

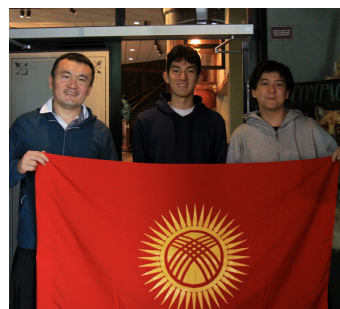


10th European Physics Olympiad
Gothenburg, Sweden
12 - 16 June 2026

Saturday, 13 June 2026

Arrival Day and Checking in

As the teams arrived at the magical Liseberg Grand Curiosa Hotel, the air sparkled with excitement and expectations. The hotel was opened in 2023 and is part of the 100-year anniversary extension of the popular amusement park, which also includes a brand-new modern water park. The water park, called Liseberg Oceana, is planned to open next year. The registration of the student contestants, leaders, and observers went smoothly, and everyone was excited for the opening ceremony later in the evening!



Meet the Students

Hussain Alsaleh



We found team Saudi Arabia after breakfast and spoke to Hussain!



Q: How do you feel about the competition?

Hussain: *I'm nervous but I'm also excited. I'm excited to meet the other teams and socialize with them.*

Q: Have you travelled abroad before?

Hussain: *Yes, I have travelled abroad for other competitions, but I this is my first time in Sweden. I have always wanted to come here!*

Q: Do you prefer theory or experiment questions?

Hussain: *I'm more of a theory person.*

Q: What is your favourite physics subject?

Hussain: *Right now, maybe electricity and magnetism.*

Q: Do you want to study physics in the future?

Hussain: *Yes!*

Q: Tell me a fun fact or hidden talent about yourself!

Hussain: *I like to play call of duty.*

Federico Roccaforte



Team Italy was hanging around in the hotel lobby!

Q: How do you feel about the competition?

Federico: *Well, I'm really excited and I hope I will do my best in these days. I'm also really excited to see what the organization has prepared for us.*

Q: Have you travelled abroad before?

Federico: *Yes I have, for both vacations and other competitions. This is my first time in Sweden.*

Q: Do you prefer theory or experiment questions?

Federico: *I like the theory more because in some sense it's easier for me.*

Q: What is your favourite physics subject?

Federico: *Electromagnetism!*

Q: Do you want to study physics in the future?

Federico: *Yes, I plan on studying physics in university and then get a doctorate.*

Q: Tell me a fun fact or hidden talent about yourself!

Federico: *I can speak German because my mother is German.*



Sviatoslav Lavrenyuk



Team Ukraine was eagerly exploring the hotel!



Q: How do you feel about the competition?

Sviatoslav: *I'm really excited because it's my first time at EuPhO and I really like the problems from previous years as they were very interesting.*

Q: Have you travelled abroad before?

Sviatoslav: *Yes I travelled abroad before for other competitions. I visited Sweden in 2019 with my family.*

Q: Do you prefer theory or experiment questions?

Sviatoslav: *I like the experimental part because it's very hands-on.*

Q: Do you want to study physics in the future?

Sviatoslav: *Yes! I want to study physics in the future.*

Sven Says...

Did you know, the hotel's restaurant has a **1923**

vintage carousel? There is also a **lobby slide** to the

reception area from the second floor!



We knocked on Haoyi's hotel door and asked if we could chat a bit!

Haoyi Li 



Q: How do you feel about the competition?

Haoyi: *A little bit nervous and excited, this is an important chance for me to compete internationally. It's also a great opportunity to travel abroad.*

Q: What is your favourite physics subject?

Haoyi: *I like thermodynamics because it connects the small and the big physics together, it bridges the microscopic and the macroscopic world.*

Q: Have you travelled abroad before?

Haoyi: *When I was younger, yes, but never outside Asia before.*

Q: Do you want to study physics in the future?

