

Foreword

Dear SoSsie,

We would like to present to you information about our contributions to Science on Stage. You will see the Discovery truck, view the modules we made for our National Event 'Science on Tour', teachers with 'best practices' and our travelling DNA laboratory. Unfortunately Michiel van den Broeke's lecture will not take place. It was intended to be a plenary session and became a parallel session for a small audience. Since that was not our intention, Michiel cancelled his offer for the lecture. Nevertheless we like to present Michiel and his Polar Research.

Science on Stage on Tour

Our National Event moved from east to west and north to south. It travelled all over the country with the Discovery truck: Science on Stage on Tour. We developed modules about everyday science (physics, chemistry and biology topics). We like to show secondary school students that science is everywhere, all the time. There is science in fitness and food, in jeans, mp3 players, and soft drinks. We developed the modules to surprise them, to let them have fun. In the first three months of 2007 we travelled around the country and about 1500 students experienced the Science on Stage modules. The modules were presented in the Discovery truck of the Rijksuniversiteit Groningen, it's an experience in it's own right as you can see in Grenoble.

We made the projects to interest the students in science. Maybe they will start studying science, maybe not. Whatever they chose, the main thing is that they chose something that 'fits their personality'. And if they don't choose a career in science, we hope they will say: "It's not my piece of cake, but science is fun."

Let's keep in touch

After three Physics on Stage events, we are now going to experience the second Science on Stage. One thrilling week with teachers from all over Europe. A week that will be the start of a 'Science on Stage beehive on a warm sunny day'. Emails will be sent all over Europe. Teachers will visit summer schools and exchange teaching kits and modules. It's great!

One of the goals for the making of this booklet is 'Keeping in touch with the Dutch'.

So please use this booklet, use us, so that we can ask for your advice as well. All together we can form a worldwide network and continue the worldwide effort encouraging young people to enjoy science and maybe become a teacher in the future or a scientist or But at least to become someone who enjoys her or his job!

We hope to hear from you, to see you, to keep in touch with you.
Have a good Science on Stage 2!

Carla Upperman
Chair Dutch NSC

Ada Molkenboer
National Representative

www.scienceonstage.nl

The Dutch present themselves

ing. Antoon Boks – Science and Physics teacher

Antoon Boks is a secondary school teacher. He is currently working to obtain a teaching degree in Physics at the highest level. Juan Dominguez is his 'schoolmate'. Together they did the preparations for the Science on Stage on Tour and for the festival in Grenoble. Antoon appeared to be a talented designer as well. He redesigned the original SoS2 poster into some fine posters for the National Event and for Grenoble as well.

Antoon works at the Bonifatius College in Utrecht as a Physics and Science teacher. He is married and has two cute daughters; the youngest one was born in the early morning of the Science on

Stage on Tour kick off, 23 January 2007! In between changing nappies, physics, Science on Stage, study and other things he tries to sing as well. He enjoys everything he does!



Antoon is member of the Dutch delegation for Science on Stage2.

His youngest daughter Eline can be admired at
www.phys.uu.nl/~molkenbr/scienceonstage2007/afstuderen
www.rug.nl/fwn/nieuws/pr/rugdiscovery/waar/vroeger/a20070307

The website of the Bonifatius College is www.boni.nl

If you would like to get in touch with Antoon, send an e-mail to A.Boks@boni.nl.

dr. Michiel van den Broeke – a scientist specialising in Ice and Climate at the Antarctic; coordinator of activities around the International Polar Year at the Institute for Marine and Atmospheric Research (IMAU) Utrecht University.



Michiel van den Broeke (1968) graduated in Physics and Astronomy (1991). In 1996 he finished his thesis on the meteorological subject the 'Interaction between climate and the melting behaviour of glaciers and icecaps'.

Afterwards he worked at the Norwegian Polar Institute in Oslo for two years.

Nowadays he is a senior teacher-scientist at the Institute for Marine and Atmospheric Research (IMAU) of Utrecht University. He gives lectures on 'Dynamical Meteorology' for master students and 'Atmosphere, Oceans and Ice' for undergraduate students at University College Utrecht. He spent more than a year abroad doing experimental research on glaciers and icecaps at Svalbard, the Alps, Greenland and

the Antarctic. His main research interest at present is to understand the climate of the large ice sheets of Greenland and Antarctica. "We combine experimental work (automatic weather stations, meteorological experiments) with regional meteorological models, in close collaboration with the research department of the Royal Netherlands Meteorological Institute (KNMI). Interesting applications are found in climate change studies, such as Antarctic Peninsula warming and ice core interpretation. Other related topics are diamond dust, katabatic winds, snowdrift, mass balance and so forth."

The lecture was meant to be on the following topic: 'Melting ice sheets, should we be worried?' "The great ice sheets of Greenland and Antarctica contain enough water to cause global sea levels to rise by more than 70 m if melted completely. Until five years ago, the Intergovernmental Panel on Climate Change (IPCC) agreed that these large ice sheets would

react slowly to a climate warming and would not contribute significantly to ongoing sea level rising. But recent observations show that both the Greenland and Antarctic ice sheets are changing at a rate much faster than was believed possible. These new insights have forced glaciologists to revise their ice sheet models and climatologists to revise projected sea level rises. In this presentation we will discuss the changes that are presently occurring in Greenland and Antarctica, their possible causes and whether or not we should be worried about these developments."

