Evaluation Plan including KPIs (key performance indicators)

(Public)

Project Acronym: EDU-ARCTIC

Project Title:

"Edu-Arctic – Innovative educational program attracting young people to natural sciences and polar research"

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Document information summary

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Executive summary

This report concerns Deliverable D5.1 Evaluation Plan including KPIs (key performance indicators) that is being part of WP 5 Evaluation and impact.

The document fulfils several basic goals:

- set an evaluation methodology including indicators to properly evaluate the project solution. Evaluation methodology before, during and after the EDU-ARCTIC educational program is being conducted according to a standardised and common approach of the performance, efficiency and re-usability of tools;
- serve as an action plan to support the evaluation process;
- support assessing pupils' STEM skills level before and after participating in EDU-ARCTIC project;
- support measurement of pupils' interest in STEM after taking part in EDU-ARCTIC project;
- provide a framework to assess pupils' development in various professional skills across STEM disciplines;
- provide additional guidance for the project Consortium on the project's implementation.

The target audience of this document are:

- Consortium members,
- REA/European Commission (EC),
- other interested parties

1. Scope and structure of the evaluation

According to the description in Annex 1 to the EC/REA GA (DoA) the EDU-ARCTIC project sets 5 steps of evaluation:

(1) 'Before EDU-ARCTIC' survey – done in WP3 - PREPARATORY OF EDU-ARCTIC PROGRAM - within task 3.1 Desk research and task 3.2 Requirement analysis. Surveys have been done in order to get to know and understand the attitude including interest of the young generation towards STEM and to design better tools and the functionalities. Survey conducted among project partners.

(2) 'EDU-ARCTIC entry' skills assessment - in order to measure young generation's STEM skills before they enter EDU-ARCTIC's educational program.

(3) 'During EDU-ARCTIC' survey - in order to monitor the process and see the reaction of pupils while taking part in the educational program: Arctic transmissions (Task 4.5) and Arctic competitions (Task 4.6). Observation techniques will be applied.

(4) 'After EDU-ARCTIC' skills assessment - in order to measure young generation's STEM skills improvement.

(5) 'After EDU-ARCTIC' survey - in order to assess the effects of tools on youth interest in STEM.

The main objective of the document is to set an evaluation methodology including indicators to properly evaluate the project's outcome. This is being done in order to meet project's objectives. The main aim of EDU-ARCTIC is to raise the attractiveness of science education and future scientific careers, enhancing competence and the interest of young girls and boys (aged 13 to 20) in STEM, especially in science, by providing an innovative and attractive educational program accessible to schools in the whole of Europe based on research conducted in institutions and polar stations located in various parts of the European Arctic.

Detailed objectives of the project are:

- enhancement of knowledge about science and scientific research, as well as their place in the modern world, familiarizing young people with scientific career opportunities;
- enhancement of knowledge about nature, geography, natural resources, history, social and political specificities concerning polar regions and increase of sensitivity to environmental issues and climate change;
- establishing strong links between the worlds of research and young people/ society in order to increase their ability to understand scientific messages and scientific language;
- rise of the number of young people interested in STEM and scientific careers;
- rise of the number of girls interested in scientific careers by providing special forms of promotion and language sensitive to gender issues in educational resources and transmissions;
- introduction of innovative tools by way of an e-learning portal and effective methods of teaching science in schools in at least 10 European countries;
- promotion of the proposed solution among as many junior high schools and high schools in Europe as possible.

This evaluation plan and methodology is a roadmap that identifies the goals and ways in which the project consortium will collect and analyse data. It identifies accepted and used research methods responsible for carrying out the evaluation and methodology plan. One of the most important aspects of that plan and methodology is that they articulate the questions according to which the evaluation will be structured. The project consortium is going to assess fulfilment of all objectives given above. In order to achieve all of them, it is going to take all actions and opportunities agreed on upfront.

2. Methods of evaluation

The evaluation process will be conducted with the use of two research techniques:

- CAWI (Computer Assisted Web Interviews)
- Focus Group Interviews.

CAWI (Computer Assisted Web Interviews) research technique is an interview in which the participant fills in an on-line questionnaire or survey received via the Internet. Currently CAWI method is one of the most popular and fastest-growing research methods. Compared to other methods, with a sense of anonymity and the opportunity to participate in the study at time convenient for the respondent, it allows to collect more accurate data. Conducting research using this method, we can reach a wider group of potential respondents, and especially we can reach a specific target group. Other advantages:

- gives an insight into the results of the study during the time the research is being conducted;
- low cost;
- depending on the provided answers the questionnaire can be modified – which is very important in terms of achieving the project objectives;
- electronic surveys are easier to correct, even if an error is found after the survey had been prepared;
- quick access to the data - received data is already in an electronic form;
- participants have the opportunity to be remain anonymous, hence more honest and this can provide more accurate data;
- survey available on the network is available all over the world.

Focus Group Interviews (FGI)

That method is based on a dialogue. Information is being gathered from respondents during the group discussion. Such discussion is focused on a given subject, carried out by a

professional moderator. Participants are encouraged to express themselves freely, both in oral and written form (depending on needs), and to take part in individual and group tasks designed for gaining subconscious information. Main advantages:

- spontaneous effect – respondents' opinions are formed when meeting other people and not alone, hence the group environment is a more natural place for expressing opinions;
- synergy effect – the effort of the whole group reveals additional potential of the individual, and in consequence leads to the emerging of a wider range of opinions and ideas than if one would speak individually with each participant;
- snow ball effect – responses from some participants trigger off responses from others which means more information;
- stimulation effect – a group increases the motivation to carry out a task, thus there is a bigger willingness to discuss;
- security effect – a group gives a sense of security, thus opinions are expressed more freely;
- FGI is used to reveal participants' attitudes and beliefs, to describe the emotions associated with a product/ service/ brand, to examine the motivation behind decisions, to look for new solution of known products.

Both CAWI and FGI will provide valid ideas and information towards meeting project objectives. Thus, a proper action plan may be implemented in order to achieve that goal.

3. Key Performance Indicators (KPIs) description

In order to properly prepare the evaluation plan, particular types of performance measurement need to be defined. **Key Performance Indicators (KPIs)** are applied in EDU-ARCTIC to advise tactical courses of action. KPIs represent a set of values against which to measure items. Choosing the adequate KPIs is necessary to understand what is important to the consortium in terms of the project Programme. KPIs should be set up using SMART criteria (Specific, Measurable, Achievable, Realistic, Time-bound). The most common categories are: Quantitative and Qualitative indicators.

Target indicators with KPI values and method of measurement. The table below provides the 3 main categories-targets that are going to be met. These are:

- the quality of educational program;
- the project's direct results;
- the project's impact upon the engagement of young people in STEM activities

All 3 main categories are given with KPIs and method of measurement.

Impact indicators and targets	Indicator value (KPI)	Method of measurement
1. Measurement of the quality of educational program	1. Utility of educational tools proposed and implemented in the project during online lessons (70% of teachers who took part will assess utility of at least one tool on a grade of 5 or 6). 2. Visual attractiveness of educational tools proposed and implemented in the project (70% of teachers who took part will assess visual attractiveness of at least one tool on a grade of 5 or 6). 3. Frequency of using educational tools proposed and implemented in the project (70% of teachers who took part will assess frequency of at least one tool on a grade of 5 or 6).	Surveys for teachers ("During Edu-Arctic' survey" and "After Edu-Arctic survey")
2. Measurement of project's direct results	1. Enhancement of knowledge about science and scientific research, as well as their place in the modern world (+ 15% compared to input level) 2. Enhancement of knowledge about nature, geography, natural resources, history, social and political specificities concerning polar regions and increase of sensitivity to environmental issues and climate change (+ 15% compared to input level) 3. Establishing strong links between the worlds of research and young people/ society in order to increase their ability to understand scientific messages and scientific language (+20% compared to input level)	1. Report on EDU-ARCTIC Skills Assessment based on skills assessment performed ex ante and ex post EDU-ARCTIC Program 2. Measurements will be done twice by means of the "During Edu-Arctic' survey" and "After Edu-Arctic survey". The results will be collected and interpreted in EDU-ARCTIC evaluation reports (mid-term and final). 3. The main source of information will be evaluation reports (mid-term and final) based on the results from on-line surveys for teachers ("During Edu-Arctic' survey" and "After Edu-Arctic survey").

	4. Implementation of innovative tools by way of an e-learning portal and effective methods of teaching science on a regular base in schools in at least 10 European countries (Minimum 500 schools from 10 European countries 5. Introduction of the EDU-ARCTIC program in schools in at least 10 European countries (Minimum 3.500 schools from at least 10 European countries).	4. Total number of schools using the program for at least one full year on a regular base will exceed 500, to be measured by the number of schools logging into the e-learning portal and list of schools registered for the program (D6.1). Regular base – on average once every two months. 5. Total number of schools showing interest in using EDU-ARCTIC products and tools, to be measured by the number of schools' declarations sent via online form.
3. Measurement of the project's impact upon the engagement of young people in STEM activities	1. Increase of the number of young people interested in STEM and scientific career (+ 25% compared to input level).	Surveys for teachers ("During Edu-Arctic' survey" and "After Edu-Arctic survey").
	2. Increase of the number of girls interested in scientific careers (+ 20% compared to input level).	
	Minimum 500 schools from 10 European countries.	Total number of schools using the program for at least one full year on a regular base will exceed 500, to be measured by the number of schools logging into the e-learning portal and list of schools registered for the program (D6.1) Regular base – on average once every two months.
	Minimum 3.500 schools from at least 10 European countries	Total number of schools showing interest in using EDU-ARCTIC products and tools, to be measured by the number of schools' declarations sent via online form.

Important note: Instead of surveys for pupils the Consortium decided to examine teachers while performing measurement of the project's impact upon the engagement of young people in STEM activities and with the target to examine the increase of the number of young people and young girls interested in STEM and scientific careers.

There are valid reasons for that change and these are as follows:

- there is a different curriculum standardization among schools, teachers and especially countries. The curriculum refers to the lessons and academic content

taught in a school or in a specific course or program. The most important that the curriculum refers to are the knowledge and skills pupils are expected to learn, including the learning standards or objectives they are expected to meet; the units and lessons that teachers teach; the assignments and projects given to pupils; the books, materials, videos, presentations, and readings used in a course; and the tests, assessments, and other methods used to evaluate student learning. Therefore the best option to measure the impact of Edu-Arctic project is to let teachers decide on how their pupils' interest, engagement, understanding, willingness for STEM changes and if it increases;

- to put teachers in charge of observing their pupils allows more honest and accurate data. Pupils may have the opportunity to be anonymous and that may lead to more accurate data;
- such pupil anonymity may bring comfort while learning;
- it may increase teachers' engagement towards Edu-Arctic as they may see the whole Edu-Arctic programme beneficial to their own approach of curricula. Teachers develop their own curricula, often refining and improving them over years. Also it is common for teachers to adapt lessons and syllabi created by other teachers, use curriculum templates and guides to structure their lessons and courses. Edu-Arctic may provide them with some useful ideas on that matter;
- Finally, the consortium partners pay attention on data protection that is enshrined in the Treaty on the functioning of the European Union (article 16) and the fundamental right to the protection of personal data that is recognised also in Article 8 of the Charter of Fundamental Rights of the European Union.