Haoyi: *Yes, I want to study physics as well as computer science and AI.*

Q: Do you prefer theory or experiment questions?

Haoyi: *I am maybe better at theory but the experiment questions are important to me because I'm weak in it so it's a good chance to practice.*

Q: Tell me a fun fact or hidden talent about yourself!

Haoyi: *I like to play table tennis at school and walk outside with my friends. I also like playing computer games.*

Caio Yamashida Risseto 

We found team Brazil at the registration and chatted with Caio!



Q: How do you feel about the competition?

Caio: *I'm very excited but kind of nervous because it's the first big international competition that I am going to.*

Q: What is your favourite physics subject?

Caio: *Electromagnetism, because it's so abstract when you look at the equations but when you understand it, everything makes sense.*

Q: Have you travelled abroad before?

Caio: *Yes I have been to e.g. Romania for the International Junior Science Olympiad.*

Q: Do you want to study physics in the future?

Caio: *I will probably study physics in college but I want to work in finance.*

Q: Do you prefer theory or experiment questions?

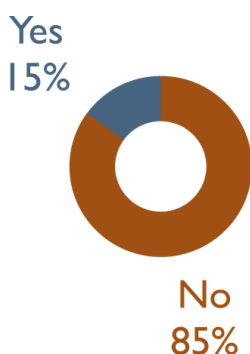
Caio: *The experiment part is my favourite but the experiments are often very difficult. It's still my favourite though.*

Q: Tell me a fun fact or hidden talent about yourself!

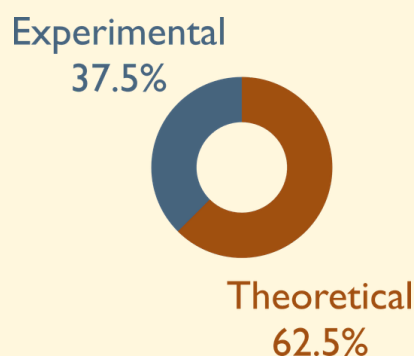
Caio: *I have a secret hobby, it's this Brazilian couples dance called forró. I like it very much!*

We were curious about our participants and asked a few questions on our Instagram account @eupho2026. Here is what we found out:

Are you travelling abroad for the first time?

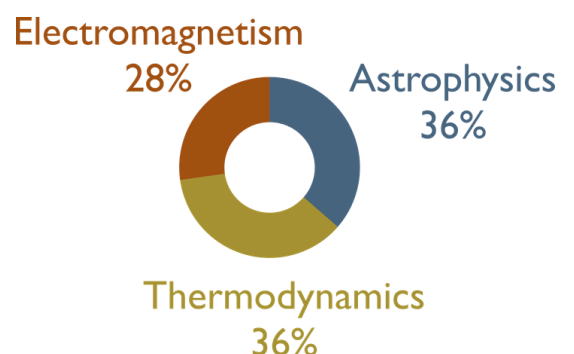


What's your favourite part?



What's your favourite branch of physics?

(Top three answers)