In his spare time Michiel van den Broeke enjoys cycling, walks with his girlfriend and their two kids, if there isn't football or swimming practice scheduled for the kids.

Site about the automatic weather stations:

www.phys.uu.nl/~wwwimau/research/ice_climate/aws

His personal website is: www.phys.uu.nl/~broeke

Louwrens van Dellen and Gijs Hijmans – coordinators Rino project

Lourens and Gijs are two of the students that run the Rino Foundation. They are both Physics students and they do this project in their spare time, like the other Rino team members. They are all physics students at Leiden University.

Louwrens: "Hello, my name is Louwrens van Dellen and I'm a third-year physics student at Leiden University. Besides studying physics, I enjoy being chairman of the Rino Foundation, the Dutch physics show group."

In Grenoble you can see the following Rino's in action:

Anna Baas, Anton Hunsucker, Gijs Hijmans, Jasper Woudenberg, Jelmer Renema, Kees Herbschleb, Louwrens van Dellen, Rick Leijssen, Rosa Runhardt and Yorick van Boheemen.

If you want to know more about the Rino project you can visit the website of the Rino Foundation: www.physics.leidenuniv.nl/rino

For more personal contact you can send them an email at rino@Physics.LeidenUniv.nl

drs. Juan Dominguez – Mathematics and Physics teacher

Juan Dominguez Y Sainza studied Mathematics at Rijksuniversiteit Groningen. He has just finished his teacher training in Utrecht and will be a physics teacher for the advanced level in secondary schools. Juan is a Mathematics and Physics teacher at the Willem de Zwijger College in Bussum.

Together with his 'schoolmate' Antoon Boks he has organised the Science on Stage on Tour event, he maintains the website and all other things that have to be done for this National Event and for the festival in Grenoble.

Besides his job and his studies, he still has enough spare time to play sports, go hiking and biking. He prefers to go hiking in the mountains.

His website (in Dutch) is www.dominguez.nl

Do you want to get in touch with Juan? Send an email to mail@dominguez.nl or jsdominguez@gmail.com



**Josje Fens and Jos Kistemaker – student-assistants
Discovery truck**

Hi, my name is Josje Fens, I'm a student of Energy and Environmental Sciences at Groningen University and have obtained a bachelor in Biology. Last year I spent most of my time at the board of the 'Usva'. This is the cultural student centre in Groningen. Besides that I work for the Discovery truck to convince secondary school students that a beta course is nice to do. And that is the reason why I'm here at the Science on Stage Festival.



If you want to ask Josje about studying in Groningen or travelling to Dutch schools with the Discovery truck you can mail her at: J.Fens.2@student.rug.nl

Hi, I'm Jos Kistemaker, twenty-three years old, and a fourth year Chemistry student. Even before I ever heard of chemistry, I felt enthusiastic about mixing household chemicals in attempts to bring about a reaction. In the final year of secondary it became clear to me that chemistry was *the* subject for me to study. Since then I have enjoyed student life to the full. For a few years I have been assisting secondary school students with their research projects and undergraduates with their practical courses.

I prepare practical courses for all ages and do promotional work for the Rijksuniversiteit Groningen. These jobs and my studies are a beautiful way of tasting all aspects of chemistry.

You can send him an email at J.C.M.Kistemaker@student.rug.nl

drs. Jan de Geus – Mathematics and computer science teacher



Jan de Geus studied Mathematics at Leiden University and obtained his teaching degree in Computer Science as well. He works at Baudartius College in Zutphen and combines teaching with all kinds of activities around the 'Universum Programme': a programme for excellent schools involved in developing extra teaching programmes and exchanging those programmes with other candidate Universum schools. He takes part in developing an NLT-module (Nature, Life and Technology) and a Mathematics D module (a new Mathematics approach) He is a collector of science stamps and books about science.

The Dutch NSC selected Jan because of his innovative and creative way of teaching science. The Kyoto project of Jan de Geus has been in the final selection of a national contest.

More information about his Kyoto project (in Dutch) you can find at www.durvendelendoen.nl and about his school at www.baudartius.nl.

You can get in touch with Jan de Geus via j.degeus@baudartius.nl

**drs. Marten Hazelaar –
science and biology teacher**

Marten Hazelaar is a ANW (general science) and biology teacher at the secondary school Christelijk College De Populier in The Hague. He studied Microbiology and was elected 'teacher of the year 2003' at the Vrije Universiteit in Amsterdam.

Together with his colleagues he develops the 'science stream' at his school.

With fifth year students (one year before their final exam), he brewed a beer which the Grolsch brewers (a famous international brewery in the east of the country) awarded an 8 out of 10. Besides his school work, he is an artist and makes graphic arts (etching and linocuts).



