Tero Lämsä (ed.)

Ever Wanted to Be an Explorer?

– Tikkala Schoolchildren Learning at the Struve Geodetic Arc at Oravivuori Station Point

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COMMUNITY EDUCATOR STUDENTS' AND ELEMENTARY SCHOOL CHILDREN'S EXPERIENTAL LEARNING PROJECT

MARJO KOLEHMAINEN

The Ever Wanted to Be an Explorer? publication is for the reader, teacher and instructor who would like his/her class or group of children to

- learn about, enjoy and get familiar with World Heritage sites
- implement experiential learning
- collaborate with community educator students

The publication is a cooperative learning project between community educator students at Humak University of Applied Sciences (Humak) and 1st-6th grade classes of the Tikkala UNESCO School located in Korpilahti, Jyväskylä. The project was carried out as a part of *the World Heritage Sites' boost to local services* project which Annamari Maukonen, the project manager lecturer, discusses in her account (see page 7).

The Ever Wanted to Be an Explorer? project was a learning project for both elementary schoolchildren as well as for community educator students. At the same time, the World Heritage site Struve Geodetic Arc chain at Oravivuori became more well-known while promoting the goals of the *World Heritage* project.

COMMUNITY EDUCATORS AT SCHOOL

The project allowed community educator students to practice guiding schoolchildren and to carry out team building tasks, develop problem solving skills and self-awareness. The project was part of the students' first year professional studies. The school is a natural environment for community educators, the field of youth work has existed in school settings since the beginning of the 21st century.

Community educators are able to work in schools to enhance the social environment and interaction between schoolchildren and adults working in schools. You can get more familiar with youth work carried out by community educators by reading the publication *Youth Work in School*.

The community educator's core body of knowledge (UAS) involves nurturing community spirit, knowledge of group dynamics as well as participatory methods which were implemented during this project. A community educator recognizes education principles and the possibilities of building a community and can apply methods according to a target group. A community educator's methodological skills are based on youth work. These types of projects perfectly suit community educators, since they apply functional and participatory methods in their work which are typical of youth work. Do you already collaborate with local active youth work supporters?

At Humak, whenever possible, studies are closely connected to RDI –projects (research, development, innovation) which are implemented in collaboration with partners. For example, community educator students carry out activities (i.e. work) during the studies; they study with the coaching of their lecturers and the learning objectives of their degree program curriculum and their courses are reflective of the real-world environment. The project and its related activities form a learning environment for the program students which enhance knowledge and skills in line with degree objectives. The school lecturers will assess the student's prior learning. Students develop their professional competence in both group and individual coaching sessions. At Humak, we use a pedagogical coaching learning model. The model teaches students ways to renew working life practices. Learning situations reflect authentic working life conditions where the learners design their own learning with the help of

a coach by using cooperative methods. Various learning tasks and rapports function as tools for reflecting on your knowledge.

As a nationwide university of applied sciences, Humak can function as a partner when developing school culture and learning environments in different municipalities all over the country. For example, we can share our expertise when promoting group-based activities among children and young people and strengthen pupils' participation.

LEARNING FROM WORLD HERITAGE

The project enabled Tikkala elementary schoolchildren to learn about world heritage and cultural learning at the Struve Geodetic Arc chain at Oravivuori station. The learning project was carried out in line with a phenomenon-based learning curriculum and multidisciplinary learning goals. Lecturer Tero Lämsä's discusses multidisciplinary and collective learning at a World Heritage site in his account (see page 5). In the project, which was carried out in the footsteps of Struve, three basic education principles were realized: cultural knowledge, interaction and self-expression, critical thinking, learning-to-learn skills as well as working life skills and entrepreneurship. The project promoted the school's educational goals and was part of the pupil's assigned school work.

The activities and realization of the Tikkala school project are described in this publication, a simulation done by community educator student Kirsikka Sorvoja and lecturer Tero Lämsä: *In the footsteps of Friedrich Struve at Oravivuori* (see page 9). We recommend that you boldly experiment with the project simulation and create similar, innovative scenarios where learning develops from the participation of students from different school levels. The activities created around the World Heritage site were successful and constituted a good learning project for both elementary school children and university of applied science community educator students.

At the end of the publication, you will find tasks which have been modified using suggestions from the Tikkala school teachers. For instance, you can experiment with teaching natural science and developing measuring skills for 1-6 graders using the closest World Heritage site as a learning environment.

Enjoy the adventure!

MULTIDISCIPLINARY AND COMMUNITY LEARNING IN LINE WITH THE NEW CURRICULUM

TERO LÄMSÄ

School work and its goals are guided by the new national core curriculum for basic education which was introduced on 1.8. 2016. The new curriculum guides schools to make use of real world learning environments and creates possibilities for project-based learning. Collaboration both within school and with people outside school is encouraged. A pupil should have at least one multidisciplinary learning module a term. Certainly in most schools like in Tikkala, this opportunity is used much more often.

World Heritage sites are versatile and inspiring learning environments around which multidisciplinary learning modules can be built in line with the goals of the new curriculum.

The learning module which was carried out in the *World Heritage Sites' Boost to Local Services* project at Oravivuori Struve Station which culminated with a one-day school field trip is a good example of this kind of collaboration. In this article, I will examine this experience while considering the principles of the core curriculum for basic education and how those goals were realized.

INTERACTION, THE JOY OF LEARNING AND EXPERIENCES OF SUCCESS

Several development principles of the school culture are addressed in the core curriculum. For example, working methods should support creativity at various ages, self-directed learning and group membership as well as enhance the joy of learning and experiences of success. The school community should create an environment that fosters and encourages interaction, experimentation, active participation, creativity, physical activity, play and adventures. Experimental and functional methods, which increase the meaningfulness of learning and student motivation, are highlighted.

A full-day field trip to Oravivuori as well as group formation days carried out by community educator students prior to the field trip, built and supported this kind of school culture. The whole school participated in the field trip and the pupils were divided into expedition groups of all ages based on their wishes and interests. This increased interaction between pupils of different ages and strengthened community spirit at school. Community educator students had planned two activity-filled days during which they worked in the same group (expedition) as during their field trip. During the days, the pupils became more familiar with their own group with the help of games and playing. Succeeding in the second-day group challenge and problem solving activities required everybody's cooperation and participation. When guiding pupils to take on different roles and share tasks with each other you can also support collaborative learning. Pupils engaged in collaborative learning capitalize on one another's resources and skills.

The basis of the new core curriculum is conception of learning that empowers pupils as active participants which learn to set goals and solve problems both independently and together with each other. Learning takes place through the interaction of other pupils, teachers, adults as well as in different communities and learning environments. Along with expanding knowledge and learning skills, pupils need also to learn to reflect on their learning, experiences and feelings.

