



Report from Portugal



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INTRODUCTION



Figure 1: Portuguese weather station:
<http://meteo.aenelas.edu.pt/>

As we had proposed, in Portugal the STEM For All Seasons Project is being carried out in the form of individual projects, carried out by 7 gifted students, who, accompanied by teachers (tutors) from STEM areas, have built activities for students from 4 to 12 years (in fact, the activities were built for students from 7 to 10, not only with above average capabilities, but also for students with average abilities, at the request of our National Agency, who, despite knowing that Portugal's participation was focused on gifted students, asked us to broaden our participation to a more inclusive dimension, focused on the whole. And so we have widened - and we have had this ever present concern - the target audience of the project for as many students as possible, even in dissemination, as we will refer to in this report.

1. Outside of the participating organisations which were the project's target groups and other relevant stakeholders? What was the project's impact on them and how did the results reach them?

In Portugal, the project - or projects, because several projects were developed - was developed by 7 students with above-average skills, guided by 3rd cycle teachers and Secondary Education in the STEM areas. In addition to the gains in these students, as was mentioned in the Introduction, it was always our concern that the greater number of students in the school could benefit from the project. Thus, in addition to the activities that were carried out with all the second year students of our group of schools (a total of 71 students - the lesson plan is in annex 1), were prepared and taught by the 7 gifted students of this project, guided by the teachers of the STEM areas affected to this project, 12 classes to 2nd, 3rd, 4th and 5th year students in our group of schools, with a total of 230 students - although there were students who had more than one class (in fact, the students of the 2nd, 3rd and 4th years of the Escola de Santar - 27 students - had 3 classes). Thus, in practice, 176 students received this project in the classes prepared and taught by the gifted students.



Commemoration of World Meteorological Day 2017 | Lecture given by the teachers of the STEM For All Seasons Project in all classes of students of the 2nd year of the Grouping of Schools in Nelas



Goals :

- | | |
|----|---|
| 1. | Recognize that there is a science that studies phenomena related to meteorology. |
| 2. | Describe the atmospheric conditions of the day, recognizing the most appropriate designation (rainy, hot, cold, windy ...). |
| 3. | Relate the seasons to the characteristic weather conditions. |
| 4. | Recognize the existence of air. |
| 5. | Relate the wind to the movement of the air (currents of air, their orientation and their effects). |



Figure 2: Classes given by teachers assigned to the project to all students of the second year of the group of schools in Nelas (71 students)

Below there are images and information regarding the classes taught by the gifted students of this project:

«The permanence of autochthonous plants in the region taking into account the climate»

Érica (student) & Ana Lemos (teacher advisor) - Lesson plan in Annex 2

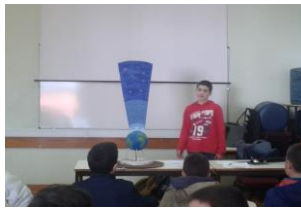
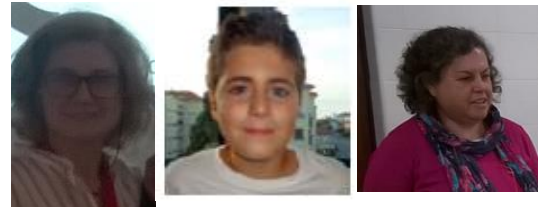


Lecture given on 02-28-2018 to 2nd, 3rd and 4th year students

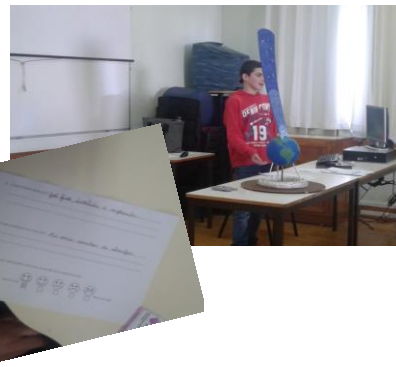
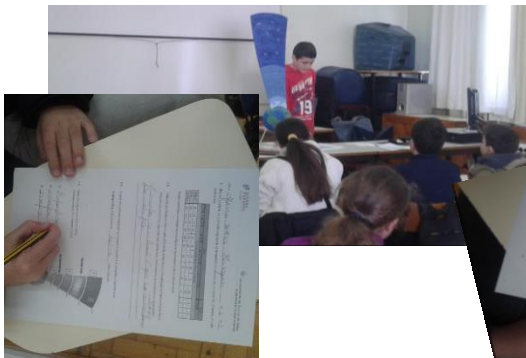


«Our atmosphere»

Gonçalo Amaral (student) & Natália Batista|
Fernanda Tavares (guiding teachers)

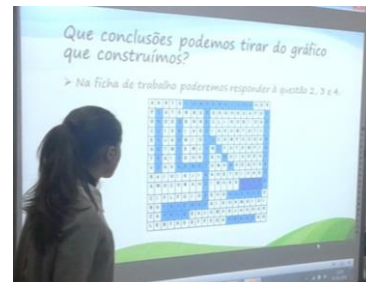


Classes given on 06-03-2018 and 07/03/2018 to students of two classes of the 5th grade



«Our wines»

Filipa (student) & Fernanda Tavares | Natália Batista (guiding teachers)



Lecture given on 03/03/2018 to 2nd, 3rd and 4th year students and on April 11th to 3rd and 4th year students





«Forest fires»

Alexandre (student) & Aníbal Xavier (teacher advisor)



Lecture given on 03/03/2018 to students of the 4th year and on April 11 to students of 3rd and 4th years



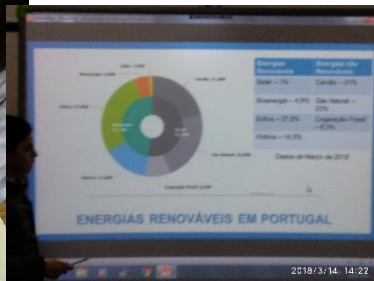


«Wind power » | 'Wind formation based on the principle of convection currents' | «Construction of a digital anemometer to study the location of micro wind generators»

Francisco Ramos | Simão Ramos (students) & Luís Carreiró (teacher advisor)



Classes given on 03/03/2018, to 2nd, 3rd and 4th year students, and on 11/04/2018, to 4th year students



For the construction of these projects, Institutions were contacted, which, in the framework of informal partnerships, contributed to the construction of the work. For direct collaboration in the construction of the students' projects, the following institutions were contacted: Quinta da Cale, Nelas Town Council (Civil Protection Branch), Nelas Health Center, Viseu Higher School of Agriculture, Viseu Higher School of Health.

It should be mentioned as well that the existence of the Meteorological Station was made known to the entire group of Nelas schools and to all the Partners of the Investing in Capacity Project (Nelas Municipal Council, Higher Education Institutions and others), being daily used, for example, by the Dão Warning Station (http://www.drapc.min-agricultura.pt/drapc/estacao_aviso_dao.htm).

We also formed a partnership with the IPMA (Portuguese Institute for the Sea and the Atmosphere), where, on June 3, 2017, with which we carried out an activity called NOVO ATLAS EUROPEU DO VENTO (NEW EUROPEAN WIND ATLAS) - launching of atmospheric balloons - in the Serra do Perdigão. It should be noted that the IPMA is an Organization of reference in Portugal and beyond Portugal in terms of weather and climate (<http://www.ipma.pt/en/index.html>).