The Dutch NSC selected Marten because of his innovative and creative way of teaching science.

Information about De Populier you can find at www.depopulier.nl

To get in touch with Marten you can mail him at hazelaar@depopulier.nl

drs. Theo Jurriëns – scientist in astronomy and truck manager of the Discovery truck

Theo Jurriëns works at the science department of Rijksuniversiteit Groningen. He is an astronomer and interested in sports and other branches of science as well. He investigated the correlations between childbirth and the occurrence of full moon. It appears there is none! Total solar eclipses and falling ice also have his interest. For the past two years, he has been travelling around the country with the Discovery truck. It's part of a public relations campaign towards secondary school students. It's meant to encourage them to science at Groningen University.



More information about the Discovery project can be found at www.rug.nl/Discovery.

About Theo's interests at www.theojurriens.nl

If you want to get in touch with him you can send him an email: T.A.Jurriens@rug.nl

dr. Aonne Kerkstra – science teacher

Aonne Kerkstra studied Chemistry at the Free University of Amsterdam. Nowadays he is a science and ANW (general science) teacher at the Interconfessionele Scholengemeenschap het Westland (ISW) in Naaldwijk and since August 2006 he is a chemistry didactical at the Technical University in Delft (TUDelft). Besides this he is a coach for the new chemistry programmes in the west of the country (Noord-Holland). He supervised the development of the modules 'Eigentijdse materialen' (Contemporary materials) and 'Zoetstoffen' (Sweeteners). The Sweeteners module can be found at www.contextchemie.nl and Aonne presents a workshop about this module at Science on Stage2 in Grenoble (April 2007).

In his spare time Aonne likes ice-skating in wintertime and in summer he cycles long distance tracks like the Noordzeeroute (www.northsea-cycl.com).

Another important thing is that, since 2005, he is the proud grandfather of his first grandson Riemer.



The website of his school ISW is www.hetisw.nl

The site with the chemistry module is www.contextchemie.nl

One of his favourite cycling tracks: www.northsea-cycl.com

If you want to ask Aonne about skating, cycling or sweeteners, send him an email at kerkstra@orange.nl

dr. Ingrid de Maat – Gersdorf – chemistry teacher Veenlanden College in Mijdrecht



Starting as a teacher at the age of nearly 35, after having gone through various backgrounds including a PhD, I like to offer pupils something more than just the content of the textbook. I was fortunate to be able to join the Science on Stage team and I look forward to coming to Grenoble where I hope to find ideas to bring straight into the classroom. I know I did when I attended last year.

I finished my formal teacher training quite recently on a small thesis with the subject of teaching in a way that is more friendly towards female pupils, whilst not being unfriendly to the males. I tested this on the subject of systematically naming carbon hydroxides, using chocolate (which is the ultimate friendly substance to women!). Every day, every ordinary lesson I try to keep an eye out for the gender differences. I am active within Technika10, an organisation that tries to

get girls interested into technical skills.

As a rule to picking up the girls without leaving the boys behind, I make an effort to make all classes rich in context and oriented around a problem to be solved, rather than just summing up the theory involved with a little experiment afterwards to verify what has been learned. The module I present at SoS2 is about using different ways to change the appearance of a pair of jeans, a hot topic in the pupil community, while being a useful platform to teach from.

Ingrid de Maat is member of the National Steering Committee and member of the Dutch delegation.

The website of Technika10 is www.technika10.nl

The site of her school Veenlanden College, Mijdrecht is www.veenlandencollege.nl

You can get in touch with Ingrid by sending an email to Ingrid.de.maat@planet.nl

drs. Arjan van der Meij – science and physics teacher De Populier in The Hague

Arjan van der Meij studied Physics at the Free University of Amsterdam and teaches Physics and Science at De Populier in The Hague. He is coordinator of the 'Science stream' at his school. Happiness and surprise are the starting points of this new teaching method. Besides this he is chair of the working group Beter Bèta (Better Science) a cooperation of inspiring teachers of different schools and the Technical University Delft.

In his spare time he likes reading, some juggling and (awful) base playing in a band. He is married to a marvellous wife and they have two fantastic kids aged 4 and 7 years.

The Dutch NSC selected Arjan because of his innovating and creative way of teaching science.

For more information about his school De Populier see www.depopulier.nl
Information about Beter Bèta you can find at www.beterbeta.nl

To ask him about the kids, the band or Beter Bèta you can email him at ajvdmeij@depopulier.nl

**ir. Marc van Mill –
educational officer at the
Cancer Genomics Centre**

Marc van Mil (28) works as an educational officer at the Cancer Genomics Centre, located at the University Medical Centre Utrecht, the Netherlands. He studied Biotechnology and specialised in education. He designed and teaches a module on molecular biology, which is offered at Utrecht University to talented secondary school pupils. Furthermore he designed and coordinates the mobile DNA-lab "read the language of the tumour", which he will present at the Science on Stage 2 festival in Grenoble and he will be at present at the fair and in the Discovery truck as well.