The Tikkala School learning module, which culminated with a field trip, provided a great opportunity for all these learning perspectives. The whole school prepared for a field trip together, pupils of all ages collaborated together and community educator students brought action-based and experiential learning to every-day school life. Pupils were also involved in the planning and sharing of roles on the field trip day. The pupils' reflections on their learning experiences was part of the learning module. Transforming a school into a learning community requires learning through exploration and joy of discovery which strengthen pupils' self-esteem. Activities should be suitably challenging. During the field trip, pupils were encouraged to find their own strengths and use

them. Community educator students gave each pupil positive feedback about his/her performance during the field trip and as a group member that helped them to flourish in that moment. The tasks assigned by the Tikkala School teachers combined the content of different subjects and inspired pupils to explore, experiment and use their own creativity.

OUT OF SCHOOL LEARNING ENVIRONMENTS INTEGRATE SUBJECTS

The core curriculum makes use of natural environments as well as built environments to teach the various subjects. When choosing the learning environments, you have to take into consideration that pupils also gain new insights and skills outside school. Libraries, sports centres, art centres, nature centres, museums and many other locations offer versatile learning environments. World and Cultural Heritage sites can be added to this list.

A central concept of multidisciplinary modules is also *an integrative approach*, the goal of which is to facilitate pupils' perception of the relevance of school subjects in relation to their lives, community, society and human kind. Exploratory working methods, which combine the knowledge and skills provided by different subjects to form meaningful wholes, prompt pupils to adopt and use them in collaborative learning. The evolving dialogue between different subjects develops significant entities in interaction with others. An integrative approach can, for example, be used by planning longer multidisciplinary modules with multiple subjects. The learning module, which culminated with a field trip at Struve Geodetic Arc chain, is a good example of this. However, you can also approach integrative teaching in many other ways such as arranging different theme days, events, campaigns, study visits and camp schools.

Cooperation with local actors as well as utilization of regionally available possibilities and resources strengthen multidisciplinary learning. With the help of collaboration between schools and society it is possible:

- to increase possibilities to study in different groups of varying ages with many different adults
- to offer possibilities to combine out of school learning to school work
- to inspire pupils to be part of their community and society in a constructive way
- to stimulate intellectual curiosity, engage in adventures and creativity as well as improve social and communication skills
- to apply knowledge and skills to practice as well as encourage sustainable ways of living

LINKING CULTURE AND HISTORY AT A WORLD HERITAGE SITE

The learning goals in basic education have been described in the core curriculum through transversal competence areas of which cultural competence, interaction and expression can especially be linked to all the possibilities World Heritage sites offer. The pupils should among other things learn to know and appreciate their environment and cultural heritage as well as recognize significant cultural environments and develop a positive attitude towards the environment. Furthermore, they should be encouraged to reflect on their own background and their position in relation to preceding generations.

In the Tikkala School's and Humak's collaborative project, cultural heritage, history and new perspectives into pupils's own environment are nicely intertwined.

Stories lived are the stories that are played out. For example, pupils who put themselves in the role of Struve opened a window into 19th century Korpilahti. One couldn't help but wonder what kind of encounters local people and expedition members measuring the triangle angles had. The second World Heritage site in Central Finland, Petäjävesi Old Church, offers a different type of interesting perspective into cultural heritage and local history.

In this publication, we have presented what is in our opinion a successful example of how a World Heritage site opens up new perspectives on learning. Hopefully, this inspires other teachers, pupils and schools to become familiar with World Heritage and develop their own expeditions and learning adventures to World Heritage sites, the surrounding nature and environment!

WORLD HERITAGE SITE'S BOOST TO LOCAL SERVICES PROJECT AND LEARNING REWARDS

ANNAMARI MAUKONEN

Unesco World Heritage sites are great attractions all over the world. Interesting World Heritage sites in Japan, India or China can even reach out to millions of travellers. Remote accessability is not a hindrance. Finland hosts seven Unesco World Heritage sites, two of which are located in Central Finland: The Struve Geodetic Arc at Oravivuori in Korpilahti and Petäjävesi Old Church in Petäjävesi.

The goals of the *World Heritage Site's Boost to Local Services project* are to increase the visibility of these two World Heritage sites in Finland, Petäjävesi Old Church and the Struve Geodetic Arc Station Point at Oravivuori as well as to create new operational models and earning possibilities for local actors. Three partners, Humak University of Applied Sciences, JyväsRiihi ry ja Vesuri ry, in Central Finland are involved in the *World Heritage Site's Boost to Local Services* project.

The goals of the three-year-old leader-project (2016-2018) are, in association with local actors, to create visibility and provide benefits to the local community. The central parts of the activity are to increase cooperation between entrepreneurs, educational institutions, third sector actors as well as to strengthen networks. Community residents, associations, enterprises and educational institutions are all seeking the best way to utilize the world-renowned Unesco brand in developing local services and marketing.

The goal is to increase the sites' visibility by means of tourist brochures, maps and on the Internet. In the shared workshops, information and marketing are developed for the needs for the local community. The project has generated different kinds of events, products and operational models which animate the sites and attract more tourists. Furthermore, the project stimulates local residents of Korpilahti and Petäjävesi to participate in community development and voluntary work.

There are already several examples of successful experiments. The moonlight climbing expedition has already been organized twice during the March full moon at the Struve Geodetic Arc station at Oravivuori. The moonlight evening, which was planned in collaboration with Sirius Astronomical Association, attracted new visitors to the Struve Geodetic Arc triangulation measurement point. From the Oravivuori Triangulation Tower, people could enjoy the view of the mesmerizing star-filled sky. The Sunset Walk, arranged in May 2017 by French and Dutch exchange students attracted international visitors to Oravivuori. Korpilahti folk musicians climbed with their instruments to the top of Oravivuori in August 2017 and 2018. Both performances were big hits.

Tales fascinate and generate new creative ideas. The Struve soup and triangular shaped sandwiches have attracted people to have lunch at Tähtiniemi Manor. Struve's story lives on in many forms, even in the menu.

This project is an excellent example of products which have been created collaboratively. *Ever Wanted to Be an Explorer? - World Heritage learning at Tikkala School* publication presents good practices available to everyone. The publication was born out of the experiences of Struve field trip carried out by Tikkala Unesco School and Humak University of Applied Sciences. The publication will now help other school groups to carry out an adventure-filled day in the footsteps of Struve.

Young people and schoolchildren play an important role in keeping our world heritage alive and infusing it with the spirit of the time. With the help of close collaboration and innovations as well as marketing ideas and providing information the World Heritage site becomes a shared issue for all the local actors in the community. Creation of local as well as wider networks contributes to the enlivening of the sites and make them marketable enabling local histories to become a shared adventure.

The Tikkala School's expedition in the footsteps of Struve inspired schoolchildren and students involved in the project. This example encourages everybody to plan their own world heritage expedition in an open-minded way.