Teachers will be asked to perform pupils' skills assessment twice: at the beginning of the program (ex ante) and just after the end of the program (ex post). Details on the timing of this part of the evaluation are given below in the subsection 4.2.

4. Structure of final surveys

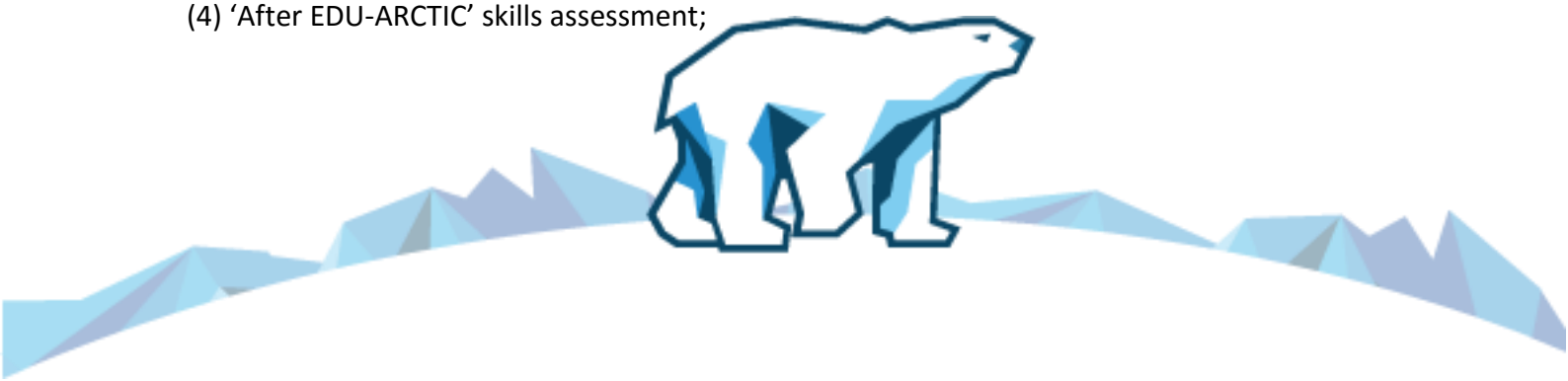
According to the description in Annex 1 to the EC/REA GA (DoA), 5 steps of evaluation are scheduled aby EDU-ARCTIC:

(1) 'Before EDU-ARCTIC' survey;

(2) 'EDU-ARCTIC entry' skills assessment;

(3) 'During EDU-ARCTIC' survey;

(4) 'After EDU-ARCTIC' skills assessment;



(5) 'After EDU-ARCTIC' survey.

A full description and its assumptions are presented below.

4.1 'Before EDU-ARCTIC' survey

There are two surveys that have been conducted within WP3 - PREPARATORY OF EDU-ARCTIC PROGRAM .

The first CAWI survey was part of task *3.1: desk research.* It was issued among the consortium beneficiaries and provided valuable points-of-view on the broad subject of STEM among the consortium beneficiaries. The main aim of the prepared questions was to better understand the barriers and missing gaps, in order to tailor the program accurately. Surveyed beneficiaries also responded on general questions about STEM conditions in their countries. The CAWI Survey was issued in Norway, France, Iceland, Poland and the Faroe Islands.

For more please see the report on task *3.1, desk research.* The CAWI survey form is an integral part of this document. See:

- **Appendix 1 – Before EDU-ARCTIC Survey – Part I.**

The second CAWI survey is a part of task *3.2: requirement analysis.* It is addressed to stakeholders (teachers, schools) and future end-users (teachers) to collect their requirements and major expectation from the program. The survey is being collected online and will gather information about: the scope of educational material, major expectations from the program, suggestions as to what to avoid in EDU-ARCTIC material, recommendations. Feedback is to be collected by project partners in their countries in at least 30 schools connected to task participants from Poland, France and Norway. The report on that survey is to be completed by the end of August 2016.

The CAWI survey form is an integral part of this document. See:

- **Appendix 2 – Before EDU-ARCTIC Survey – Part II**

4.2 'EDU-ARCTIC entry and after' skills assessment

An observation sheet for teachers will be prepared. The sheet will consist of questions about changes in pupils' behaviour, openness and scientific courage. It allows to measure how EDU-ARCTIC has an influence on the development of their skills. The observation sheet will be given to teachers conducting lessons by using various EDU-ARCTIC tools. They will fill it in,

basing themselves in their observation of pupils during classes. The sheet consists of 3 main categories and 13 questions concerning general opinions about the influence of the project on pupils' skills.

- Procedure: CAWI – sent online;
- Target: teachers.

There are 7 categories of STEM skills : KPIs were defined accordingly.

- Learn and apply content;
- Integrate content;
- Interpret and communicate information;
- Engage in inquiry;
- Engage in logical reasoning;
- Collaborate in a team;
- Apply technology appropriately.

The observational sheet will be filled in twice:

- at the latest 2 weeks after a given school has joined the project;
- after two full years of participation in the project – for schools which will start before month 11 or in months 34-35 for other schools;
- objective to be met: 100 schools linked to the project for 2 years;
- objective to be met: 500 schools linked to the project for 1 year.

Both CAWI survey forms are an integral part of this document. See:

- **Appendix 3 – Before EDU-ARCTIC - entry skills assessment;**
- **Appendix 9 – After EDU-ARCTIC - after skills assessment.**

4.3 'During and after EDU-ARCTIC ' surveys

The survey is to be conducted twice - the first one at mid-term and the second ex-post, in order to monitor the process and see the reaction of pupils while taking part in the educational program. The survey will also contain questions on: Arctic transmissions (Task 4.3) and Arctic competitions (Task 4.4). Additionally to the surveys described in the REA/EC Grant Agreement (in DoA), Consortium decided to perform evaluation on Educators' Fora (Task 4.6).

- Procedure:

- ✓ CAWI – sent online (separate for Arctic transmission, Arctic competitions and Educators' Fora)
- ✓ FGI – only for winners of the Arctic competition (about 30 minutes, group discussion according to FGI technique)

- Target:
  - ✓ teachers – Arctic transmission, Arctic competition and Educators' Fora
  - ✓ pupils – only for Arctic competition

After each Arctic transmission, the survey will be automatically sent to e-mail addresses given by participants of the transmission during the log-in process. The survey will consist of approx. 8 questions about:

- understanding the presented educational material;
- opinions about educational material: interesting, boring, etc.;
- opinions about teaching, communication ability of the host of the transmission;
- opinions about technical issues, e.g. is the log-in process simple or difficult? Were there any technical problems during transmissions?

After the Arctic competitions, evaluation is to be provided in 2 steps:

1. A CAWI survey will be sent to each participant of the competitions
2. The FOCUS interview will be done twice, each time among winners, participating in the polar expedition.

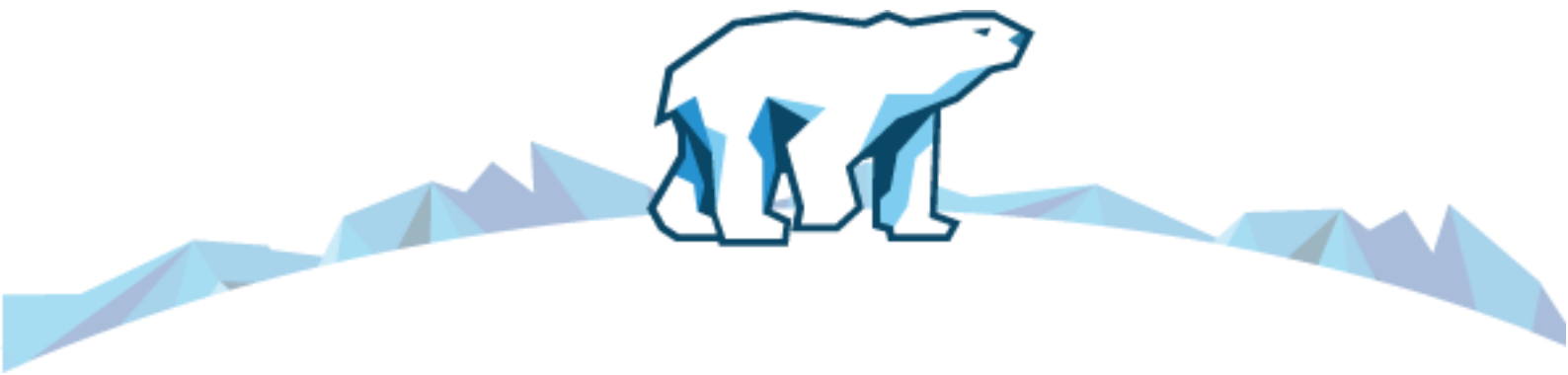
Evaluation of Educators' Fora a is planned after each of 3 Fora. After each Forum the survey will be sent to e-mail addresses of participants. The survey will consists of ca. 15 questions about:

- the quality of the programme, the venue and catering;
- opinions on each of the sessions;
- suggestions what could be improved, etc.

The 'After EDU-ARCTIC' survey will be a summary tool. We will enquire about each functionality of the modules of the EDU-ARCTIC portal (online lessons, Polarpedia, monitoring system). The survey will consist of approx. 9 questions.

All CAWI survey forms are an integral part of this document. See:

- Appendix 4 – During EDU-ARCTIC survey - Main survey;
- Appendix 5 – During EDU-ARCTIC survey - Arctic transmissions survey;
- Appendix 6 – During EDU-ARCTIC survey - Arctic competitions survey;



- Appendix 7 – During EDU-ARCTIC survey - Arctic competitions - FGI Scenario framework
- Appendix 8 - During EDU-ARCTIC survey - Educators' Fora survey;
- Appendix 10 – After EDU-ARCTIC survey - Main survey.

5. Final remarks

This document presents EDU-ARCTIC's evaluation methodology including indicators to properly evaluate the project solutions. Evaluations before, during and after EDU-ARCTIC's educational program will be conducted according to a standardised and common approach of the performance, efficiency and re-usability of tools. This document also serves as an action plan to support the evaluation process.

It must be stated that some of the questions may change or be adjusted. This will be highlighted during the monitoring process. We assume that wording may change or questions may be added or be more precisely corrected.

Appendix 1 – Before EDU-ARCTIC Survey – Part I

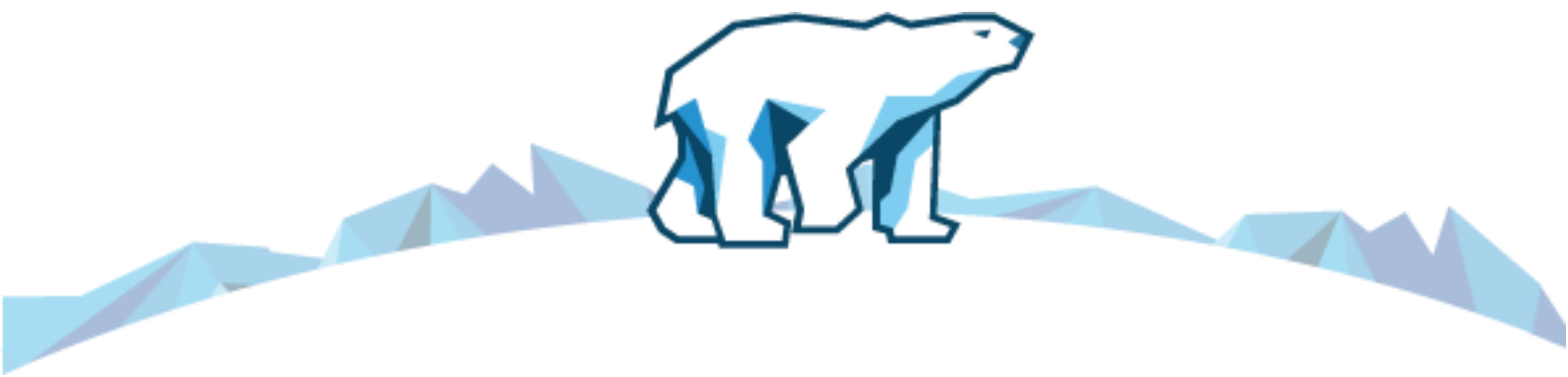
You are invited to participate in a survey (CAWI) on current approaches in methods of encouraging young people to pursue careers in STEM in different regions of Europe. The purpose of this survey is also to study the STEM education and approaches across Europe.