Please get in touch with Marc van Mil because this Dutch initiative would like to spread out to other European countries.

Marc van Mil, Education officer, Cancer Genomics Centre, University Medical Centre Utrecht
Stratenum 3.223, Universiteitsweg 100, 3584 CG Utrecht, the Netherlands
Phone: +3130 253 8754; m.h.w.vanmil@umcutrecht.nl

The (only in Dutch) website of the Genomics initiative is www.watisgenomics.nl
More about the DNA labs you can find at
www.watisgenomics.nl/genomics/genomics/dnalabs.html
The international website is www.DNALabs.eu

drs. Ada Molkenboer – Physical Geographer and PR officer Science Department Utrecht University.

Ada studied Physical Geography. The red thread through her career is popularisation of science and encouraging people of all ages to be interested in and have fun with science and technology. She does Public Relations for Physics and Astronomy at the Science Department of Utrecht University. Her main task is Bachelor and Master marketing and special events like WetenWeek and Eureka! Cup.

She adores holidays abroad or cycling along rural Dutch roads. She loves enjoying landscapes, leaving footprints and taking (landscape) photographs home. The more rugged the landscape is, the more she likes it. Iceland, New Zealand, Turkey, Norway, Her three sons work areas of science as well. The girlfriends happily take care of the necessary balance in life.

Ada Molkenboer is National Representative and member of the National delegation.

Some photographs of holidays and family events are at the website www.phys.uu.nl/~molkenbr

To get in touch for questions about Science on Stage, studying in Utrecht or delightful holiday destinations you can mail her at A.Molkenboer@phys.uu.nl



Jan Staal – pilot Discovery truck



Jan Staal is truck driver of the Discovery truck. When schools visit the truck he is an assistant as well. His eyes start shining when he talks about the truck. He's a real trucker. Officially he's a chauffeur for the Members of the University Board of Rijksuniversiteit Groningen, but most of the time they have to drive themselves or find another chauffeur.

Jan is married and has two sons and a small dog named Puk.

drs. Rob and Maïke Ouwerkerk – physics teachers

Rob Ouwerkerk studied Experimental Physics in Leiden. He is a physics teacher and ICT coordinator for the New Curriculum of Physics and Sciences at Stedelijk Gymnasium Haarlem. Besides this he is a freelance science journalist and IT author. In his spare time Rob also cycles through the most beautiful parts of Europe. Maïke Ouwerkerk is a student Educational Science at the Utrecht University



Maïke and Rob are members of the National Steering Committee but they don't belong to the Dutch delegation, the workshop is selected by the ISC.

Emails you can send to robouwerkerk@planet.nl

ir. Carla Upperman – biology teacher and chair NSC

Carla Upperman studied Biology at Wageningen University and Research (WUR). She is a part-time biology teacher at Pleincollege Bisschop Bekkers in Eindhoven. In her spare time she can often be found with her Icelandic horses, not only as a horsewoman but as photographer as well.

Carla Upperman chairs the National Steering Committee, she's not in the Dutch delegation. For questions you can mail her at carla.upperman@iae.nl

drs. René Westra – biology teacher and PhD student



René Westra (1950) has been working as a biology teacher since 1974, at Petrus Canisius College in Alkmaar. Since 2003 he has been working as a halftime PhD at Fisme (Freudenthal Institute for Science and Mathematics Education) which is part of Utrecht University. His investigations are about acquiring an adequate learning and teaching strategy to introduce dynamics and complexity of ecosystems to the upper level of secondary schools. Computer modelling with the graphic tool Powersim plays an important role. In the series of lessons he developed and tested at his own school and which was also tested by other teachers, authentic practices play an important role. He also used the Powersim modelling tool in school practice by participating in an experimental central examination (Compex) where use of the computer plays a central role. His free time is divided between his family (woman, five children, six grandchildren) and long distance running (especially the marathon).

René is member of the Dutch delegation and selected for his special activities at school with Powersim.

Information about his school the Petrus Canisius College in Alkmaar at: www.pcc.nu
The website of the Freudenthal Institute for Science and Mathematics Education
www.fisme.uu.nl/fisme/en

You can email René Westra: r.westra@pcc.nu; R.H.V.Westra@phys.uu.nl

Workshop and fair

Science on Stage on Tour

Antoon Boks, Juan Dominguez, Ingrid de Maat and Ada Molkenboer

How do you get Science on Tour? Well, get some teachers together for a huge brainstorm. Let them develop some short contemporary science modules. Make friends with a cooperative university that has a prestigious truck at its disposal and use it to tour along Dutch secondary schools.

The national Science on Stage on Tour event took place in the first three months of 2007 and we visited schools all over the country.

When the truck folds out it's like a classroom with very up-to-date equipment. We

developed six modules, each takes one class hour and they are meant for secondary school students in third and fourth grade, 3^e and 4^e class Havo/Vwo, (two and three years before their final exams).