Our next goal is to share the new practices and products generated by the *World Heritage Site's Boost to Local Services* project internationally. The first step is the international *Hygge & Heritage – World Heritage and Local Services* Seminar in Petäjävesi and Korpilahti 18.-20.11.2018. *Ever Wanted to Be an Explorer? - World Heritage learning at Tikkala School* publication will be released at the seminar.

www.maailmanperinto.humak.fi

http://hygge-and-heritage-seminar.humak.fi/

IN THE FOOTSTEPS OF FRIEDRICH STRUVE AT ORAVIVUORI

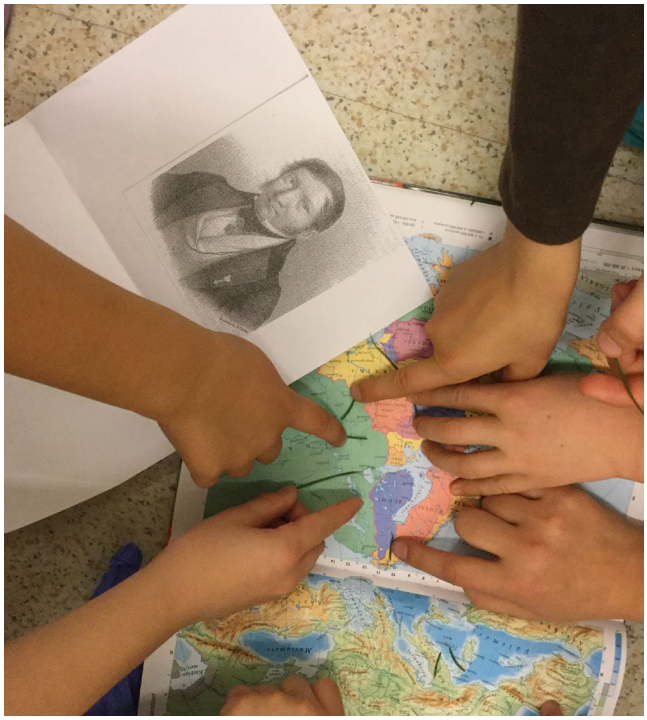
KIRSIKKA SORVOJA & TERO LÄMSÄ

WARM-UP

The first step taken at Tikkala School to get familiar with astronomer Friedrich Georg Wilhelm von Struve and the Struve Geodetic Arc named after him, was to read an article published in Helsingin sanomat (3.8.2017): ”T*he nearly 40-year-long experiment to determine the size and shape of the Earth also took place in Finland exactly 200 hundred years ago*”. Fifth and sixth grade students familiarized themselves with the Struve Geodetic Arc measuring methods based on the article and together studied the route with the help of map books.

The next step was to form groups consisting of older pupils and first to fourth grade students. The opening activity was a sing-along about a mouse who measures the Earth by lining up pine needles. Afterwards, the older pupils taught the younger ones about Mr. Struve and collected pine needles with which they measured the Struve Geodetic Arc in the map book. *”The younger pupils were able to absorb just the right amout of information from older pupils and the activity was carried out harmoniously*”, said teacher Tiina Jylhä.

Next, a shared info session about the coming field day to the Struve Geodetic Arc Measurement Station at Oravivuori was held. The application process to participate in the different expeditions was also discussed. The starting point for the formation of the expedition groups was to strengthen pupils’ experiential role model learning. An info-letter (Attachment 2) was also sent to parents and each pupil received a job application form (Attachments 3 & 8). In the application, pupils had to tell about their own strenghts and justify why they wanted to be part of a specific expedition group. The idea was that the pupils would explore Oravivuori in their own expedition and carry out both of the tasks specifically assigned to their group as well as other shared tasks assigned to other groups.



All the pupils were able to join the group of their choice, and the rest of the preparatory tasks before the field trip were carried out in their own expedition groups. The goal was to work in small groups during the whole project and develop group dynamics to prepare for a successful field trip to Oravivuori. Furthermore, another goal was to strengthen the whole school's community spirit by forming groups consisting of pupils from different grades.

ENCOURAGING TEAM SPIRIT

The collaboration project with Tikkala school was part of the community educator students' professional studies at Humak University of Applied Sciences. In the first planning meeting, students' goals and roles in the project were determined. Humak students' goals in this collaborative learning project were to facilitate pupils' group formation, make them aware of their roles in the group, create positive team spirit as well as strengthen their interaction skills. For this purpose, students planned and guided two group formation days where pupils worked in their expedition group at Tikkala School. Each expedition consisted of approximately six pupils of different ages and two or three student-instructors.

The first group formation day

On the first day, the goal was to get familiar with members of the expedition group with the help of games and role-play. The students and pupils were divided into expedition groups and each group received their designated colour in the form of a scarf. The day was planned so that part of the group was engaged in indoor activities for an hour and another part played outside for an hour and then the groups switched. One example of an activity was an "I like.."- getting-to-know game ". One pupil stands inside a circle and expresses his/her likes and all the others (including the narrator) who like the same thing change their place in the circle. The one who is not fast enough to get a place in the circle has to take the center position.

The second group formation day

The second group formation day was already directly linked to the preparation for the field trip day. The theme of the day was: "*Ever wanted to be an explorer?"*. During the day the expedition groups carried out different tasks related to teamwork and problem-solving skills. The successful completion of the tasks required cooperation and everybody's participation. This strengthened collaboration skills needed on the field trip. The day was spent along the nature trail with designated tasks. At one task point, participants wrote down guidelines for the field trip. The themes for the task points became: trust, safety, problem solving, rules, team work and having fun.

Allowing the participants to vent some of their energy, different tag games such as *Ninja Tag* and *Songbirds* were played. *The Master* and *Piglet* ring game, where the master tries to find the piglet in the center of the ring while wearing a blindfold, created much laughter. Team spirit was strengthened in the *Floor is Lava* game where participants walked with the help of papers through a "lava field". The loudest game was *Shout and Run*, where children competed who

would run the furtherst during one shout. Especially older children liked the *Moving Picture* activity. The expedition was divided into two teams and the teams challenged each other to recreate a moving picture based on GIF-images. The day ended in a final circle to explore people's feelings about the day's activities. They also agreed upon the name for their expedition group.

To build trust, the organizers created an element trail for children. Children walked in pairs along the trail so that one of the children was blindfolded while the other guided. *At the Safety Task Point*, children were shown different types of possible problem situations which they could encounter during the field trip, and they had to try to find solutions for them.

Once they reached the *Problem-Solving Task Point*, children had to stand on a tarp and turn it over without anybody falling or touching the ground. One of the tasks was to jointly lower a stick to the ground using only index fingers. The goal was to increase cooperation skills while avoiding dropping the stick. This task turned out to be very challenging due to students' height differences. This tested everyone's patience.

Teamwork skills were challenged by a game called *Six-Feet-and-Two-Hands*. Different body parts were written on separate sticky notes. Children take turns choosing a sticky note and placing the corresponding body parts on the game board on the floor. In this way the players' bodies become intertwined. Another game consisted of touching the floor with the corresponding body parts, for example five hands, eight feet and two knees. They also had fun with boot throwing. The day concluded once more with a final circle debriefing.

EXPLORING GROUP ROLES

The day before the field trip was reserved for preparatory work at school. An info session where the following day's program and safety rules were discussed was held for the students. During the day, group roles and responsibilities of different group members during the field trip at Oravivuori were determined. The older pupils took on expedition leadership roles and a seperate orientation session was arranged for them. During the session, they familiarized themselves among other things with field trip tasks, field trip gear and leadership responsibilities.