This survey will take approximately 5 minutes of your time.

1. Please provide the name of the country you live?
   ……

2. Is STEM an essential component of compulsory education for young students in the age-range of 13 to 20 in your country?
   - YES
   - NO

3. Are there any governmental (receiving national funding) projects in your country that support schools, teachers and students in the age-range of 13 to 20 in STEM education?
   - YES
   - NO



4. Is there a labour market demand for STEM careers in your country?
    - YES
    - NO

5. What is the level of labour market demand for STEM in your country?
    - LOW
    - MEDIUM
    - HIGH

6. How would you describe the quality of teaching STEM in your country (please write your comments)?
   ……

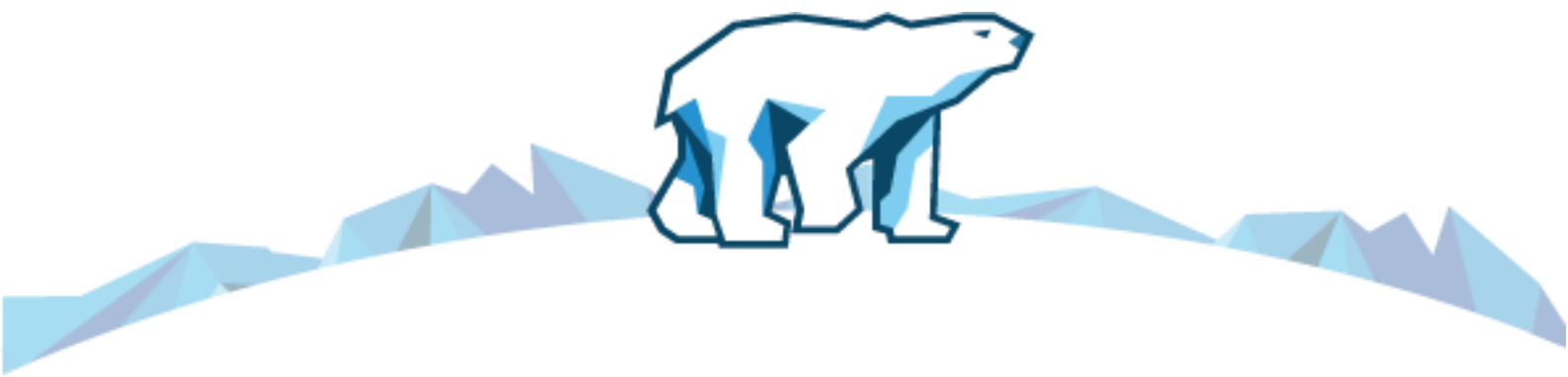
7. Are there any STEM collaborations between formal, non-formal and informal educational providers (please write your comments)?
   …….

8. Do you see that greater attention should be given to promoting STEM in your country?
    - YES
    - NO

9. Is there a gender parity among students who have chosen to study STEM in your country?
    - More men choose this field of study
    - More women choose this field of study
    - There is a gender parity

10. Do you see that greater support and promotion of action should be given to attract women to STEM in your country?
    - YES
    - NO

11. Are schools in your country adequately equipped with ICT tools (Internet access, computers, projectors, speakers, webcams) in order to participate in the EDU-ARCTIC program?
    - YES



- NO

12. What percentage of schools is adequately equipped with ICT tools (Internet access, computers, projector, speakers, webcam) in your country?
    - Less than 40%
    - Between 40% -60%
    - Above 60%

13. Do you think that polar studies are important in STEM in your country?
    - YES
    - NO

14. What subjects consist of part of STEM for young students in the age of 13 to 20 in your country (please write your comments)?
    ……..

15. What is the average number of hours per week allocated to STEM in your country (please write your comments)?
    ……

Thank you for time and answers.

Appendix 2 – Before EDU-ARCTIC Survey – Part II

Ladies and Gentlemen,

the Institute of Geophysics of the Polish Academy of Science (IGF-PAS), together with several European scientific institutions and partners, has prepared a detailed working plan for the EDU-ARCTIC project. The project has been designed for teachers and pupils in secondary education. The aim consists in helping pupils to increase their knowledge about the Arctic, to consolidate science teaching in this domain based on the observations and results of several European polar stations and observatories.

The project proposes free access to the following items:

- **Online transmissions** from polar stations (so-called webinars);
- **"Polarpedia"** – an online encyclopaedia of scientific terms, didactic material, dictionaries in 5 languages;

- **Arctic competition** – for pupils from all over Europe; the winner participates in a polar expedition;
- **Monitoring system** – phonological monitoring in the vicinity of the schools with the possibility of registering to access collected data;
- **Workshops and Educators' Forum** – innovative training programmes allowing teachers to incorporate new scientific research into class work.

In order to prepare our work programme efficiently, we would like to ask you to fill in the following survey. Your replies will help us to optimize our offer in view of your needs and the organizational possibilities of your school.

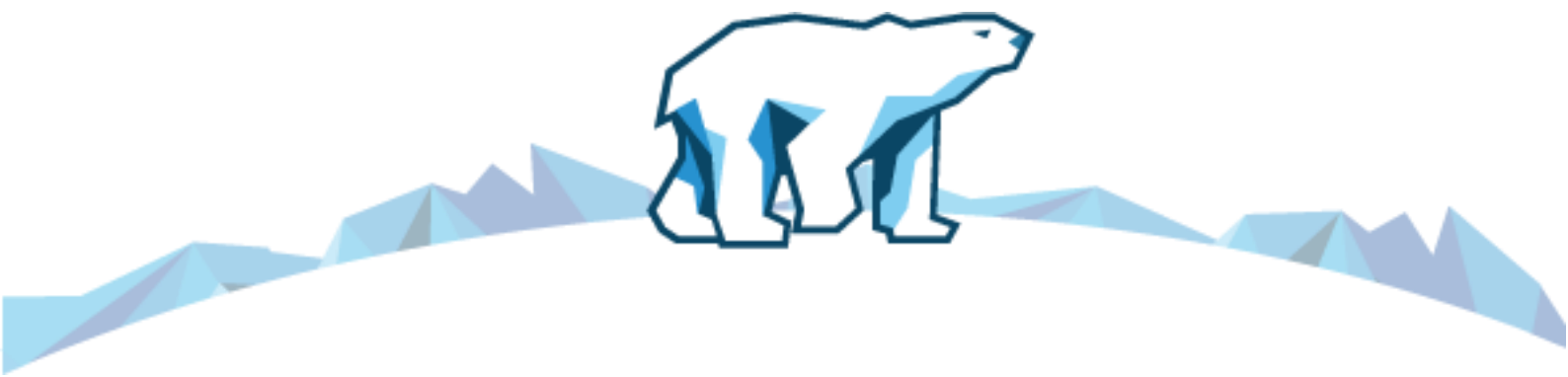
1. Please provide the name of the country you live in?
   ……..

2. Are you interested in extending current science curricula at your school by including additional material on the Arctic environment and polar research?
   - Yes
   - No

3. Please indicate the type of school you are teaching at?
   - Lower secondary school (approx. 13-16 years)
   - Higher secondary school (approx. 16-20 years)
   - Vocational school or professional training

4. In what type of activities could you include elements of our project (you can choose several answers)?
   - Within regular teaching hours
   - Compulsory extra classes (e.g. 1 hour per week)
   - As an optional course among a set list
   - Voluntary extra classes
   - A set of extra-curricular hours (for example thematic weeks, summer schools)
   - Other: ……..

5. How many hours per school year could you dedicate to the Arctic and polar research per group?
   - Less than 5
   - 5-10
   - 11-20



- more than 20

6. How many groups could benefit from EDU-ARCTIC at your school?
    - 1
    - 2
    - 3 or more

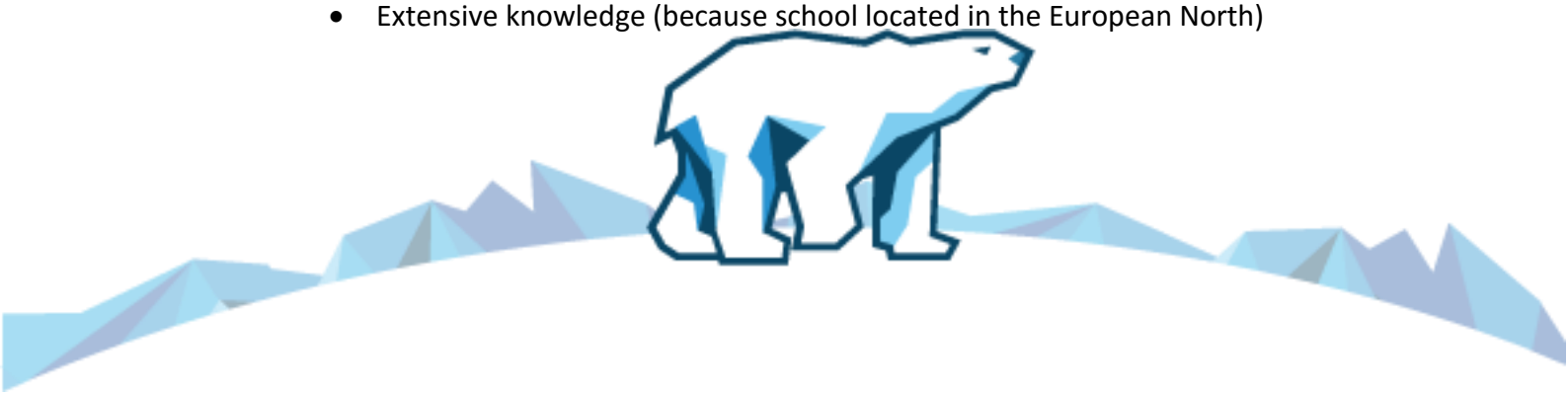
7. In which type of classes could you include EDU-ARCTIC elements (you can choose several)?
    - Geography
    - Chemistry
    - Physics
    - Biology
    - Natural science
    - Extra-curricular activities

8. To what extent are your pupils in a position to benefit from the transmissions and educational material in English?
    - English is no problem
    - English is a bit of a challenge, but we'll manage
    - English will represent a serious challenge, but we will manage somehow
    - Teaching sources only in national languages

9. Have your pupils participated in online lessons already (e-learning platforms or webinars)?
    - Yes, very often
    - Yes, but only a few times
    - Not for the time being

10. How far in advance do you need to be informed about an online lesson that will be proposed?
    - One week
    - 2-3 weeks
    - 1 month

11. What do your pupils know about the Arctic already?
    - Extensive knowledge (because school located in the European North)



- Mostly geographical knowledge acquired at school
- Limited knowledge (e.g. animals, some natural phenomena such as polar lights)
- No knowledge

12. Do you or your school practice or participate in any programme of nature observations? (If Yes, please elaborate on programs in other section).
    - Yes
    - Other?.....
    - No

13. What type of nature observation is most important for your teaching and the school curriculum (please write your comments)?
    .....