The modules are:

- Bungee catapult – Kees Hooyman
- Customize your own jeans – Ingrid de Maat
- Food technology - C3 Foundation and Ingrid de Maat
- Science fRiction – Henk Buisman
- Pictures in 3D – Rob Ouwerkerk
- Why moving? – Carla Upperman

In Grenoble at the festival you can meet the teachers and experience the modules yourself in the Discovery truck setting. After the festival you can download all the modules, including a teachers guide, from the Dutch www.scienceonstage.nl site and use them in your own classroom or maybe in your own truck. We hope to meet you all in the most exciting Discovery science truck of Europe.

Presenting the workshop, assisting the Dutch fair contribution in Grenoble and organising the Science on Stage on Tour event was also a graduation project for Antoon Boks and Juan Dominguez to become a first degree physics teacher.

Teachers during the try-out at the Woudschoten teachers conference

Antoon Boks, physics and ANW (general science) teacher Bonifatius College, Utrecht, A.Boks@boni.nl

Juan Dominguez, mathematics and physics teacher, Willem de Zwijger College, Bussum, mail@dominguez.nl

Ingrid de Maat, chemistry and ANW (general science) teacher, Het Veenlanden College, Mijdrecht, Ingrid.de.Maat@planet.nl

Ada Molkenboer, PR officer Science faculty, Utrecht University; A.Molkenboer@phys.uu.nl



Workshop and fair

Outline SoS Discovery truck modules

Customise your own jeans - Ingrid de Maat

This module describes how to experiment with old jeans. The module aims at about 14-year-old pupils. It has been written by pupils of the same age, after doing a project of three months for 2 hours a week. The hat in the picture and this module is the result of that project. Pupils in the third grade of my secondary school have classes in Physics, Chemistry and Biology. I was asked to give the more gifted children an extra 2 hours a week of "Science". For starters, I used a ready-made module from "new chemistry" [1] that involved a lot of experiments done on little pieces of jeans fabric. One of the differences I made was to cut the fabric in 8 relative large pieces that could be sewed into a hat after finishing all the experiments, thus involving technical skills as well. For chemistry, we whitened the jeans with bleach and made it "dirty" using KMnO_4 . Furthermore, we prepared some indigo. For physics we worked with pumice to get a stone washed effect. And for biology we used enzymes to get the fabric softer and whiter. After all this and having finished the hat, I had the pupils critically discuss the module, and let them pick the more interesting and fun experiments in it. They prepared a 45-minute lesson and gave this to others in the same class. After another critical review the entire class together prepared one lesson and gave this lesson to a different class in the same age group. They listened to comments, made final improvements and now proudly present the result during SOS! Ingrid de Maat: Ingrid.de.maat@planet.nl

Foodstuffs technology - Ingrid de Maat and C3

You drink and eat every day. So every day you consume a lot of foodstuffs. You need a lot of chemistry to prepare these foodstuffs. In this module you learn about fragrance and tasting agents, taste perception and digestion. This way you get acquainted with some elements of foodstuffs technology. You will make your own soft drink and notice that familiar foodstuffs can taste completely different. Students also get informed about education and career prospects. Ingrid de Maat: Ingrid.de.maat@planet.nl

Science fRiction - Henk Buisman

In this module students investigate some properties of friction. They will find out more about the relations that Leonardo da Vinci already recorded centuries ago. In order to investigate friction at atomic level, the availability of an Atomic Force Microscope is recommended. Henk Buisman: buisman@orange.nl

Bungee catapult - Kees Hooyman

In this module students learn about the bungee-trampoline, a very spectacular machine. When you fall down after being launched, you discover free fall and zero gravity. In this module security aspects are investigated as well. How much G-force works on you? What is the maximum height you can reach? What is the maximum speed you can reach? What's the chance you fall on the ground? There is a test array for measuring the acceleration, force and height, and a computer model simulating the launch. Kees Hooyman: khooyman@xs4all.nl

Pictures in 3D - Rob Ouwerkerk

This module consists of three parts. Students first do a short task on the computer about seeing depth and 3D pictures (perception). Secondly, they use the camera to make some photographs. Lastly, they convert the photographs they made into 3D pictures. Rob Ouwerkerk: robouwerkerk@planet.nl

Why moving? - Carla Upperman

In this module students row on an indoor rower. During the rowing process they measure different conditions like the force by using only arms, only legs or both. The consumed calories are measured as well. This module contains elements of biology, physics and sports. Carla Upperman: carla.upperman@iae.nl

Outside fair activity

About the Discovery truck

Theo Jurriëns

In 2006 the National Steering Committee of Science on Stage decided to cooperate with the Discovery project of Rijksuniversiteit Groningen. The RuG Discovery is a fascinating science truck of the Department of Mathematics and Natural Sciences of Groningen University. The Discovery project aims to attract more students to science studies and increase the awareness of science among the general public as well. Since the start of the project in October 2005, the truck visited 150 secondary schools and 25 primary schools in the Netherlands and nearby Germany. During a typical school visit we address 150 to 200 students. The students carry out small experiments that can be performed within one class hour. Besides this they get some information about studying science in Groningen and about career prospects as well.

