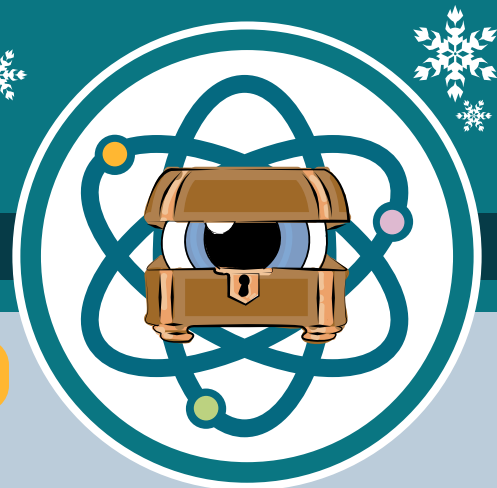


Ark of Inquiry

newsletter

4/2016

issued by the Ark of Inquiry project consortium



Welcome, dear Subscriber!

This is the eighth official newsletter of the Ark of Inquiry project. We are thankful for your interest in the project. In the newsletter, you will find information about the latest news and upcoming events.

We hope that you have had a wonderful year and are ready for winter and the seasonal holidays.

As you may already know, Ark of Inquiry is a teacher training project which aims to train at least 1100 pre- and in-service teachers in inquiry learning and raise their awareness of Responsible Research and Innovation (RRI). The trainings have already started and will take place in 12 European countries: Estonia, Finland, Hungary, Germany, Italy, Greece, Cyprus, Turkey, Belgium, the Netherlands, France, and Austria. All interested teachers and educators are more than welcome to participate in the trainings. You will be able to learn more about inquiry learning, RRI, the Ark of Inquiry portal and find out how to support pupils in their inquiry activities. If you are interested in finding the nearest training session, contact us via arkofinquiry@gmail.com and we will put you in touch with the local coordinator!

In this issue, you can read about the first impressions from the teacher training sessions held in Estonia, Italy, Turkey and the Netherlands and find out about recent project-related events in Greece, Austria and France. As always, we will also introduce some of the inquiry activities that can be found in the Ark of Inquiry platform. This week we focus on those that support teaching and learning about sustainability. You will learn what has happened in the past couple of months and find out which events are worth looking forward to in the upcoming months.

Starting from this issue, we welcome input from all teachers who have participated in the Ark of Inquiry teacher trainings or other project-related events to share their impressions directly with us. Contact us via arkofinquiry@gmail.com to submit your story!

On behalf of the Ark of Inquiry team, we wish you a wonderful winter and happy holidays. We hope to see you at our trainings!

Upcoming events

EA will organize a workshop about the Ark of Inquiry project in Athens, Greece on 18 December 2016 during HISTEM2016, a conference on learning and teaching, organized by the University of Patras, the National Kapodistrian University of Athens and the Hellenic Open University (16–18 December 2016).

The conference provides a platform for dissemination of best practice in teaching and learning in Greece and will inspire and empower STEM educators to improve teaching quality, to increase engagement in STEM education and career pathways, to connect pupils with real-life industry relevancy, and to drive creativity, inquiry learning, problem-solving and project-based learning. In the workshop on the Ark of Inquiry project, the participants will learn about the Ark of Inquiry portal, be exposed to the various resources for teachers developed in the project and find out more about the concept of RRI.

More upcoming events on our website!

About the project:

Project Title:

Ark of Inquiry: Inquiry Awards for Youth over Europe (FP7, No. 612251)

Funding Scheme:

EU-FP7-SCIENCE-IN-SOCIETY-2013-1 (CSA-SA)

Duration:

4 years (March 2014-Feb 2018)

Consortium: 13 partners coordinated by Tartu Ülikool (University of Tartu), Estonia; Ellinogermaniki Agogi Scholi Panagea Savva AE, Greece; Turun Yliopisto (University of Turku), Finland; Panepistimio Kyprou (University of Cyprus), Cyprus; UNESCO Regional Bureau for Science and Culture in Europe, Venice, Italy; Hogeschool van Arnhem en Nijmegen (HAN University), The Netherlands; Bundesministerium für Bildung (Ministry of Education), Austria; Humboldt-Universität zu Berlin (Humbolt University), Germany; Bahcesehir Egitim Kurumları Anonim Şirketi (BEKAS), Turkey; Ecole de l'ADN (DNA Learning Centre), France; University Colleges Leuven-Limburg (previously KHLim), Belgium; Kutató Tanárok Országos Szövetsége (Hungarian Research Teachers' Association), Hungary; SA Teaduskeskus AHHA (AHHA Science Centre), Estonia

European Union's
Seventh Framework Programme



Where to find Ark of Inquiry? Visit our website!