VISITA (Agrupamento de Escolas de Nelas)			
3 de Junho (sábado)			
SERRA DO PERDIGÃO			
NOVO ATLAS EUROPEU DO VENTO			
Início	Fim	Duração	Descrição
07:40	07:50	00:10	Encontro na Escola Secundária de Nelas
07:50			Partida de Nelas (Escola Secundária)
07:50	09:50	02:00	Viagem: Nelas - Centro Ciência Viva da Floresta (Proença-a-Nova)
09:50	10:50	01:00	Visita ao Centro de Ciência Viva da Floresta
10:50	11:20	00:30	Apresentação sobre a experiência: objetivos
11:20	11:20		participantes
11:20	11:20		descrição da experiência de campo
11:20	11:20		infraestruturas: energia e dados
11:20	11:20		equipamento e localização no terreno
11:20	11:20		dados: arquivo e acesso
11:20	11:40	00:20	Viagem: Centro Ciência Viva da Floresta - Vale do Cobreão
11:40	12:40	01:00	Visita (I): Vale do Cobreão (lançamento de radiosondas)
12:40	13:00	00:20	Viagem: Vale do Cobreão - Vila Velha de Ródão
12:40	13:40	01:00	Almoço (Vila Velha de Ródão)
13:40	14:20	00:40	Visita: Centro de Arte Rupestre
14:20	14:35	00:15	Viagem: Centro de Arte Rupestre - Alvaiaide
14:35	15:35	01:00	Visita: Centro operacional
15:35	16:05	00:30	Viagem: Alvaiaide - aerogerador
16:05	17:25	01:20	Visita: cumeada Sul e aerogerador
17:25	17:45	00:20	Viagem: aerogerador - Foz do Cobreão
17:45	18:15	00:30	Fim do dia / Foz do Cobreão (Lanche)
18:15	20:25	02:10	Viagem: Foz do Cobreão - Nelas
20:25			Chegada a Nelas



1.1. Evaluation of the impact of the classes given by the gifted students in the classes of students of the 2nd, 3rd and 4th years of schooling (evaluation done by students, parents and teachers)

It was our concern to evaluate the impact of these activities on students, which is why we asked for the completion of pre-tests and post-tests to the students of School of Santar (and their parents), because they were, as said, those who had more classes. So, before they had the classes taught by the students of the STEM for All Seasons Project, a questionnaire was distributed by the students of Escola de Santar (2nd, 3rd and 4th year students) where they spoke about the knowledge they have on the STEM, as well as on the interest in Mathematics, Science and Engineering/Technology. At the end of the year, after the conclusion of the lecture of classes within this project, students were asked to respond to a second questionnaire equal to the first.

Twenty students answered the questionnaires. From the data obtained, several tables were organized, which are presented below, together with the interpretation and conclusions reached.

QUESTION	BEFORE THE ACTIVITIES				AFTER ACTIVITIES			
	Yes	No	Yes/No More or less	N. A.	Yes	No	Yes/No More or less	N. A.
2. Have you ever heard of STEM?	2	18	0	0	19	1	0	0

Before the beginning of the activities, only 2 students knew the term STEM. For 18, it was unknown. In the end, only one says he has not heard "about STEM".

QUESTION	BEFORE THE ACTIVITIES	AFTER ACTIVITIES
3. Which one best describes the meaning of STEM?		
Technology education school module	2	1
Science, technology, engineering and mathematics	15	18
School Mission Focused on Employment	1	0
Short-term educational meeting	0	1
They did not answer	2	0

To the question "Which of the hypotheses best describes the meaning of STEM?", 15 students answered correctly in the 1st questionnaire. In the second, there are 18 correct answers and 2 wrong answers.

We now draw attention to the various pictures. In the second of each area, one realizes all the answers given. "?" Is placed in cases where the student responds "more or less" or "x" in YES and NO.

The questionnaires are anonymous, so we can not know the changes that occurred in relation to each student, but only in relation to the totality.

MATHEMATICS

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES			
	Yes	No	Yes/No More or less	N. A.	Yes	No	Yes/No More or less	N. A.
4. Do you like math?	17	3	0	0	13	7	0	0
5. Are you good at Maths?	15	5	0	0	11	8	1	0
6. Do you consider that mathematics is difficult?	6	14	0	0	6	12	2	0
7. Do you put the hypothesis that one day you will have a job that requires a lot of math?	11	9	0	0	10	10	0	0

QUESTIONS	BEFORE THE ACTIVITIES								
	8	5	1	1	1	1	1	1	1
4. ^a	S	S	S	S	S	S	N	N	N
5. ^a	S	S	S	N	N	N	N	N	S
6. ^a	N	N	S	S	N	S	S	S	S
7. ^a	S	N	S	S	N	N	N	S	N

AFTER ACTIVITIES										
5	4	1	1	1	1	3	1	1	1	1
S	S	S	S	S	S	N	N	N	N	N
S	S	S	S	N	N	N	?	N	N	N
N	N	?	?	N	S	S	S	S	N	N
S	N	N	S	S	S	N	N	S	N	S

It is verified that, when completing the 1st questionnaire,

- 13 students liked Mathematics, they were good students in this discipline and they did not consider it difficult, and 8 of these students even considered the hypothesis of one day having a job for which a lot of mathematics was needed.
- 1 student liked Mathematics, was a good student, and although he found the discipline difficult, he hypothesized that one day he would have a job for which he needed a lot of mathematics.
- 3 students liked Mathematics, but they were not good students, and of these, 1 answered YES to the 6th and 7th questions, 1 answered NO to both and the third answered YES to the 6th and NOT to the 7th.
- 3 students did not like Mathematics and found it difficult; 2 of them were not good students, but one answered YES to the 7th question; the latter said to be good students, however he replied NO to the 7th question.

For the second questionnaire, the following was established:

- 9 students like Mathematics, are good students, do not find the discipline difficult, but only 5 consider the hypothesis of one day having a job for which a lot of mathematics was needed.
- Of the remaining 4 students who enjoy Mathematics, 2 do not respond adequately to the 6th question (1 writes "more or less" and the other indicates YES and NO), but they are good students and one of them even puts the chance to have a job for which much mathematics is needed; of the other two students, 1 finds the chair difficult, the other does not, and neither is a good student, but both answer YES to the 7th question.
- 7 students do not like math. Of these, 6 consider not to be good students to this discipline and 1 does not respond correctly (put "x" in YES and NO). As for the difficulty of mathematics, 5 respond YES, 2 respond NO. Finally, to the 7th question, 2 respond YES and 5 respond NO.

SCIENCES

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES			
	Yes	No	Yes/No More or less	N. A.	Yes	No	Yes/No More or less	N. A.
8. Do you like science?	19	1	0	0	18	1	1	0
9. Do you have a way for the sciences?	17	3	0	0	10	6	3	1
10. Do you put the hypothesis of one day to have a job in the area of science?	5	15	0	0	7	13	0	0

QUESTIONS	BEFORE THE ACTIVITIES			
	12	5	2	1
8. ^a	S	S	S	N
9. ^a	S	S	N	N
10. ^a	N	S	N	N

BEFORE THE ACTIVITIES							
6	4	3	2	2	1	1	1
S	S	S	S	S	S	S	?
S	S	N	N	?	?	N. R.	N
N	S	N	S	N	S	N	N

As far as the Sciences are concerned, here are the data collected from the first questionnaire:

- 17 students liked and had a way to the sciences, but only 5 put the chance of one day having a job in that area.
- 2 also liked Sciences, but they considered not having a way and did not put the chance of one day having a job in that area.

