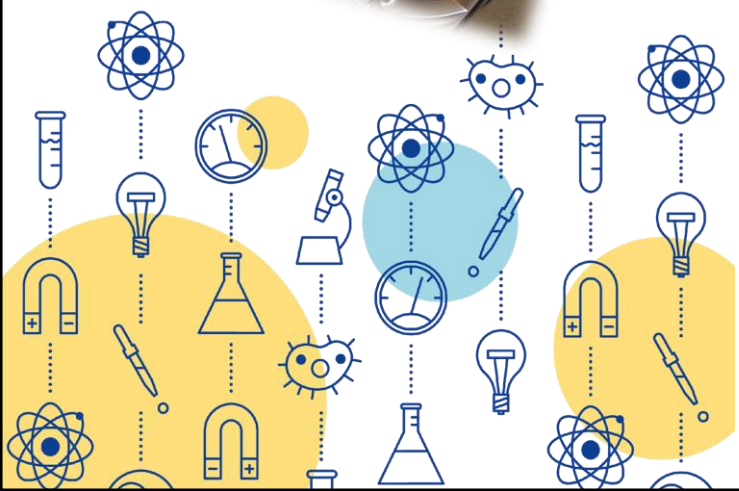


Renewable Energy Day for Secondary School Students

Karin Hellat, Riinu Härmas, Karl-Ander Kasuk, Ülle Kikas
Institute of Chemistry, University of Tartu, Estonia



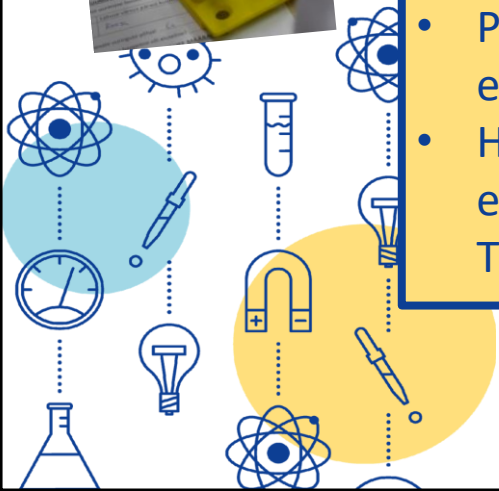


What is Investigation Lab?

Aim: to enhance science education and practical skills, foster curiosity, serve as a valuable resource for schools, bridge the gap between theory and practice.



- Established in 2016 by the University of Tartu's Science School;
- Almost 8000 students from ca 100 schools (2016-2023);
- Awarded with the title of National Science Popularizer 2017;
- Provides exciting experiments solving problems from real life: enhances knowledge, lab experience, teamwork, and IT skills;
- High-quality programs supported by modern facilities and a skilled, enthusiastic team: more than 40 tutors and guides, mainly from Tartu University's natural science students and faculty.





Renewable Energy Day

Short lecture: renewable energy resources

Hydrogen lab: experimenting with solar cell, electrolyzer and fuel cell



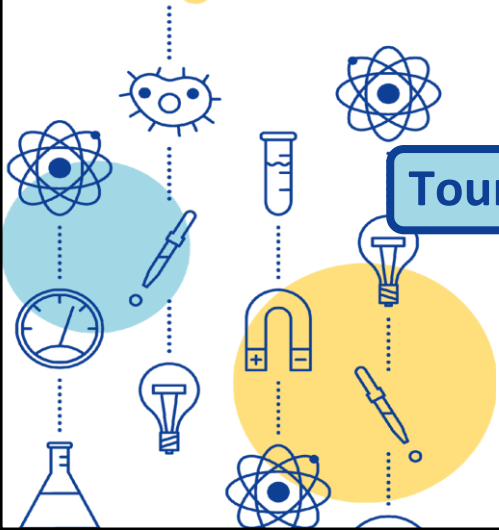
Role play: construction of offshore wind farm in the Gulf of Riga