14. What kind of introductory material would you need in advance for a polar lesson (you can choose several answers)?
    - short outline of the problem
    - full-length article
    - multimedia presentation – (e.g. powerpoint)

15. Which type of teaching tools do you prefer to use in class (you can choose several answers)?
    - Full-length articles
    - A tool box
    - Multimedia presentations – (e.g. powerpoint)
    - Illustrations
    - Prezi presentation
    - Other:.....

16. Please indicate a few Arctic themes likely to be of interest to your pupils (please write your comments)?

Appendix 3 – Before EDU-ARCTIC - entry skills assessment

Dear Ladies and Gentlemen,

as the authors of the EDU-ARCTIC project, we want our project to be effective and friendly for our recipients. For this purpose we constructed this survey with a list of questions. The survey will be conducted twice: 1 – at the beginning of your participation in the EDU-ARCTIC program. 2 – just after the end of an educational program. Your answers will allow us to determine whether the project met the set objectives. These questions relate to your pupils.

How to fill in a survey?

Firstly, please read all the questions carefully.

Survey no. 1 – where we study the initial state, before participating in the project. Your evaluation is the result of your observation of your pupils.

Survey no. 2 - will be filled in at the end of the program and will allow us to determine whether the project met the set objectives. We assume that your daily observation of your pupils allows you to select the proper answers. You might also want to arrange one or two lessons using the EDU-ARCTIC portal to help you to reply to the questions below. You know your own pupils best, and this knowledge is very valuable for us. It is essential that replies are based on a real reflection of your pupils' behaviour during lessons. Thank you very much for your cooperation.

This is survey no. 1 - entry skills assessment.

Respondent's particulars

- **The average age of your pupils** [13-20 – a scroll-down list to choose the proper answer]
- **The subject, I teach:** [a scroll-down list to choose the proper answer from the following]
  Mathematics/Chemistry/Biology/Physics/Geography/other (to be entered manually).
- **Country -** a scroll-down list to choose from all European countries

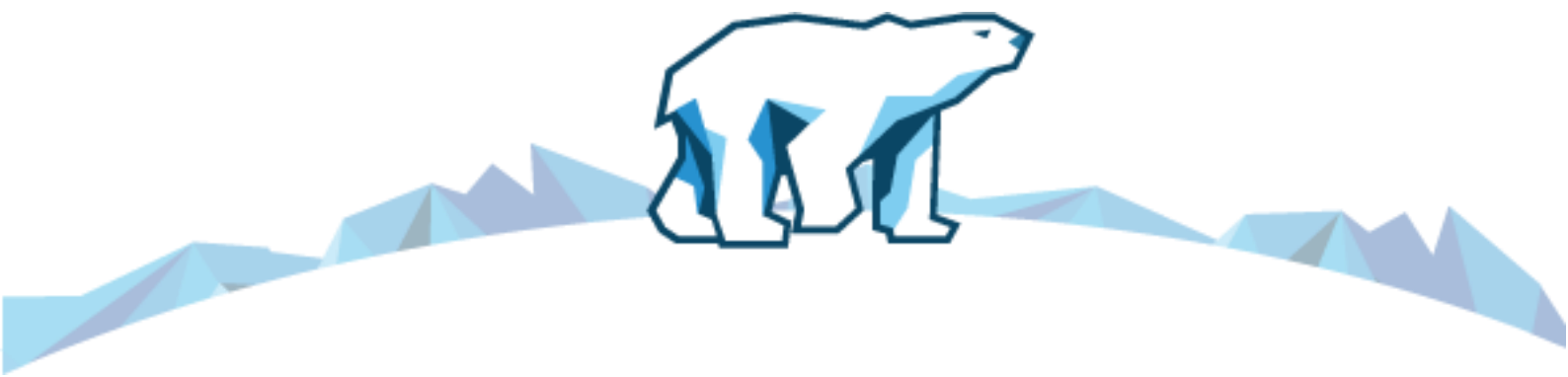
How to answer the questions?

Dear Ladies and Gentlemen,

we are interested in average statistical data. As you will notice, the questions relate to the whole class, and the answers should be marked on a scale from 1 to 4. As you can see all the questions are divided into three main categories. Thank you very much for your answers.

CATEGORY 1: STEM SKILLS

LEARN AND APPLY CONTENT



1. Do your pupils use the acquired knowledge in practice? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 – Definitely use it		
3 – Tend to use it		
2 – Tend not use it		
1 – Definitely do not use it		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils interested in issues related to the Arctic? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely interested		
3 - Quite interested		
2 - Not very interested		
1 - Definitely not interested		
I have no opinion – if option is selected, system will treat this as: no answer given		

INTEGRATE CONTENT

1. Do your pupils integrate knowledge from various fields of mathematics and natural sciences (e.g. they use information obtained on other subjects while participating in your lesson)? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely integrate		
3 – Often integrate		
2 - Rarely integrate		
1 - Definitely do not integrate		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Do your pupils explain external phenomena (e.g. natural, social, etc.) using the concepts acquired during the act of learning? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely explain		
3 - Often explain		
2 - Rarely explain		
1 - Definitely do not explain		

I have no opinion – if option is selected, system will treat this as: no answer given		

INTERPRETATION AND COMMUNICATION OF INFORMATION

1. Do your pupils correctly interpret the results of experiments, results of research? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely yes		
3 - Rather yes		
2 - Rather no		
1 - Definitely no		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils able to use scientific language, which you use in a class (e.g. use the same terminology)? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are able		
3 - Rather are able		
2 - Rather are not able		
1 - Definitely are not able		
I have no opinion – if option is selected, system will treat this as: no answer given		

ENGAGE IN INQUIRY

1. Are your pupils enthusiastically involved in research processes or experimental processes which you propose during your lesson? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely involved		
3 - Rather involved		
2 - Rather are not involved		
1 - Definitely are not involved		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Do your pupils independently design the experimental, research process? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely design		
3 - Rather design		
2 - Rather do not design		
1 - Definitely do not design		
I have no opinion – if option is selected, system will treat this as: no answer given		

ENGAGE IN LOGICAL REASONING

1. Can your pupils logically conclude? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely can		
3 - Rather can		
2 - Rather cannot		
1 - Definitely cannot		
I have no opinion – if option is selected, system will treat this as: no answer given		

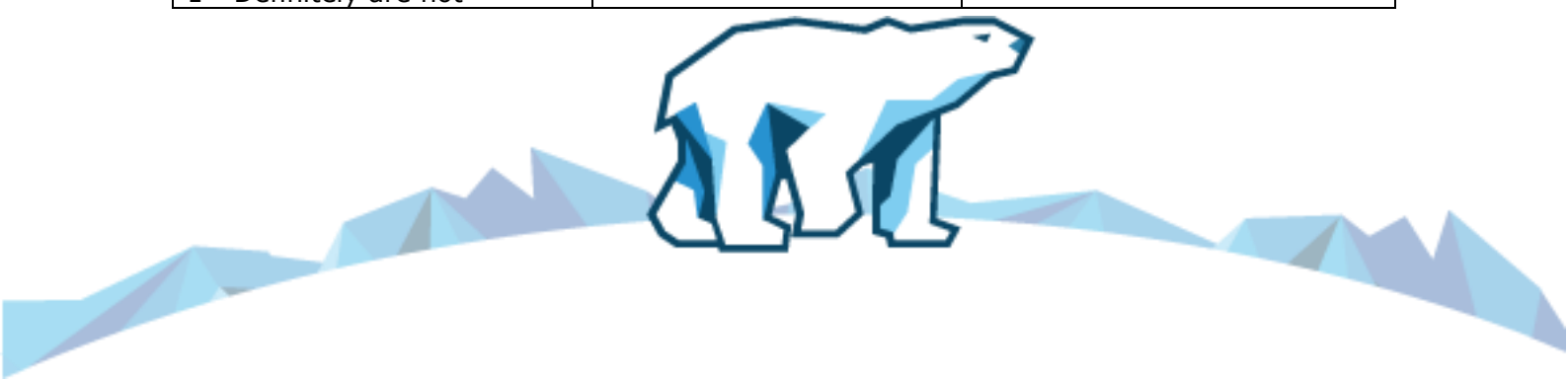
COLLABORATE IN A TEAM

1. Can your pupils realize tasks within group? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely can		
3 - Tend to be able to		
2 - Tend not to be able to		
1 - Definitely cannot		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils willingly engaged in various of tasks within group? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers

	Schoolgirls	Schoolboys
4 - Definitely engaged		
3 – Tend to be engaged		
2 - Tend not to be engaged		
1 - Definitely are not		



engaged		
I have no opinion – if option is selected, system will treat this as: no answer given		

APPLY TECHNOLOGY APPROPRIATY

1. Do your pupils willingly use modern technologies in order to learn? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely do so		
3 – Tend to		
2 - Tend not to		
1 - Definitely do not use		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Do you think modern technologies have an impact on raising the effectiveness of learning process among your pupils? Please select the most appropriate.

4 – Yes, definitely	
3 – Quite.	
2 - Not very much	
1 - Definitely no	
I have no opinion – if option is selected, system will treat this as: no answer given	

CATEGORY 2: KNOWLEDGE ABOUT SCIENCE AND SCIENTIFIC RESEARCH, AS WELL AS THEIR PLACE IN THE MODERN WORLD

1. Please find below specified elements of the research process. Please rate how well your pupils are able to realize each one of these.

Scroll down list with a single choice with marks from 1 to 4 and separate for schoolgirls and schoolboys. Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

Schoolgirls Schoolboys							
	Formulating research questions	Choice and justification of the research hypotheses	Consulting publications on the subject	Selection of research tools	Sampling (choice of samples)	Execution of research	Hypothesis testing
4 - very efficiently							
3 – rather							

efficiently							
2 - quite incapable							
1 – definitely incapable							
I have no opinion – if option is selected, system will treat this as: no answer given							

2. Are your pupils showing interest in scientific careers? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are showing		
3 - Rather are showing		
2 - Rather are not showing		
1 - Definitely are not showing		
I have no opinion – if option is selected, system will treat this as: no answer given		

3. Are your pupils showing interest in STEM? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are showing		
3 - Rather are showing		
2 - Rather are not showing		
1 - Definitely are not showing		
I have no opinion – if option is selected, system will treat this as: no answer given		

4. Have of your pupils got a knowledge about the vocational tasks of a professional scientist? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely have		
3 - Rather have		
2 - Rather do not have		
1 - Definitely do not have		
I have no opinion – if option is selected, system will treat		

this as: no answer given		

5. Do your pupils know anything about the conditions of work of professional scientists (e.g. possibilities of employment, salary, requirements to obtain a degree)? Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 – They definitely do		
3 - Some		
2 – Not very much		
1 – Nothing at all		
I have no opinion – if option is selected, system will treat this as: no answer given		

CATEGORY 3: KNOWLEDGE ABOUT NATURE, GEOGRAPHY, NATURAL RESOURCES, HISTORY, SOCIAL AND POLITICAL SPECIFICITIES CONCERNING THE ARCTIC AND INCREASE OF SENSITIVITY TO ENVIRONMENTAL ISSUES AND CLIMATE CHANGE.