THE TRIP BEGINS

On the field trip day, community educator students gathered at the Struve Geodetic Arc Station point's parking lot just before the children arrived. Each group received a man costumed as Mr Struve and "sherpas" who accompanied the children along the trail. The children were met when they exited the bus and they were divided into their expedition groups. Each expedition

group performed its task during the circuit at their own pace, either on the way to the top or returning from it, to avoid crowding. The groups' progressions were monitored so as to ensure that none of the members would fall behind.

The group leaders guided their groups with the help of the students towards the top. Some of the expedition groups made stops at intervals to complete the tasks (Attachment 5) and after each finished task, sherpas would give a piece of a map to the children. At the end, the pieces formed the map of Oravivuori. The student costumed as Mr Struve stayed in character during the whole trip, telling stories about the construction ot the Struve Geodetic Arc measurement points during the 1900th century and life back then.

Once they had reached the top, they ate snacks, made warm drinks and enjoyed the view. Everyone had a chance to climb to the top of the wooden tower where

it was possible to take landscape pictures as souvenirs. The members of the expedition group received positive and constructive feedback for their input from their instructors. One of the goals of the field trip was to strengthen students' self-esteem and belief in their own abilities with the help of positive feedback. For community educator students, practising this skill in an instructional situation was one of their learning objectives. The feedback was given either at the top of Oravivuori or afterwards depending on the group. The goal of the feedback was to highlight each student's strengths and provide examples of good teamwork. The trip ended in the parking lot where the schoolchildren voiced their gratitude to the students. The shared trip was a memorable and instructive experience for all the participants.

POST-FIELD TRIP ANALYSIS ACTIVITIES AT SCHOOL

During the post-field trip session a separate feedback exchange was conducted for the expedition leaders. Each leader gathered feedback for his/her own group. The other members of the expedition received a feedback reviewing the successful aspects of the leader's activites (Attachment 7). Each expedition group also gave a shared evaluation about the expedition (Attachments 6 & 9).

At school, each expedition wrote a research report about the field trip in PowerPoint form. The objective was to present concepts learned from the field trip as well as theme-related tasks for the other expedition groups. This turned out to be very challenging since the groups consisted of children of very different ages whose IT-skills varied greatly.

Preparing the slide shows and processing information was easier for the older pupils which slightly excluded the younger pupils. School teacher Tiina Jylhä stated: " It is difficult to motivate pupils to continue the work because for them the trip was mentally finished when Oravivuori had been conquered". Even in the planning and preparatory phase, the focus was mainly on the trip itself and not the aftermath. Finally, it was realized that the field trip debriefing was best conducted with the help of visual arts and other creative methods.

Souvenirs from Oravivuori

In the art class (attachment 10), the younger pupils drew cartoons and other drawings based on their field trip experiences. The older pupils were given the assignment to create their own memorabilia souvenirs. One group planned an Oravivuori souvenir cup. The group chose an appropriate material for the cup by carrying out tests for ease of drinkability based on comparisons of different types of materials. Another group brainstormed different types of souvenirs, each pupil planning and drawing their own idea. *The Guide to Oravivuori* expedition group planned an Oravivuori information board.

What did we learn from this?

The field trip was very successful and careful preparations played an important part. Rainy weather during the field trip day did not cause undue misfortune since both children and adults had received proper information about the field trip's goal and safety plan as well as what items would be necessary to bring in order to cope with the different weather conditions. The teambuilding days' activities arranged by the community

educator students enhanced the childrens' ability to work as one team. This also contributed to creating a positive and safe atmosphere.

The teaching material related to the Struve Geodetic Arc Station Point was successful. Creative and functional age-appropriate methods were employed during the project. The children were able to practice important teambuilding skills and take on different group roles during the field trip.

The learning project allowed for the implementation of the following three general basic education curriculum learning goals such as cultural competence, interaction and self-expression, thinking and learning to learn as well as working life competence and entrepreneurship. Jylhä stated that "working towards a common goal is a central skill when discussing working life and entrepreneurship". Experiential learning at a World Heritage site brings fresh air into the dusty storerooms of traditional learning.

ADDITIONAL INFORMATION

UNESCO SCHOOLS

The UNESCO Associated Schools Network's goal is to promote intercultural dialogue, peace, human rights, sustainable development and quality education. In recent years especially, Global Education Citizenship and Education for Sustainable Development have taken on the central role in protecting Cultural - and World Heritage sites. The World Heritage Cultural- and Education programme part of the Global Education Citizenship support the individual's cultural identity and promote cultural competence and sustainable development.

The network was launched in 1953. At the moment, it includes 10,000 educational institutions ranging from pre-school education to teacher training in over 180 countries. Finland has been part of the network since 1959 and these days it encompasses over 50 institutions ranging from pre-school education to teacher training instititutions.

The UNESCO Associated Schools Network activities include transnational flagship projects, each school's pilot projects as well as producing learning material. Selected UNESCO Associated Schools carry out pilot projects on one or more out of four main themes of study:

- The Role of the United Nations and World Concerns
- Sustainable Development
- Peace and Human Rights
- Intercultural Dialogue

Additional information

http://www.oph.fi/tietopalvelut/kansainvalinen_koulutustieto/unesco

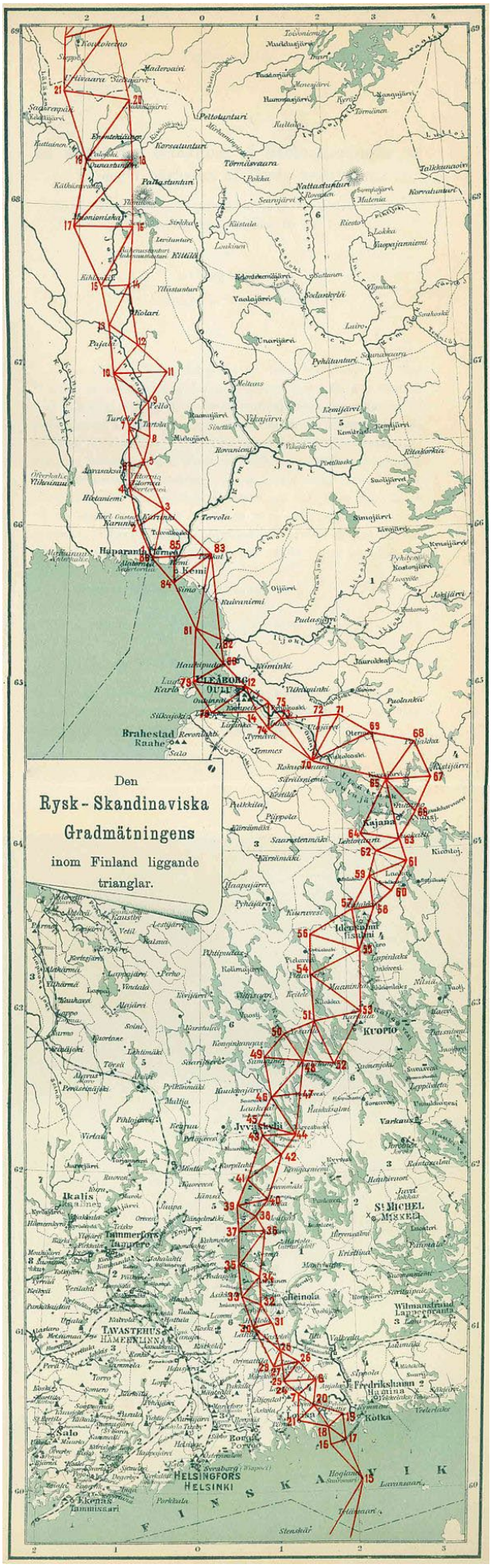
FRIEDRICH GEORG WILHELM VON STRUVE

Wilhelm Struve was born in Altona near Hamburg, then a part of Duchy of Holstein of Denmark. His father Jacob Struve was a math teacher and Rector of the local high school. His descendants were astronomers through three generations. In 1808, young Wilhelm was sent to his brother in Tartu, back then the Governorate of Livonia of the Russian Empire, probably to avoid military service in Germany which was then occupied by Napoleon.