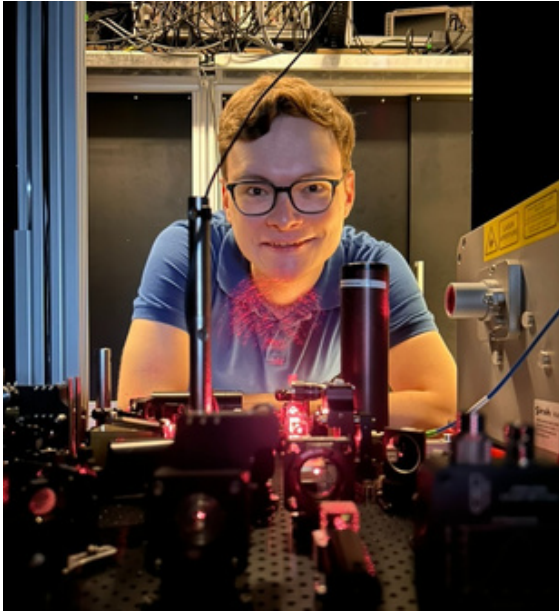


Photo credit: Maurice Zeuner

Maurice is a PhD-candidate at a major laser facility in Munich, Germany. His research uses relativistic laser pulses to drive non-linear collective effects in plasmas. Through a process called laser wakefield acceleration, he accelerates electrons to extreme energies and generates ultra-bright, partially coherent X-ray flashes, which he is developing to probe phenomena relevant to laser-driven nuclear fusion. He is also a specialist consultant on radiation and hazardous materials for the fire and disaster control services in his county.

Interviewed by Asira Lele.

Q What were your expectations during EuPhO 2017 as a student, and how would you view those expectations now, as a member of the Academic Committee?

As a student, I was very excited but also quite nervous. I expected the atmosphere to be very competitive; instead, I found it very friendly with a heap of fascinating people to talk to and great excursions with plenty of space for fun and shenanigans! To this day, I really enjoy thinking back to the first EuPhO in Estonia and how I faced the challenge of doing moderations for the first time. Now, in my role, I often remember how it was to sit on the other side of the table.

An amazing aspect of our Olympiad is that it provides you with this platform to discuss your physics ideas and thoughts in an international setting. I encourage every student not to be afraid and to give it a try, whether at lunch with teammates, on a boat tour with another team, or during moderations with the graders and the Academic Committee.

Been There, Solved That

Meet **Maurice Zeuner**, who participated in the very first EuPhO in 2017 and is now an Academic Committee Member.

Q What are your expectations for the students for EuPhO 2026?

Apart from their general curiosity and eagerness to solve our problems (believe me, there is so much hard work that went into developing them!), the students should not forget to have a great time. Don't think too much about your final score; instead, take in the entire atmosphere, enjoy the excursions, and the cultural program. Get to know the others! Also, I think it is fair to say that everyone can give themselves a pat on the back and be proud of having made it to an international competition. Being here is the biggest reward, regardless of whether you can take home a medal or what color it might be.

Q How would you encourage students to bring out their creativity in Physics through EuPhO as a medium?

You might have noticed that our tasks are designed to be mostly new to everyone. So the "traditional" method won't work; you will need to get creative. When you have something new in front of you, it is a great approach to "play" with it: see if patterns emerge and try to connect those patterns to your previous knowledge. Sometimes you will be very puzzled, but at other times, you might have an idea and a "click" moment. I hope that many of you will get such a highly enjoyable "click" moment in our exams.



Maurice(left) at EuPhO with his team. Photo credit: Maurice Zeuner

Q What advice would you give to today's Physics students?

The typical: Stay curious, ask the right questions, and work hard. But in addition to that, you really have to find a good way of treating AI tools. Unfortunately, I can see that many of the students I teach at university are using AI to "cover up" their knowledge gaps for short-term rewards, but as a result, they miss the opportunity to learn something for the long term. I believe that you should be extremely careful and disciplined in the ways you incorporate AI into your learning routine and research.

Q If any participants dream of joining the Academic Committee one day, what would you like to tell them?

Haha, good question :D Well, maybe this: Rest assured that as a participant, you are getting waaaay more sleep (and cool excursions) during the Olympiad than we do. ;)

A Day at the Carlsten Fortress



Photo credit: Per Pixel Petersson / www.vastsverige.com

While the students have their very first EuPhO exam on Saturday, the leaders will spend an afternoon at the Carlsten fortress, located about 45 kilometers northwest of Gothenburg. After breakfast, the leaders will be transported to the ferry, where they will take a scenic boat trip from the Stenpiren pier. They will head off to explore the Carlsten fortress with a guided tour.