The programme of the visit is extremely customer friendly. The hosting school decides the programme, resulting in a mixture of physics, chemistry, life sciences, mathematics and



astronomy. The truck is well equipped with a PC server, 10 laptops, internet, a huge plasma screen with smart board. Practical workshops are also possible. In 2007 and 2008, the truck will be used for outreach on the occasion of the International Polar Year as well.

More information about the Discovery truck you can find at www.rug.nl/discovery,

Theo Jurriëns, Faculty of Mathematics and Natural Sciences, Groningen University, T.A.Jurriens@rug.nl

Dutch prime-minister Jan-Peter Balkenende (left) during a truck visit, "pilot" Jan Staal (middle) and truck manager Theo Jurriëns (right).

On-stage activity

The Rino Foundation

the Rino's

The Rino Foundation travels to Dutch schools, museums and other events with a show consisting of many exciting experiments with fluid nitrogen. Besides the show element, the secondary school students also get explanation about the physics behind the experiments. The physical content is about phenomena like phase transition, pressure differences, temperature dependant material quality, The Leiden-frost effect and superconductivity. The Rino 'Freezing Physics' show, could very well be the biggest physics show in Europe. Besides the preparations and the performance, the whole organisation and the board as well are voluntary carried out by students of the Leiden university.

The students that will take care of the on-stage performance are: Anna Baas, Anton Hunsucker, Gijs Hijmans, Jasper Woudenberg, Jelmer Renema, Kees Herbschleb, Louwrens van Dellen, Rick Leijssen, Rosa Runhardt and Yorick van Boheemen.



More information at the website of the Rino Foundation: www.physics.leidenuniv.nl/rino and personal at rino@Physics.LeidenUniv.nl

Workshop and fair

Experience the mobile DNA-labs

Ir. Marc van Mil

Marc van Mil is an education officer at the Cancer Genomics Centre, University Medical Centre Utrecht. He will present a workshop about the mobile DNA-labs and be at present at the fair and in the Discovery truck as well. Please get in touch with Marc van Mil because this Dutch initiative would like to spread out to other European countries.

In the workshop and at the fair participants will experience the mobile DNA-lab "read the language of the tumour". In this lab, upper-secondary school pupils (age 16-18) are given the role of DNA-researchers and are asked to compare DNA from cancer cells of a (fictive) patient with DNA of healthy cells. Based on their results, they have to advise the physician on the optimal treatment for this particular patient.

In the current havo/vwo curriculum of Dutch secondary schools, DNA is an important but rather isolated topic that pupils often perceive as complex and highly abstract. Yet DNA and the genes that are located on it form the basis of almost every aspect of life. In order to introduce modern DNA-research to schools and get pupils acquainted with



current genomics topics and their implications for society, the five genomics Centres of Excellence have each developed a mobile DNA-lab that has been offered free of charge to all secondary schools in the Netherlands since January 1 2006.

The DNA-lab "read the language of the tumour" is one of five mobile DNA-labs travelling through the Netherlands. The four-hour educational modules for upper-level secondary school pupils (age 16-18) contain a two-hour practical lab taught at school by university students with up-to-date genomics equipment and techniques. Teachers can obtain additional information and register for the labs at the dedicated website www.DNALabs.nl.

The goal of the DNA-labs is to offer relevant and up-to-date genomics education in the Netherlands, based on new insights in didactics. After one year of running the DNA-labs we can now conclude that the mobile labs are a great success. Until July 2007 the labs are almost fully booked and will then have reached over 25.000 pupils in 275 different schools.

International peer review committees of the genomics centres have commented very positively on the DNA-lab initiative and have recommended expanding it to other countries in Europe. We would like to get in touch with organisations in other countries to spread out to other European countries.

Please contact:

Marc van Mil

Education officer, Cancer Genomics Centre,

University Medical Centre Utrecht

m.h.w.vanmil@umcutrecht.nl

Stratenum 3.223, Universiteitsweg 100, 3584 CG Utrecht, the Netherlands

Phone: +3130 253 8754

Workshop

Web chemistry: Sweeteners

Aonne Kerkstra

Aonne Kerkstra will represent the chemistry branch of science with 'sweeteners'. He is a part-time chemistry teacher who works at a secondary school ISW in Naaldwijk and a part-time teacher trainer at the department of Science Education and Communication of the Delft University of Technology. He is also a coach in a team of chemistry teachers and university experts who develop learning units for the new context based chemistry curriculum in the Netherlands.

In this workshop the participants will get the opportunity to explore the web-based learning unit "Sweeteners". The principles of the new teaching approach in Dutch secondary school chemistry: "Chemistry between context and concept" are introduced.

The major concept of this learning unit is stereochemistry. The context is "Sweeteners", in particular the synthetic sweetener aspartame. Considering the teaching methods, this module is based on blended learning principles and an active e-learning approach.

The students learn actively using virtual 3D molecular models accessible on-line.

