

TEESCHOOLS

Transferring Energy Efficiency in Mediterranean Schools

PRIORITY AXIS: Fostering Low-carbon strategies and energy efficiency in specific MED territories: cities, islands and remote areas

OBJECTIVE: 2.1 To raise capacity for better management of energy in public buildings at transnational level

DELIVERABLE NUMBER: 5.4.1

TITLE OF DELIVERABLE: WP5 Open lessons for behavioral change to teachers and students

WP n. 5: CAPITALISING

ACTIVITY n. 5.4. 1 Open Lessons

PARTNER IN CHARGE: FVMP

PARTNERS INVOLVED: CSPT

Status:

Draft

Final

Version n. 01

Date December 2019

OBJECTIVE

The open lessons have the objective to change the behaviour of the actors on energy efficiency in school buildings.

CONSIDERATIONS

Considerations and suggestions to do the activities:

- Students, teachers and technical staff will be involved
- The main thing is to transfer knowledge on simple every day actions
- Reference point could be the presentation of CEA in Split
- Examples of good practices in other schools could be used
- Each open lesson must last between one hour and one hour and a half
- The open lessons will end at the end of October

OUTPUTS

The open lessons will involve around 2000 teachers, students and school staff and

- There will be 70 open lessons
- 10 open lessons per country
- At least 5 schools for each country

REPORT

At the end of the activities each country will send a report (max 10 pages) with:

- Schools where the open lessons took place
- Agenda, poster....
- Number of students, teachers and staff involved (list of participants)
- Material used
- Photos (2 or 3 per open lessons)
- Surveys
- Evaluation and conclusions (1 page)

PARTNERS INVOLVEMENT

The institutional partners will organize the open lessons.

The technical partners will help institutional partners in technical aspects.

ITALY:

OPEN LESSONS FOR BEHAVIORAL CHANGE TO TEACHERS AND STUDENTS

Trasferiamo l'efficienza energetica nelle SCUOLE mediterranee

TEESCHOOLS

“Scuole ad Energia Quasi Zero - NZEB”

Let's **START!**



Lead Partner



Project partners

Local Partner in charge: Municipality of Castel San Pietro Terme (CSPT)

Index

<u>1. Introduction</u>	4
<u>2. Schools and people involved</u>	4
<u>3. Materials and methods used</u>	5
<u>3.1 Teaching</u>	5
<u>3.1 Open lesson contents and duration</u>	6
<u>3.1 Didactic materials</u>	6
<u>3.1.1. Primary schools</u>	7
<u>3.1.2. Middle schools</u>	8
<u>3.1.3. High schools</u>	9
<u>4. Open lesson: photo report</u>	11
<u>4.1. Primary schools “Albertazzi”</u>	11
<u>4.2. Primary schools “Lucia Sassatelli”</u>	13
<u>4.3. Middle schools “F.lli Pizzigotti”</u>	14
<u>4.4. High schools “IIS Bartolomeo Scappi”</u>	15
<u>4.4.1. First year classes</u>	15
<u>4.4.2. Fifth year classes</u>	16
<u>5. Final numbers: conclusion</u>	17

1. Introduction

The Municipality of Castel San Pietro Terme carried out the open lessons for behavioral change to teachers and students in the schools of its territory selected as case study from October to December 2019.

These open lessons involved more than 300 people including students, school staff and teachers from primary, middle and secondary schools and about 28 hours of lessons in total. In the last session of this report (Chapter 5), a summary table of the open lessons executed in Castel San Pietro Terme is reported.

2. Schools and people involved

The schools of Castel San Pietro Terme involved in the project have been selected among the five schools previously underwent the energetic audit during the development of the WP3 activities. The different schools that took part in the open lessons are under the supervision of diverse directorates which were contacted separately in order to insert the open lesson in each school program and to obtain the necessary authorizations for teaching. In Table 1, the schools which took part in the learning program are summarized.

Table 1. Schools of Castel San Pietro Terme selected for the open lessons.