The Carlsten fortress is a stone fortress located on the island of Marstrand. Construction began in 1658 on the orders of King Charles X Gustav, shortly after Bohuslän became part of Sweden. The fortress was completed in 1689 and served as an important defensive stronghold to protect Sweden's western coast and the strategically important, ice-free harbor of Marstrand, where the Swedish Navy was stationed.

In addition to its military role, Carlsten Fortress was also used as a prison. One of its most famous prisoners was Lars Larsson Molin, known as "Lasse-Maja," a notorious thief and master of disguise who became a legendary figure in folklore.

Over the centuries, this fortress has witnessed wars, political intrigue, and dramatic prison escapes, and now it is one of Sweden's most fascinating historical landmarks!

Sven Says...

Did you know, the first EuPhO was held in 2017 in **Tartu, Estonia**, with only 91 students from 20 countries. In **Gothenburg**, we are hosting 200 students from 41 countries!



♥ ♣ A Swedish Card Game: Go Fish (Finns i Sjön) ♦ ♠

OBJECTIVE



Collect as many sets of four matching cards as possible.

SETUP



Deal 7 cards to each player. Place the remaining cards face down in a pile called the lake.

HOW TO PLAY



Ask another player for a rank you already hold. If they have any, they must give you all of them and you continue your turn. If not, they say "Go Fish!" and you draw from the lake. The turn then goes to the next player.

WINNING!



When all cards have been played, the player with the most four-of-a-kind sets wins.



Steam and Thermodynamics

Written by Andréas Sundström

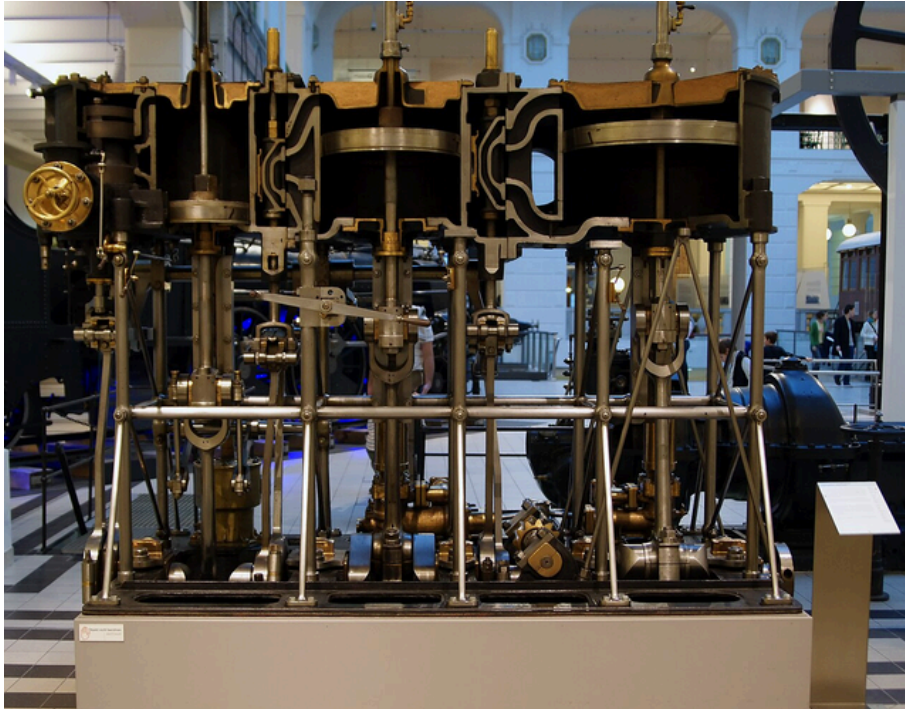


Photo Credit: Vienna Technical Museum, CC BY 3.0, via Wikimedia Commons

Gothenburg was founded on the premise that Sweden needed a port on the west coast to secure access to the ocean-trading routes. As an example of the impact from this maritime trade, Chalmers University of Technology (which is co-hosting you here this week) was founded with money earned from the Swedish East-India Company. Today, the leaders will get the chance to experience some of Gothenburg's maritime history on the 112 year old steam ship Bohuslän. I will therefore take the opportunity to take a look into the physics behind the propulsion of this steam ship.