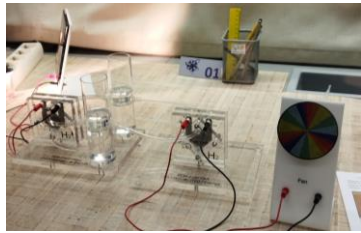
Quiz: renewable energy



Tour in Chemicum: hydrogen production and storage

Hydrogen technology in everyday life: pancake machine with a hydrogen fuel cell



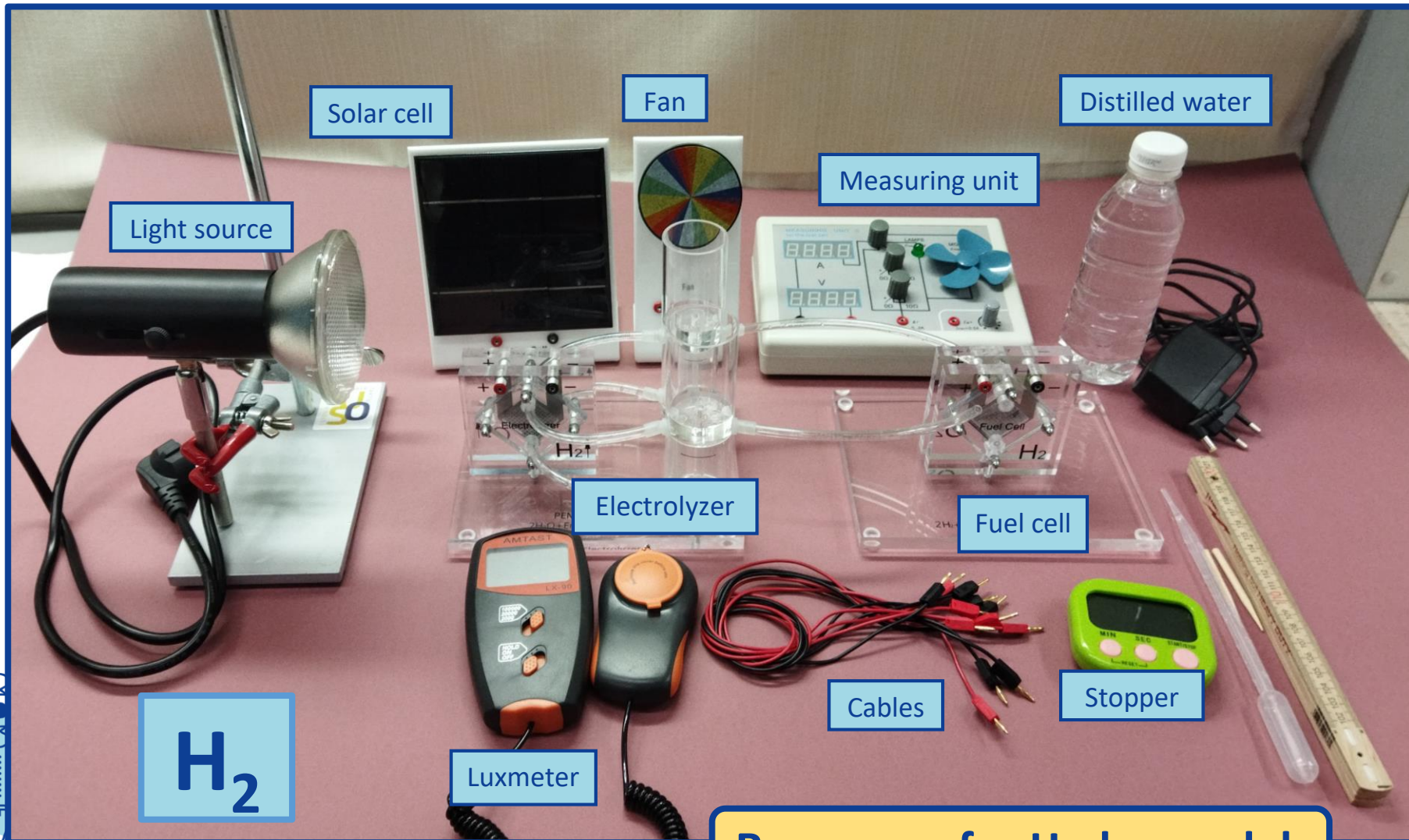


Hydrogen Lab



- Hydrogen lab activities are dedicated to solving a specific problem: finding a way to provide an electrically powered car with reserve hydrogen;
- During an African rally, solar batteries generate electricity during the day;
- There is a question about the feasibility of converting the electricity produced during the day into hydrogen;
- The converted hydrogen could potentially be used to generate electricity for the car during the night.





Resources for Hydrogen lab

Debate



Tuuli Allikas
CEO, Wind Energy Alliance

I wish that Estonia would start building offshore wind farms as soon as possible. By building these, we will also develop Estonia's green industry and use our green renewable resources. Even if we produce too much electricity, we can convert it into hydrogen, which we can use to decarbonise chemical industries and air and sea transport. Hydrogen can also be used to produce ammonia and fertilisers, another opportunity for business development in Estonia. In addition, hydrogen can be converted back into electricity if there is a shortage of electrical energy.

Fact: The highest use in Estonia's history has been 1,591 MW. Currently, the power of 145 wind turbines in Estonia is 320 MW, but all the offshore wind farm developers want to bring to Estonia would have a total production capacity of 12,908 MW.

Concern: We have made promises in the climate field but are running out of time to fulfil these promises.

Question: How can we create more value for the world as a country?

UURIMISLABOR

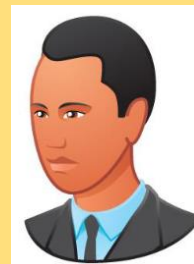
UNIVERSITY OF TARTU



Role-play



Saara Veski
Accountant



Olev Tulev
Electric car enthusiast



Kulla Kivi
Oil Shale Miner



Neeme Lind
Ornithologist on Kihnu Island



Tunne Meri
Nuclear Energy Entrepreneur





Role-play

Debate



Õie Otsus
Energy Minister #1

I want to make a decision considering the interests of the Estonian state and its people. I want to listen to all parties and understand what is important to them. Often, a compromise that satisfies all parties to some extent can be found. Nelson Mandela's quote inspires me: "May your choices reflect your hopes, not your fears." Accordingly, I will also decide on this issue based on hopes, not fears.