School grade	School name	Direction
Primary School	Albertazzi (Fig. 1)	State Didactic Direction
	Luciana Sassatelli (Fig. 2)	Castel San Pietro Terme
Middle School	F.lli Pizzigotti (Fig. 1)	Comprehensive Institute Castel San Pietro Terme
High School	Bartolomeo Scappi (Fig. 3)	IIS Bartolomeo Scappi Castel San Pietro Terme



Figure 1. Image showing the building of both Primary school “Albertazzi” and Middle School “F.lli Pizzigotti”



Figure 2. Image showing the building of Primary school “Luciana Sassatelli”.



Figure 3. Image showing the building of High school IIS “Bartolomeo Scappi”.

Due to the large number of classes and students, a selection among the classes has been done considering either school and class grade and number and availability of the students. Therefore, the open lessons were carried out in the following classes:

- 5 classes from the 5th grade Primary schools “Luciana Sassatelli” and “Albertazzi”;
- 3 classes from 3rd year Middle school “F.lli Pizzigotti”;
- 2 classes from the 1st year and 2 classes from the 5th year of high school “Bartolomeo Scappi”;
- technical staff and teachers from each of these schools.

3. Materials and methods used

Considering that the learning program would have been executed in schools and classes of different grade, the lesson contents have been specifically set considering the age of the students involved in the training process. In this framework, the same themes and concepts have been illustrated using different approaches, techniques and didactic materials. In general, the main didactic supports consisted in Power Point presentation, brief videos, didactic laboratory, practice with measuring instruments and discussion with students.

3.1 Teaching

All the activities included in the open lessons have been realized thanks to the fruitful collaboration of each Dean of the involved Directorates and with the support of teachers and technical staff of the selected schools.

The open lessons at primary and middle schools have been carried out thanks to the hiring of an external support with large experience in teaching of pupils and young students on the themes of the TEESCHOOLS Open Lessons. This support was done by the Cooperative Atlantide, based at Cervia (RA), that participated in the previous European project named Energy@school on the themes of energy saving at school and coordinated by “Unione dei Comuni della Bassa Romagna”.

Regarding the learning program developed in the high school, the open lessons were held by the staff of the Municipality, in particular by the Local Project Coordinator and by the Energy Manager using the didactic material before described.

3.1 Open lesson contents and duration

During the open lessons all the students learned about the following themes:

- presentation of TEESCHOOLS project;
- illustration of the results from the energetic audit carried out at their schools in the first phase of the project;
- introduction to energy concepts, climate altering emissions, energy efficiency, NZEB, energy consumption, energy saving, practical sessions using instrument, ect.;
- practical activities using measuring instruments with the aim to give tangible and understandable concepts related to energy consumption, energy saving, relation to activities in and out of the schools, energy and environment;
- daily behavioural best practices to save energy at home and at school has been also illustrated.

Students of each classes participated at two hours of individual encounters except for the 2 classes from the 5th year of the high school of Hotel Management “B. Scappi” for which a specific learning path has been implemented realizing two additional lessons lasting 2 hours each.

3.1 Didactic materials

As mentioned in the previous paragraph, different teaching approaches and materials have been fielded for improving the comprehension of the energy and environmental concepts to different target audience and to trigger new behavioural in energy saving at school and at home.

As a reminder of the learning experience with the TEESCHOOLS Open Lessons, at the end of the lessons all the participants received a useful gadget related to the topics covered (Fig. 4)



Figure 4. Gadget with the logo of TEESCHOOL Project for participants.

3.1.1. Primary schools

The program at the primary schools included slides (Annex 1), writing questionnaire (Annex 2), videos, practical activity with games linked to energy and environmental issue (Fig. 5) and finally stimulation of pupils with some simple questions.