Teacher feature from Turkey



We asked one of the teachers, Erdoğan DEMİRCİ, who participated in the Ark of Inquiry teacher training in Turkey to share his experiences with the project and with inquiry learning in general. Erdoğan DEMİRCİ is a science teacher at Makbule Süleyman Alkan Secondary School, Head of Science Teachers Committee in Buca-Izmir and Vice President of Science Teachers Association in Turkey. Here is what he had to say:

"I learned about necessary methods and techniques related to inquiry based science education 6 years ago. As an active science teacher, I am still using effective teaching and learning approaches such as multiple intelligences theory and its implementations in my classrooms. I strongly believe that these methods increase pupils' interest and motivation dramatically.

It is clear from my observations in my inquiry learning classroom that through inquiry, pupils have more opportunities to discover the world and to construct their own science concepts without getting extra help from teachers. Inquiry learning helps to integrate previous concepts with new ones and develop science process skills. Pupils who have learned through inquiry are more successful in their academic development and more interested in conducting scientific research to find solutions to socio-scientific issues.

However, it should be taken into consideration that inquiry learning takes more time than rote learning and that time management is a very important aspect to consider for teachers when using IBSE- and RRI-based materials in the classroom. More teacher trainings and professional development seminars are needed for teachers to fully understand the meaning of RRI and IBSE. In addition to the time constraints, the current science curriculum also makes it difficult to implement IBSE teaching and learning modules.

I strongly believe that the Ark of Inquiry project and its platform with inquiry learning materials will provide more opportunities to science teachers and their students to enhance and extend the quality of science education."

The Ark of Inquiry project aims to raise youth awareness to Responsible Research and Innovation (RRI) and to build a society skilled in RRI and related scientific communication. It will provide young European citizens (7 to 18 year olds) with a pool of activities to improve their inquiry skills, increase their awareness and understanding of conducting 'real' science, and prepare them to participate in different roles in the European research and innovation process.

To this aim the project will:

- a) develop a framework for identifying inquiry activities that promote pupils' awareness of RRI;
- b) collect existing inquiry activities and environments from various national and international projects;
- c) make activities available across Europe through the Ark of Inquiry platform (implement the inquiry activities on a large-scale across a European school network such as the UNESCO Associated Schools Programme Network (ASPnet) so to bring together learners, and supporters (teachers, science and teacher education students, and staff of universities and science centres). During the project it is expected that at least 20 000 students will participate in the Ark of Inquiry.
- d) train at least 1,000 teachers to support pupils' inquiry activities in a manner that attracts pupils' interest and motivation towards RRI.

Where to find Ark of Inquiry? Visit our website!

News from the field

Ark of Inquiry teacher trainings kicked off in Estonia

63 Estonian teachers and staff of science centres and museums participated in the first Ark of Inquiry teacher training sessions in Estonia, held on 21—22 October 2016 and 23—24 November 2016. The overall aim of the course was to introduce inquiry learning and to encourage educators to implement inquiry learning in their everyday work. As a practical outcome of the course, we expected the teachers to create their own inquiry activities which suit their specific needs and target groups.

The participants had a very diverse background, but most of them had solid previous work experience as educators and more than 77% of the participants had previous experience with inquiry learning. During the first day, the teachers got acquainted with the inquiry cycle model and experienced inquiry as learners. Based on previous experience with Estonian teachers, we know that they find Go-Lab inquiry learning spaces (ILSs) very useful for inquiry learning, so we decided to dedicate the whole second day to introducing the possibilities offered by the Go-Lab Portal and Graasp environment. The teachers became familiar with the different online labs, apps and various tools that could be used in their own inquiry activities which they will create at the end of this course. Then, the teachers got acquainted with the ILSs through a series of hands-on activities in the computer lab. In the afternoon, the teachers were grouped according to their teaching level (primary, middle, secondary, vocational schools and science centres and museums) and the groups drafted a simple inquiry activity. At the end of the day, the teachers presented their inquiry activities and got feedback from each other. The last point on the agenda was a visit to AHHA Science Centre where the teachers participated in a hands-on activity based on the inquiry cycle in the laboratory.