The learning unit "Sweeteners" was developed in 2004-2006 by a group of secondary school chemistry teachers in cooperation with experts of the AMSTEL Institute and Van 't Hoff Institute for Molecular Sciences at the University of Amsterdam.

This module is designed for students at secondary education advanced level, the last two years of the pre-university stream. In 2006-2007 several secondary schools use this module experimentally.

In the workshop the basic principles of the learning unit "Sweeteners" will be briefly introduced by Aonne Kerkstra.

In the second part the participants will experience the module as students. They will explore the world of sweeteners online. They will experience the four thematic content parts of the unit: (i) bulk materials, (ii) stereochemistry, (iii) enzymatic synthesis of a sweetener aspartame and (iv) structure-activity relationship (sweetness).

In the last part of the workshop the participants will discuss the new Dutch teaching approach and the possibilities to use this learning unit in their own country.

Aonne Kerkstra; kerkstra@orange.nl

Links:

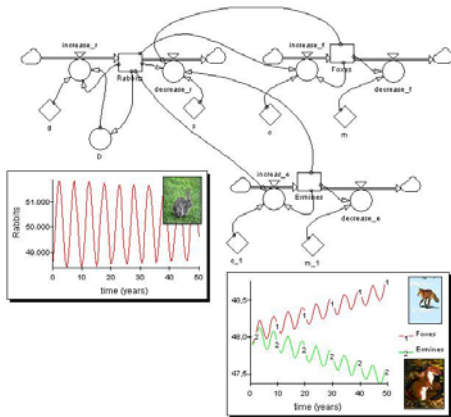
Chemistry module: www.contextchemie.nl

Short presentation

Use of a graphic modelling computer tool in modern biology upper secondary education

René Westra

René Westra gives a short presentation at Science on Stage. In this presentation the



attendants will have the opportunity to get to know the freeware graphic modelling computer tool Powersim. This tool is being used in my school in the Dutch experimental computer based part of the central examinations in biology in upper secondary school (Compex). And in a series of lessons that was developed to test in class the principles of the new teaching approach in Dutch secondary school biology. This is a "concept -activity-context approach", where we worked with two authentic practices to introduce dynamics and complexity in the concept ecosystem: a scientific investigation about optimisation of mussel breeding and a management procedure to restore a rabbit population in a dune reservation.

Working with the Powersim modelling tool gives students the possibility to investigate contexts in which concepts like complexity and dynamics play an important role, like water or salt management in the human body in extreme situations such as running the marathon, changes over time in ecosystems under the influence of special variables, or evolutionary developments in two or more populations (see illustration with populations of rabbit, fox and ermine).

You can email René Westra: r.westra@pcc.nu

Links:

www.pcc.nu (about the Petrus Canisius College in Alkmaar, his school)

www.fisme.uu.nl/fisme/en (Freudenthal Institute for Science and Mathematics Education)

www.powersim.no (about the graphic modelling tool)

www.cdbeta.uu.nl/vo/modelleren/default.php (about the applications of this modelling tool)

www.nibi.nl go to CVBO (about the Concept-Activity-Context approach)

www.cito.nl/vo/ce/compex/algemeen/eind_fr.htm (about the Compex- experiment)

Workshop

From digi-chalk to Digi-teacher

Rob and Maike Ouwkerk

Interactive whiteboards, Computer based exams, Elo's, Community of learners, Hyves, CMS, Youtube, Applets, Digital Portfolio, Modelling, Entertaibles, Coach, Virtual experiments, RSS, Assist Sketch Understanding System, Web quests, Webbased teaching, Just In Time Thinking,....so many different tools to enhance education in the sciences. And so many innovative ways of provide new and exciting materials to our students.

In the workshop Rob and Maike Ouwkerk will give you an impression of the current standings in the Netherlands on ICT based teaching. Which tools have been successful? How about scientific research on ICT based teaching? Which goals have been aimed for and which ones have already been achieved? What about future developments?

"We will also spend some time on the plans for the new concept-context based curriculum for Physics and the Sciences in the Netherlands. In the second part of the workshop, attending teachers can explore our Science On Stage Electronic Learning Environment (SOSELE 2007) and try out some very good practises in ICT based teaching."

You can email them at robouwerkerk@planet.nl

Fair and truck presentations

A 'best practice' project on a Dutch school

Understanding by Stop Motion Animation

De Populier – The Hague

Arjan van der Meij and Marten Hazelaar

Arjan van der Meij and Marten Hazelaar are both science teachers at the secondary school Christelijk College De Populier in The Hague. The Dutch NSC selected them because of their innovative and creative way of teaching science.

This science project is part of the three-year 'science stream' at our school, that our students can choose. Those students spend at least one day every week working on science projects and studying science related subjects.

One of the first grade projects (the students are 12 – 13 years) is about the ins and outs of photography and related topics: cyanotype (blue-print), designing and building a pinhole camera and 3d-photography. An imported part of the project is making a stop-motion animation. It explains the principles of animation and afterimage. The students first design a storyboard and make a short animation afterwards.