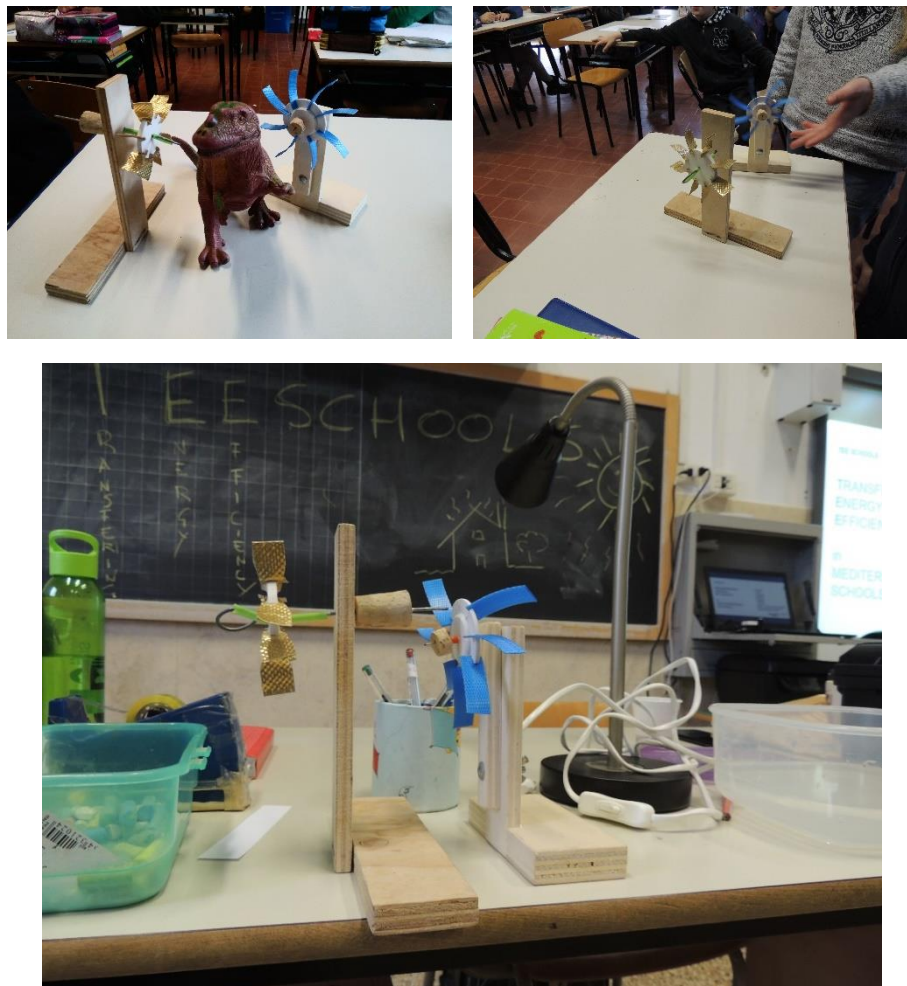


Figure 5. Images showing some didactic material used during the open lesson in the primary school.

3.1.2. Middle schools

At the middle school classes, the didactic support was given by slides, videos and practical activities conducted with the informatics on line support created on the web site www.kahoot.it. In particular, each class was subdivided in four groups of about 5-6 students and each group has been equipped with a tablet designed to connect to the online platform specifically designed for this type of activities (<https://create.kahoot.it/details/teeschools/a912f914-0045-4557-8b42-4a1fb93b4a2e>) and based on quizzes (Fig.6).

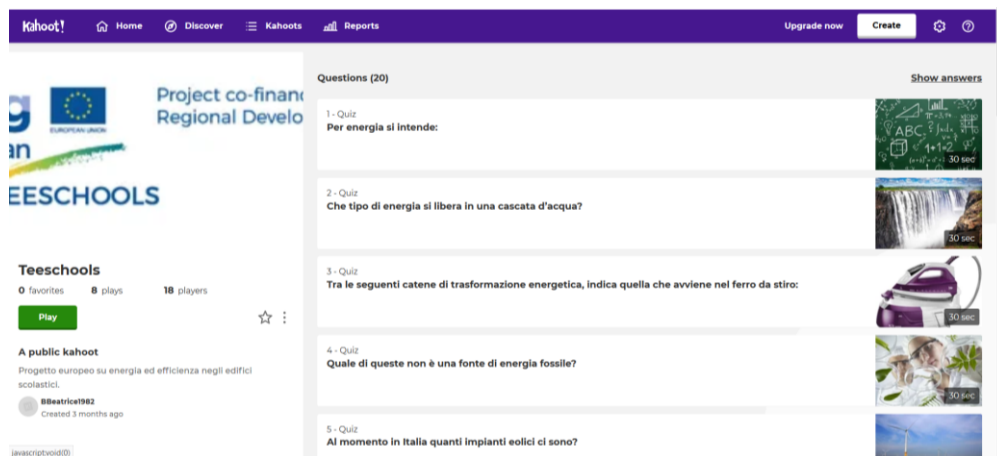


Figure 6. Figure show the dedicated TEESCHOOLS page on the online tool Kahoot.it used to perform the activities in the middle schools of Castel San Pietro Terme.