The teachers were very happy with the training and felt motivated to start implementing inquiry in their classrooms. We will meet those 63 participants again in December 2016 and January 2017 when they will share their experience with implementing inquiry learning in their everyday work and reflect on their work so far. As a preparation for the last part of the course, the teachers will also participate in a Moodle course where they will be introduced to the Ark of Inquiry web-based platform and the concept of RRI.

The next training groups begin in January and March. We hope to train more than 80 educators in inquiry in Estonia. We also hope the teachers become inquiry ambassadors and share their knowledge of inquiry learning with their peers and colleagues who could not participate in the trainings.



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Ark of Inquiry was introduced during a national conference in Greece

On 4–6 November 2016 Ellinogermaniki Agogi (EA) organized a national conference with the aim to introduce and discuss the notion of **“Open School”**. An “Open School” is a school that effectively introduces and implements educational innovations and is an engaging learning and teaching environment that brings together not only the pupils and teachers but also families, community groups, local businesses, experts, universities, and others into an innovation ecosystem.

More than 150 educators from all over Greece participated in the three-day conference that offered a series of lectures, workshops and keynote speeches. In this context EA held a workshop on the Ark of Inquiry project on Saturday for 25 educators. Teachers had the chance to learn about RRI and to explore the Ark of Inquiry portal and the available resources for teachers.



First impressions from trainings in the Netherlands

The first training in the Netherlands took place this autumn. 8 teachers from primary and secondary education and senior students participated in the training sessions. The Water Museum in Arnhem is the partner in this training session for the region Arnhem/Nijmegen, so the first training module took place in the museum. The participants were introduced to the concept of inquiry learning, followed by several hands-on inquiry activities in the museum. The participants experimented with a topographical map of the Netherlands, which showed the differences in height in the Dutch landscape. They added water to this 3D model to investigate questions such as: What would be the effects of a rising sea-level? Which parts would be flooded when the level rises two meters, etc.? The participants were also challenged to make the Dutch flag (red-white- and blue) with several liquids such as water, oil and methanol and dyes in a test tube.

One week later the participants met again in the teacher training institute of HAN for the second module. In this module they learned how to work with the Ark of Inquiry platform and the teachers' toolbox, preparing themselves for the implementation of the Ark of Inquiry tools in their classes. In addition, they participated in another hands-on assignment, derived from the Ark of Inquiry platform, where the participants had to build a vehicle that would be able to move propelled by the wind (which was generated by a small table fan in our classroom). Our participants became very competitive during the activity and were eager to build a wind-vehicle that would be the quickest.

Then, after a few weeks, the third module took place. The teachers learned how to work with the pedagogical scenarios. We especially focused on an elaborated Responsible Research & Innovation scenario and implemented a practicum with mealworms to confront our participants with questions such as: Would insects become a proper substitute for eating meat? The teachers told us they had become aware that RRI is applicable in so many aspects of everyday life.

In the last training module, we used scenarios 4 and 5 together with the SIL framework to help the participant teachers to redesign a tasting practicum regarding the overall proficiency levels (novice, basic, advanced). The framework of the three levels helped teachers to think about more challenging introductions, how to guide formulating a hypothesis and so on. The teachers highly appreciated this hands-on redesigning activity. As one of the participants told us, “The model showed me that there are many possibilities to differentiate in inquiry learning, and that was what I was looking for”. We concluded the last module with reflection on our experiences during all the modules, and the teachers shared their impressions, successes and potential pitfalls regarding the Ark of Inquiry project.

Where to find Ark of Inquiry? Visit our website!

Two Ark of Inquiry workshops were held in Austria: Educational Resources for responsible research in MINT subjects

First of the two Austrian Ark of Inquiry workshops that was organized by BMB this autumn was held on 20 October 2016 during the “eLearning Experts Conference” in Eisenstadt.

The nationwide conference, which was held for the 13th time this year, has become a regular and well-known training and networking event in information and communication technology for teachers of all types of schools. More than 400 participants had come to learn more about the implementation of the digital revolution in education in workshops. The Ark of Inquiry workshop held during this conference focused on the topic “Educational resources for responsible research in MINT subjects” and led the participants through the following programme points:

- Ark of Inquiry project overview
- What do we mean by RRI - responsible research?
- The educational model of research learning in Ark of Inquiry
- Digital examples of responsible research (RRI)
- RRI with Raspberry Pi

Finally, the Ark of Inquiry project website as well as the portal and the Austrian Ark of Inquiry platform were presented and were well received by all participants.

