>



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# Night of researchers

- The festival of science - European Researchers' Night is an annually organized event throughout Europe.
- Venue: Bratislava
- The main aim of this festival is, above all, to familiarise the general public with science and research.
- Activities:
  - The program activities bring research out of the laboratory and into the city centres, shopping malls, cafés, clubs or museums.
  - The public can try out the latest technologies and instruments under the guidance of scientists, participate in experiments, competitions and quizzes, watch demonstrations and simulations and exchange ideas and parties with the researchers.
- Web site:  
<https://www.nocvyskumnikov.sk/>



# Online promotional activities



## Online promotional activities

- Social networks\*
  - School website
  - Newsletter
  - Videos\*
  - Podcast\* (new)
  - Promotional materials\*
- 
- \* Students participate in the preparation of content.

The left side of the slide features a dark green background with a complex network of glowing green lines and dots, resembling a molecular structure or a digital network.

# Web and social networks

- Website: <https://www.sosch.sk/>
- Facebook: <https://www.facebook.com/soschba>
- Instagram: <https://www.instagram.com/soschba/>




# Arranging activities



**Staff  
involved in  
promotional  
activities**

- **Project Manager**
  - Plan, prepares and coordinates the activities
  - Takes part on activities
  - Gives feedback
- **Student project team**
  - 30 members
  - At least one member from each study program and year
- **Team of teachers**
  - Teachers from different departments
  - Take part on specific activities according their specialisation



## Motivation of students

- Professional reputation and status in the school
- Exceptional evaluation in a related professional subject
- Portfolio building for Erasmus+ selection procedure, for calls for projects outside the school
- Professional skills development
- Soft skills development

Activity	Number of participants
2016/2017	3729
2017/2018	4428
2018/2019	3068
2019/2020	1934
COVID affected years	
2023/2024	1480

## Promotional activities in numbers

- 2022/2023
  - 30 group activities
  - 20 individual consultations (pupils, elementary school teachers)
  - 1480 participants



# Promoting chemistry careers and qualifications to students

# Promoting chemistry careers

- Activities for secondary school students
- University fairs
- Open days of universities
- Job fairs



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# University fair Gaudeamus – Akadémia

- Gaudeamus - Academy
- Veue: Brno, Prague, Nitra and Bratislava
- Lectures with up-to-date information on admissions and study conditions, as well as behind-the-scenes information directly from students and graduates
- Testing Centre and Advice Service for undecided students - complex information, advice and support in choosing a university
- College stands
- Stands of counselling institutions for higher education study abroad
- Educational Centre - lectures, seminars and consultations aimed specifically at guidance counsellors and secondary school teachers
- Web: <https://sk.gaudeamus.cz/>



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## University Fair - "Where to go to college"?

- Roadshow
- Post-secondary Education Showcase
- Information about Slovak and Czech universities, study programmes and conditions for studying abroad
- Study options, accommodation, financing, future job opportunities
- Venue: Trnava, Trenčín, Žilina, Banská Bystrica, Poprad, Prešov, Košice, Bratislava
- Website: <https://kamnavysoku.sk/>



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## Mini fair ALMA MATER

- Mini fair in every regional city in Slovakia.
- Help with choosing a university.
- Contribute to reducing the brain drain from Slovakia.
- Increase awareness of Slovak universities.
- Introduce the Study at home, Slovakia will reward you scholarship scheme.
- Next year's freshmen will be able to receive €9,000 (in some cases up to €16,500).

# #studying without borders

- Study Abroad Fair
- In person in Bratislava or online
- Personal meeting with representatives of foreign schools
- Presentations of schools at a set time
- Opportunities to study at universities and secondary schools in different countries.
- Information about study benefits, admission conditions and further employment.
- Website: <https://studiumbezhranic.sk/>





# Online university fair

- Video presentations of universities
- Chat with university representatives
- Web: <https://veltrh.vysokeskoly.sk/>



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## Open days

- Open days at chemically and technically oriented faculties
- Faculty of Chemical and Food Technology STU in Bratislava
- Faculty of Natural Sciences of Comenius University in Bratislava
- Faculty of Natural Sciences of Cyril and Method University in Trnava



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# CHEMWEEK

- Faculty of Chemical and Food Technology STU in Bratislava (FCHPT STU Bratislava)
- Chemical experiments live - distillation, extraction, filtration, titration or chromatographic techniques.
- Shows that without the combination of chemistry with other science disciplines and technical approaches, many things would not exist or work today



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## Job fair JobSpott

- Job fair
- Venue: Trnava, Trenčín
- Web: <https://jobspott.sk/>



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# ChemDay

- Job fair for companies of chemical, food and pharmaceutical industries at FCHPT STU in Bratislava
- Ideal place for better and faster job search in the studied field for graduating students and graduates of FCHPT STU
- The members of the Association participated in the fair: Axxence Slovakia, Duslo, Lanxess Central Eastern Europe, Saneca Pharmaceuticals and VUCHT.



# Activity

# Activity

- Solve the following tasks in groups.
- You can find useful materials on Google drive:  
[https://drive.google.com/drive/folders/1yXJtFh2LgoPkTF23OhWnN8oVYVXuO6\\_z?usp=sharing](https://drive.google.com/drive/folders/1yXJtFh2LgoPkTF23OhWnN8oVYVXuO6_z?usp=sharing)
- Select one group member to summarize the results for your group.

# Activity

- What promotional activities do your school carry out?
- Who is involved in promotional activities?
- Are employers and graduates involved in promotional activities?

# Activity

- Choose the promotional activity you will organise.
  - One group chooses an activity to be carried out on the school site and the other group chooses an activity to be carried out off the school site.
- Please indicate:
  - The objective of the activity
  - The target group of participants
  - Estimated number of participants spatial conditions (dimensions, equipment of the space) number of presenting pupils and teachers
  - Choose activities – for example experiment, play, competition.
  - Choose the criteria according to which you will select the experiments.
    - For example: difficulty of preparation, amount of material used, simplicity of execution, green experiments ...
  - Select 5 experiments to demonstrate at the promotional activity.
  - A student of the SOŠCH will be part of your team. He/she can help you evaluate the attractiveness of the experiments.