



# Add-on-Skills Summer School

## **Final presentation**

### Team 4

TEAM 4



Poland day



4 July  
Poland



5 July  
Italy



6 July  
Spain



7 July  
Danwood



8 July  
PERI



11 July  
Lithuania



12 July  
Latvia

## Pros & cons of concrete construction

### Pros

- Concrete is incredibly durable
- It's extremely long lasting
- Concrete makes great flooring
- It can be used for a range of purposes



### Cons

- It often needs to be reinforced
- Requires professional installation
- Concrete can crack



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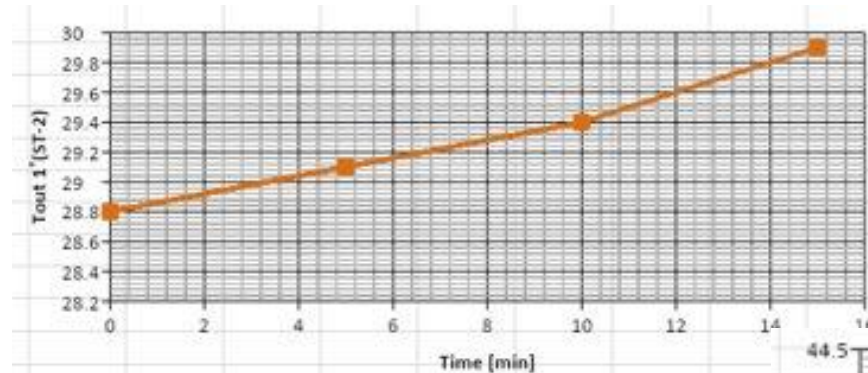
11 July  
Lithuania

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Latvia

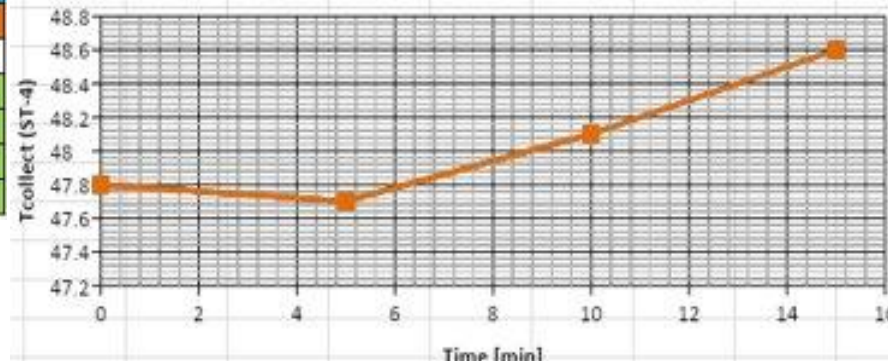
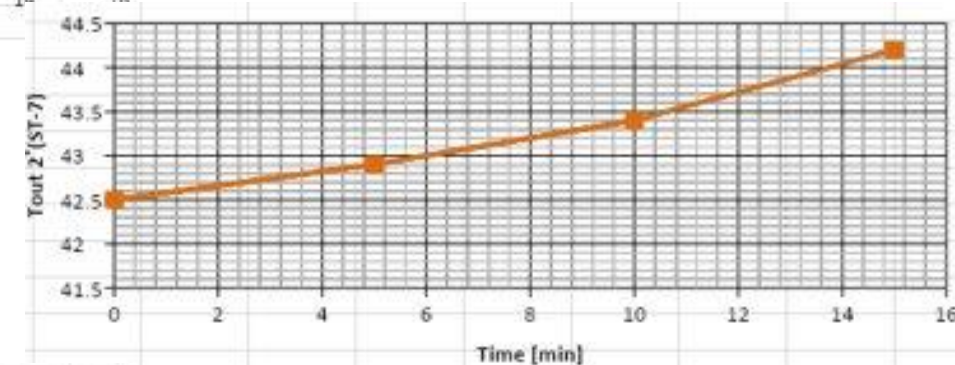
## Determination of characteristic parameters of a solar collector



Temperature [°C]	Time [min]			
	0	5	10	15
Tout 1' (SI-1)	52	51.9	52.1	53
Tin 1' (SI-2)	28.8	29.1	29.4	29.9
(Tin+Tout)/2	40.4	40.5	40.75	41.45
Ta (SI-5)	23	23	23	23
(Tin1'-Tou1')/2-Ta	17.40	17.50	17.75	18.45
$\rho$ [kg/m <sup>3</sup> ]	992.3	992.3	992.2	991.9
Q 1' [l/h] * (SC-1)	40	40	40	40
m [kg/s] * (SC-1)	0.011	0.011	0.011	0.011
cp [J/kg/K]	4180	4180	4180	4180
Qu [W]	1059.22	1050.74	1046.04	1064.20
A [m <sup>2</sup> ]	2.13	2.13	2.13	2.13
E [W/m <sup>2</sup> ]	600	600	600	600
h [%]	83.66	82.22	81.85	83.27
Tin 2' (SI-6)	25.6	25.5	25.8	26.3
Tout 2' (SI-7)	42.5	42.9	43.4	44.2
Tcollect * (SI-4)	47.8	47.7	48.1	48.6
QII' [l/min] * (SC-2)	0.25	0.25	0.25	0.25



We were in the lab doing 2 labs.



This is the first laboratory work with solar collectors, we had to wait 15 minutes from the start of the experiment and fix the parameters every 5 minutes.



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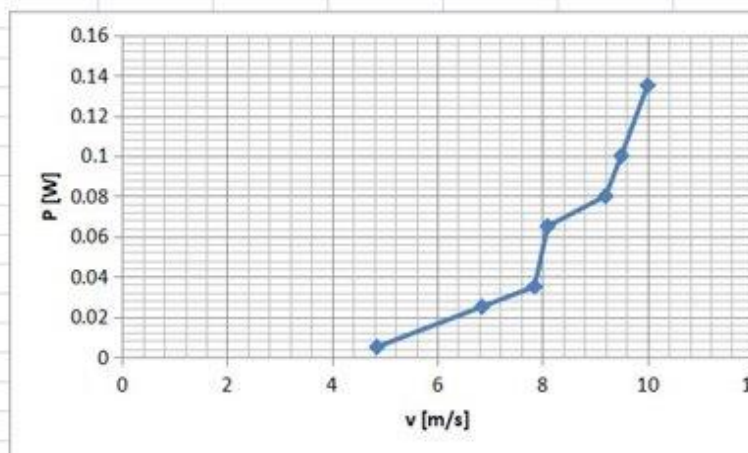
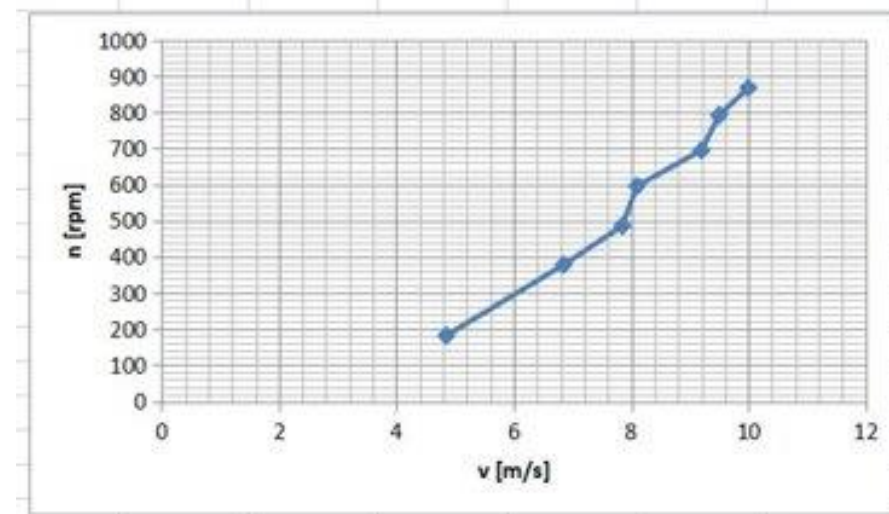
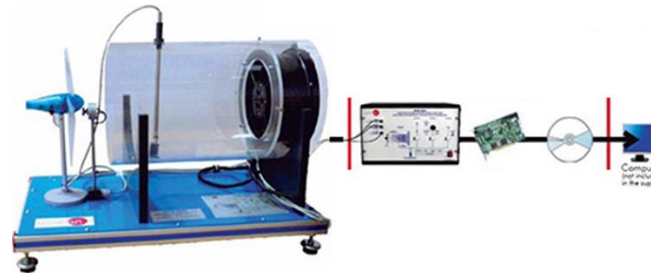
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# Determination of the characteristics of wind turbines