A steam engine is a heat engine that works by the principle of the expansion of water when boiled to steam, leading to a high pressure in a boiler. This high-pressure steam is fed into a cylinder with a piston, the force from the steam pushes on the piston. If the piston then starts moving out, the force from the steam performs mechanical work on the piston. Normally, the steam is then fed into a condenser where it is cooled down to the point where the steam condenses to liquid water, and can get pumped back into the boiler. In this cycle, which is well modeled by the theoretical thermodynamic Rankine cycle, when the heat flows from the hot boiler to the cool condenser, a limited fraction of this heat energy is converted to useful mechanical energy.

In order to maximize the useful work extracted from the steam, the steam should theoretically be allowed to expand until the steam pressure in the cylinder equals the atmospheric pressure on the other side of the piston. There are, however, a number of practical problems with such a setup. The most obvious problem is the long piston stroke required for sufficient expansion. Another problem is that, as the steam expands, the pressure in the cylinder drops, likewise with the driving force on the piston, which results in uneven engine operation.

One clever solution to these problems, used on many ships, including Bohuslän, is the so-called compound steam engine, where the steam is expanded sequentially in two or more cylinders. In these engines, the first (high-pressure) cylinder is fed with the highest-pressure steam directly from the boiler, as in the above. The remaining steam pressure after the first cylinder, is then fed into a second (medium- or low-pressure) cylinder. Because the pressure is lower in this cylinder, the driving force on the piston would be lower. However, this is compensated by increasing the diameter of the cylinder, increasing the area of the piston that this lower pressure can act on, thus the lower-pressure cylinders. A compound steam-engine can therefore easily be identified by its multiple cylinders with different diameters. For the leaders, I therefore strongly suggest that you take a tour of the engine room and see if you can recognize the high-, medium- and low-pressure cylinders. For the students, you will have to do the same challenge, but for the steam engine pictured above.