During the second year the students will get the project 'Cycles'. This project deals with nutrient cycles and the conversion of compounds in nature (photosynthesis, dissimilation). This project allows our students to encounter the concept of chemical reactions for the first time. They will perform a simple chemical reaction and make a video of it. Afterwards they make a clay animation of this rearranging of molecule atoms and make a video of this as well. Students manipulate the atoms themselves: atoms bond and molecules appear or disappear. Doing this, we expect that students will remember and understand the rather abstract essence of chemical reactions much better, than by using classical teaching methods.

For more information, mail to

Marten Hazelaar, hazelaar@depopulier.nl

Arjan van der Meij, ajvdmeij@depopulier.nl



Fair and truck presentations

A 'best practice' project on a Dutch school

Kyoto project

Baudartius College - Zutphen

Jan de Geus

Jan de Geus is a teacher in mathematics and computer science at the Baudartius College in Zutphen. He is member of a team that co-developed a project in which secondary school students from 12-18 years design their own project week. (<http://www.apsinternational.nl>) The aim is giving students from the first grade a quick glance in the kitchen filled with science, and provide students of the last grade the opportunity to carry out a real scientific investigation in cooperation with research institutes and/or local authorities.

Fourth, fifth and six grade students investigate subjects like 'Clean energy', fifth grade 'The Kyoto protocol'. 'Low-energy houses', 'CO2 storage in oceans', etcetera. The students make preparations in advance and do the experiments and the rest of the (external) investigations during the project week.

In the Kyoto project, the content differs from year to year, we try to increase the awareness of the worldwide impact of many issues, in particular the global warming, most probably

connected to the increasing amount of CO₂ in the atmosphere. There lies an option to participate in the CarboSchools project, supported by the EU.

Jan de Geus and his colleagues like to encourage science teachers to make a new start and organise weeks like these at their own schools. Don't start carefully with something small, but design a complete week with one class for starters. Have a day out in the country on Wednesday or do sports. Design a science walk in your city, take water samples, go to the municipality and ask them everything you never dared to ask. Take the advantage of such a week and make the most out of it, 'impossible' doesn't exist any more!! Confront the students of 12 tot 18 years with the unsolved and maybe insolvable energy problem, dare them to the edge and they will be convinced that it's their problem as well. The Kyoto project of Jan de Geus has been in the final selection of a national contest. More information (in Dutch) at www.durvendelendoen.nl and at www.baudartius.nl.

You can get in touch with Jan de Geus via j.degeus@baudartius.nl

Links:

www.durvendelendoen.nl

www.baudartius.nl

'Universum Programma' and schools

The Dutch government has offered a financial contribution to start programmes and support 'Best practices' in order to get 15% more students into science programmes and into sciences studies. The Platform Bèta Techniek distributes the money and one of the programmes is the 'Universum Programma'.

Schools that take part in the 'Universum Programma' share knowledge, experiences 'Best practices' and develop new products in cooperation with other schools in the network of 'Universum schools'.

Besides all of the above, they all have a 'follow school', a school new in the programme, which is adopted by an experienced school; they cooperate intensively.

The aim of the programme is that schools contribute in developing teaching material to make science subjects at school more attractive and interesting for the students. In this way more students will choose science and technical studies in higher (tertiary) education.

There are about 88 schools (of 650 Dutch schools for secondary education) in the 'Universum Programma'.

Members of the Dutch Steering Committee, the working group and national delegates are teachers at the:

Baudartius College – Zutphen (Jan de Geus)

Chr. College De Populier - Den Haag (Arjan de Meij and Marten Hazelaar)

St. Bonifatius College – Utrecht (Antoon Boks and Kees Hooyman)

More information about the 'Universum Programma' (in Dutch) at:
www.universumprogramma.nl

Epilogue

We would like to thank everyone who made a contribution to Science on Stage2: the Dutch Steering Committee, working group, delegates, sponsors and supportive family members. A lot of effort and spare time has been put into Science on Stage2. The Dutch Science on Stage Steering Committee and working group has no paid members.

Members of the National Steering Committee are:

Carla Upperman, chair
Ada Molkenboer, National Representative
Ingrid de Maat, member
Kees Hooyman, member
Henk Buisman, member
Rob Ouwerkerk, member
Maike Ouwerkerk, member

The working group consists of:

Antoon Boks and Juan Dominguez

The National delegation:

Ada Molkenboer
Ingrid de Maat
Antoon Boks
Aonne Kerkstra
Arjan van der Meij
Jan de Geus
Jan Staal (pilot Discovery truck)
Jos Kistemaker (self funding delegate)
Joske Fens (self funding delegate)
Juan Dominguez
Marc van Mil
Marten Hazelaar (self funding delegate)
René Westra
Theo Jurriëns (manager Discovery truck)

On stage activity The Rino's

Anna Baas
Anton Hunsucker
Gijs Hijmans
Jasper Woudenberg
Jelmer Renema
Kees Herbschleb
Louwrens van Dellen
Rick Leijssen
Rosa Runhardt
Yorick van Boheemen

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Instituut voor Biologie NIBI www.nibi.nl