- 1 student answered NO to all questions in this group.

From the answers to the second questionnaire, it is verified that

- 10 students like the discipline and consider having a way to the Sciences, but only 4 put the hypothesis of one day having a job in Sciences.
- 5 students like the discipline, but have no way to the Sciences, having 3 answered NO to the 10th question and 2 YES.
- 4 students like Science, but do not pronounce correctly on the 9th question (1 puts the "x" in YES and NO, 2 write "More or less" and the last one does not respond); of the 4, only 1 answers YES to the 10th question.
- Finally, 1 student answers YES and NO to the 8th question and NO to the remaining 2 questions.

ENGINEERING / TECHNOLOGY

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES			
	Yes	No	Yes/No More or less	N. A.	Yes	No	Yes/No More or less	N. A.
11. Do you care about the way things work?	17	2	0	1	18	2	0	0
12. Do you have a way to build and repair things?	14	6	0	0	11	8	1	0
13. Have you ever created anything in the context of electronic components, tools, laymen, etc.?	14	6	0	0	14	6	0	0
14. Have you already done programming?	17	3	0	0	15	5	0	0
15. Do you consider having a career in engineering or technology?	8	12	0	0	8	11	1	0

QUESTIONS	BEFORE THE ACTIVITIES										
	7	3	2	1	1	1	1	1	1	1	1
11.^a	S	S	S	S	S	S	S	S	NR	N	N
12.^a	S	S	N	S	N	S	N	S	S	S	N
13.^a	S	S	S	S	N	N	N	N	S	N	N
14.^a	S	S	S	N	S	S	S	N	S	N	S
15.^a	N	S	N	S	S	S	N	N	S	N	S

AFTER ACTIVITIES												
5	3	1	2	1	1	1	1	1	1	1	1	1
S	S	S	S	S	S	S	S	S	S	S	S	N
S	S	S	S	N	N	N	N	?	N	N	N	N
S	S	S	N	S	S	S	N	N	N	S	N	S
S	S	S	N	S	N	S	S	S	S	N	N	S
N	S	?	S	S	S	N	S	N	N	N	N	N

Analysing the tables referring to the questionnaire presented to the students before the activities, it is verified that

- 10 students have shown interest in how things work, have a way to build and repair things, have created something and have already done programming, yet only 3 considered to have a career in engineering or technology.
- 7 more students answered YES to the 11th question. Of these, only 3 respond YES to the 12th; only 3 respond YES to the 13th; 5 respond YES to 14th and 3 respond YES to 15th.
- 1 student did not answer the 1st, and, to all the others, he answered YES.
- 2 students answered NO to the 11th question, the first one answered YES to the 12th and NOT to all the others, and the second one answered NO to the first three and YES to the last two.

Compiling the data from the tables for the second questionnaire, it is concluded that

- 9 students reveal an interest in the way things work, have a way to build and repair things, have created something and have already done programming, yet only 3 consider to have a career in the field of engineering or technology.
- Another 10 students answer YES to question 11, but only 2 indicate a way to build and repair things. These 2 students answer NO to the 13th and 14th questions and YES to the 15th. Of the remaining 8 students, 4 respond YES and 4 NO to the 13th question, 3 respond YES and 5 NO to the 14th and 3 respond YES and 5 NO to the 15th.
- Finally, there is a student who has already created something, has already done programming, but is not interested in the way things work, there is no way to build and repair things and also does not consider having a career in the field of engineering or technology .

The **parents** of the students who were taught by STEM students were also invited to comment on their children's involvement in the activities. The first questionnaire was answered by 10 parents, and the second questionnaire, by 18.

Several tables have been organized, which are presented below, together with the interpretation that the data allow to arrive.

QUESTION	BEFORE THE ACTIVITIES		BEFORE THE ACTIVITIES	
	Yes	No	Yes	No
2. Do you know the term STEM?	7	3	9	9

Before the activities, 7 parents knew the term STEM. For 3 it was unknown. Of the 18 parents who answered the second questionnaire, 9 knew the term and 9 did not.

QUESTION	BEFORE THE ACTIVITIES	BEFORE THE ACTIVITIES
3. Which one best describes the meaning of STEM?		
Technology education school module	0	1
Science, technology, engineering and mathematics	10	17
Science, technology, engineering and mathematics	0	0
Short-term educational meeting	0	0

To the question "Which of the hypotheses best describes the meaning of STEM?", The 10 parents answered in the first questionnaire. In the 2nd, there are 17 correct answers, there are 1 wrong answer.

MATHEMATICS

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES					
	Yes	%	No	%	Yes	%	No	%	More or less	%
4. Does your child enjoy Mathematics / activities in which he applies mathematical skills?	7	70,0	3	30,0	12	66,7	5	27,8	1	5,6
5. Do you feel that your child has a craving for math / math skills?	7	70,0	3	30,0	13	72,2	5	27,8	0	0,0

6. Does your child consider mathematics / math skills useful / useful?	8	80,0	2	20,0	16	88,9	2	11,1	0	0,0
7. Does your child plan to have a job involving the use of mathematics?	8	80,0	2	20,0	13	72,2	5	27,8	0	0,0

QUESTIONS	BEFORE THE ACTIVITIES					
	5	1	1	1	1	1
4. ^a	S	S	S	N	N	N
5. ^a	S	S	N	S	N	N
6. ^a	S	S	N	S	S	N
7. ^a	S	N	S	S	N	S

AFTER ACTIVITIES							
8	2	1	1	1	1	3	1
S	S	S	S	?	N	N	N
S	S	S	N	S	S	N	N
S	S	N	S	S	S	S	N
S	N	N	N	S	S	S	N

Regarding the area of Mathematics, and taking into account the 1st questionnaire, the opinion of the 10 parents can be translated as follows:

- 7 consider that children like Mathematics, 6 of them craving for this area, finding Math to be useful. According to parents, 5 of these students are even thinking of having a job that involves the use of mathematics.
- Of the 3 parents who answer NO to question 4, only 1 consider that the child has an appetite for Mathematics and that for children, Mathematics is useful. Of the 3 parents, 2 answered YES to the 7th question.

The second questionnaire shows that of the 18 parents,

- 12 think that children like Mathematics, revealing 11 of them craving for that area; 11 answer YES to the 6th question and 8 answer YES to 7th.

- A parent does not respond adequately to the 4th question; the others respond YES.
- 5 parents report that children do not like math but one of them reveals that the child is keen on the subject and 3 respond YES to the 6th and 7th questions.