1. Please find below a list of specific issues and concepts related to the Arctic. Please rate the level of knowledge of your pupils for each item.

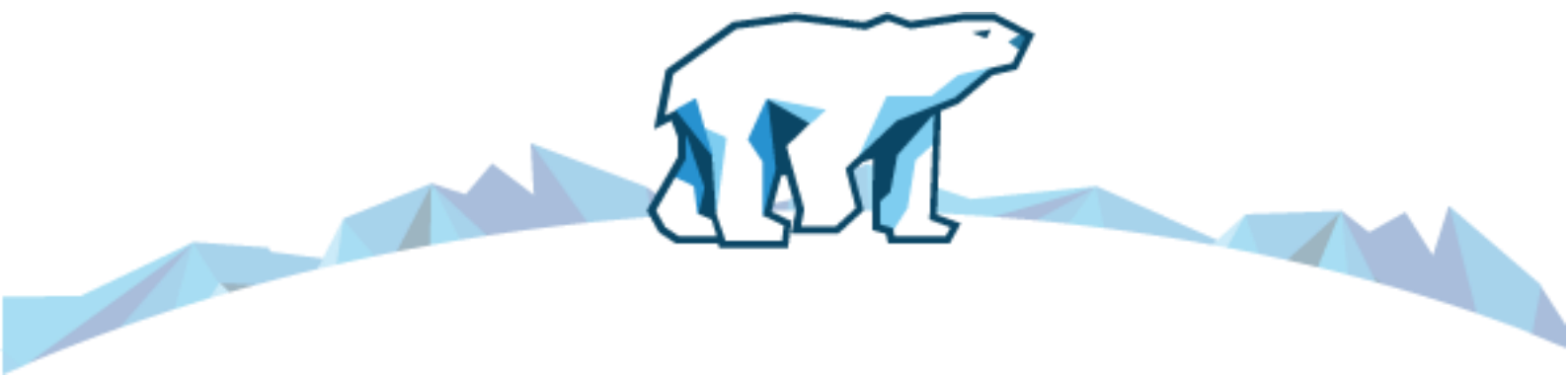
Scroll down list for a single choice with marks ranging from 1 to 5 and separate for schoolgirls and schoolboys. Please put the appropriate number of schoolgirls and schoolboys that match to the given answers.

Schoolgirls Schoolboys							
	Knowledge about nature	Geography	Natural resources	History	social and political specificities concerning polar regions	sensitivity to environmental issues	climate change
5 - very good							
4 – quite good							
3 – average							
2 –not very good							
1 – very little							

Thank you for filling in the survey.

Appendix 4 – During EDU-ARCTIC survey - Main survey

Dear Ladies and Gentlemen,



below you will find a list of questions concerning the EDU-ARCTIC project. Questions are divided into two categories: (1) TECHNOLOGY - here we ask you to answer questions about the various modules of the EDU-ARCTIC portal, and (2) FACTUAL - in this section we ask about the impact of the project on your pupils (e.g. interest, understanding, knowledge).
Thank you in advance for your answers.

Respondent's particulars

Sex: Female\Male [choose from the scroll-down list]

The average age of pupils in your class: [13-20 - choose from the scroll'-down list]

The number of pupils in your class (schoolboys)

The number of pupils in your class (schoolgirls)

Sum (is being added automatically)

(1) TECHNOLOGY

1. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal and the whole EDU-ARCTIC project in terms of their **utility in conducting various activities within the project**:

1. ONLINE LESSONS

1 2 3 4 5 6

2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6

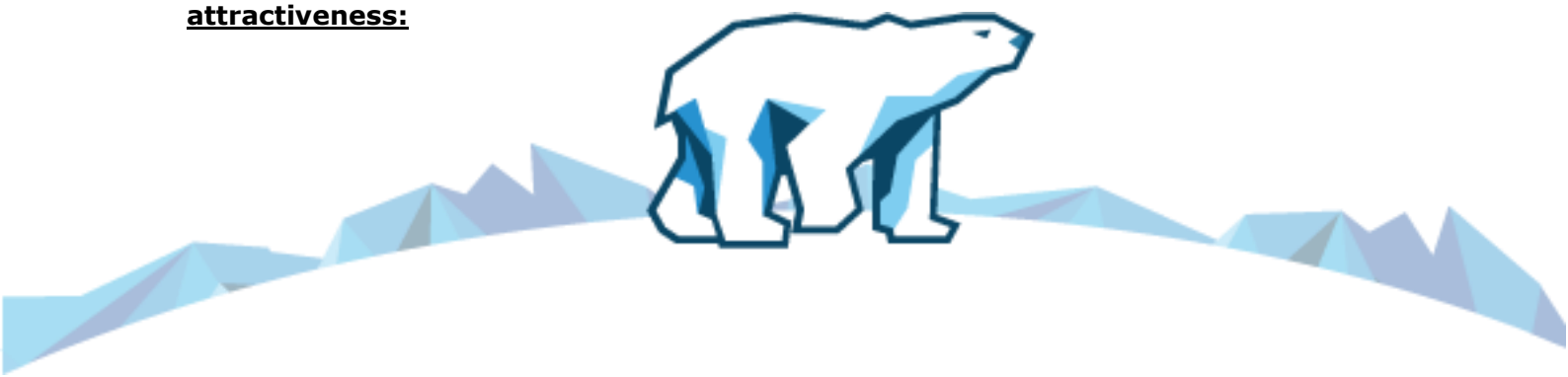
…….

In case your answer is 3 or less for any of the modules, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal that received a mark of 3 or less. Thank you.

2. What changes would have to be implemented within a given module in terms of **its utility in conducting various activities within the project?** Please provide a separate ideas for changes for each module of the portal, which received a mark of 3 or less.

2. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal in terms of their **visual attractiveness:**



1. ONLINE LESSONS

1 2 3 4 5 6

2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6

……

In case your answer is 3 or less, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal, which received a mark of 3 or less. Thank you.

2. What changes would have to be implemented within a given module in terms of **its visual attractiveness**? Please provide separate ideas for changes for each module of the portal, which received a mark of 3 or less.

---

3. How often do you use the following modules of the EDU-ARCTIC portal?

1. ONLINE LESSONS

3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your school's non-participation in ONLINE LESSONS (e.g. whether this depends on transmission time, technical issues you are facing while connecting on-line, materials prepared by didactician, subject or any other factors - please specify)?

2. POLARPEDIA

3 - A few times a month

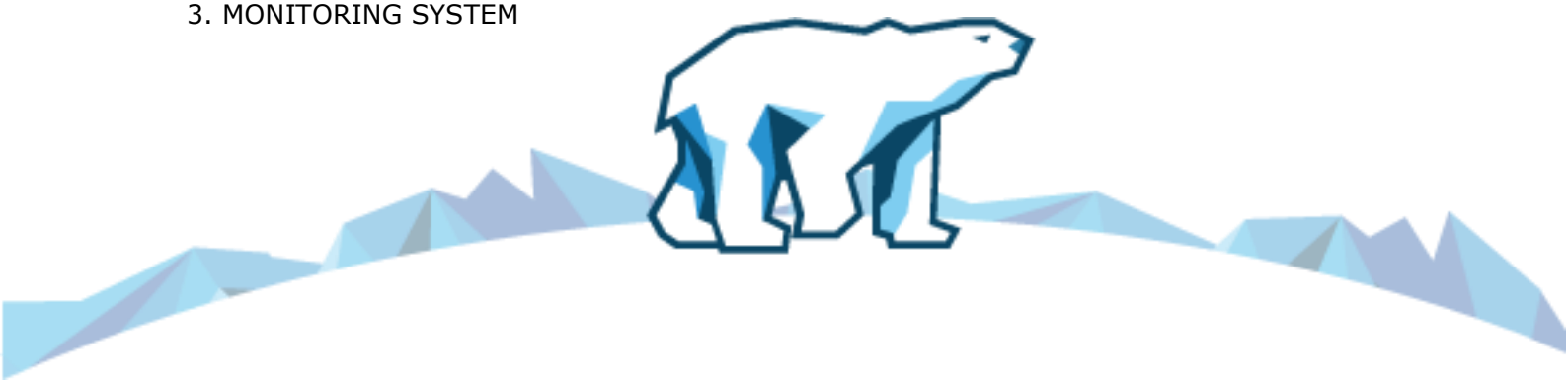
2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your lack of use of POLARPEDIA (e.g. whether this depends on dictionary entries, quality of published materials, graphical quality, easy search or any other factors - please specify)?

3. MONITORING SYSTEM



3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your school's lack of interest in the MONITORING SYSTEM (e.g. whether this depends on module quality, purpose of the module or any other factors - please specify)?

(2) FACTUAL

1. What is the impact of each of the EDU-ARCTIC modules on your pupils' knowledge **about issues related to the Arctic (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?**

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact) [choose from the scroll-down list].

1. ONLINE LESSONS

1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4

2. What is the impact of each of the EDU-ARCTIC modules on the **level of understanding of scientific issues and scientific language** among your pupils?

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact) [choose from the scroll-down list].

1. ONLINE LESSONS

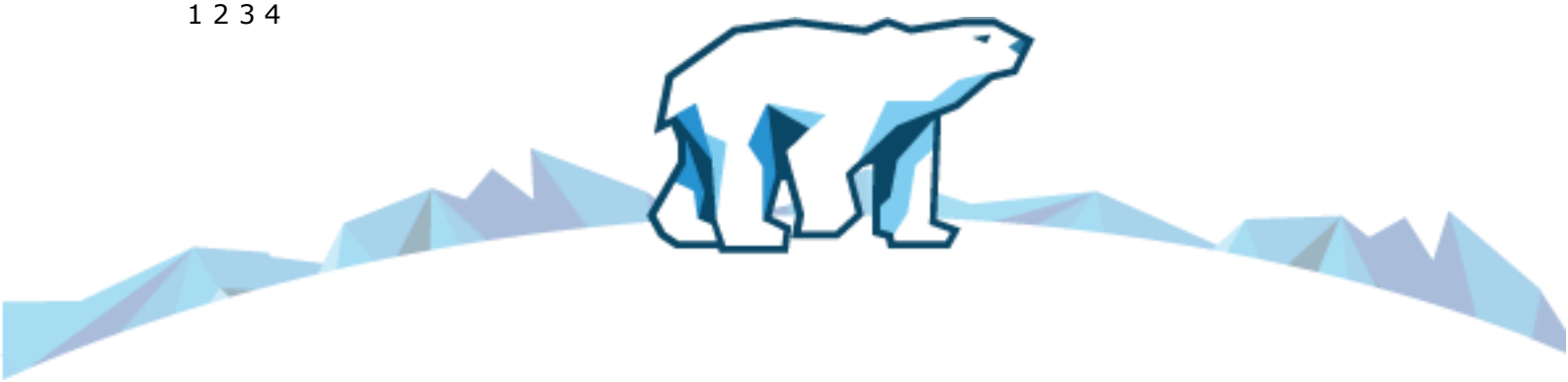
1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4



3. What is the impact of each of the EDU-ARCTIC modules on the **level of interest in STEM and scientific careers** among your pupils?