Table 1. Results of experiment.

Setting						
$n\%$	$v$	$v_{avg}$	$n$	$n_{avg}$	$P$	$P_{avg}$
MAX	m/s	m/s	rpm	rpm	W	W
%						
40	5	4.85	186	182	0.01	0.005
	4.7		178		0	
50	7.3	6.85	374	378	0.03	0.025
	6.4		382		0.02	
60	7.6	7.85	500	485.5	0.04	0.035
	8.1		471		0.03	
70	8.3	8.1	605	596	0.06	0.065
	7.9		587		0.07	
80	9.1	9.2	703	695	0.06	0.08
	9.3		687		0.1	
90	9.6	9.5	799	792	0.11	0.1
	9.4		785		0.09	
100	10.2	10	872	868	0.13	0.135
	9.8		864		0.14	

Second laboratory work with a wind turbine.



We increased the speed of the turbine and noticed the following dependence: the faster the turbine rotates, the higher the speed of the wind, the faster the fan rotates.

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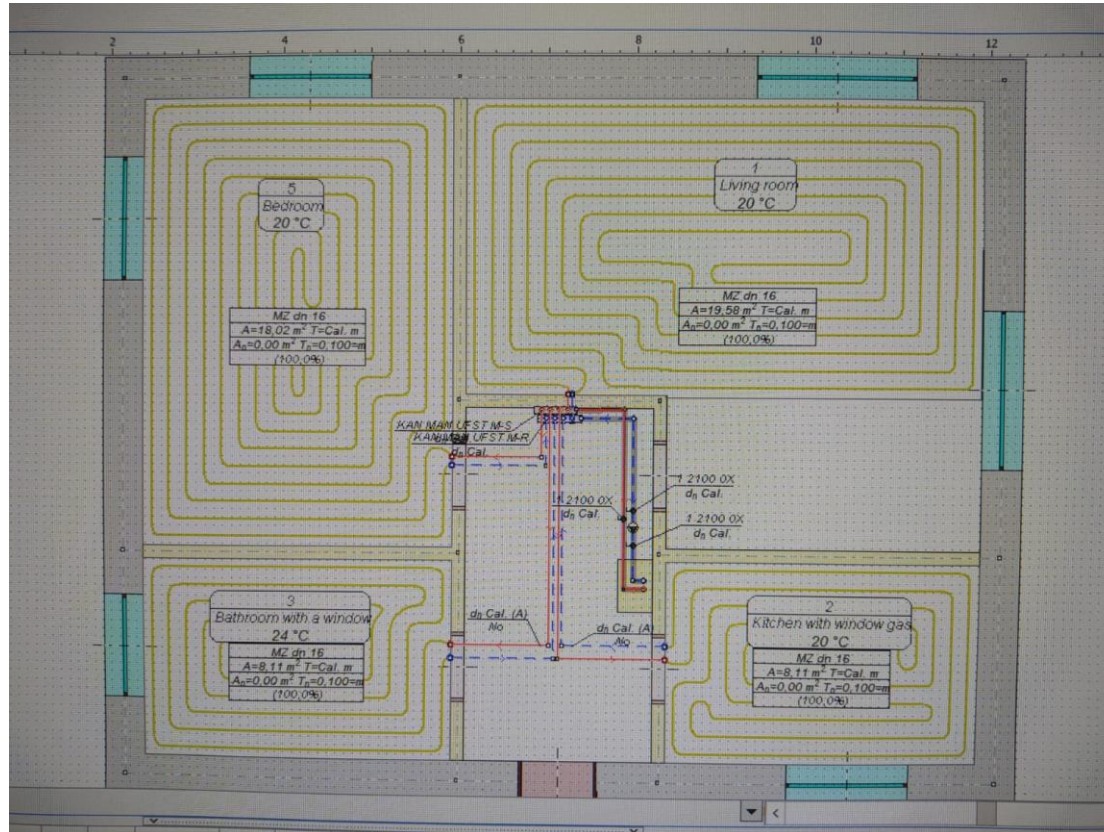
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## Floor heating systems



Info on the material				d	λ	ρ	R
				m	W/(m·K)	kg/m³	m²·K/W
Floor covering: Thin carpet flooring 0.07 m²·K/W							0,070
Cement screed.				0,0650	1,300	2200	0,050
KAN-therm Tacker foamed polystyrene board EPS100 038 (PS20)				0,0200	0,038	20	0,526
Profil2 foamed polystyrene board EPS100 038 (PS20) whit PS f				0,1000	0,038	20	2,632
PE foil for laying under thermal insulation D = 0,15 mm				0,0002	0,200	1300	0,001
Concrete base under the floor.				0,1500	1,400	2200	0,107

With the Audytor program, we designed underfloor heating

Italy day





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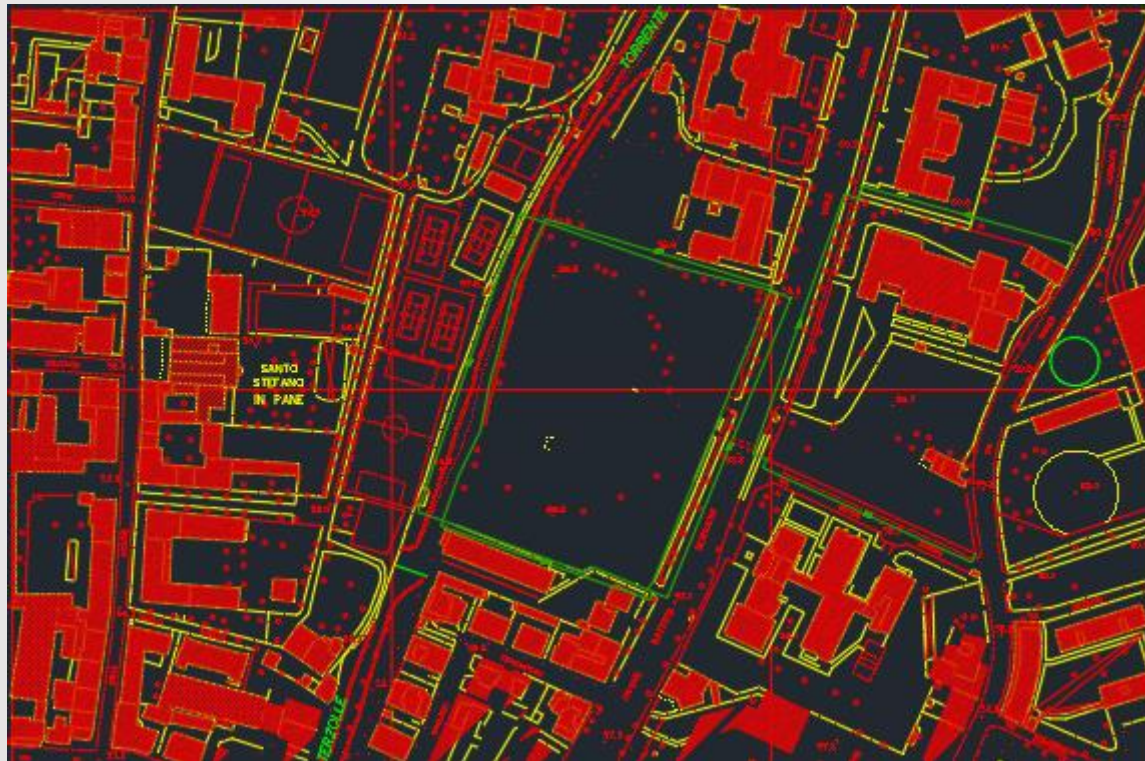