Seeing with neutrons: inside ESS in Lund

Physics research in Sweden: ESS

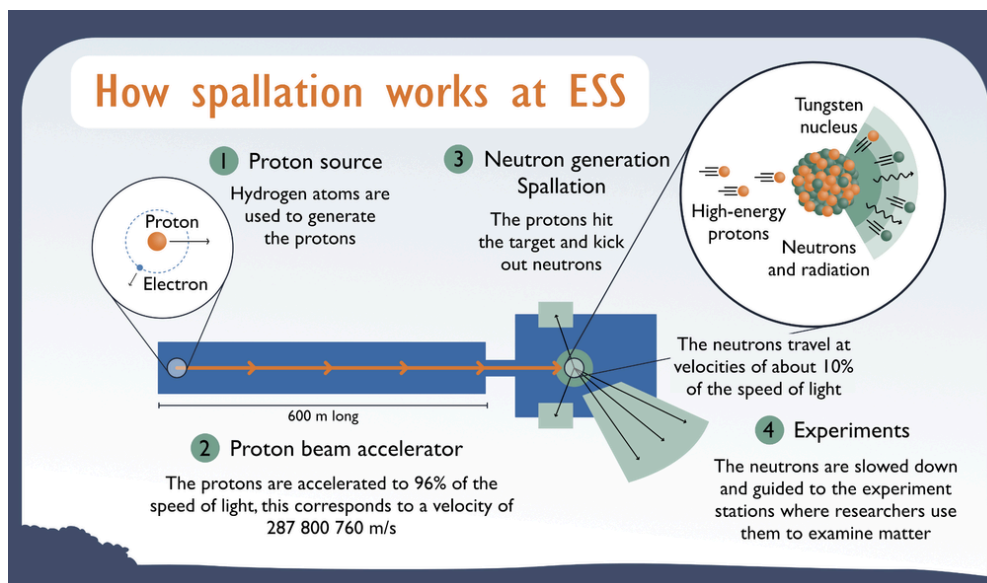


Written & Illustrated by Moa Kristiansson

On the edge of Lund in southern Sweden, one of Europe's most ambitious science projects is taking shape. The European Spallation Source, ESS, is being built to create some of the world's brightest neutron beams. These beams let scientists look deep inside materials and see how atoms move and interact. The goal is to understand matter so well that we can design better batteries, medicines and sustainable technologies.

At the heart of ESS is a linear accelerator almost 600 meters long. It pushes protons to energies of about 2 GeV, which corresponds to roughly 96 % of the speed of light. The protons are sent onto a tungsten target wheel that is 2.6 meters wide and weighs almost five tonnes. When the protons hit the tungsten, they knock out neutrons in a process called spallation. The target station is housed inside an 11 meter high, 6 meter wide

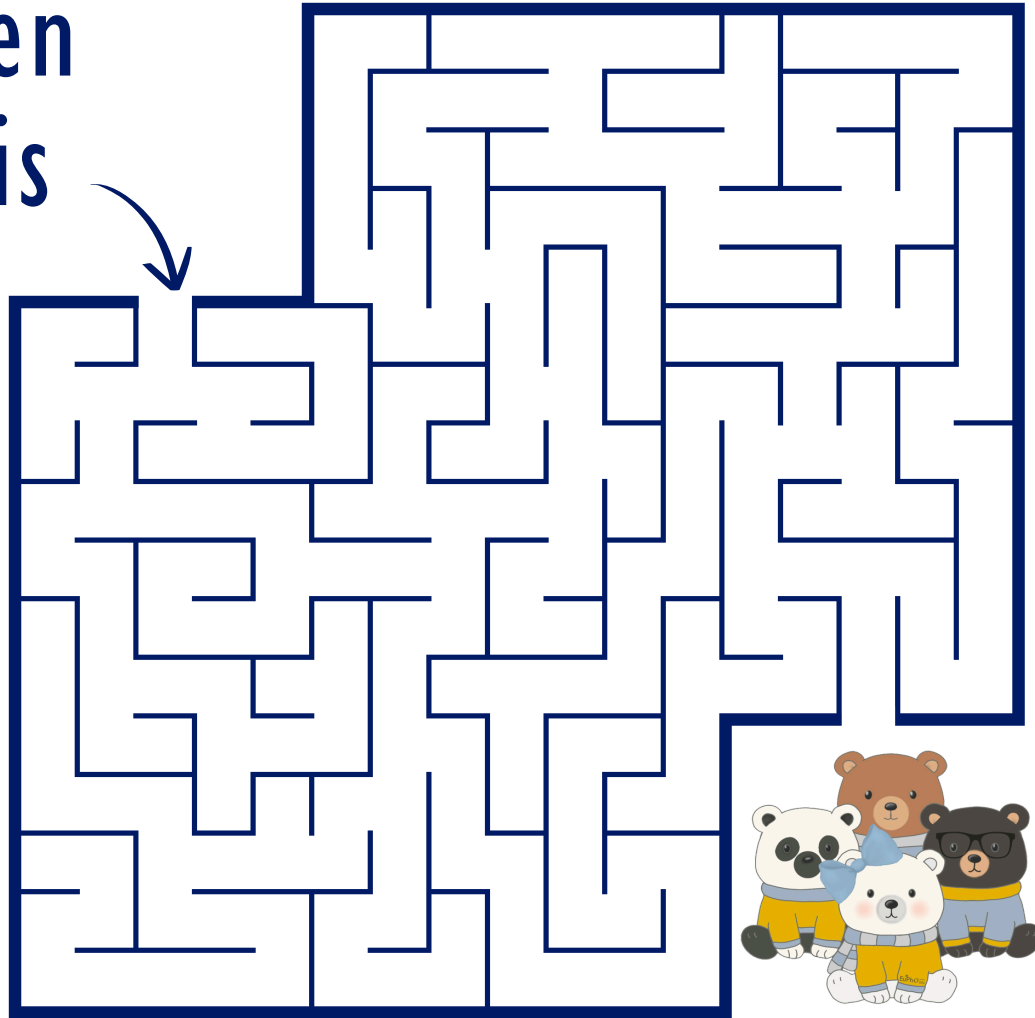
monolith of concrete and steel that weighs about 6000 tonnes to protect the surrounding from the radiation generated in the spallation process. The newly created neutrons first rush out at about 10 % of the speed of light and are then slowed down to roughly the speed of sound so that they can be used for the experiments. Neutrons are very useful because they have no electric charge, they