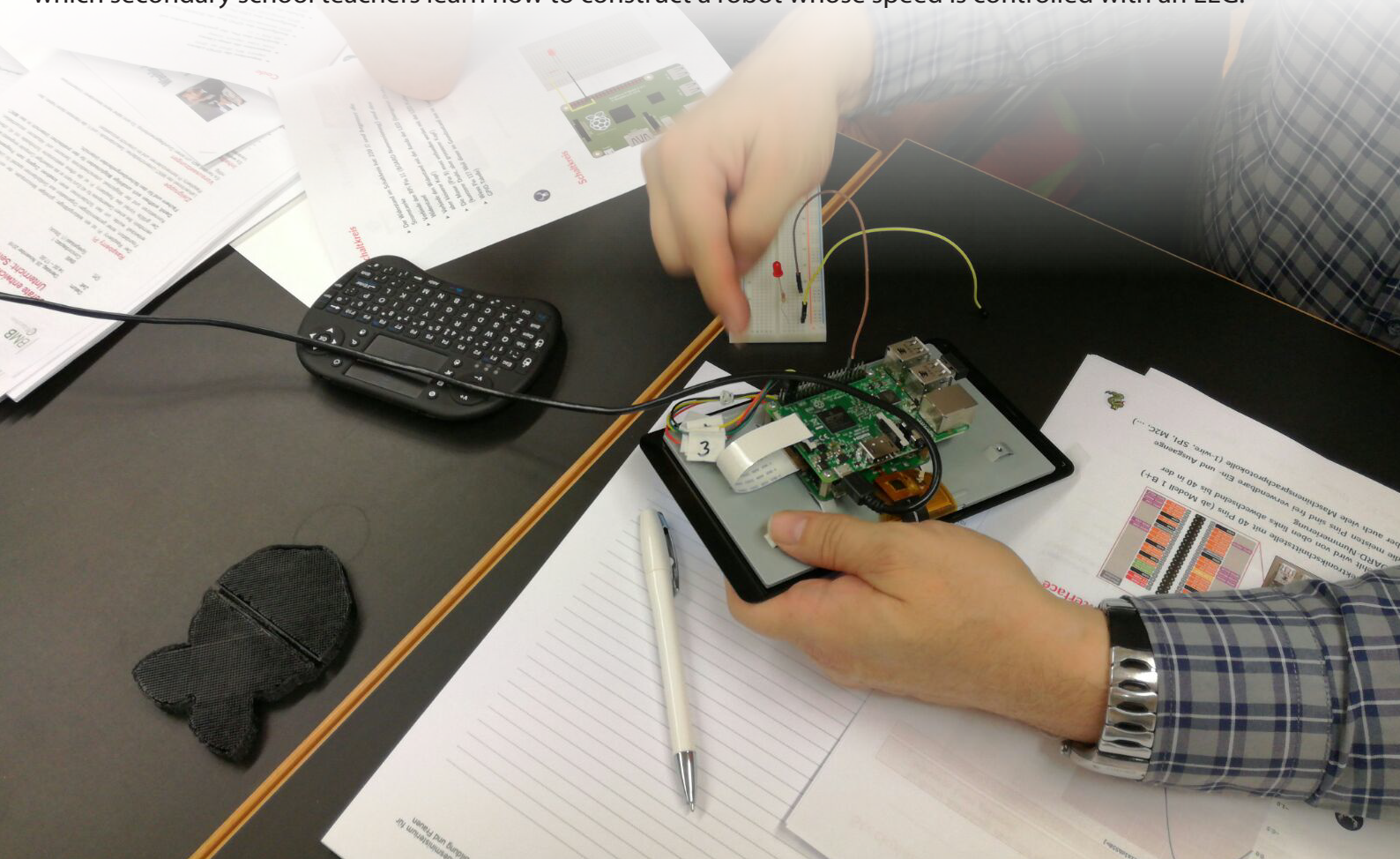
The second workshop “Device development with the Raspberry Pi in the classroom: sensors and actuators” was held on 29 November 2016. During this workshop, the participants were introduced to Raspberry Pi, a powerful but affordable minicomputer, which was developed specifically for educational purposes. The main advantage of Raspberry Pi is the open electronic interface with 40 open connectors and the possibility to connect different sensors and actuators, which opens up countless possibilities for practical instruction in MINT subjects and for interdisciplinary teaching.