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Task: Sustainable design  
of a school



1. Choose the construction site



Location: Cordoba





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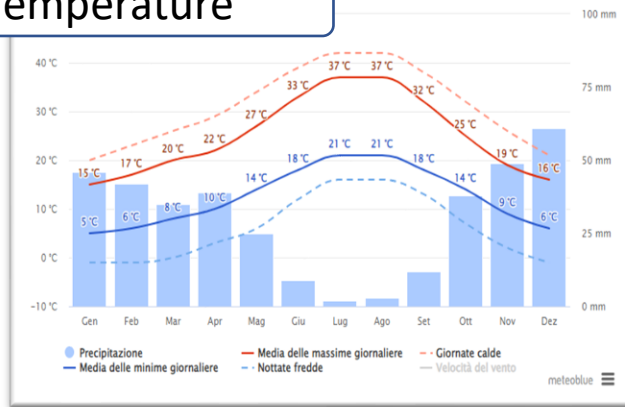
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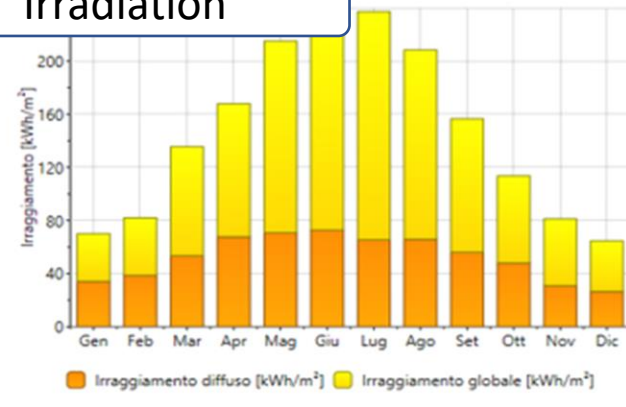
Task: Sustainable design  
of a school

## 2. Construction site analysis

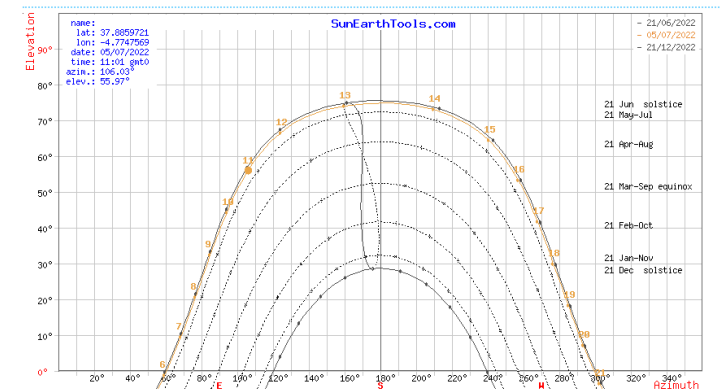
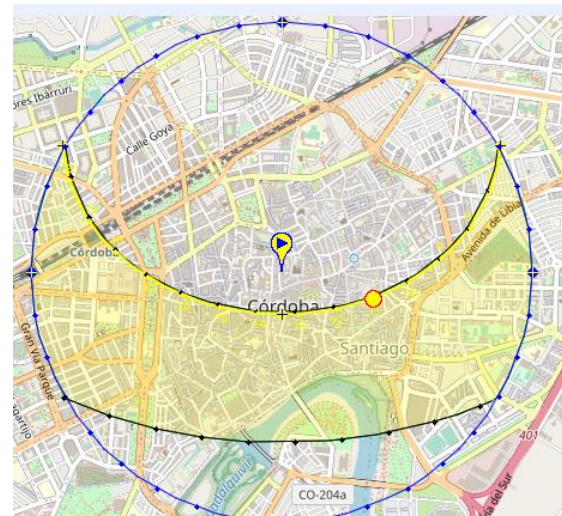
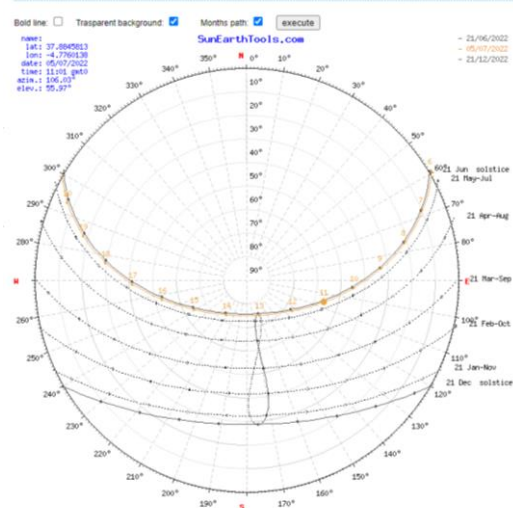
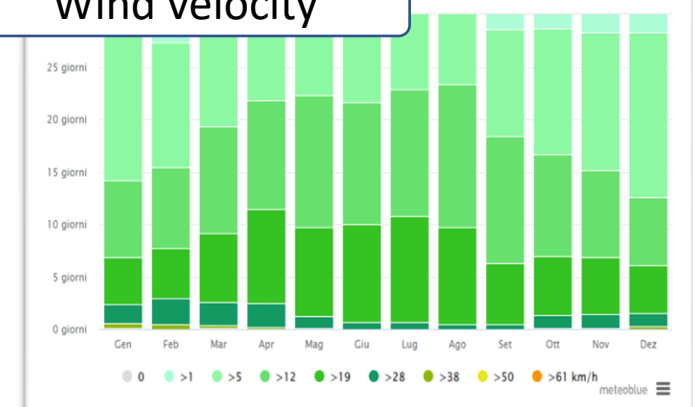
### Temperature