can pass through materials that stop electrons or X-rays. They are sensitive to magnetic structures and to light elements like hydrogen. This makes them ideal for studying e.g. water inside materials, protein structures, magnetic materials and how battery components change while they charge and discharge. ESS will initially host around 15 neutron instruments, each designed for a particular type of research question. When ESS reaches full operation at 5 megawatts of beam power, it is expected to be up to 100 times brighter than existing spallation sources. Around 3000 visiting scientists per year are expected to use the facility. The construction of ESS is still ongoing but the first scientific results are expected to be produced already next year.

If you are curious about ESS, you can read more at www.ess.eu.

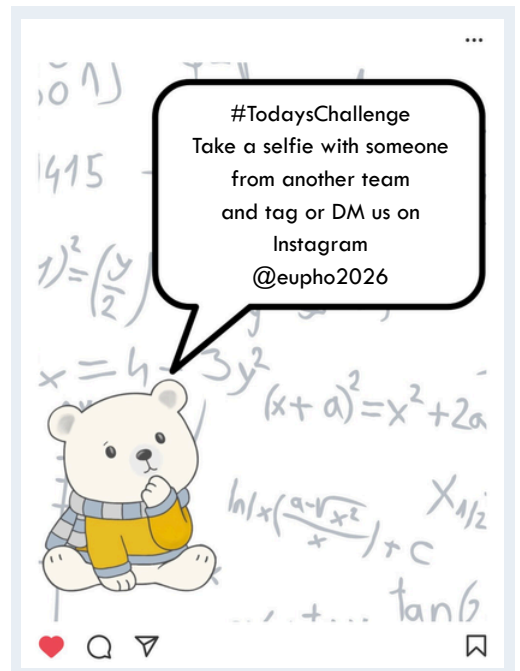
Help Sven reach his friends!



Today's Schedule

Time	Students	Venue
7:00 - 8:00	Breakfast	LGC Hotel
8:00	Transport to Exam Hall	Bus/Tram/Walk
9:00 - 14:00	Experimental Exam	SB Multisal, Chalmers
14:00	Transport to ferry w. packed lunch	Bus/Tram
15:00 - 16:15	Boat trip	Lilla Bommen
16:15 - 18:15	Free time/Beach	Brännö
18:15 - 20:00	Boat trip with dinner	Brännö Brygga

Time	Leaders	Venue
5:00 - 8:00	Translation & Breakfast	Auditoriet, LGC Hotel
8:00 - 9:30	Breakfast/Free time	LGC Hotel
9:30	Transport to ferry	Bus/Tram
10:00 - 13:30	Boat trip	Stenpiren
13:30 - 16:30	Lunch & Guided tour	Marstrand Island/Carlsten Castle
16:30 - 20:00	Boat trip with dinner	Marstrand Island



Layout & Editing: Maitreyi Muralidhar
Sven Design & Social Media: Miriam Pristera
Photographer: Marin Gecaj
Journalist: Moa Kristiansson
www.eupho26.se @eupho2026



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