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The main aims of this Ark of Inquiry training workshop were to demonstrate the Raspberry Pi concept, the diverse components of the Raspberry Pi computer and its application possibilities in class. During the workshop, the participants could try out simple exercises: switching on LEDs, using motors, sensors, radio receivers and touch screens and smartphone remote controls. In addition, the participants were involved in creating a guide for the use of Raspberry Pi in class. Lastly, the participants familiarized themselves with the inquiry cycle model used in Ark of Inquiry and its RRI concept.

In 2017, BMB will organize a follow-up workshop called "Mindbot: a Raspberry Pi robot with thought control", in which secondary school teachers learn how to construct a robot whose speed is controlled with an EEG.



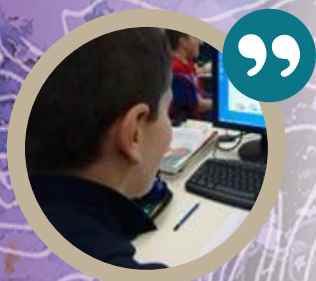
Trainings and other project-related events took place in France

Several training sessions for French teachers (3 and 7 November 2016) and for pupils (11 October and 9 November 2016) were held in autumn near Paris and in Nîmes and Montpellier, during which the project and the collection of inquiry activities in the platform were introduced to teachers and the pupils could participate in hands-on inquiry activities on forensic DNA testing. The sessions with the pupils were organized in cooperation with the teacher Angélique Daum from the Lycée Daudet school in Nîmes and Christian Siatka (the DNA School of Nîmes). The teachers were happy to see that there are a lot of activities in the platform which are ready to be used in the classroom. The pupils were excited to analyse unknown DNA samples from a crime scene and compare their results with a reference DNA. It was regarded as an excellent approach to illustrate all the concepts of RRI to the pupils.

In addition to training sessions, Stephan Theulier from EADN presented the Ark of Inquiry project and the project activities during the national biology and geology teacher days held in Paris (18—19 November 2016) to 200 teachers all over France and performed some activities on a stand.

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Teacher feature from Italy



Italian teachers have shared with us their experiences with the project. Here is what they had to say.

Elisa, teacher: teamwork to reach all pupils

Teacher Elisa Puttin at the Istituto Comprensivo G. Ponti, Trebaseleghe (Padua) taught a lesson on atoms called “Build an Atom” in her class of 12–14-year-old pupils. She invited the English teacher at the school to collaborate in teaching the lesson. She commented that “the activity was very successful... It took longer than expected, of course I have a class of 26 pupils and 3 of them with special needs (they enjoyed the project).” So, with her ability to involve the pupils and adapt the lesson expectations and with the support of the pedagogical scenarios provided through the Ark of Inquiry project, the lesson was successfully concluded by a team of dedicated educators.



Katia and Maria Luisa, teachers: effective grouping to increase communication

Katia Bottazzo and Maria Luisa Bianchi, teachers at the Istituto “A. Scotton”, Breganze (Vicenza) implemented with their pupils (aged 15–16) an activity entitled “Which soap is the best?” The teachers commented, “Our pupils have participated in this activity with great enthusiasm after having understood what they were asked to do.” Therefore, after some initial guidance, the pupils could complete the rest of the steps on their own. The pupils then reported their success in the activity as a group. Both teachers noted the following about the activity: “It was very successful... at the end of the project they [the pupils] spontaneously started to communicate between the groups to compare their main findings.” Katia and Maria Luisa said that they would like to use the same activity again next year, but with improvements focused on even more efficient in-class discussions.



Laura and Sara, teachers: encouraging pupils to engage with science after school

Laura Biondi and Sara Passaler teach at the Istituto Caio Giulio Cesare, Mestre (Venice). They worked together to teach “Estimating the density of an endangered plant species in a named ecosystem” in their class of 12–13-year-olds. The lesson took place at the Natural History Museum in Venice, within the Project LIFE VIMINE and with support from their school’s ICT teacher, Franco Torcellan. Pupils were also able to go outside and work with other scientific experts for part of this activity. Laura noted that pupils “had the possibility to meet the LIFE VIMINE project operators and to learn about the method(s) they use to protect sandbank from erosion. Questions were asked and options were promoted”. The teachers mentioned that this ability to engage with their community and recognize their role in the protection of an endangered plant species improved pupils’ ability to make connections between knowledge and practice. Laura noted that “pupils realized how important it is to involve the community to maintain the ecosystem.” As a result, a successful lesson was carried out in a large class thanks to these teachers’ professionalism and commitment to teaching their pupils responsible research skills.