### Irradiation



### Wind velocity



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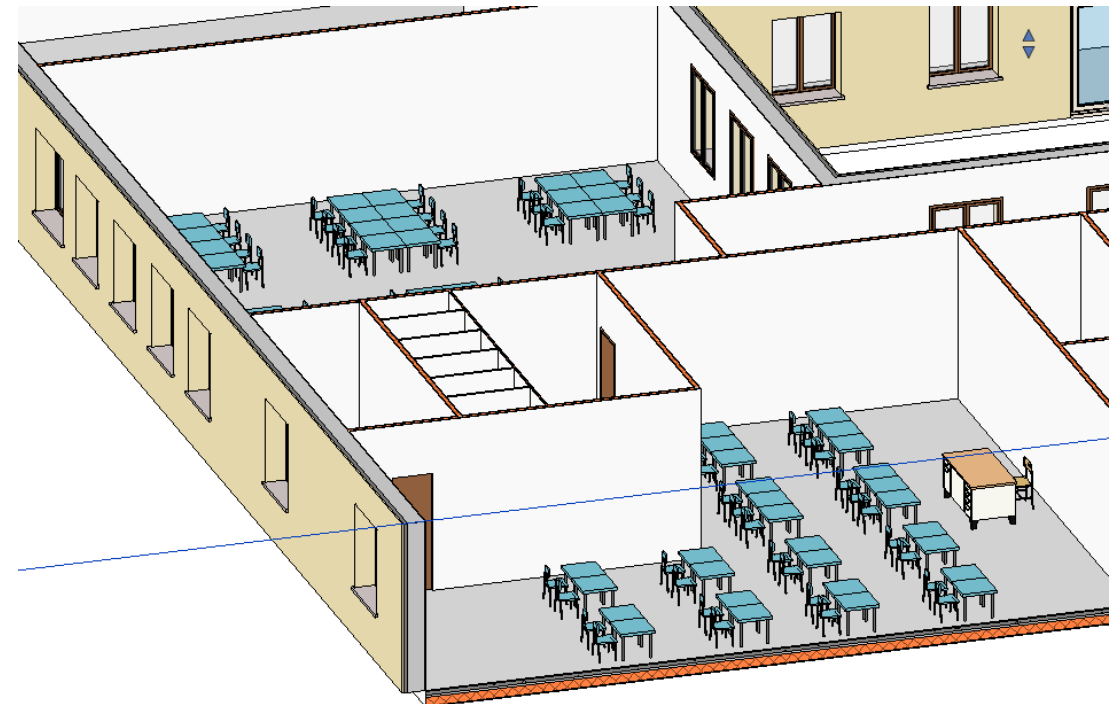
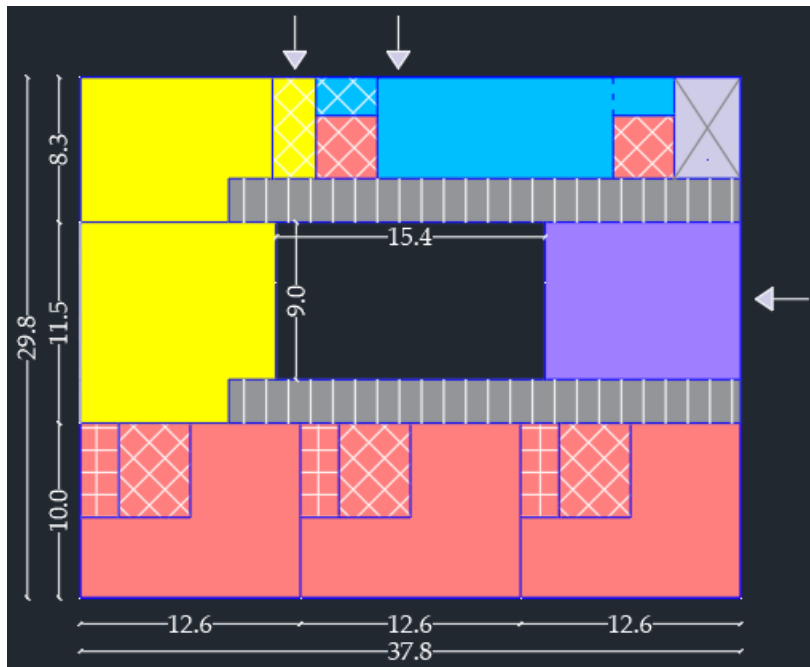
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Task: Sustainable design  
of a school

### 3. Functional Organization of the building



TEAM 4

2,5 m<sup>2</sup>/student

27 students for  
each classroom

81 students



Erasmus+



add-on-skills

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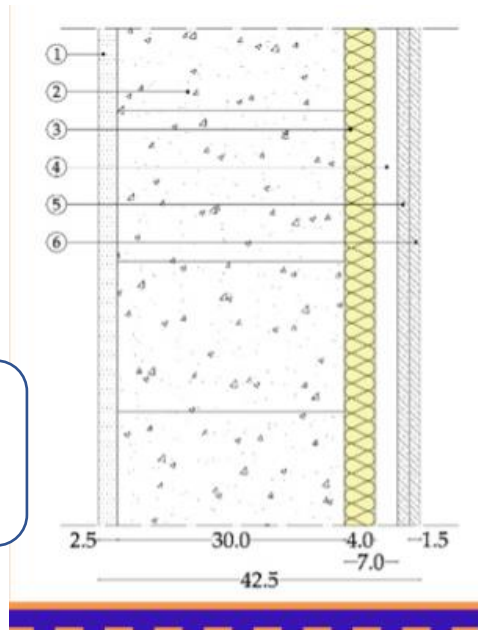
Task: Sustainable design  
of a school

## 4. Design of the façade

Requirements:

- 1/8 of Aero-illuminating ratio
- $U=0,29 \text{ W/m}^2\text{K}$  for the walls
- $U=1 \text{ W/m}^2\text{K}$  for window glass

The  
external  
wall



- 1 External plaster (2.5 cm)
- 2 Autoclaved aerated concrete (30 cm\*)
- 3 Rock wool (acoustic insulation - 4 cm)
- 4 Air cavity (7 cm\*\*)
- 5 Plasterboard panel (1.5 cm)
- 6 Plasterboard panel (1.5 cm)