SCIENCES

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES					
	YES	%	NO	%	YES	%	NO	%	More or less / I do not know	%
8. Does your child enjoy experimental science / activities?	10	100,0	0	0,0	16	88,9	1	5,6	1	5,6
9. Do you feel that your child has an appetite for experimental science / activities?	10	100,0	0	0,0	12	66,7	5	27,8	1	5,6
10. Does your child expect to have a job that involves the use of Experimental Science / Activities?	5	50,0	5	50,0	8	44,4	9	50,0	1	5,6

QUESTIONS	BEFORE THE ACTIVITIES	
	5	5
8. ^a	S	S
9. ^a	S	S
10. ^a	S	N

AFTER ACTIVITIES						
7	4	1	1	3	1	1
S	S	S	S	S	?	N
S	S	S	N	N	?	N
S	N	?	S	N	N	N

The 10 parents who filled out the 1st questionnaire answered that their children liked Sciences and had a penchant for the area, but only 5 thought that the child put the chance of having a job that involved the use of Sciences / activities experiments.

Compiling the data from the 2nd questionnaire, we learn that, of the 18 parents,

- 16 consider that children like Mathematics, 12 of them are keen on the area and 8 put the hypothesis of having a job that implies the use of Experimental Sciences / activities.
- 1 student answers NO to the three questions in this group.
- 1 does not give an adequate answer to the first two questions and says NO to the last one.

ENGINEERING / TECHNOLOGY

QUESTIONS	BEFORE THE ACTIVITIES				AFTER ACTIVITIES					
	YES	%	NO	%	YES	%	NO	%	YES and NO	%
11. Does your child care about how things work?	9	90,0	1	10,0	17	94,4	1	5,6	0	0,0
11. Does your child care about how things work?	6	60,0	4	40,0	10	55,6	8	44,4	0	0,0
13. Has your child created something in the context of electronic components, tools, laymen, etc.?	4	40,0	6	60,0	13	72,2	5	27,8	0	0,0
14. Has your child done programming?	5	50,0	5	50,0	10	55,6	8	44,4	0	0,0
15. Does your child have a career in engineering or technology?	3	30,0	7	70,0	8	44,4	9	50,0	1	5,6

QUESTIONS	BEFORE THE ACTIVITIES							
	2	1	1	1	1	2	1	1
11.^a	S	S	S	S	S	S	S	N
12.^a	S	S	S	N	N	S	N	N
13.^a	S	S	N	S	N	N	N	N
14.^a	S	N	S	S	S	N	N	N
15.^a	N	S	S	N	S	N	N	N

AFTER ACTIVITIES											
3	2	2	1	1	1	1	1	3	1	1	1
S	S	S	S	S	S	S	S	S	S	S	N
S	S	N	S	S	S	S	S	N	?	N	N
S	S	S	S	N	S	S	N	S	N	N	N
S	N	S	S	S	N	N	S	N	S	S	N
S	S	S	N	S	?	N	N	N	N	N	N

Of the 10 parents who answered the 1st questionnaire,

- 11 reveal that children are interested in the way things work, having 6 ways to build and repair things, 4 have created something, and 5 have done programming.
- As for the last question, only 3 put the possibility of having a career in the area of engineering or technology.

Observing the second questionnaire, we note that, of the 18 parents,

- 17 consider that children are interested in the way things work, 10 students have a way to build and repair things, 13 have created something, 10 have already done programming and 8 even put the chance to have a career in the area engineering or technology.

STEM TEACHERS Questionnaire

A teacher of the 1st cycle of Basic Education of students who are in the age group of 6-7 and 8-9 years answered the questionnaire, before and after the activities.

To the question "I already knew the term STEM", he answered in the first questionnaire NO and in the second, YES.

The answer to the question "Which of the hypotheses best describes the meaning of STEM" is similar in both questionnaires.

The tables below record the answers given to questions 4 to 13 in the two questionnaires.

MATHEMATICS

QUESTIONS	BEFORE THE ACTIVITIES	AFTER ACTIVITIES
4. Your students enjoy Mathematics / / activities in which they apply mathematical skills.	A minority	A minority
5. Do you consider that your students are keen on mathematics / math skills?	A minority	A minority
. Do you consider that they see math / mathematical skills as useful?	A minority	A minority
7. How many students think they will have a job that involves the use of mathematics?	A minority	About half the class

SCIENCES

QUESTIONS	BEFORE THE ACTIVITIES	AFTER ACTIVITIES
8. Do your students enjoy science / experimental activities?	Most	Most
9. Do you feel that your students are keen on experiential sciences / activities?	About half the class	Most
10. How many students think they will have a job that involves the use of experimental sciences / activities?	A minority	A minority

ICT / Visual Education / Technological Education

QUESTIONS	BEFORE THE ACTIVITIES	AFTER ACTIVITIES
11. Are your students interested in the way things work?	About half the class	About half the class
12 Do your students have a way to build and repair things?	A minority	About half the class
13. How many students think they will have a job as engineers or in the field of technology?	A minority	A minority

The most favourable answers (in the context of what is desired - improved perception) concern the 8th question in the 1st questionnaire and the 8th and 9th questions in the second questionnaire: "The majority".

In the 1st questionnaire all questions in the area of Mathematics deserved the answer "A minority". The second answer is the same as in the first three questions. The last answer improved relative to the 1st questionnaire correspondent (changed from "A

minority" to "About half the class"). This seems to be the least desirable area of the students: there are 7 responses "A minority", with only the 7th answer of the 2nd questionnaire worthy of the information "About half the class".

The area of Science is the one that appeals to the students. Most of them like sciences. In the second questionnaire, the teacher reveals that "The majority" likes science and has an appetite for experimental sciences / activities, but only a minority thinks they will have a job that involves the use of science.

The ICT / VE / TE area is in an intermediate position compared to the other two: in the 1st questionnaire, there is 1 answer "About half the class" and 2 "A minority" and in the second there are 2 answers " About half the class "and 1" A minority ".

Conclusion

Regarding the data obtained from the students' questionnaires, regarding questions 4 to 15, there is a curious fact. To the questions "Do you like Mathematics?", "Are you good at Mathematics?", "Do you like Science?", " Do you have a way for science?" "Are you good at building and repairing things?" the number of students who answered YES in the first questionnaire is always higher. This can be interpreted as a lack of awareness of the students before the activities. It is understandable that the closer contact with each of those areas of knowledge has given them a greater maturity.

As for the possibility of having a job in which they need knowledge in the various areas, the number of students who answer YES rises from 11 to 10 with regard to Mathematics, increases from 5 to 7 with regard to Sciences, in Engineering / Technology. But there is still a large number of students who answer NO to these questions.

Observing the parents' questionnaires, we noticed that the area that shows the highest increase in the evaluation before and after activities is that of technology, and the answer 13 is the one that shows the most progress on the part of the students. The exception is only in the answer to question 12.

Inverse course is in the area of Sciences. Prior to the activities the answers to questions 8 and 9 were 100% YES and after the activities they stayed for 88.9% and 66.7%, respectively. In turn, the 10th went from 50% to 44.4%.

In the area of Mathematics, the ratio between the percentages of YES in the various answers oscillates, but there is not a great imbalance between the 1st questionnaire and the 2nd.

Regarding the data provided by the teacher, it should be noted that if we compare the two questionnaires, we will note that some improvements from the 2nd to the 1st are visible: answers 7 and 12 have gone from "A minority" to "About half of the class" and answer 9 went from "About half of the class" to "Most."