Where to find Ark of Inquiry? Visit our website!

Inquiry activities: activities that support sustainability

As many of you may have noticed, the Ark of Inquiry portal is now available to everyone at arkportal.eu. The portal features an ever-growing collection of inquiry activities in different languages and domains. In our previous newsletters, we have brought to you a selection of inquiry activities with a strong RRI focus or those suggested by our pilot teachers. In the last issue, we presented to you a selection of activities that help to engage all learners with inquiry-based science. In this issue, we have decided to focus on activities that support teaching and learning about sustainability.

Harvesting the wind

Wind is a sustainable energy source which will always be available, just like solar energy, water power or biomass. Compared to oil and natural gas, it does not pose a threat to people or the environment. In this inquiry activity pupils will examine the ecologically sustainable benefits of wind technology. Pupils will understand the functioning principle of a wind turbine as well as the impact of fossil fuels and the benefits of renewable energy.

How does a sustainable lifestyle look like?

This activity is available in German and is developed as an online tool. This online tool features an educational game that fosters sustainable behaviour. The KonsuManiac tool allows pupils to catch a glimpse of the actual impact of their shopping. The pupils fictitiously shop at various shops: grocery, clothes shop, pharmacy and hardware store. At the end of the "shopping spree" the pupils finally see how sustainable or not sustainable shopping really is.

Everyday CO2 emissions footprint – My way to school

This activity is available in Finnish. In this activity pupils will determine how much CO2 their everyday transportation to school produces. Every pupil records the distance from home to school and the time it takes to cover the distance. If different means of transport are used, each type is recorded separately. Based on these recordings, the combined CO2 emissions are calculated for the entire class. The obtained results and suggestions on how to reduce CO2 emissions are shared with pupils' parents at parents meetings or family events.

What does our home produce?

In this activity pupils learn how they can reduce their use of water and energy at home. By the end of this activity pupils will have considered how they can reduce their water and energy consumption and what can be produced at home. This raises pupils' awareness of the use of limited resources and possible solutions at home.

Upcoming events

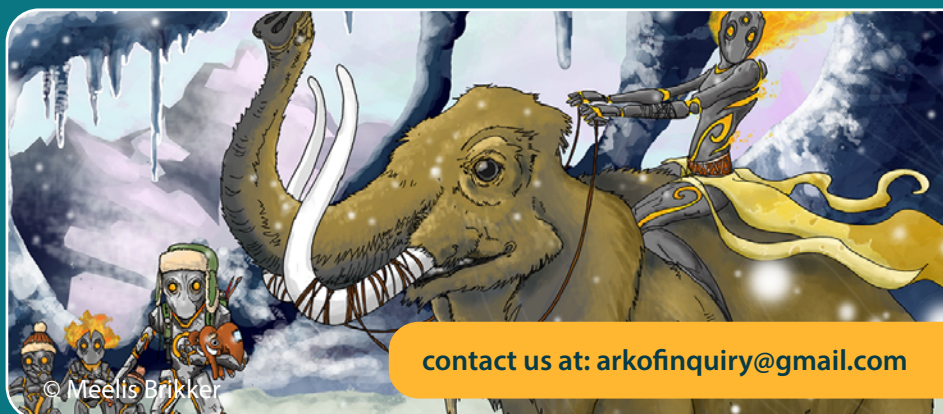
Christian Siatka, General Manager of Ecole de l'ADN (EADN), will represent the project during a national seminar in biology in the presence of the General Inspectors of National Education in France at the Ministry of National Education in France (14—15 March 2017).

EADN will present the activities that have been developed by EADN and that have been included in the Ark of Inquiry platform.

In the next newsletter:

- Find out more about the Ark of Inquiry platform and activities inhabiting it;
- see what was done in Ark of Inquiry during the winter months;
- and find out what events are worth looking forward to in spring.

Dear Subscriber, we wish you all the best and hope to see you again soon!



contact us at: arkofinquiry@gmail.com