The  
glazing



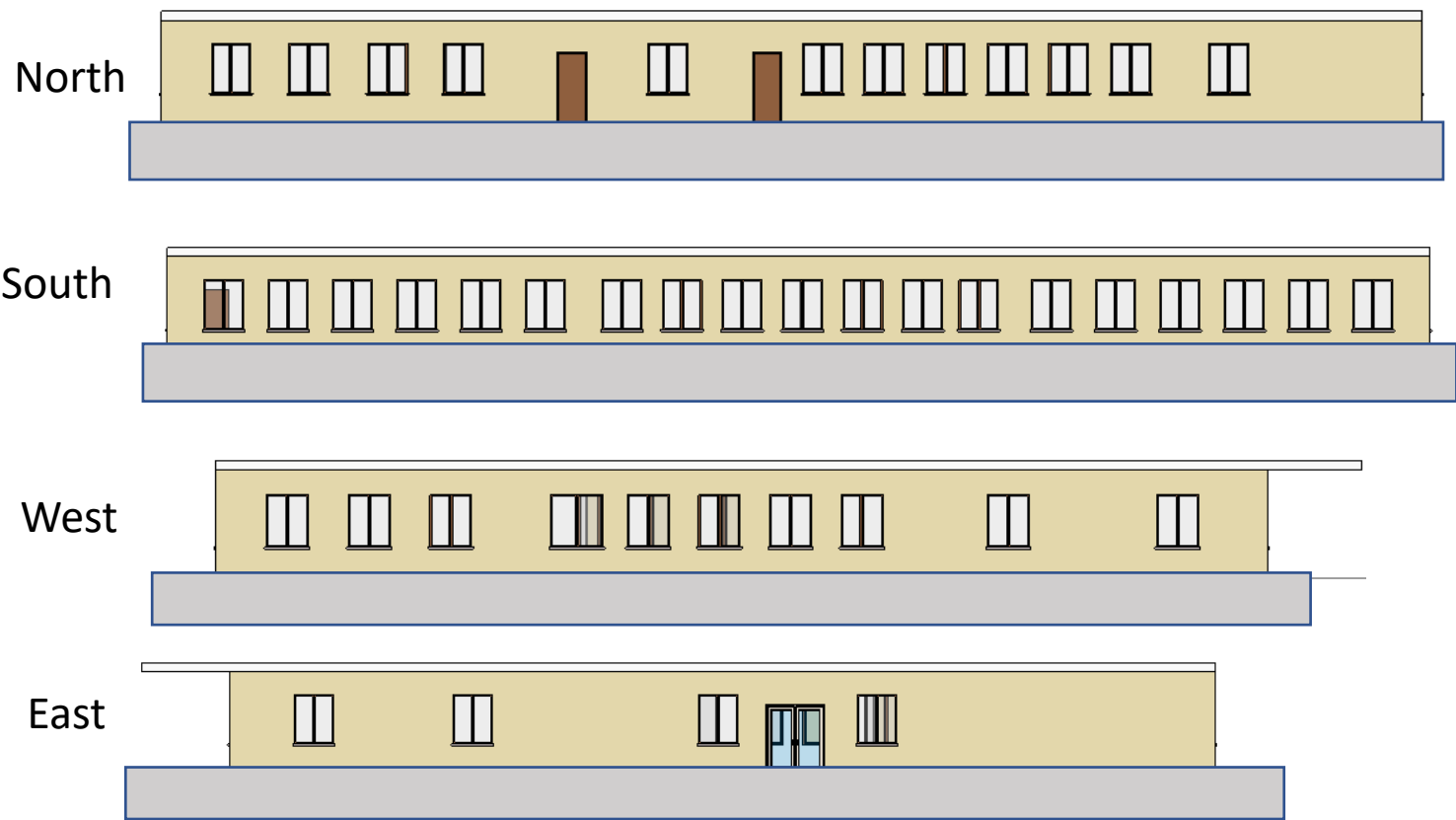


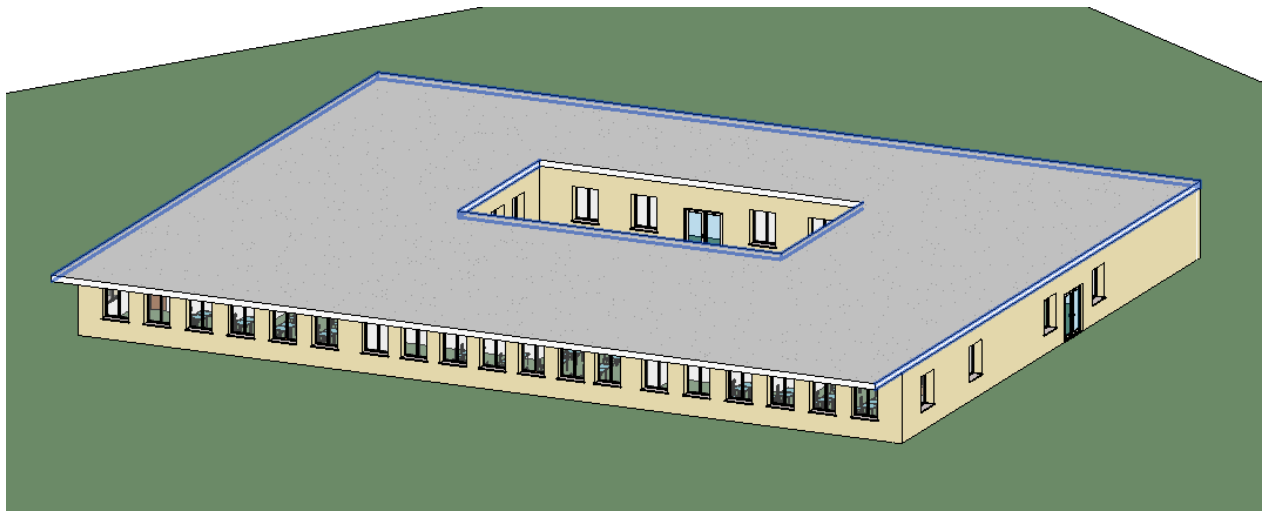
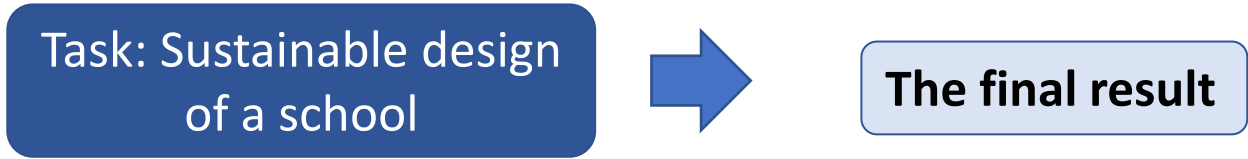
Task: Sustainable design  
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4. Design of the façade

- Requirements:
- 1/8 of Aero-illuminating ratio
  - $U=0,29 \text{ W/m}^2\text{K}$  for the walls
  - $U=1 \text{ W/m}^2\text{K}$  for window glass





# Spain day





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## SOLAR COLLECTOR CALCULATION (HOT WATER)

### Working conditions

	Daily Solar Radiation in collector (Kwh/m <sup>2</sup> )	Ambient temperature (°C)	Temperature of network water (°C)	Number of Days by month	Monthly Solar Radiation in collector (Kwh/m <sup>2</sup> )
January	2,39	7,91	14,32	31	74,20
February	3,40	12,10	14,24	28	95,10
Mach	4,55	13,52	15,61	31	141,20
April	5,79	16,54	18,16	30	173,80
May	6,71	20,65	21,19	31	208,10
June	7,67	24,61	23,88	30	230,10
July	7,64	28,57	25,50	31	236,70
August	6,82	28,75	25,62	31	211,50
September	5,30	23,94	24,19	30	158,90
October	3,69	19,34	21,61	31	114,40
November	2,60	10,94	18,58	30	78,10
December	2,01	10,45	15,92	31	62,20
Annual			59		1.784

### Water demand and heating load

Monthly water demand	Heating Load (MJ/month)	Heating Load (Kwh)
5.499	1.051,01	291,95
4.967	950,97	264,16
5.499	1.021,33	283,70
5.322	931,61	258,78
5.499	892,95	248,04
5.322	804,25	223,40
3.767	543,69	151,02
1.507	216,72	60,20
3.645	546,13	151,70
5.499	883,28	245,36
5.322	922,26	256,18
5.499	1.014,20	281,72
57.346	9.778	2.716

### Other data

	Absorbed energy/m <sup>2</sup> (Kwh/m <sup>2</sup> )	Thermal losses/m <sup>2</sup> (Kwh/m <sup>2</sup> )	Useful Energy/m <sup>2</sup> (Kwh/m <sup>2</sup> )	Collector efficiency (%)
ANNUAL	1429,22	67,69	1361,54	76,31

Average daily wáter demand

157.11 L

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## SOLAR COLLECTOR CALCULATION (HOT WATER)

### Design of installation

Proposed total collector area (m<sup>2</sup>)

2,00

1,5

Estimated volume of tank (l):

130,00

Proposed volume of tank (l):

130,00

Corrections Factors:

$F_r'/F_r$ :

0,95

Proposed number of Collectors

1

$V/A$  (l/m<sup>2</sup>)

65,00

Proposed  $V/A$  (l/m<sup>2</sup>)