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact) [choose from the scroll-down list].

1. ONLINE LESSONS

1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4

4. To what extent does the project contribute as far as their **increase of knowledge on issues related to the Arctic is concerned (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?**

Scroll-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 1% to 9%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 20% to 29%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project by 30% and more.		

5. To what extent does the project contribute to **improve the level of understanding of the world of science and scientific language**?

Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 1% to 9%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 20% to 29%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project by 30% and more.		

6. To what extent does the project contribute to the **increase of interest in STEM and scientific careers among your pupils?**

Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 1% to 9%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 20%		

to 29%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project by 30% and more.		

Appendix 5 – During EDU-ARCTIC survey - Arctic transmissions survey

EDU-ARCTIC SURVEY (SENT TO EVERY PARTICIPANT OF THE ONLINE LESSONS)

Thank you for your time and for your participation in today's transmission. In order to prepare content and materials more efficiently for you, we would like to ask you to fill in the following survey:

1. How easily understandable was the presented material

1. completely ununderstandable
2. difficult to understand
3. quite understandable
4. easily understandable

2. Was the material interesting?

1. totally uninteresting
2. rather uninteresting
3. quite interesting
4. very interesting

3. Contact of the teacher with recipients (e.g. willingly responded to questions, encouraged recipients to express themselves, amiably reacted to the behaviour of recipients)?

1. very little contact
2. rather little contact
3. quite good contact
4. excellent contact
5. I have no opinion

4. Pedagogic skills of the teacher who conducted the lesson (e.g. giving clear, understandable and interesting examples, ability of interesting the audience)

1. manifestly lacking pedagogic skills
2. only modest pedagogic skills

3. sound pedagogic skills

4. excellent pedagogic skills

5. I have no opinion

5. The technical part of online lessons (including the process of enrolling in transmission, the quality of sound and video, easy use of the transmission tools' function)

1. very difficult to use

2. difficult to use

3. quite easy to use

4. very easy to use

5. I have no opinion

6. Do you think the online lessons have a positive effect on the growth of interest in STEM among your pupils?

1. no positive impact whatsoever

2. only little positive impact

3. quite positive impact

4. very positive effect

7. Suggestions for changes, improvements:

<text-box>

8. Suggestions of topics for subsequent transmissions

<text-box>

Appendix 6 – During EDU-ARCTIC survey - Arctic competitions survey

SURVEY FOR TEACHERS INVOLVED IN THE ARCTIC COMPETITIONS

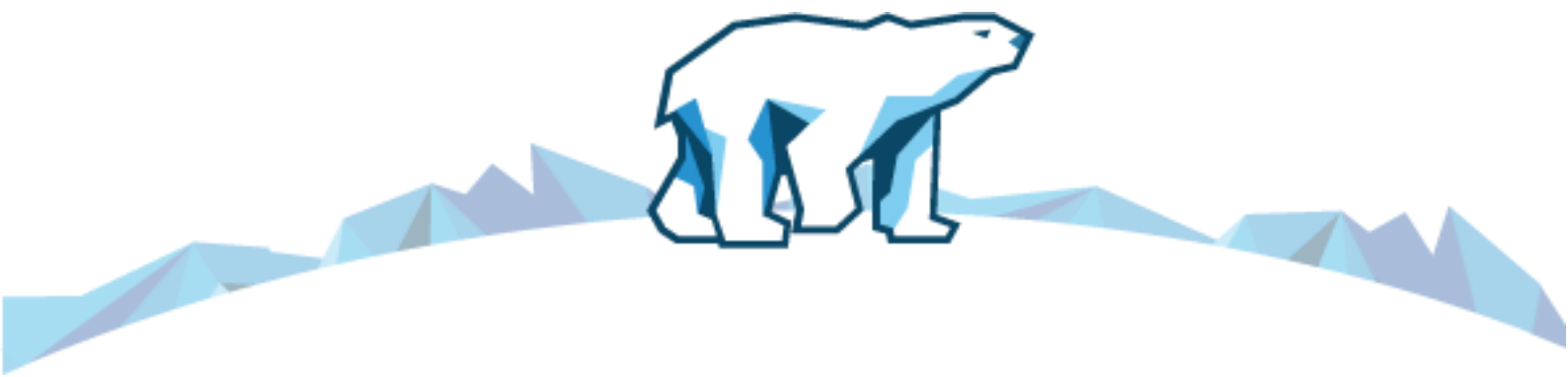
1. Are the rules of the Arctic competition understandable for your pupils?

1. totally ununderstandable

2. quite difficult to understand

3. quite easy to understand

4.easily understandable



2. How would you assess the substantive level and given requirements of the Arctic competition?

1. extremely difficult
2. quite difficult
3. at optimum level
4. a little too easy
5. fat too easy

3. How would you assess the reaction of your pupils to the Arctic competition and its rules? Please mark on the scale:

1 2 3 4 5 6 7 (negative vs. positive emotions)

4. Do you think the Artic competition has a positive effect on the growth of interest in STEM among your pupils?

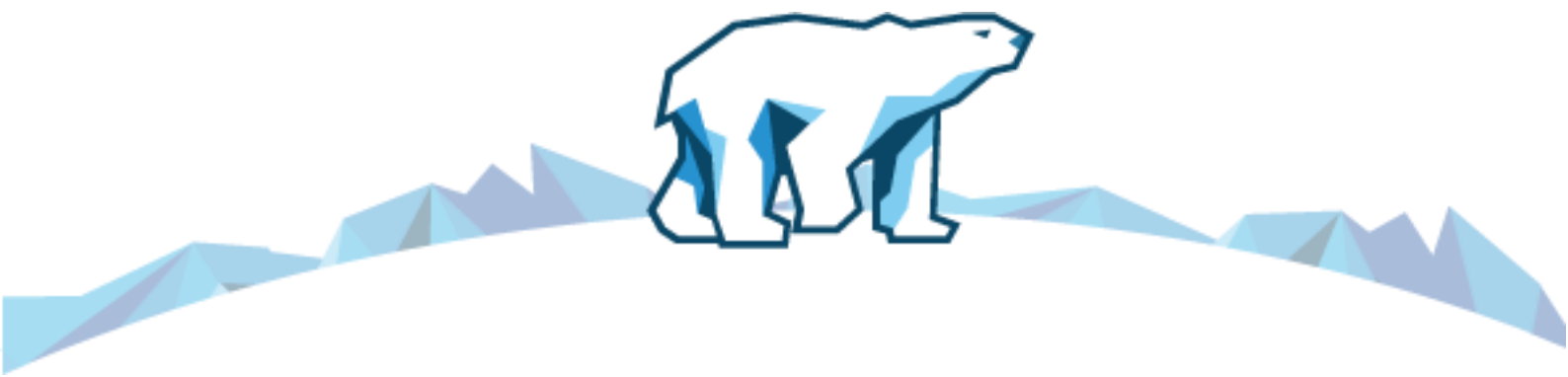
1. no impact whatsoever
2. little impact
3. quite strong impact
4. very strong impact

5. Do you think the Artic competition positively affects the level of knowledge about the Arctic among your pupils?

1. no impact whatsoever
2. little impact
3. quite strong impact
4. very strong impact

6. Would you recommend any changes to the rules of the Arctic competition? If so, please elaborate below.

<text box>



Appendix 7 – During EDU-ARCTIC survey - Arctic competitions - FGI Scenario framework

FGI SCENARIO FRAMEWORK PERFORMED AMONG WINNERS OF THE ARCTIC COMPETITION AT THE POLAR STATION

1. Duration: 30 – 40 minutes
2. Form: group discussion, participation of all winners in the discussion.
3. Structured interview, questions to be asked in order.
4. Separate survey among pupils and teachers.

Stages:

1. Greeting and Welcoming of Guests. Presentation of the purpose of the meeting, i.e. obtaining information on the opinions about the Arctic competition of teachers and pupils.

2. Open questions:

1. In your opinion, how do such competitions affect the level of interest in mathematics and natural science?

2. Do such competitions encourage to acquire new knowledge?

3. In your opinion, how do such competitions affect pupils' interest in science?

4. What is your overall opinion about the schedule during the polar station visit?

5. In your opinion, how do such competitions draw pupils to mathematics and natural sciences?

6. Do you think that one's participation in the Arctic competition may cause a greater interest in scientific careers?

7. Would you recommend any changes to the rules of the Arctic competition and especially to the criteria for the choice of the winners?

8. Would you recommend any changes as to the organization of the Arctic competition?

9. Do you see yourself going on a scientific career in future (Question will be asked to pupils only).

Appendix 8 – During EDU-ARCTIC survey - Educators' Fora survey

SURVEY FOR TEACHERS PARTICIPATING IN THE WORKSHOPS

Thank you for your time and for your participation in the workshop on …….

In order to prepare content and materials more efficiently for you, we would like to ask you to fill in the following survey:

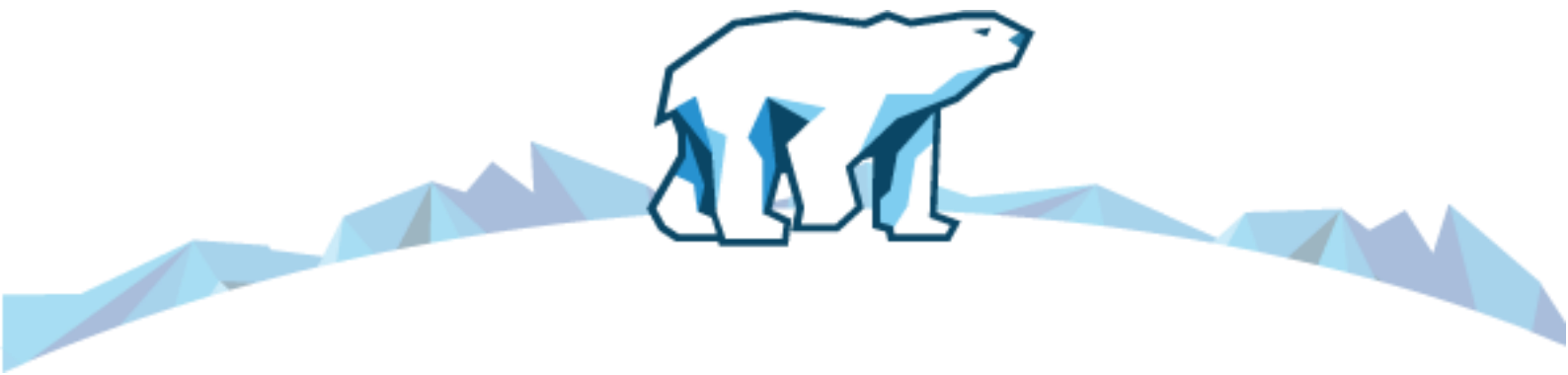
Please mark on a scale of 1 to 4, where 1 is – VERY BAD and 4 is VERY GOOD, in order to evaluate the Workshop.