Fact: The negative impact of climate change on agriculture implies changes to the Estonian diet, as a large part of our everyday food comes from foreign countries where climate change devastates agriculture.

Concern: I already see increasing social division and want to enhance cooperation for joint success with my decisions.

Question: How can I resolve the issue of offshore wind farms fairly, taking into account everyone's wishes and also thinking about our long-term goals?



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Debate



Pearu Õigus
Energy Minister #2

Parliamentary elections are coming up again, and I want to get as many votes as possible. I can only please some, so I'd better position myself as the first choice for as many people as possible. I need to stand out and seem to voters as the only candidate who stands up for them. I don't care if non-voters hate me – they won't vote for me anyway.

Fact: Estonia's annual carbon dioxide emissions are 9.3 million tons, less than 0.03% of the world's emissions (36.8 Gt).

Concern: I'm not interested in the climate situation. I'm interested in how I can benefit from it as much as possible.

Question: Which decision will make me most popular among the people?



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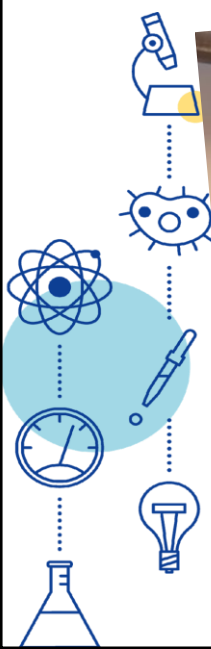




Role-play



Tour of Chemicum



Pilot Project: Renewable Energy Day



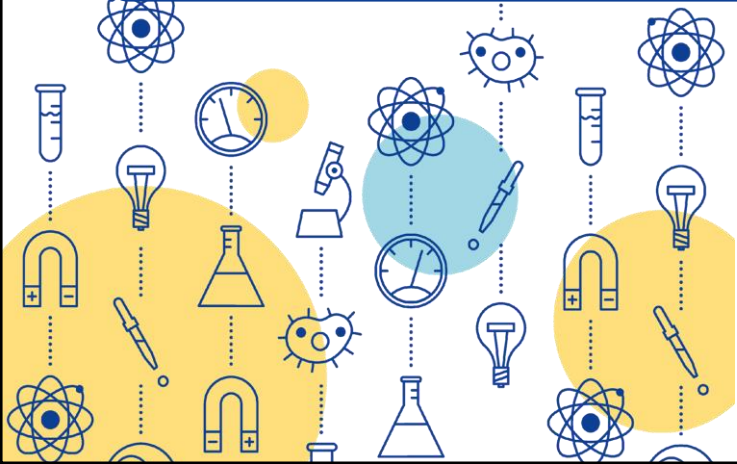
PARTICIPANTS

140 Secondary School Students from 5 Gymnasiums



TUTORS

14 Bachelor, Master and Doctoral Students





Feedback

WHAT I LIKED AND REMEMBERED:

How hydrogen is made;
Pancake machine;
Renewable energy, offshore wind farms,
hydrogen;
Very nice people and a nice environment;
The nice attitude of the guides and their
infectious passion for the topics, sparked
an interest in further research and
learning;
The basement was cool;
Hydrogen can be used to store energy;
I liked the speeches of the energy
ministers, and it was also fun to do the
experiment;
I liked the discussion about the wind
power plant: its pros and cons

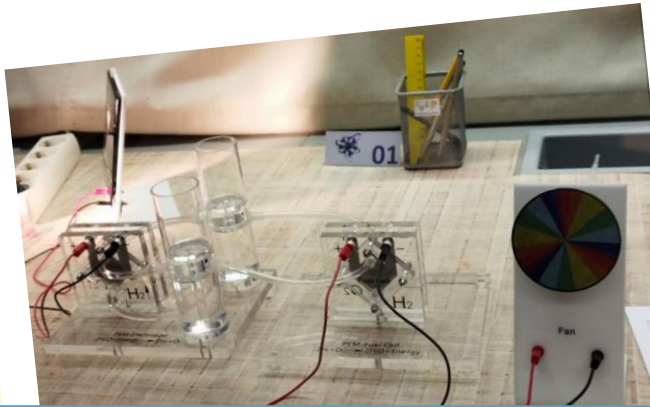


SUGGESTIONS:

Everything was wonderful;
Everything was tight;
Everything was good;
Keep up the same spirit 😊;
Everything was very well organised
and enlightening;
Lab work could be more interesting;
It could have been longer;
The tour could be more detailed and
in more rooms;
More bang :)



RIIKLIKULT TUNNUSTATUD
TEADUSE
POPULARISEERIJAJA 2017



Tour of Chemicum for EUROVARIETY 2023



Prof Enn Lust
on the roof of Chemicum