In 1808, Struve started his studies at Tartu University at 15 years old and soon graduated with a degree of philology with honors. He decided to change his field to astronomy. From 1813-1820, he taught at the university, first as secondary professor and after 1820 as professor extraordinary of mathematics and astronomy.
From 1820-1839 he was the astronomer-observer at the Tartu observatory. From 1839–1862, he was the director of the new Pulkovo Observatory of the Russian Academy of Sciences, in the suburb of St-Petersburg.

Struve studied double stars and was the first one who succeeded in measuring the parallax or the relative motion of Vega. He also worked on geodesy, the shape of the Earth and helped build an over 2,820 km long chain of survey triangulations - Struve Geodetic Arc, named for him.

(Source: Wikipedia)



THE STRUVE GEODETIC ARC AS THE EARTH'S MEASURING TAPE

The Struve Geodetic Arc is a chain of survey triangulation measurements stretching from the Arctic Sea to the Black Sea. The Struve Geodetic Arc is an UNESCO World Heritage site. Six of the station points that have been selected to represent the entire Arc on the World Heritage List are located in Finland. The station points have historical importance, but they also offer excellent views of the surrounding area.

The triangulation measurements were started in 1861 and finished in 1855. Measurement of the triangulation chain comprises 258 main triangles and 265 geodetic vertices. The northernmost point is located near Hammerfest in Norway and the southernmost point near the Black Sea in Ukraine.

In 2005, the Struve Geodetic Arc chain was inscribed on the World Heritage List. The Struve chain represents the cultural heritage of science and technology. The station points are located in ten countries: Norway, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Belarus, Ukraine and Moldova. The Struve Geodetic Arc was accepted into the World Heritage List following a joint proposal by these countries. A total of 34 station points have been selected for preservation. Six of these are located in Finland.

THE STRUVE CHAIN STATION POINT AT ORAVIVUORI

The station point on top of Oravivuori in Korpilahti was surveyed and marked with a drillhole in the bedrock in 1834. Since the measurements for the Struve Geodetic Arc, Oravivuori has been one of the main geodetic station points in Finland.

On the site, there is a replica of a triangulation tower in commemoration of the significance of the area for cartography in Finland built together by National Land Survey of Finland and Finnish Geodetic Institute (today Finnish Geospatial Research).

Additional information at National Land Survey of Finland:
http://www.maanmittauslaitos.fi/tietoa-maanmittauslaitoksesta/teemat/struven-ketju

Additional information about World Heritage-related learning and Ever Wanted to Be an Explorer? project:

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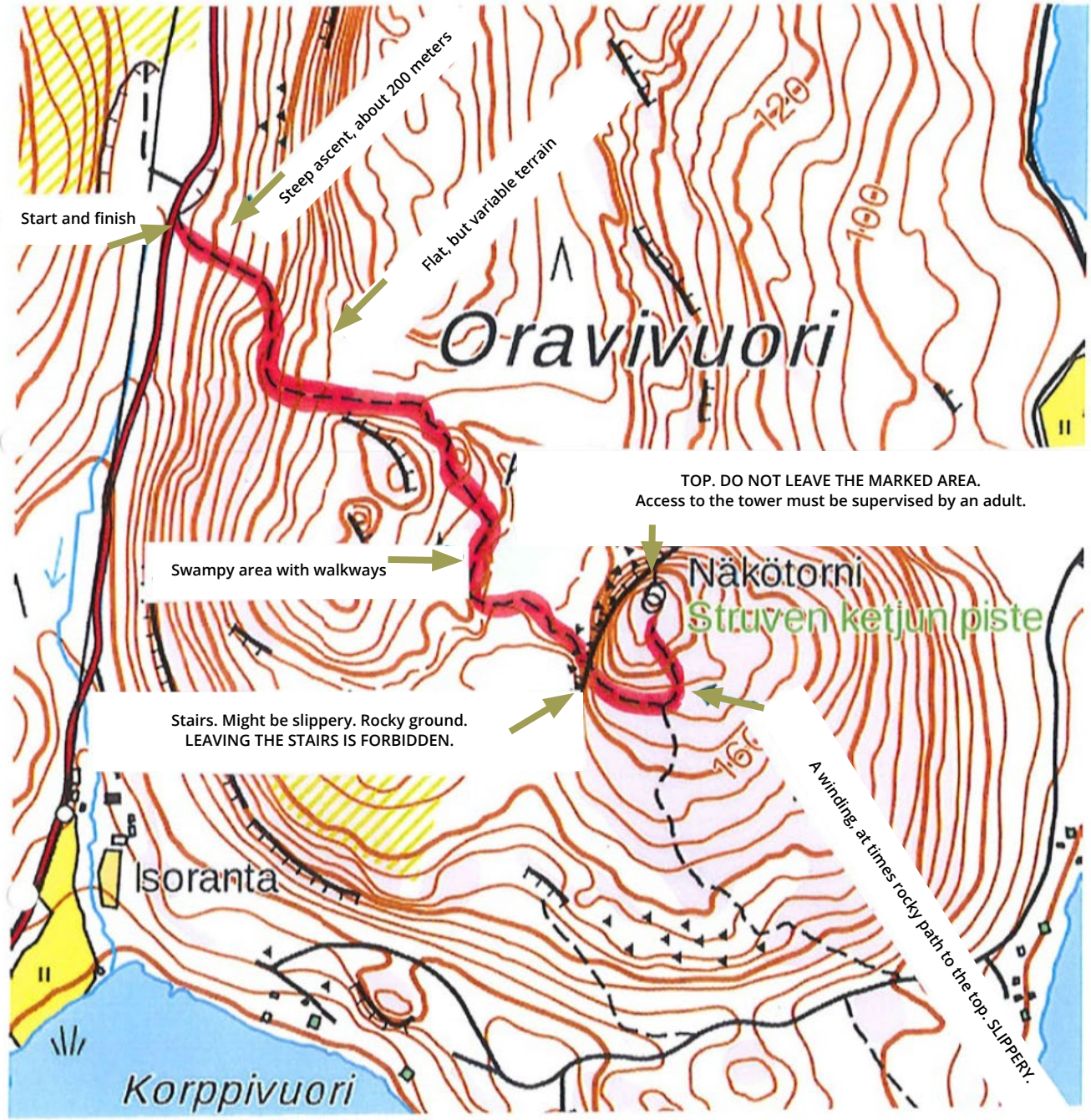
APPENDICES

Attachment 1. The Map of Oravivuori

THE EXPEDITION MAP

The route outlined in red.