As the STEM For All Seasons Project is not yet finished for the students who are developing the projects, the post-test has not yet been applied to these students and, therefore, we still can not present the conclusions of this application.

2. To whom did you disseminate the project results inside and outside your partnership? Please define in particular your targeted audience(s) at local/regional/national/EU level/international and explain your choices.

There were **7 moments of dissemination of the project in Portugal**, summarized below:

1st MOMENT



On 04/10/2017, teachers from the STEM For All Seasons Project presented this project at the National Meeting of Mathematics Teachers, which took place at the Polytechnic Institute of Viseu (whose High Schools are partners of the Investing in Capacity Project and also collaborated in the construction of Projects of students of the STEM For All Seasons Project). Almost 500 teachers of Mathematics and other STEM areas were present. The choice of this event for dissemination was because it is aimed at

teachers - and they can replicate the lesson plans proposed by our students with their students - and for teachers in the STEM areas, the theme of this project. In addition, being a national event compels an immense number of teachers to be aware of the project.

2nd MOMENT



3rd MOMENT



The second moment of dissemination of the Project took place with the presentation of the article *Invest in the Capacity Project and Project Erasmus + STEM For All Seasons - An integrated and interdisciplinary approach in Education*, which was approved and published in the book of minutes of the Congress HSCI 2017 14th International Conference on Hands-on-Science.

The third moment of dissemination of the Project was the presentation of this article in this event (Braga - Portugal), on 07/13/2017. There were hundreds of teachers from several countries from the STEM areas at this event.

The choice of this event for dissemination was because it is aimed at teachers - and they can replicate the lesson plans proposed by our students with their students - and for teachers in the STEM areas, the theme of this project. Moreover, the fact that it is an international event contributes to an even greater number of teachers being aware of the project. The fact that we have published the article multiplies the possibility of more teachers access to what was done.



The fourth moment of dissemination of the project took place on March 23 and 24, 2018, in the auditorium of the Municipal Council of Nelas, partner entity of the Project Investing in Capacity and also collaborated with projects of the students of STEM For All Seasons, and it was part of the celebration of World Meteorological Day. It was titled *Learning*

when it is born is for all¹ - learning theories and practices: PIC projects, STEM For All Seasons and other proposals. In this event more than 100 people were present (teachers, students and parents).

About the curriculum of each lecturer, the Congress website can be consulted at <https://mfffalmeida1.wixsite.com/congressopicstem/copia-conferencistas>. More information about the congress and projects can be found on the website (<https://mfffalmeida1.wixsite.com/congressopicstem>)

The idea of not circumscribing the theme to giftedness came from our National Agency. When we sent the first report, where we recalled that Portugal's participation was limited to giftedness, we were asked to broaden the scope in a more inclusive perspective. The principle of the Investing in Capacity Project is focused on inclusion and equity: to give each one what each one needs, and this response is given to students who, although gifted, are in a school of all and for all. However - and although we continue to argue that there must be differentiated answers - we agreed that it would be more advantageous that the greatest number of people take advantage of this project - a concern, moreover, that it has always been present since the beginning of the project -. For this reason, lesson plans, although very interesting for gifted students, can be implemented by all students (on request, as already mentioned in this document, from our National Agency) and - following this inclusive vision - the Congress that we organized focused on learning along the Gaussian Curve.

¹ "Learning when it is born is for all" is an adaptation of a Portuguese proverb - The sun when it is born is for everyone - and this title was chosen in an allusion to meteorology and the need to view learning in an inclusive way.

The Congress Program can be found on a page (<https://mfffalmeida1.wixsite.com/congressopicstem/cronogram-em-ingles>) of the site (<https://mfffalmeida1.wixsite.com/congressopicstem>) built to publicize not only the Congress but also the STEM For All Seasons Project.

The Congress had 25 conferences (plus two of the opening panel), organized in seven panels and, as mentioned, took place in two days (March 23 and 24, 2018):

First panel: "The importance of partnerships in the teaching-learning process"
(Part I)



In this panel, six conferences were held (initially seven were planned, but one of the students could not be present), referring to the projects developed by each of the students who are part of the STEm For All Seasons project:

«Game (regions map)» Afonso Milheiriço / Ana Paula Céu



«Construction of a digital anemometer to study the location of micro wind generators'; 'Wind power'; Wind formation based on the principle of convection currents» Francisco and Simão Ramos / Luís Carreiró



«Forest Fires» Alexandre Marques / Aníbal Xavier



«Constitution of the atmosphere» Gonçalo Amaral / Fernanda Tavares / Natália Batista



«The influence of climate on the quality of wine» | Filipa Figueiredo / Fernanda Tavares / Natália Batista



Second panel: "Learning at birth is for all or the concept of inclusive school"
 «Challenges of the School of the century. XXI: the right of everyone to learn »
Professor Ariana Cosme - University of Porto

This university professor of national and international renown spoke about the need for curricular flexibility and pedagogical differentiation, so that we can attend to the diversity of students within the classroom.



Third panel: "Walking the Gaussian Curve (Part I)"

«What can be improved in schools for the students with more difficulties?»

Cristina Simões - AE by Tondela Cândido de Figueiredo / Catholic University of Viseu

This university professor, with national and international awards for her work on the quality of life of people with intellectual and developmental disabilities (IDD), formerly designated students / people with mental disabilities, focused on inclusive school intervention with students with IDD.



Fourth panel: Commemoration of World Meteorological Day ": «The STEM for All Seasons Project (Erasmus + K2 Project)» (Grouping of Schools in Nelas); «The STEM For All Seasons Project: Five Countries» (General Coordinator of the Project - Ireland via Skype / recorded intervention); «Learning meteorology in schools - why?» (Pedro Viterbo - Department of Meteorology and Geophysics of IPMA)

The fourth panel integrated three conferences:

Presentation of the STEM For All Seasons Project in Portugal, made by the portuguese coordinator of the project, Fátima Almeida, Teacher of Portuguese of the Secondary Education and Specialized Teacher in Special Education.



The second conference was by recording, given by the general coordinator of the Project (Ireland), Donat Leahy.



The third conference of this panel was given by Professor Pedro Viterbo, Director of the Department of Meteorology and Geophysics of the Portuguese Institute of the Sea and the Atmosphere (IPMA), a national and international reference organization, where hundreds of specialists in the area of Meteorology work and investigate.



Fifth panel: Going through the Gaussian curve (Part II)

«What is giftedness? Impact on students and parents » - Helena Serra | APCS

«Supervision in the classroom: myths and truths» - Cândida Cardoso | RINGS

«Educational interventions in gifted students» - Juan A. Alonso - President of the Ibero-American Federation of the World Council for Gifted and Talented Children

The fifth panel integrated three conferences:

The President of the General Assembly of the Portuguese Association of Gifted Children, Professor Helena Serra, a national and international reference in giftedness, spoke about the impact that giftedness has on gifted students and their parents.



The second lecture was given by the psychologist Dr. Cândida Cardoso, responsible for ANEIS (National Association for the Study and Intervention in Giving) of Viseu, addressed the myths and truths of giftedness in the classroom, focusing on practices that can make the difference in the teaching and learning of gifted students.