Students received the PIN code and instruction for login on their tablets and for starting to play and interactively participate with the teacher supervision (Fig. 7).

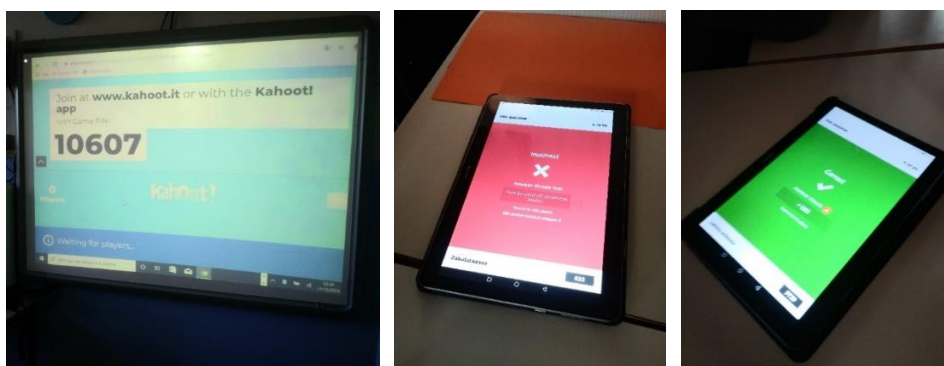




Figure 7. Images showing tablet used by the students to interactively participate at the open lessons.

3.1.3. High schools

Due to their specificity in the Hotel Managing the students of high school “B. Scappi” followed a different program respect to primary and middle schools but always linked to energy and environmental issue as the aim of these open lessons require.

After an introduction to TEESCHOOLS Project, lessons followed with the power point presentations related to the environmental and energetic issue mentioned in the previous point 3.1 and reported in Annex 3a (slides for 1st year classes) and Annex 3b (slides for 5th year classes). Projection of brief videos has been also done. Furthermore, all the students of this school performed a dedicated practical activity to measure microclimate, monitoring temperature (T) and relative humidity (RH), CO₂ concentration and luminosity in the room during the lesson. Supplementary activity was also focused on the evaluation of the energetic consumption of the equipment present in the school kitchen and used for cooking lessons. This practical activity was carried out either by learning how to read an energy plate of an appliance and by using different specific instruments of measure as follows: LCD Digital Energy Power Meter/Watt Voltage Calculator (Fig. 8), Thermo-Hygrometer (Fig. 9), CO₂ meter, Lux-meter (Fig. 10).



Figure 8. LCD Digital Energy Power Meter/Watt Voltage Calculator



Figure 9. Thermo-Hygrometer



Figure 10. Lux-meter used during practical activity in the high school.

Students also experimented the production of CO_2 adding vinegar to sodium bicarbonate during a brief experiment carried out in the practical activity (Fig. 11)



Figure 11. Experiment carried out in order to produce CO_2 adding vinegar to sodium bicarbonate.

In addition, as implementation of learning process, students of the fifth classes followed an experimental training to apply in their cooking lessons with the main aim to calculate

the CO₂ production during the preparation of pre-selected recipes. Before, during and at the end of the preparation of these recipes students have been supported by their teachers to evaluate energy consumptions and emissions produced during the whole cycle of preparation also taking into account consumptions and emission related to the production and transport of each ingredient of the recipes. After two weeks of work in separate groups, two additional hours of lessons for each of these classes have been done for the presentation of their work in in the preparation of the low energy dishes and also to stimulate a discussion about the best recipe considering the suitable compromise among energy consumption in the preparation, CO₂ emission and taste of the prepared dish. In Annex 4 the recipes proposed and prepared by the different groups of students are described whereas in Annex 5 slides of the lessons with the analyses of the work done during the preparation of the dishes and related conclusion is reported.

4. Open lesson: photo report

In the following paragraph final results from the open lessons executed in in the schools of Castel San Pietro Terme are reported. These results are presented as collection of most significant photos taken during the open lessons. Photos taken at the different schools are presented in diverse sections.