1. **Regarding the event in general:**
   1-2-3-4
2. **Organisation of the event in general:**
   1-2-3-4
3. **Programme sent on time:**
   1-2-3-4
4. **Information about the travel arrangements sent on time:**
   1-2-3-4
5. **Relevance and accessibility of the venue:**
   1-2-3-4
6. **Quality of the venue:**
   1-2-3-4
7. **Quality of the catering:**
   1-2-3-4
8. **The programme and the venue facilitated interaction between participants:**
   1-2-3-4
9. **Opportunities during the event to express yourself freely:**
   1-2-3-4
10. **Knowledge/communication/responsiveness of the event facilitator(s):**
    1-2-3-4
11. Regarding each session

- session 1 *Title*: 1-2-3-4
- session 2 *Title*: 1-2-3-4
- …

12. **What did you like most about the event?**
    <text-box>

13. **What did you like least about the event?**
    <text-box>



14. **What do you think could be improved as regards a future event of the same kind?**
    <text-box>

15. **Any other comments?**
    <text-box>

Appendix 9 – After EDU-ARCTIC - after skills assessment

Dear Ladies and Gentlemen,

as the authors of the EDU-ARCTIC project, we want our project to be effective and friendly for our recipients. For this purpose we set up a list of questions. Your answers will allow us to determine whether the project met the set objectives. These questions relate to your pupils.

How to fill in a survey?

Firstly, please read all the questions carefully.

Survey no. 1 – was conducted at the beginning of your participation in the EDU-ARCTIC program, where we study the initial state, before participating in the project.

Survey no. 2 - is filled in at the end of the program and will allow us to determine whether the project met the set objectives. We assume that your daily observation of your pupils allows you to select the proper answers. You might also want to arrange one or two lessons using the EDU-ARCTIC portal to help you to reply to the questions below. You know your own pupils best, and this knowledge is very valuable for us. It is essential that replies are based on a real reflection of your pupils' behaviour during lessons. Thank you very much for your cooperation.

This is survey no. 1 - entry skills assessment.

Respondent's particulars

- **The average age of your pupils** [13-20 – a scroll-down list to choose the proper answer]
- **The subject, I teach:** [a scroll-down list to choose the proper answer from the following]
  Mathematics/Chemistry/Biology/Physics/Geography/other (to be entered manually).
- **Country -** a scroll-down list to choose from all European countries

How to answer the questions?

Dear Ladies and Gentlemen,

we are interested in average statistical data. As you will notice, the questions relate to the whole class, and the answers should be marked on a scale from 1 to 4. As you can see all the questions are divided into three main categories. Thank you very much for your answers.

CATEGORY 1: STEM SKILLS

LEARN AND APPLY CONTENT

1. Do your pupils use the acquired knowledge in practice? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 – Definitely use it		
3 – Tend to use it		
2 – Tend not use it		
1 – Definitely do not use it		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils interested in issues related to the Arctic? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely interested		
3 - Quite interested		
2 - Not very interested		
1 - Definitely not interested		
I have no opinion – if option is selected, system will treat this as: no answer given		

INTEGRATE CONTENT

1. Do your pupils integrate knowledge from various fields of mathematics and natural sciences (e.g. they use information obtained on other subjects while participating in your lesson)? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely integrate		
3 – Often integrate		
2 - Rarely integrate		
1 - Definitely do not integrate		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Do your pupils explain external phenomena (e.g. natural, social, etc.) using the concepts acquired during the act of learning? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely explain		
3 - Often explain		
2 - Rarely explain		
1 - Definitely do not explain		
I have no opinion – if option is selected, system will treat this as: no answer given		

INTERPRETATION AND COMMUNICATION OF INFORMATION

1. Do your pupils correctly interpret the results of experiments, results of research? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely yes		
3 - Rather yes		
2 - Rather no		
1 - Definitely no		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils able to use scientific language, which you use in a class (e.g. use the same terminology)? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are able		
3 - Rather are able		
2 - Rather are not able		
1 - Definitely are not able		
I have no opinion – if option is selected, system will treat this as: no answer given		

ENGAGE IN INQUIRY

1. Are your pupils enthusiastically involved in research processes or experimental processes which you propose during your lesson? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys

4 - Definitely involved		
3 - Rather involved		
2 - Rather are not involved		
1 - Definitely are not involved		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Do your pupils independently design the experimental, research process? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely design		
3 - Rather design		
2 - Rather do not design		
1 - Definitely do not design		
I have no opinion – if option is selected, system will treat this as: no answer given		

ENGAGE IN LOGICAL REASONING

1. Can your pupils logically conclude? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely can		
3 - Rather can		
2 - Rather cannot		
1 - Definitely cannot		
I have no opinion – if option is selected, system will treat this as: no answer given		

COLLABORATE AS A TEAM

1. Can your pupils realize tasks within group? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely can		
3 - Tend to be able to		
2 - Tend not to be able to		
1 - Definitely cannot		
I have no opinion – if option is selected, system will treat this as: no answer given		

2. Are your pupils willingly engaged in various of tasks within group? Please put the proper number of schoolgirls and schoolboys that match to the given answers

	Schoolgirls	Schoolboys
4 - Definitely engaged		
3 – Tend to be engaged		
2 - Tend not to be engaged		
1 - Definitely are not engaged		
I have no opinion – if option is selected, system will treat this as: no answer given		

APPLY TECHNOLOGY APPROPRIATY

1. Do your pupils willingly use modern technologies in order to learn? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely do so		
3 – Tend to		
2 - Tend not to		
1 - Definitely do not use		
I have no opinion – if option is selected, system will treat this as: no answer given		

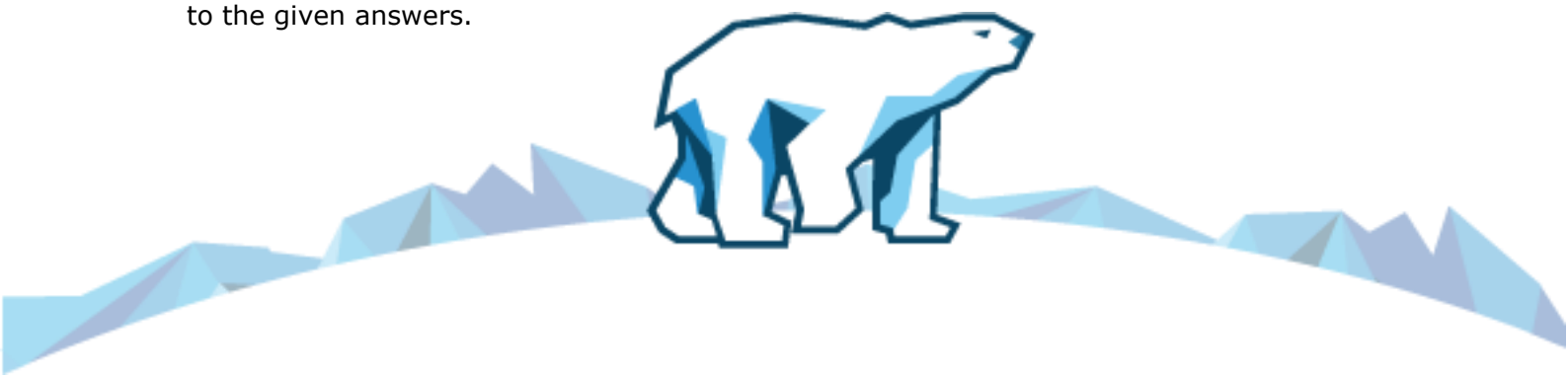
2. Do you think modern technologies have an impact on raising the effectiveness of learning process among your pupils? Please select the most appropriate.

4 – Yes, definitely	
3 – Quite.	
2 - Not very much	
1 - Definitely no	
I have no opinion – if option is selected, system will treat this as: no answer given	

CATEGORY 2: KNOWLEDGE ABOUT SCIENCE AND SCIENTIFIC RESEARCH, AS WELL AS THEIR PLACE IN THE MODERN WORLD

1. Please find below specified elements of the research process. Please rate how well your pupils are able to realize each one of these.

Scroll down list with a single choice with marks from 1 to 4 and separate for schoolgirls and schoolboys. Please put the proper number of schoolgirls and schoolboys that match to the given answers.



Schoolgirls Schoolboys							
	Formulating research questions	Choice and justification of the research hypotheses	Consulting publications on the subject	Selection of research tools	Sampling (choice of samples)	Execution of research	Hypothesis testing
4 - very efficiently							
3 – rather efficiently							
2 - quite incapable							
1 – definitely incapable							
I have no opinion – if option is selected, system will treat this as: no answer given							

2. Are your pupils showing interest in scientific careers? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are showing		
3 - Rather are showing		
2 - Rather are not showing		
1 - Definitely are not showing		
I have no opinion – if option is selected, system will treat this as: no answer given		

3. Are your pupils showing interest in STEM? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely are showing		
3 - Rather are showing		
2 - Rather are not showing		
1 - Definitely are not showing		
I have no opinion – if option is selected, system will treat this as: no answer given		

4. Have of your pupils got a knowledge about the vocational tasks of a professional scientist? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 - Definitely have		
3 - Rather have		
2 - Rather do not have		
1 - Definitely do not have		
I have no opinion – if option is selected, system will treat this as: no answer given		

5. Do your pupils know anything about the conditions of work of professional scientists (e.g. possibilities of employment, salary, requirements to obtain a degree)? Please put the proper number of schoolgirls and schoolboys that match to the given answers.

	Schoolgirls	Schoolboys
4 – They definitely do		
3 - Some		
2 – Not very much		
1 – Nothing at all		
I have no opinion – if option is selected, system will treat this as: no answer given		

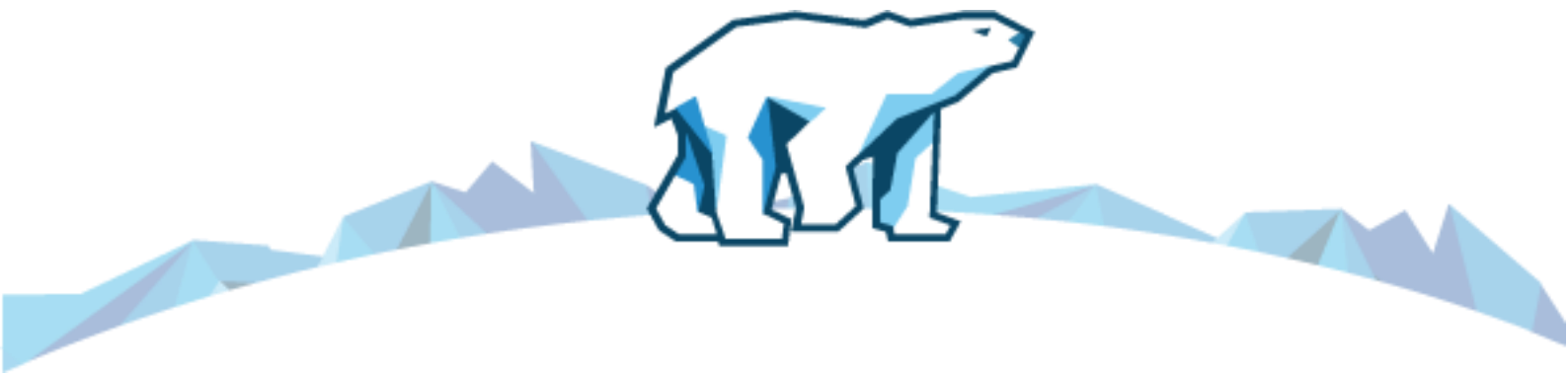
CATEGORY 3: KNOWLEDGE ABOUT NATURE, GEOGRAPHY, NATURAL RESOURCES, HISTORY, SOCIAL AND POLITICAL SPECIFICITIES CONCERNING THE ARCTIC AND INCREASE OF SENSITIVITY TO ENVIRONMENTAL ISSUES AND CLIMATE CHANGE.