The third conference, given by Professor Juan Alonso, an international reference in giftedness and President of the Ibero-American Association of Giftedness, focused on educational interventions in gifted students



Sixth panel: "Is learning when it is born for all?"

«The Neuroscience of Learning»

Joana Rato - Neuropsychologist - ICS - Health Sciences Institute | Portuguese Catholic University - Lisbon

Lectured by University Professor Joana Rato, a national and international reference in the area of neurosciences, this conference focused on the neuroscience of learning, seeking an answer to the question of learning along the Gaussian Curve.



Seventh panel: "The importance of Partnerships in the teaching-learning process" (Part II) | Communications from the Partner Institutions of PIC 5 and 6

Responsible for the Partner Institutions of PIC 5 and 6 were invited to talk about action research projects in education that they are developing in partnership with other Institutions. The focus was on working in partnership, taking up, therefore, the theme of the first panel of this Congress, in order to conclude the cycle proposed for it.



The Project Investing in Capacity and the STEM For All Seasons Project exists thanks to partnerships (national and international), and this Congress, in addition to each theme that it approached, was intended to be a celebration of teamwork. The partners who were present do not exhaust the partnerships of these projects: they represent the structures that have been present for six years.

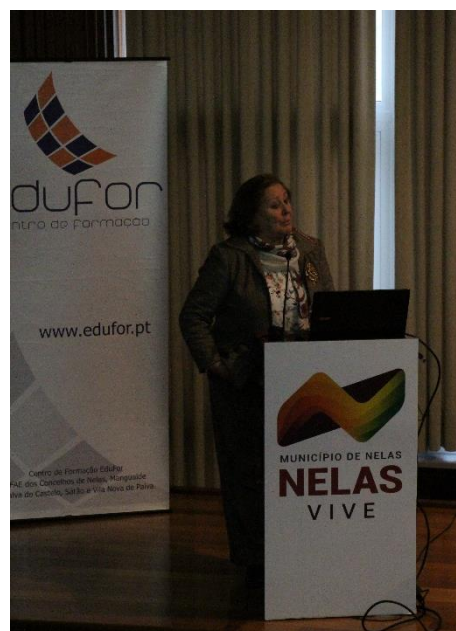
Dr. Sofia Relvas, Deputy Mayor of Nelas, presented the project that is being developed by the Municipal Council of Nelas entitled "SEC Family".



Dr. Rui Fonte, Coordinator of the Library of the Lapa do Lobo Foundation, presented the communication entitled "The Lapa do Lobo Foundation as a Place of Education".



Professor Helena Serra, President of the General Assembly of the Portuguese Association of Gifted Children, spoke about the national PIC projects.



The fourth conference of this panel was given by Dr. José Miguel Sousa, Director of the Edufor Training Center - PIC and the STEM For All Seasons Project partner - responsible for the accreditation request of this Congress. The title of this conference was "Erasmus + Projects: an opportunity for all".



The University Professor of the Health Sciences Institute of the Portuguese Catholic University (UCP) of Viseu, Professor Maria José Correia, presented the communication titled "SalivaTec" - The research developed in SalivaTec begins with the revision and annotation of existing molecular information creating and updating databases made available publicly. This information is then combined with experimental data and clinical data which allows to make biomarkers proposals that are then experimentally validated with state-of-the-art technology.



Professor Cristina Azevedo Gomes, former President of the School of Education of Viseu (ESEV), presented the communication "Academia Dão Petiz Project - the importance of interinstitutional collaboration in the construction of meaningful contexts of learning".



The Professor of Higher Education, Professor Amadeu Matos Gonçalves, Professor at the School of Health of Viseu (ESSV), presented the communication "" MAISaúde Mental Project ", co-financed by Portugal2020; Centro2020 and European Regional Development Fund»



Professor Marcelo Oliveira, Professor at the School of Technology and Management of Viseu (ESTGV), presented the communication "Research and development based on practice - an example of an educational framework at the Polytechnic of Viseu".



Professor Cristina Amaro da Costa, Professor at the Viseu Higher School of Agriculture (ESAV), presented the communication "ECONewFarmers Building the future with new farmers in organic production through vocational training".



The last conference of the panel and of the Congress, entitled "KICK - OFF Project - Mangualde", was delivered by Dr. Natália Mendes, Superior Technician of IPDJ - Portuguese Institute of Sports and Youth – Viseu, Services and Program Coordinator



Concerning the evaluation of this Congress - and focusing on the questions regarding the effects of learning in practices, it should be mentioned that 75% of the respondents mentioned that the training contributed in an excellent way to a reflection on their professionalism (20% mentioned that this contribution was very good), 60% mentioned that the training contributed in an excellent way to the identification of aspects in the teaching practice, which should be improved (35% mentioned that this contribution was very good), 45% said that training contributed with valid knowledge for the renewal / improvement of the practices (50% mentioned that this contribution

was very good) and 75% reported that there was an excellent domain of content and communication skills (20% mentioned that this contribution was very good)

5th MOMENT

We call social communication to the fifth moment of dissemination. There were national newspapers and sites that publicized the Congress, also talking about the STEM For All Seasons Project. The image published here refers to a news that appeared in the newspaper "Diário de Viseu", talking about the Congress (after it happened) - the title is 'Nelas reflected on constructive learning':



6th MOMENT

The sixth formal moment of dissemination of the Project took place at the STEM Discovery Week 2018, on April 23, at the Felismina Alcântara High School (Mangualde), in which the student Alexandre Marques participated, who presented his research on STEM and about the project he developed under the STEM For All Seasons Project.



7th MOMENT

The seventh moment of dissemination of the Project was launched on March 23, 2018, at the Congress "Learning when it is born for all": it is the book that talks about the activities developed by the Project Investing in Capacity (PIC) and the STEM Project For All Seasons. This book can be consulted at https://www.edufor.pt/aenelas-pic/imagens/Livro_PIC5.pdf.



- 3. Erasmus+ promotes an open access requirement for all materials produced through its projects. In case your project has produced intellectual outputs/tangible deliverables, please describe if and how you have promoted their free access to the public. In case a limitation was foreseen for the use of the open licence, please specify the reasons, extent and nature of this limitation.**

The lesson plans - outputs foreseen under this project - are posted on the Project website (<http://www.stemforallseasons.eu/>). It is planned to build a material that will compile all the lesson plans elaborated in the five countries, which may be published on the website, and there is no restriction on public consultation of this information.

- 4. How have you ensured that the project's results will remain available and/or will be used by others?**

The results of the project will be posted on the website, on the blog and on the Etwinning platform.

- 5. How did you see the potential to use this project's approach in other projects on a larger scale and/or in a different field or area?**

The idea of building lesson plans - on a European scale - is clearly inclusive of all areas of education. If we dwell on the construction of time-related lesson plans, it might be interesting to extend the partners to collect more proposals for intervention in order for each country to expand its possibilities of action. This has been an excellent experience and can be a starting point with an even larger dimension (in terms of number of partnerships).

CONCLUSION

This project has been a great asset both to the students who are developing the projects and to the students to whom they are teaching. The fact that, in addition to the lesson plans, the school stays with a weather station allows other classes to be created in the future and other projects can be born.