65,00

$(\tau\alpha)/(\tau\alpha)_n$

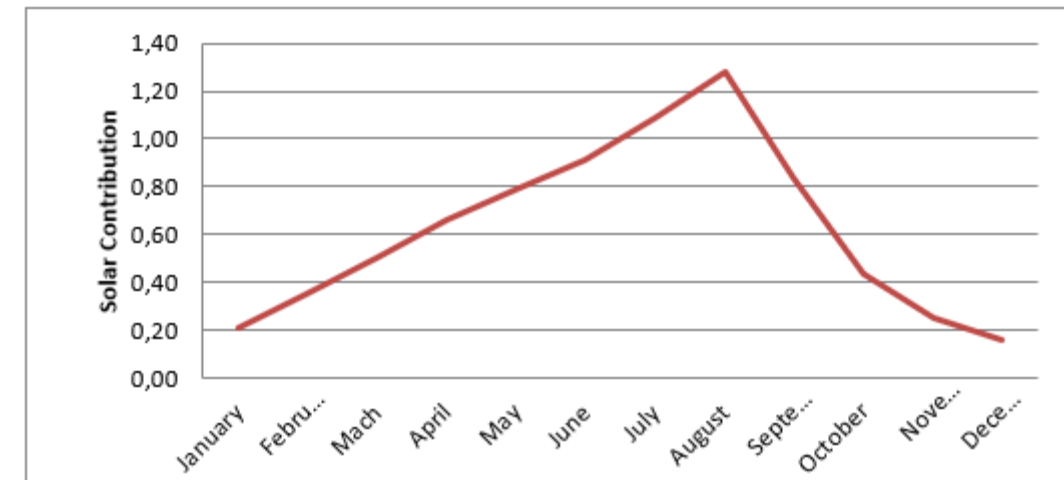
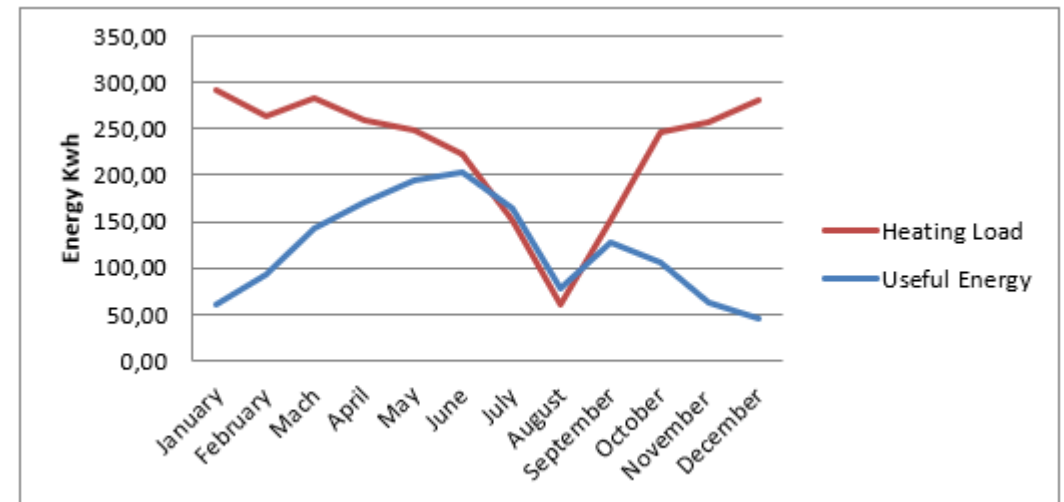
0,96

ANNUAL SOLAR  
CONTRIBUTION, F(%):

53,41%

ANNUAL USEFUL  
ENERGY (Kwh):

1450,83%





# PHOTOVOLTAIC ENERGY CALCULATION (ELECTRICITY)

## Working conditions

	Daily Solar Radiation in collector (Kwh/m <sup>2</sup> )	Hora Solar Pico (HSP)
January	2,39	2,39
February	3,40	3,40
Mach	4,55	4,55
April	5,79	5,79
May	6,71	6,71
June	7,67	7,67
July	7,64	7,64
August	6,82	6,82
September	5,30	5,30
October	3,69	3,69
November	2,60	2,60
December	2,01	2,01
Annual		58,58

## Electric loads

	Number of elements	Consumed Power (W)	Total Energy Consumed (Wh/dia)
Light	93	1.395,00	13.950,00
Fridge	2	140,00	3.360,00
TV	1	80,00	160,00
Music	1	20,00	60,00
Computer	5	600,00	1.800,00
Vaccum cleaner	0	0,00	0,00
Washing maching	1	300,00	300,00
TOTAL		2.535,00	19.630,00

Corrected Electric  
Load (Wh/day)

29171.52

	Typical Efficiency of Batteries	Real Efficiency of Batteries	Typical Efficiency of Inverter	Real Efficiency of Inverter	AC Electric Load (Wh/day)	DC Electric Load (Wh/day)	Corrected Electric Load (Wh/day)
Correctd Energy:	95%	95%	85%	85%	19.630,00	0,00	29.171,52



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## PHOTOVOLTAIC ENERGY CALCULATION (ELECTRICITY)

### Characteristics of the PV panels

Panel Power (W)	275
Panel Voltage (V)	1000
Intensity in the Maximun power point (A)	9
Voltage in the Maximum Power Point (V)	31
Short Circuit Intensity (A)	9
Open Circuit Voltage (V)	39

**ND-RB275**

### Design of the PV system

Number of PV Panels calculated	44,20
Number of PV Panels suggested	45,00
Number of PV of the project	45,00
Number or PV Panel in Serie	1,00
Number of PV Panel in Parallel	45,00

TOTAL NUMBER  
OF PV PANELS **45**

### Characteristics of the batteries

Volatage of the Batteries (V):	12
Battery Capacity (Ah):	225
Depth of discharge (%):	15,00%
Wire losses (%):	100,00%

### Design of the battery bank

Number of Batteries in Serie in the Proyect:	84.00
Number of Batteries in Parallel in the Proyect:	3.00
TOTAL NUMBER OF BATTERIES:	252.00

### Charge controller system

NUMBER OF CHARGE  
CONTROLLER OF THE  
PROYECT:

**8**

### Inverter

NUMBER OF  
INVENTERS OF THE  
PROJECT: **3**

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# Roof type

Construction site: Cordoba

Selected type: Extensive green roof

- Budget limitations

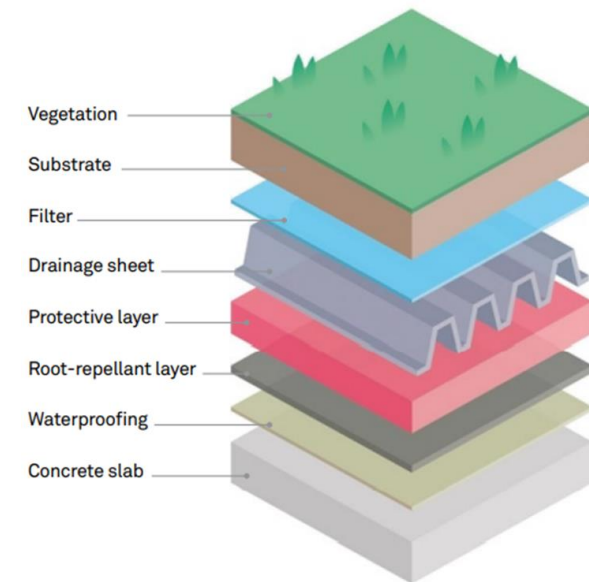


- Extensive green roof is the least expensive type of green roof

- No structural limitations
- 50% of the roof with no sun exposure



- Extensive green roof include plants that don't need sun exposure



Main components

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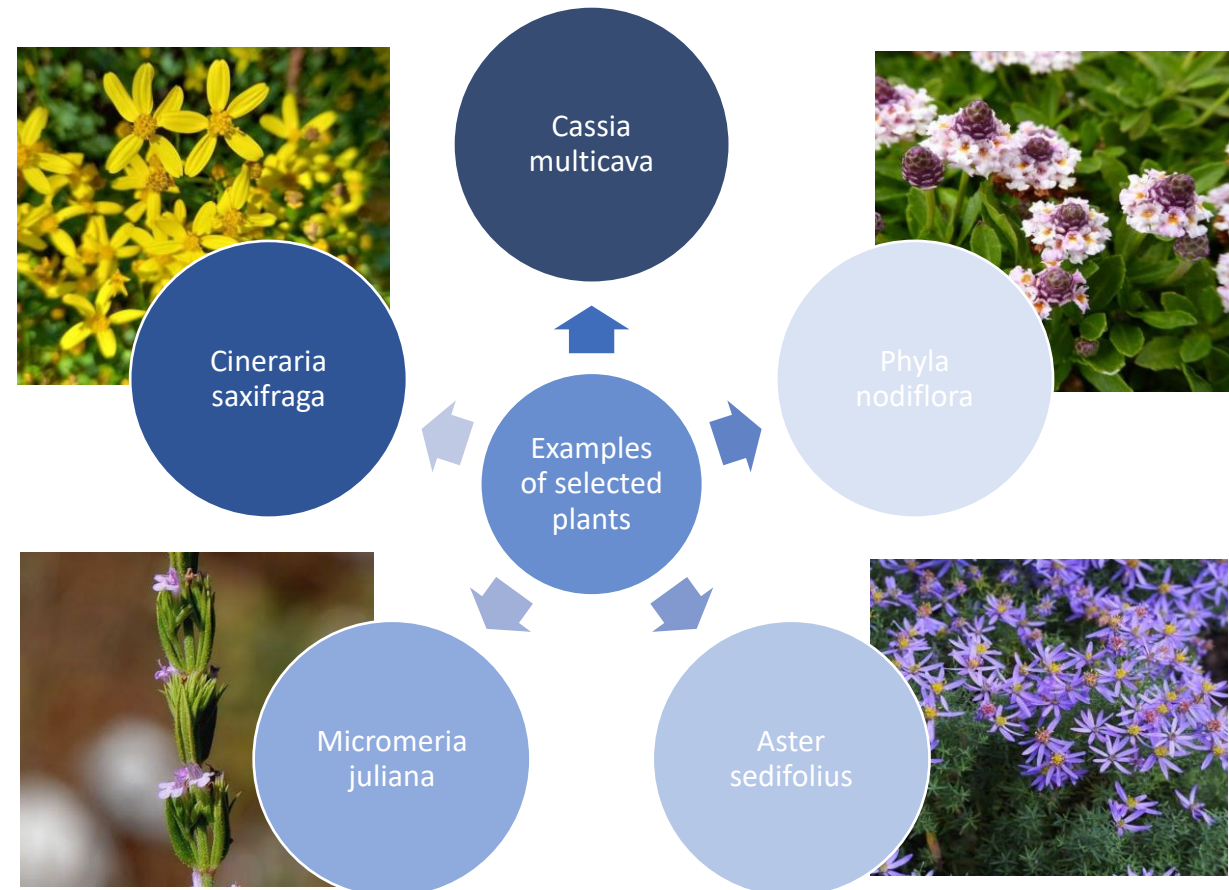
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# General information

Maintenance of an extensive roof is limited to watering in the first year during the plant establishment period and occasional weeding of invasive species for 3-4 years following installation.

Cost: between 80 € and 100 € per m<sup>2</sup>.



# Danwood day



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## Danwood S.A. Bialystok



DANWOOD S.A  
is the biggest  
manufacturer of  
ready,  
energy-efficient  
homes in Poland,  
whose production  
capacity reaches  
up to 1500  
homes a year.





PERI day



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**PERI** is a manufacturer and supplier of formwork and scaffolding systems founded in 1969 in Germany.



**PERI**



Lithuania day



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# Trimble Connect

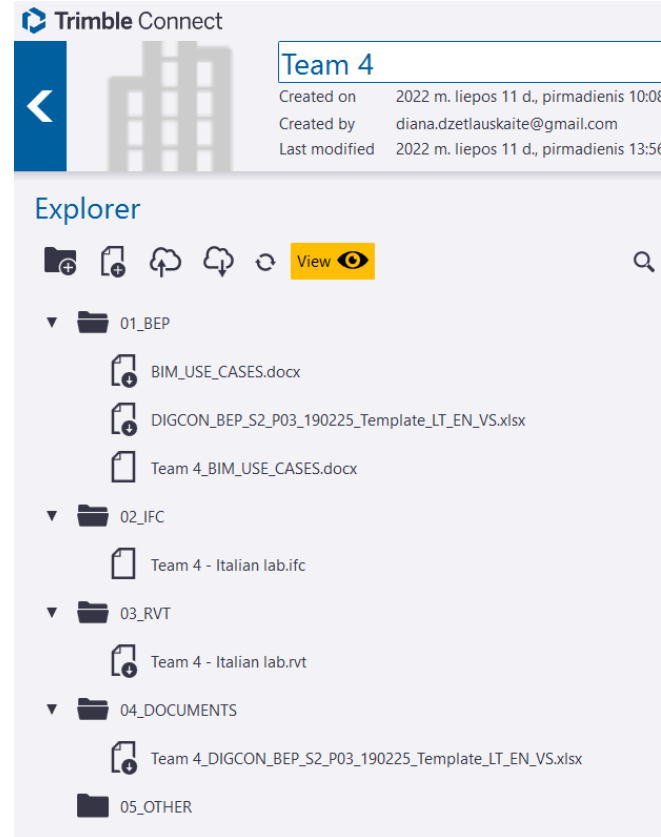
Task:

Join to Trimble  
Connect

Creat new 5 folder

Upload RVT and IFC files

Create a commentar for  
partner



TEAM 4



Erasmus+



add-on-skills

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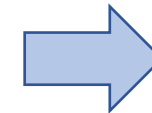
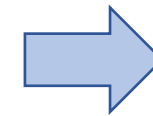


12 July  
Latvia

Task: create  
different types  
of walls

	Function	Material	Thickness	Wraps
1	Finish 1 [4]	Noce	0.0200	<input checked="" type="checkbox"/>
2	Structure [1]	Aria	0.0300	<input checked="" type="checkbox"/>
3	<b>Core Boundary</b>	<b>Layers Above Wrap</b>	<b>0.0000</b>	
4	Thermal/Air Layer [3]	Isolamento	0.1600	<input type="checkbox"/>
5	Structure [1]	Ultralam X LVL	0.0900	<input type="checkbox"/>
6	<b>Core Boundary</b>	<b>Layers Below Wrap</b>	<b>0.0000</b>	
7	Structure [1]	Isolamento	0.1200	<input checked="" type="checkbox"/>
8	Finish 2 [5]	Intonaco - Bianco	0.0150	<input checked="" type="checkbox"/>