4.1. Primary schools “Albertazzi”

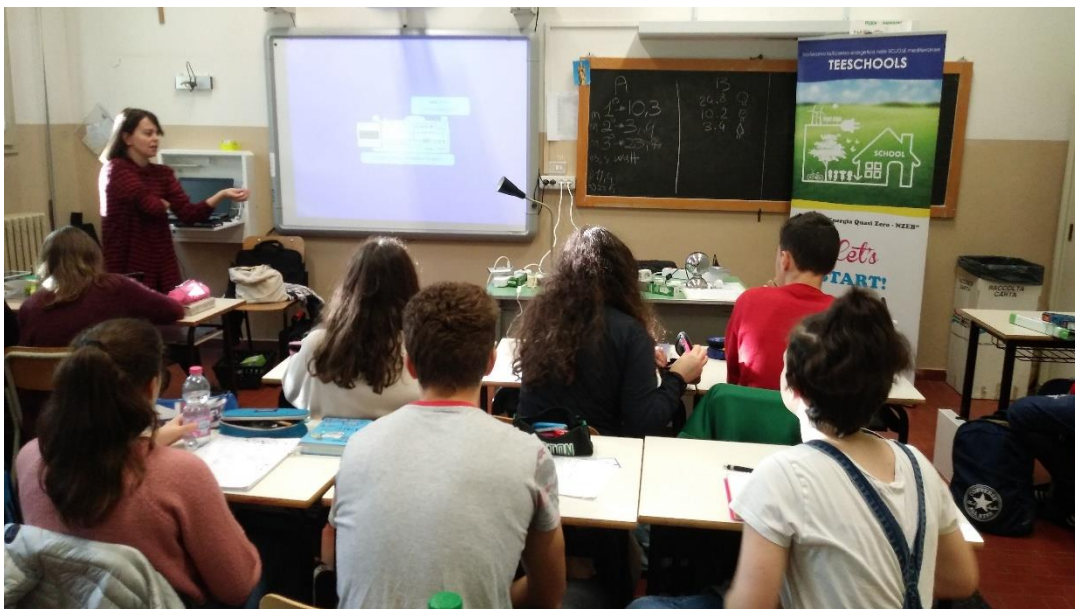




4.2. Primary schools “Lucia Sassatelli”



4.3. Middle schools "F.lli Pizzigotti"



4.4. High schools “IIS Bartolomeo Scappi”

4.4.1. First year classes





4.4.2. Fifth year classes





5. Final numbers: conclusion

Table 2 summarizes the main important information about the schools (classes, students, teachers, staff involved), and agenda of the open lesson held in Castel San Pietro Terme from October to December 2019.

Table 3 reports significant number related to the target reached at the end of the open lessons.

Table 2. Summary of main information

School name	School grade	Class grade	Class name	Students	Staff and Teachers	Scheduled day	Scheduled hours	Duration (hour)
Albertazzi	Primary	5th	5D	26	2	06/12/2019	8:15-10:15	2
			5E	26	2	06/12/2019	10:15-12:15	2
Sassatelli		5th	5A	25	2	11/12/2019	8:15-10:15	2
			5B	23	2	09/12/2019	8:15-10:15	2
			5C	24	2	09/12/2019	10:15-12:15	2
F.Ili Pizzigotti	Middle	3th	3C	22	2	10/12/2019	8:00-10:00	2
			3E	24	2	29/11/2019	8:00-10:00	2
			3F	22	2	11/12/2019	12:00-14:00	2
IPSAR B. Scappi	High	1st	1B	21	3	18/10/2019	8:30-10:30	2
			1C	22	3	14/10/2019	11:30-13:30	2
		5th	5A	14	4	18/10/2019	10:30-12:30	2

						15/11/2019	10:30-12:30	2
			5E	21	4	16/10/2019	10:30-12:30	2
						13/11/2019	10:30-12:30	2

Table 3. Final summary

Numbers	Description
4	Total number of involved schools
3	Different grade of involved schools
4	Different grade of involved classes
12	Total number of classes involved
270	Total number of students involved
30	Total number of staff members and teachers involved
14	Total number of Open lessons implemented
28	Total hours