SEARCHED FOR FAR AND WIDE BUT FOUND ON THE DOORSTEP

World Heritage Learning in Local Surroundings

We are part of UNESCO's ASB schools (UNESCO Associated Schools Network) and we regularly conduct UNESCO Schools cultural heritage learning. Cultural heritage includes not only daily life celebrations, past celebrations traditions and artifacts but also, as an essential part, World Heritage sites both in Finland and throughout the world. Expeditions will follow the footsteps of Struve on Wednesday October 4th to Oravivuori in Korpilahti. Our local surroundings are part of the United Nations World Heritage, one point in the Struve triangulation chain which stretches from the Black Sea all the way to the Artic Sea. Survey triangulations helped determine the size and shape of the earth over one hundred years ago. The work lasted forty years. The Russian Tsar Alexander I provided financial support for the project.

Our own expedition groups will work together to achieve a common goal which is one of the transversal competencies in the curriculum. The goal is, together as a group, to successfully climb to the peak and back down and carry out research tasks as well as learn to function as a group member.

Each expedition group will study local surroundings and the nature around Oravivuori from different research field perspectives. The Map Group will study distances as well as cardinal points and make scale comparisons between nature and the corresponding map of the area. The Mathematics Group will explore ancient measurement units, estimate distances, get familiar with different geometrical forms and build them. The Nature Group will study the local flora and fauna, find spiderwebs and conduct botanical research. The Hiking Group will practice, among other things, the use of Trangia with the help of an adult. The Arts Group will do cave painting, make sketches of the surrounding views, collect colour samples and analyze them. The Guiding Group will make a video postcard from the summit and take photographs of the scenic viewpoints in order to create attractive travel advertisements.

Yesterday, Thursday, 5th and 6th grade pupils told the younger ones about the Wilhelm Struve Chain. We also measured the distance from the Black Sea to the Artic Sea with the help of spruce and pine needles. Today on Friday, Humak community educator students helped facilitate activities which explored group formation and group working skills through role plays and games.

The work will continue on Monday. On Tuesday, we will have a start-up meeting where we will check the readiness of the field trip equipment. Each group will receive its own Humak team which will accompany them during the expedition. In addition, each expedition group has its own sherpa/student which will assist the group in overcoming all the physical and mental challenges which may come up during the trip. A surprise historical guest will accompany each expedition group.

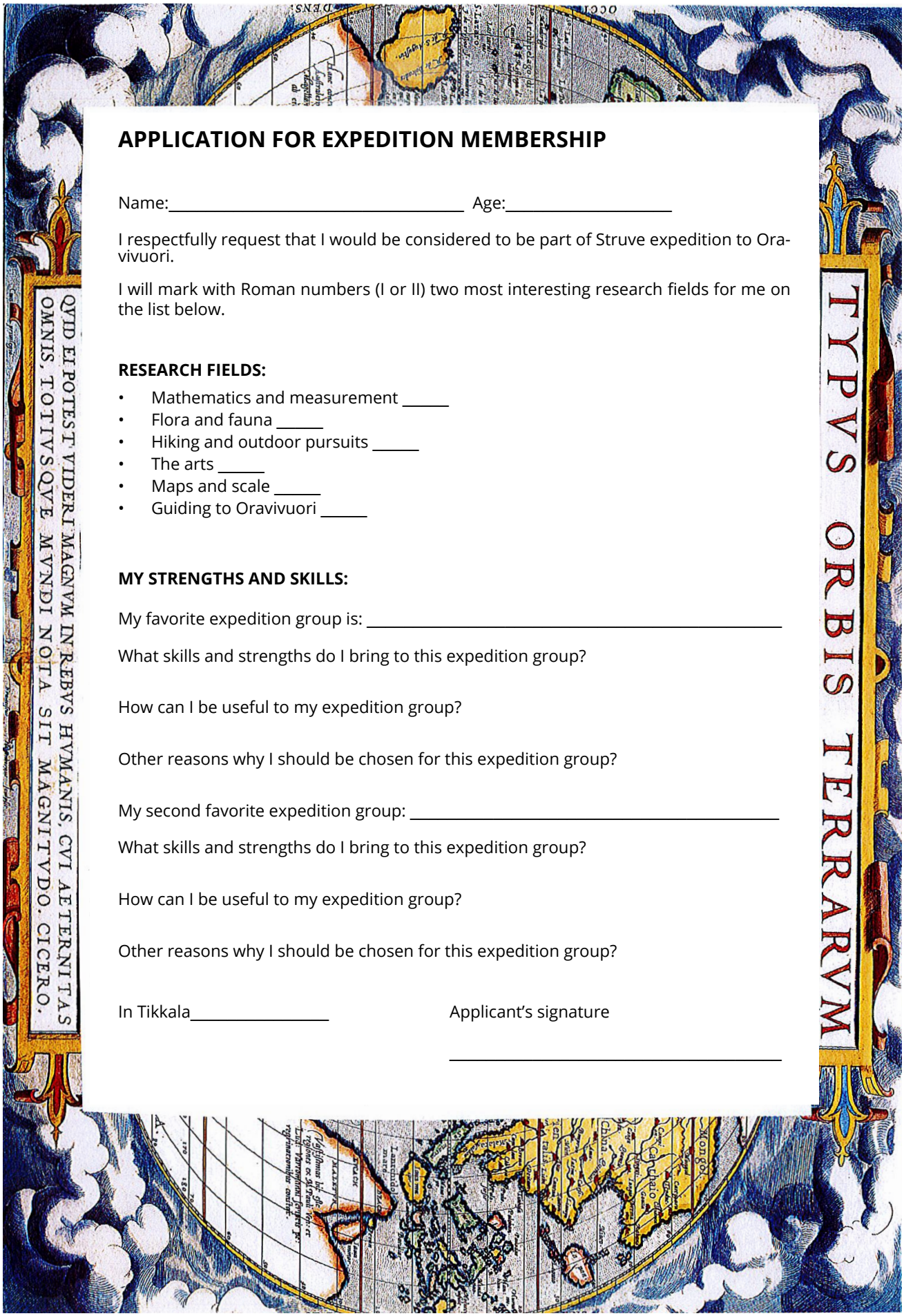
PREPARING FOR THE TRIP

Rain will not stop the expedition unless the downpour is the equivalent of 'raining cats and dogs'. The decision will be made at the school so bring your backpack and equipment to the school no matter what.

REMEMBER TO DRESS IN LAYERS, so that you may easily remove or add clothing!