Regarding the classes given by our students, it is important to mention that the assessments made by the students were all positive. We can leave the following statements left in the evaluations of some students: "We learned a lot and also had a lot of fun"; "It's a cool new experience!"; "I like to learn from fun people like today and the class was fun"; "The teacher [student of STEM For All Seasons] was the best I've ever had" ...

Annex 1

Lesson plan - Commemoration of World Meteorological Day 2017

LESSON PLAN

World Meteorological Day

WITH THIS LESSON, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

- | | |
|----|---|
| 1. | Recognize that there is a science that studies phenomena related to meteorology. |
| 2. | Describe the atmospheric conditions of the day, recognizing the most appropriate designation (rainy, hot, cold, windy ...). |
| 3. | Relate the seasons to the characteristic weather conditions. |
| 4. | Recognize the existence of air. |
| 5. | Relate the wind to the movement of the air (currents of air, their orientation and their effects). |

THEORETICAL CONTEXTUALIZATION OF THE TASK THAT WILL BE CARRIED OUT:

In the Environmental Studies Program for the 2nd year of schooling, in the Block "Discovering the Natural Environment", students are expected to understand the contents related to the basic elements of the physical environment (air, water, Rocks, soil), the living beings that live in it, the climate, the relief and the stars. More specifically, the physical aspects of the local environment:

- ** The time it takes (to record daily weather conditions).
- ** Recognize some weather conditions (rainy, hot, cold, windy ...).
- Relate the seasons to the characteristic weather conditions.
- ** Recognize the existence of air (conduct experiments).
- ** Recognize moving air (wind, air currents ...).

As part of the commemoration of World Meteorological Day, the STEM project team will promote this practical session for 2nd year students, which will aim to broaden the students' knowledge in this area.

ACTIVITY / EXPERIENCE 1:

Title: "What is the orientation of the wind" / Construction of a weather vane.

Material needed:

- Glass of yogurt
- Pencil with rubber tip
- One pin
- 1 straw
- Cardboard
- Ribbon tape
- Scissors
- Stapler
- Paper base with wind rose designed.

Methodology:

- Talk with the students about the wind and its orientation.
- Provide the activity-oriented report to be developed.
- Provide a card with the rose of the winds.
- Build a weather vane.
- Observe the effect of wind.
- Record the observed data.
- Analyze the data.

ACTIVITY / EXPERIENCE 2

Title: "The wind and the dunes"

Material needed:

- Thin sand
- Board
- Hair dryer

Methodology:

- Activity performed by the teacher with the collaboration of the students.
- Discuss with students about the wind and its effects.
- Provide the targeted report of the activity to be developed.
- Observe the effect of wind.
- Record the observed data.
- Analyze the data.

Annex 2

Lesson plan - The permanence of the native plants in the region taking into account the climate

Lesson Plan

Relationship between germination and temperature

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

- | | |
|----|---|
| 1. | Area of your municipality. |
| 2. | Location of the county on the map of Portugal. |
| 3. | Examples of existing plants in the municipality. |
| 4. | Distinction between forest spot and cultivated plants. |
| 5. | Know the factors that determine the climate. |
| 6. | Analyze the weather in Nelas, based on the records of the Meteorological Station of the School. |

ACTIVITY / EXPERIENCE

Materials Required: 5 pots / 5 soil thermometers / 25 soaked beans / garden shovel / cultivating soil / graduated cup

Methodology:

- 1- To make known the structure of a seed (cotyledons and embryo)
- 2- Put soil in each pot
- 3- Sow 4 beans in each pot.
- 4- Water each pot with the same amount of water.
- 5- The water is always collected from the same place.
- 6- Place in each vial a thermometerApós quinze minutos registrar a temperatura de cada vaso.

7- Put the pots in different places of the school.

8- Collect the Weather Station data on irrigation days and before it happens.

Part II: Data collection

- Collect vessel temperatures every 2 days before being showered with 30ml of water.
- Collect these data for two months and compare them with those collected by the Meteorological station.

Part III: Analysis of results

1. Relate temperature and humidity (watering) with the germination time of each seed and with the place where the pot was placed.
2. Match point one with the data collected at the Station.
3. Construction of a data analysis grid.

Activity aimed at: alunos do 1.º ciclo (dos 7 aos 9 anos)

Annex 3

Lesson plan - Our atmosphere

Lesson Plan

Our atmosphere

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

- | | |
|----|--|
| 1. | Learn that the atmosphere is divided into layers. |
| 2. | Characteristics of atmospheric layers. |
| 3. | Size of the atmosphere and planet Earth, in reality. |
| 4. | What can be found in each layer of the atmosphere. |
| 5. | Know the altitudes and temperatures of the various layers. |

ACTIVITY / EXPERIENCE

Materials Required: Model (already developed)

Methodology:

- 1- The student-teacher will say who, because he is presenting this work and what he intends to show with this (to make known the terrestrial atmosphere);
- 2- The student-teacher will explain what is represented in his model and the scales of the globe and the atmosphere.
- 3- The student-teacher will explain the characteristics of each of the layers of the atmosphere, including altitudes and temperatures.
- 4- Students will interact with the student-teacher throughout the class;
- 5- The students fill in a worksheet, which systematizes what was worked in class and intends to test the degree of clarity with which it was given;

6- The students fill in a small questionnaire that intends to qualitatively and quantitatively evaluate the students' satisfaction with this experience.

Part I: Construction of the activity

The student-teacher made the following reflection: "In the beginning, I projected what I would do. Ideas from the beginning were always the same but with some small details that were added. The mock involved a lot of work to do, both mine and others people at home. In the end everything was worth it and I liked the final result. "

Part II: Data collection

Data collection was done through the fact sheets student-teacher made for the students to complete during the class. Most of them demonstrated that they really did learn in that class, and the answers were also all right in both classes.

Part III: Analysis of results

The student-teacher gave the students cards to fill in at the end of the class, where they evaluated the class on a scale of 1 to 5 and wrote a little about what they found. The result was very positive because the majority gave 5 and found the subject interesting.

Activity aimed at: 5th grade students.

Annex 4

Lesson plan - Our wines

Lesson Plan

Our wines

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

- | | |
|----|---|
| 1. | Understand the notion of ambient temperature. |
| 2. | Know the notion of precipitation. |
| 3. | Understand the influence of temperature and precipitation on the occurrence of cold, hot, dry and humid months. |
| 4. | Analyze a thermopluviometric graph. |
| 5. | Identify, based on the thermopluviometric graph, dry and wet periods. |
| 6. | Understand the influence of temperature and precipitation on the quality of wine. |

THEORETICAL CONTEXTUALIZATION OF THE TASK THAT WILL BE CARRIED OUT

Ambient temperature is the air temperature of a given location.

Precipitation is all water in the liquid or solid state in the form of snow and that results due to condensation of the water vapor that is located in the atmosphere.

A thermopluviometric graph represents the temperature and precipitation recorded at a location during the period of one year. The thermopluviometric graphs have different values according to the climate.

The red line refers to the temperature variation (it can be seen that July and August are the hottest and driest months). Blue bars correspond to precipitation (January, February and December are the rainiest and coldest months).

In our region as a rule the coldest months also correspond to the months when the greatest rains occur and the hottest months to the driest months.