	Function	Material	Thickness	Wraps
1	Finish 1 [4]	Travertino	0.0200	<input checked="" type="checkbox"/>
2	Thermal/Air Layer [3]	Isolamento	0.0800	<input checked="" type="checkbox"/>
3	<b>Core Boundary</b>	<b>Layers Above Wrap</b>	<b>0.0000</b>	
4	Structure [1]	Calcestruzzo	0.1200	<input type="checkbox"/>
5	Structure [1]	Aria	0.0500	<input type="checkbox"/>
6	Structure [1]	Laterizio (5)	0.1200	<input type="checkbox"/>
7	<b>Core Boundary</b>	<b>Layers Below Wrap</b>	<b>0.0000</b>	
8	Finish 2 [5]	Intonaco - Bianco	0.0150	<input checked="" type="checkbox"/>







## BIM Execution Plan (BEP)

Task: analyze the BEP and fill in the required information

<b>Project Name:</b>	<b>Sustainable kindergarden in Cordoba</b>
<b>Project short name:</b>	<b>0722_KIN_COR_D42</b>
<b>Customer (Client name):</b>	<b>University of Cordoba</b>
<b>Prepared by:</b>	<b>Team 4</b>
<b>Project Location:</b>	<b>Cordoba, Av. De la Libertad, 42</b>
<b>Contract type:</b>	<b>Project and Build</b>
<b>Short BIM related description</b>	<b>Area- 988.4m<sup>2</sup>, 3 class room, canteen, care room, kitchen.</b>

BIM Execution Plan (BEP)											
PROJECT TEAM CONTACTS											
NR	From ICS	Role	Short description of responsibilities	Kodas (Nr+Rolės kodas) (Automated )	Duties	Company	Name, Surname	Adress	e_mail	phone number	Assigned Software
1	CC		All related with role	CC1	Student						
2	AA	Architect		AA2	Student	Team 4	Luis Ramos Navarrete	Spain, Cordoba	<a href="mailto:lnavarrete02@gmail.com">lnavarrete02@gmail.com</a>	34603733163	Revit
3	DR	Project Manager		DR3	Student	Team 4	Diana Dzetlauskaitė	Lithuania, Vilnius	<a href="mailto:s19706@sso.vtdko.lt">s19706@sso.vtdko.lt</a>	37068727370	Revit
4	DJ	BIM coordinator		DJ4	Student	Team 4	Olga Doilidova	Lithuania, Vilnius	<a href="mailto:s19582@sso.vtdko.lt">s19582@sso.vtdko.lt</a>	37067474960	Revit
5	DS	Desinger		DS5	Student	Team 4	Sara Cappelli	Italy, Civitella Marittima	<a href="mailto:sara.cappelli6@stud.unifi.it">sara.cappelli6@stud.unifi.it</a>	3289515156	Revit
6	DS	Desinger		DS6	Student	Team 4	Olga Daniszewska	Poland, Ostroleka	<a href="mailto:olgadaniszewska@wp.pl">olgadaniszewska@wp.pl</a>	48662906435	Revit
7				7							
8				8							

TEAM 4



Erasmus+



add-on-skills

Latvia day



4 July  
Poland

5 July  
Italy

6 July  
Spain

7 July  
Danwood

8 July  
PERI

11 July  
Lithuania

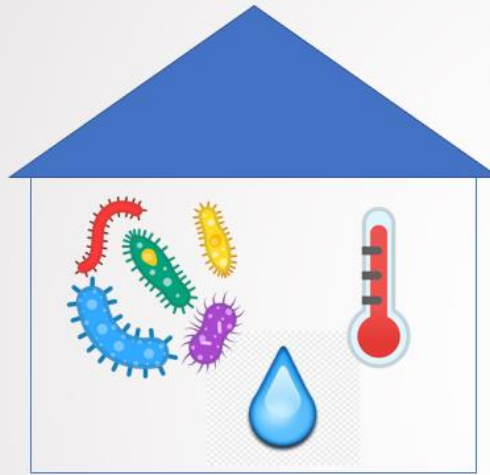
12 July  
Latvia

Task: find an idea for a  
smart house

Depending on:

- Air pollutants concentration
- Temperature
- Humidity

Window - e

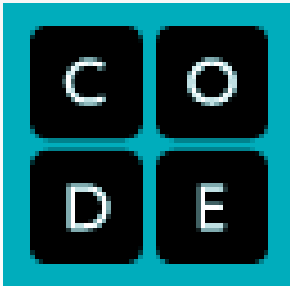


sensors






Task: get in touch with the basics of programming








Lesson 5: The Artist


## Congratulations! You completed Puzzle 10.



Share your drawing:

 Copy link to project

 Send to phone

move backward by 80 pixels

set width 1

freeCodeCamp (🔥)



(New) Responsive Web Design

Learn HTML by Building a Cat Photo

index.html

```
<h2>Cat Photos</h2>
```

### Step 4

Commenting allows you to leave messages without affecting the browser display. It also allows you to make code inactive. A comment in HTML starts with `<!--`, contains any number of lines of text, and ends with `-->`. For example, the comment `<!-- TODO: Remove h1 -->` contains the text `TODO: Remove h1`.

Add a comment above the `p` element with this text:

```
TODO: Add link to cat photos
```

```
<p>Click here to view more cat photos.</p>
<!-- TODO: Add link to cat photos -->
```

### CatPhotoApp

#### Cat Photos

Click here to view more cat photos.

4 July  
Poland

5 July  
Italy

6 July  
Spain

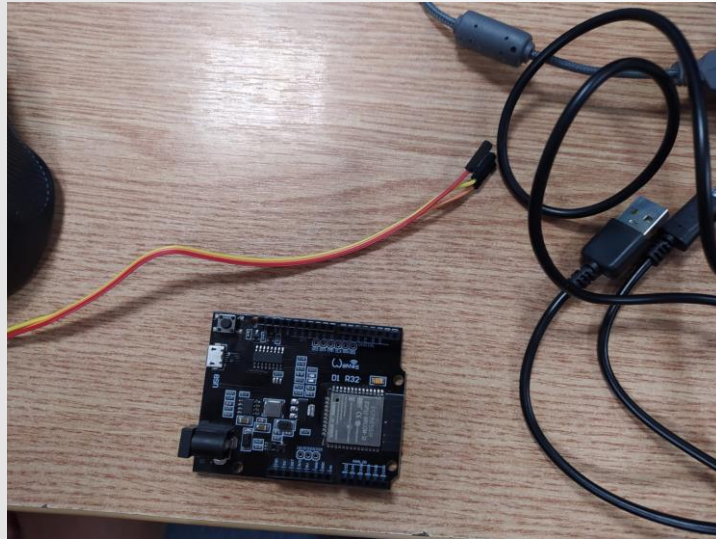
7 July  
Danwood

8 July  
PERI

11 July  
Lithuania

12 July  
Latvia

Task: Monitor the  
temperature and gas changes  
with simulations



TEAM 4



ThingSpeak™

Our results

COM4

```
WiFi Client connected
Humidity: 52.00% Temperature: 27.00°C 80.60°F
WiFi Client connected
connecting to WiFi ...
.....WiFi connected
IP address:
192.168.201.48
Humidity: 53.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 52.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 53.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 53.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 53.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 52.00% Temperature: 27.10°C 80.78°F
WiFi Client connected
Humidity: 53.00% Temperature: 27.00°C 80.60°F
WiFi Client connected
```

Commercial Use

How to Buy

OD

MATLAB Analysis

MATLAB Visualization

27

a minute ago



Erasmus+



add-on-skills



Thanks for the attention!



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