EQUIPMENT LIST:
Backpack
Water bottle
Juice bottle/thermos (you can also bring warm beverages)
Own snacks (no candy, chips, soft drinks etc.)
Gloves and mittens, preferably also extra pair
Headwear
Sturdy waterproof outdoor footwear
Woolen socks in the backpack
Clothing for leisure activites
Raincoat or –cloak, if you have (disposable rain jacket is fine as well)

Attachment 3. Expedition team job application



APPLICATION FOR EXPEDITION MEMBERSHIP

Name:_____ Age:_____

I respectfully request that I would be considered to be part of Struve expedition to Oravivuori.

I will mark with Roman numbers (I or II) two most interesting research fields for me on the list below.

RESEARCH FIELDS:

- Mathematics and measurement _____
- Flora and fauna _____
- Hiking and outdoor pursuits _____
- The arts _____
- Maps and scale _____
- Guiding to Oravivuori _____

MY STRENGTHS AND SKILLS:

My favorite expedition group is: _____

What skills and strengths do I bring to this expedition group?

How can I be useful to my expedition group?

Other reasons why I should be chosen for this expedition group?

My second favorite expedition group: _____

What skills and strengths do I bring to this expedition group?

How can I be useful to my expedition group?

Other reasons why I should be chosen for this expedition group?

In Tikkala_____ Applicant's signature

_____

If you are a **TEAM LEADER:**

- You give everybody a chance to speak.
- You listen to everybody's opinion.
- Your make sure that nobody feels left out.

If you are a **MOTIVATOR:**

- You encourage everybody to participate.

If you are a **MEDIATOR:**

- You help the group to deal with disagreements.
- You find different solutions.

If you are a **CRITIC:**

- You weigh all the pros and cons of matters.
- You make questions about other's proposals

If you are a **ORGANIZER:**

- You write notes.
- You make sure and remind everybody that all the necessary items have been packed.

Attachment 5. Field trip evaluation

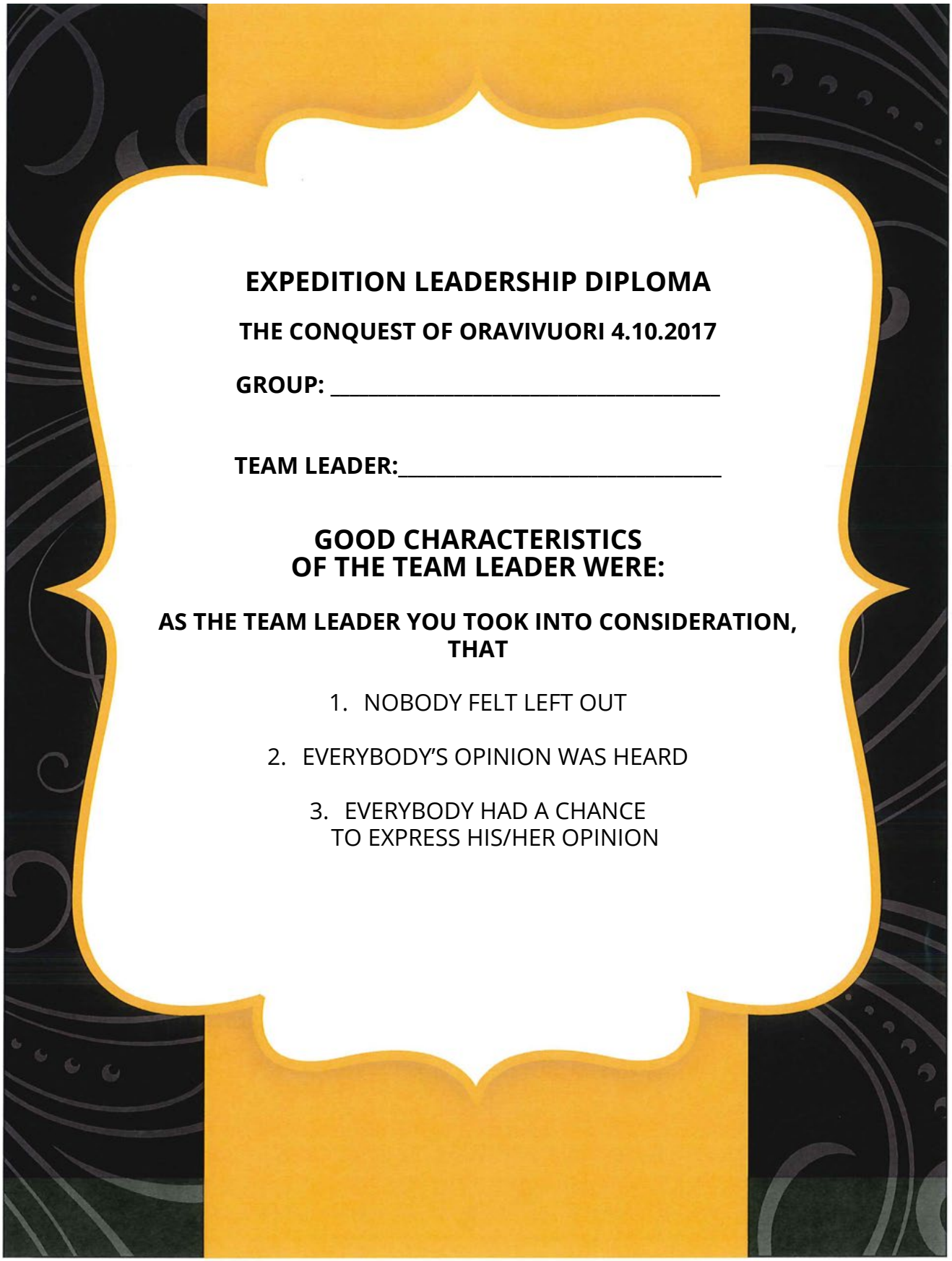
REASONS FOR THE EXPEDITION'S SUCCESS:

EVALUATION: COLOR 1-8 TRIANGLES IN THE CHAIN

EXPLANATIONS: _____

_____

Attachment 6. Team leader evaluation



EXPEDITION LEADERSHIP DIPLOMA

THE CONQUEST OF ORAVIVUORI 4.10.2017

GROUP: _____

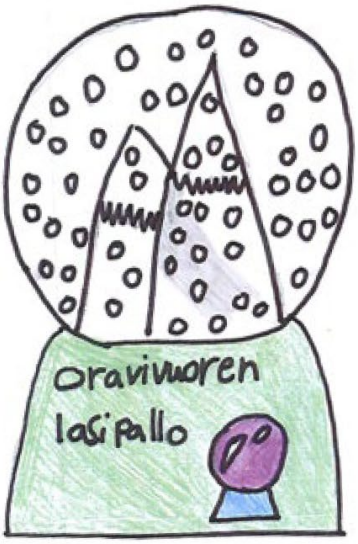
TEAM LEADER:_____

GOOD CHARACTERISTICS OF THE TEAM LEADER WERE:

AS THE TEAM LEADER YOU TOOK INTO CONSIDERATION, THAT

1. NOBODY FELT LEFT OUT
2. EVERYBODY'S OPINION WAS HEARD
3. EVERYBODY HAD A CHANCE TO EXPRESS HIS/HER OPINION

Attachment 7. Oravivuori souvenirs



Eväsrasia

Tämä eväsrasia on valmistettu erittäin kestävästä muovista. Se on helppo kuljettaa makana, ja se on myös hyvä lapsille, koska tämä on helppo avata, ja sulkea. Vaikka tämä onkin helppo avata, tämä myös pysyy hyvin kiinni. Tämä ei myöskään paina paljon.