The climatic conditions verified in a place condition the agriculture a lot, thus there are more or less defined the best times for the accomplishment of certain agricultural tasks. For example the pruning (cutting of sticks) and the empa (tying the sticks to the wires) of the vines take place in the winter season.

The quality of a wine is influenced by several factors such as:

- The way grapes are grown and harvested;
- Oenological practices carried out (treatment of wines);
- The amount of rainfall;
- Temperature variations;
- The soil type;
- The relief and altitude.

All these factors influence the quality of the wine, as they make the wines have different colors, aromas and flavors.

The climatic conditions of a place influence the ripening of the grapes, as well as of all fruits in general. As the grapes mature, they reduce their level of acidity and increase the level of sugar.

In addition to sunlight and heat, the production of grapes and the quality of wine produced is also influenced by the volume and distribution of rainfall throughout the year. Intense rains in the harvest period can impair the quality of the grapes, causing the sugar levels to be lower and the risk of fungi and diseases increasing.

The heat during the day is beneficial for the grape to mature properly, while the cool of the night allows the vine to rest, retaining greater acidity and freshness in the grapes. This causes producers in warmer regions to look for terrain of altitude - where the nights are cooler - achieving an ideal balance between daytime and nighttime temperatures.

For all these reasons, it is very important to know the climate of each location.

ACTIVITY / EXPERIENCE

Materials Required: Computer, Power Point Presentation, Pen, Pencil and Eraser, Data from the Weather Station of Nelas Group of Schools.

Methodology:

Part I: Construction of the activity

Initially, student-teacher will present the STEM for All Seasons project, followed by the objectives that she intend to achieve with the class.

- Question the students about the concept of Temperature and Precipitation.
- Definition of thermopluviometric graph.
- Distribution of a small work sheet, to accompany the presentation with the answer to certain questions.
- Construction of the thermopluviometric graph using the excel file and the collaboration of the students that will dictate the precipitation and temperature values for the Nelas region using the data found in the worksheet table.
- Answer to Questions 2, 3 and 4 of the Card.
- Ask the students about the factors that can influence the quality of a wine.
- Presentation of the Scratch animation about the biological cycle of the vine.
- Answer to question no. 5 of the worksheet and conclusion of the lesson.

Part II: Data collection

After collecting the data of the weather station for the year 2017, they will be inserted by the students in a table in an excel spreadsheet and the graph will be built simultaneously.

Part III: Analysis of results

The data on the chart will be analyzed by the students, who will also fill out a small work sheet.

Activity aimed at: students in the 1st cycle (from 7 to 9 years)

Annex 5

Lesson plan – Fire prevention

Lesson Plan

FIRE PREVENTION

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

1.	Sensitize children to the problem
1.1	Causes of a fire.
1.2	How to prevent it.
1.3.	What to do during a fire.
1.4	What to do after a fire.

THEORETICAL CONTEXTUALIZATION OF THIS CLASSROOM:

Considering that the problem of fires has occupied and worried the entire Portuguese society;

Having well alive in our memory the images of the fateful days October 15 and 16;

The student-teacher found it appropriate to talk about this subject for children, and therefore necessarily in a playful way, with the aim of instilling in them fundamental care for the forest and fire prevention.

In view of this, he decided to prepare this lesson, based on a project started more than a year ago, well before the suffering of the whole country and our region in particular.

ACTIVITY / EXPERIENCE

- **Materials required:**

- ✓ Card;
- ✓ Pencil and plastic;
- ✓ Data;
- ✓ Buttons;
- ✓ Cards to sort out issues;
- ✓ List of questions and answers to clarify if the children have more doubts.

Methodology: Game of Glory

Part I: Construction of the activity

- The student-teacher and the project supervisor present themselves to the class, contextualizing the activity, within the framework of the STEM For All Seasons Project;
- The student-teacher explains what the STEM acronym stands for;
- The student-teacher presents the game, referring to the rules:
 - ✓ Students will be divided into three groups;
 - ✓ Each student plays the dice, advancing the pins how many houses dice indicate;
 - ✓ Each household has questions to which the students who have released the dice will answer;
 - ✓ There are houses that represent advances in the game and others, retreat;
 - ✓ The first student reaching the last house (Glory) wins.

Part II: Data collection

- Students complete a worksheet which seeks to ascertain the degree of clarity of the given class.

Part III: Analysis of results

- The answers given allow you to get results on the impact of the class on the students.

Target audience of this activity: Students in the 1st cycle (from 7 to 9 years)

Annex 6

Lesson plan – The wine-growing regions of Portugal

Lesson Plan

The wine-growing regions of Portugal

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

- | | |
|----|--|
| 1. | Identify the regions of Portugal. |
| 2. | Locate the wine-growing regions of Portugal. |
| 3. | Characterize the predominant climate in the different regions. |

THEORETICAL CONTEXTUALIZATION OF THE TASK THAT WILL BE CARRIED OUT

After a research, in works already done on the subject, a theoretical work was done, where the climate in Portugal and the regions that constitute it are characterized. According to the country's division into wine regions, the predominant grape varieties, the sensorial characteristics of the wines produced by them and the phenology in each region were identified.

ACTIVITY / EXPERIENCE

Materials required: Computer, projector, mobile phone and worksheet.

Methodology: After a brief exploration of some of the contents on the climate and its influence on the grape varieties and consequent influence on the wines, students are invited to participate in a small game, by teams, with question-answer, about the knowledge they have acquired previously. Lastly. They will have to individually resolve a worksheet and evaluate the lesson.

Activity aimed at: Students of the 4th year (9 years old)

Annex 7

Lesson plan – Wind Energy

Lesson Plan

Wind Energy

IN THIS CLASSROOM, THE STUDENTS ARE INTENDED TO LEARN THE FOLLOWING:

1.	Produce electricity by friction between objects.
2.	Produce electricity using a wind generator.
3.	Conduct simple experiments with lamps, wires and other conductive and non-conductive materials using the wind generator.
4.	Build simple electrical circuits.

The activity consists of using wind direction and speed data collected from the weather station as a starting point for the possibility of using wind energy in the production of electricity. This will be implemented by the students of the PIC in a class of the 4th grade (1^oC), using a methodology of laboratory work; simple circuits (lamp, switch, wiring and wind generator) will be built to test the influence of wind speed on the production of electricity.

Esta atividade enquadra-se nas Metas Curriculares do (4^oAno)

ACTIVITY / EXPERIENCE: PERFORMING EXPERIENCES WITH ELECTRICITY

- Produce electricity by friction between objects.
- Perform simple experiments with batteries, lamps, wires and other conductive and non-conductive materials,
- Build simple electrical circuits.

Materials Required:

- Connection wires
- Switches
- Lamps

- Wind generator (built by PIC students)
- Anemometer (built by PIC students)

Metodologia:**Part I:**

The activity will be developed in a 4th grade class by the students of the PIC, in the form of laboratory activity: the students of the 4th year will assemble a simple electric circuit (lamp, switch, wiring and wind generator) and test the influence of wind speed (measured in anemometer) in the production of electric energy. Afterwards, the data obtained by the meteorological station will be analyzed and the best days for the production of electric energy will be selected.

Part II: Data collection

During the activity

Part III: Analysis of results

During the activity