1. Please find below a list of specific issues and concepts related to the Arctic. Please rate the level of knowledge of your pupils for each item.

Scroll down list for a single choice with marks ranging from 1 to 5 and separate for schoolgirls and schoolboys. Please put the proper number of schoolgirls and schoolboys that match to the given answers.

Schoolgirls Schoolboys							
	Knowledge about nature	Geography	Natural resources	History	social and political specificities concerning polar regions	sensitivity to environmental issues	climate change
5 - very good							
4 – quite good							
3 – average							
2 –not very good							
1 – very little							

Thank you for filling in the survey.



Appendix 10 – After EDU-ARCTIC survey - Main survey

Dear Ladies and Gentlemen,

below you will find a list of questions concerning the EDU-ARCTIC project. Questions are divided into two categories: (1) TECHNOLOGY - here we ask you to answer questions about the various modules of the EDU-ARCTIC portal, and (2) FACTUAL - in this section we ask about the impact of the project on your pupils (e.g. interest, understanding, knowledge).
Thank you in advance for your answers.

Respondent's particulars

Sex: Female\Male [choose from the scroll-down list]

The average age of pupils in your class: [13-20 - choose from the scroll'-down list]

The number of pupils in your class (schoolboys)

The number of pupils in your class (schoolgirls)

Sum (is being added automatically)

(1) TECHNOLOGY

1. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal and the whole EDU-ARCTIC project in terms of their **utility in conducting various activities within the project**:

1. ONLINE LESSONS

1 2 3 4 5 6

2. POLARPEDIA

1 2 3 4 5 6

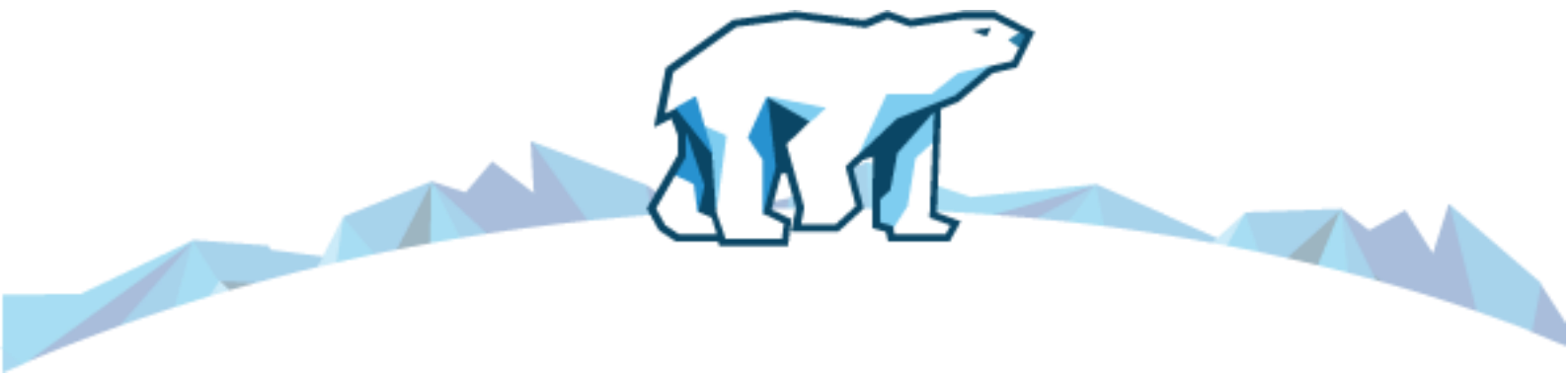
3. MONITORING SYSTEM

1 2 3 4 5 6

……

In case your answer is 3 or less for any of the modules, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal that received a mark of 3 or less. Thank you.



2. What changes would have to be implemented within a given module in terms of **its utility in conducting various activities within the project?** Please provide a separate ideas for changes for each module of the portal, which received a mark of 3 or less.

2. Please mark on a scale of 1 to 6, where 1 is the lowest and 6 the highest, in order to evaluate the following modules of the EDU-ARCTIC portal in terms of their **visual attractiveness:**

1. ONLINE LESSONS

1 2 3 4 5 6

2. POLARPEDIA

1 2 3 4 5 6

3. MONITORING SYSTEM

1 2 3 4 5 6

……

In case your answer is 3 or less, please answer the following questions:

1. What are the reasons for your evaluation mark? Please provide a separate reason for each module of the portal, which received a mark of 3 or less. Thank you.

2. What changes would have to be implemented within a given module in terms of **its visual attractiveness**? Please provide separate ideas for changes for each module of the portal, which received a mark of 3 or less.

3. How often do you use the following modules of the EDU-ARCTIC portal?

1. ONLINE LESSONS

3 - A few times a month

2 - Less than twice every month

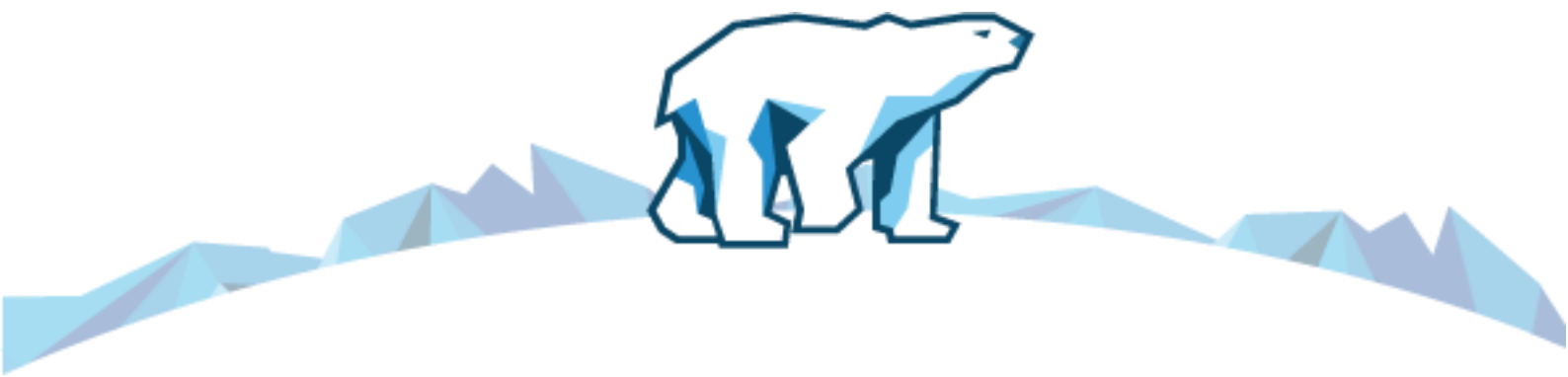
1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your school's non-participation in ONLINE LESSONS (e.g. whether this depends on transmission time, technical issues you are facing while connecting on-line, materials prepared by didactician, subject or any other factors - please specify)?

2. POLARPEDIA

3 - A few times a month



2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your lack of use of POLARPEDIA (e.g. whether this depends on dictionary entries, quality of published materials, graphical quality, easy search or any other factors - please specify)?

3. MONITORING SYSTEM

3 - A few times a month

2 - Less than twice every month

1 - On average once a month

Rarely - if option is selected, system will treat this as: no answer given

If you have selected 1, please justify your answer. In particular, please identify the main factors that determine your school's lack of interest in the MONITORING SYSTEM (e.g. whether this depends on module quality, purpose of the module or any other factors - please specify)?

---

(2) FACTUAL

1. What is the impact of each of the EDU-ARCTIC modules on your pupils' knowledge **about issues related to the Arctic (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?**

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact).

1. ONLINE LESSONS

1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4

---

2. What is the impact of each of the EDU-ARCTIC modules on the **level of understanding of scientific issues and scientific language** among your pupils?

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact).

1. ONLINE LESSONS

1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4

3. What is the impact of each of the EDU-ARCTIC modules on the **level of interest in STEM and scientific careers** among your pupils?

(4-very strong impact, 3-significant impact, 2-little impact, 1-no impact).

1. ONLINE LESSONS

1 2 3 4

2. POLARPEDIA

1 2 3 4

3. MONITORING SYSTEM

1 2 3 4

4. To what extent does the project contribute as far as their **increase of knowledge on issues related to the Arctic is concerned (nature, geography, natural resources, history, social and political specificities concerning the Arctic and increase of sensitivity to environmental issues and climate change)?**

Scroll-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 1% to 9%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project from 20%		

to 29%.		
The level of knowledge increased compared to the prior state before the EDU-ARCTIC project by 30% and more.		

5. To what extent does the project contribute to **improve the level of understanding of the world of science and scientific language**?

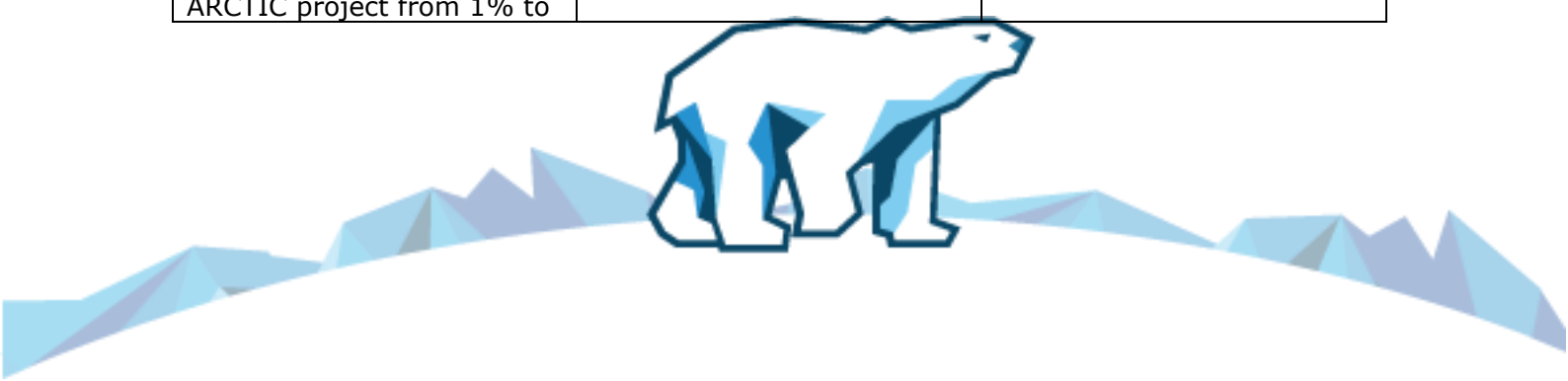
Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 1% to 9%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project from 20% to 29%.		
The level of understanding increased compared to the prior state before the EDU-ARCTIC project by 30% and more.		

6. To what extent does the project contribute to the **increase of interest in STEM and scientific careers among your pupils?**

Drop-down numerical list:

	Schoolgirls	Schoolboys
There is no impact.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 1% to		



9%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 10% to 19%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project from 20% to 29%.		
The level of interest increased compared to the prior state before the EDU-ARCTIC project by 30% and more.