Attachment 8. Assignments for the expedition groups during the World Heritage field trip

HI HO LET'S GO ON OUR FIELD TRIP!

Here are some examples of different World Heritage site assignments which can be carried out during or after the trip.

The assignments are designed for first to sixth grade pupils and they are carried out in mixed-grade groups. The assignments are divided into six different themes: mathematics and measurement, nature, hiking, the arts, maps and scale and guiding activities. The older pupils assist the younger ones when needed. The equipment, necessary to carry out the field trip tasks, is listed below. In order to complete the assignments, you will need a tablet for filming or otherwise recording.

Expedition group members usually share their findings after the trip. Share your completed assignments on social media platforms of your choice using hashtags, #World Heritage #Explorer. By sharing, we can all enjoy different expeditions at World Heritage sites.

The assignments are adaptations of the Tikkala School's learning projects designed by teachers Tiina Jylhä, Kirsi Eronen, Maaret Koskinen and Jukka Suoniemi.

A SHARED ASSIGNMENT FOR ALL THE GROUPS

Field Trip Memory

Each group member takes a picture of either a landscape, an event or something related to the assignment. Later at school, you will write an explanation to go with the image and this piece of work will be affixed on a paper to be part of a visual showcase which everybody will be able to view. This exhibition can be displayed in any public facility to be viewed by the local populace.

Equipment: *tablet*

THE MATHEMATICS AND MEASUREMENT GROUP'S ASSIGNMENT

360°

At some point during the trip, choose a location and stand there on your own, alone. Turn slowly 360o and view your surroundings. What is the most beautiful and impressive thing you see in nature? Make a short video excerpt while explaining your thoughts.

Equipment: *tablet*

Collect Souvenirs from the Trip

Gather 5 souvenirs from the trip which you place in a shared bag or pouch. The souvenirs will later be examined at school.

At school: sort and classify all the collected souvenirs artifacts into four different groups so that each group shares a common denominator or theme. Write the theme down on a piece of paper.

Equipment: *bag (canvas or other)*

NATURE GROUP'S ASSIGNMENTS

Observing the Environment

Walk along the path, sometimes leaving it to touch and explore, with or without a magnifying glass, interesting things you encounter. Use all your senses: "I smell...I taste...I touch...I hear...I see."

Equipment: *magnifying glass*

Nature's Television

Try and find a peaceful spot where you can lay down for a moment and watch Nature's television. Lay on your back, relax, listen and watch the sky. Enjoy a moment of serenity sensing Nature's sounds, smell and views. Record it, as if from your own television.

Equipment: *tablet*

HIKING GROUP'S ASSINGMENTS

First Aid

The assignment will be carried out on the way to the summit. One of the group members falls down and injures his or her wrist, arm or shoulder. The other members provide first aid. Take a picture of the injured group member after having given first aid. You decide to continue on the trip. You must help the injured member all the way to the final destination.

Equipment: *own equipment, Nature's equipment, imagination, tablet*

Cardinal Points, Tips from Nature.

The assignment will be carried out along the way. As a group, observe nature in the path's vicinity. Take one or several photographs of surrounding landmarks which can help you figure out where the cardinal points are. You should be able to justify what element in the image tells something about direction. Be prepared to explain your deduction.

Equipment: *tablet*

ART GROUP'S ASSIGNMENTS

Nature's Design

At school beforehand, prepare cardboard cut-out frames to be brought on the field trip. Photograph Nature's own artwork by holding up the frame in front of your chosen scene or element.

Equipment: *tablet, frames*

Designing a Landmark

Plan and design a landmark by using found branches, stones and leaves collected from the ground. You can place a white sheet under the landmark to make it more visible. You can freely choose the topic and material. Remember that you can't rip or break branches off living trees and you should not damage moss and lichen. Finally, take a picture of your landmark.

Equipment: *tablet*

MAPS AND SCALE GROUP'S ASSIGNMENTS

Draw a Map

The assignment will be carried out during the trip. Take as many pictures and videos as possible and record the World Heritage site's surroundings so that later, at school, you can draw a map outlining the route to the destination. If necessary, make notes and drawings on paper.

Equipment: *tablet, paper, pencil*

You continue the assignment at school after the trip. .
Equipment: *tablet, notepad, pencil, colour pencils, compass and an A4 size paper*

- Based on the images, videos and notes, draw a map of the surroundings of the World Heritage sites.
- Use real map symbols and colours in your drawing.

Estimate the Distance

The assignment will be done out at the World Heritage site itself. The teacher plans ahead of time where the assignment will be carried out and what the destination will be. Using the compass, find something due east. How far is the landmark/object in your estimation?

Which tools helped you make your assessment?
Equipment: *compass and pencil*

GUIDING GROUP'S ASSIGNMENTS

Emotion Travelogue

Choose different objects or views with which you can speak about the World Heritage site to others. Describe the places and prepare a video presentation where you express your feelings about the place. Use different rhythm instruments from the school to create a musical soundtrack for the video.

Video Postcard

Record a landscape video postcard with a narrative. Conduct an interview. The interviewer is chosen beforehand and questions are written which the other group members will answer during the interview.

Tero Lämsä (ed.)

Ever Wanted to Be an Explorer?

– Tikkala Schoolchildren Learning at the Struve Geodetic Arc at Oravivuori Station Point

How can multidisciplinary and community learning in the spirit of the new curriculum be put into practice? How can successful experiential projects be run? How can a World Heritage site offer a new perspective into learning? This publication resulted from an experiential multidisciplinary unit jointly carried out by community educator students at Humak University of Applied Sciences and the Tikkala UNESCO School.

The “Ever Wanted to be an Explorer?” project was a learning experience for elementary school children as well as Humak students. At the same time, it was possible to increase the visibility of the World Heritage site at Struve Chain Station point at Oravivuori.

The “Ever Wanted to be an Explorer?” publication is for readers, teachers, and instructors who want to initiate activities with their students or groups of children in order to:

- learn about, enjoy and become familiar with World Heritage sites
- implement phenomenon-based learning and take advantage of learning environments outside school
- collaborate with community educator students

The endeavor was carried out as part of The World Heritage Site’s Boost to Local Services project which was implemented by Humak University of Applied Sciences, Jyväs Riihi ry ja Vesuri ry. The goals of the World Heritage Site’s Boost to Local Services project are to increase the visibility of these two World Heritage sites in Finland, Petäjävesi Old Church and the Struve Chain Station point at Oravivuori as well as to create new operational models and earning possibilities for local actors.

maaseuturahasto
LEADER JyväsRiihi
LEADER Vesuri-ryhmä
HUMAK UNIVERSITY OF APPLIED SCIENCES