Erasmus+

Erasmus + KA2 Project
«ENGAGING STUDENTS IN LEARNING PROCESS THROUGH INOVATION»
2017-ES01-KA219-0379634

UNIREA HIGH SCHOOL

Phenology

ERASMUS
COLEGIUL NATIONAL "UNIREA"

SUMMARY

1)WHY PHENOLOGY?
2)WHAT PHENOLOGY IS?

Why Phenology?

- Phenology helps us to understand nature.
- Leafing, Flowering and Fruiting.
- Bird migration/brooding.
- Insect Pests infestation and Plant diseases incidence.
- Floods and frosts.
- Climate change – indicators – early spring?

WHAT PHENOLOGY IS?

Phenology means the study of the timing of plant and animal life cycle stages.

Examples:

- **leafing and flowering**
- **emergence of insects**
- **migration of birds**

PHENOLOGY INCLUDES MANY SUBJECTS, LIKE :

FLOWERS AND FRUITING

Photos: Gardens by the Bay

PHENOLOGY INCLUDES MANY SUBJECTS, LIKE :

BIRD MIGRATION

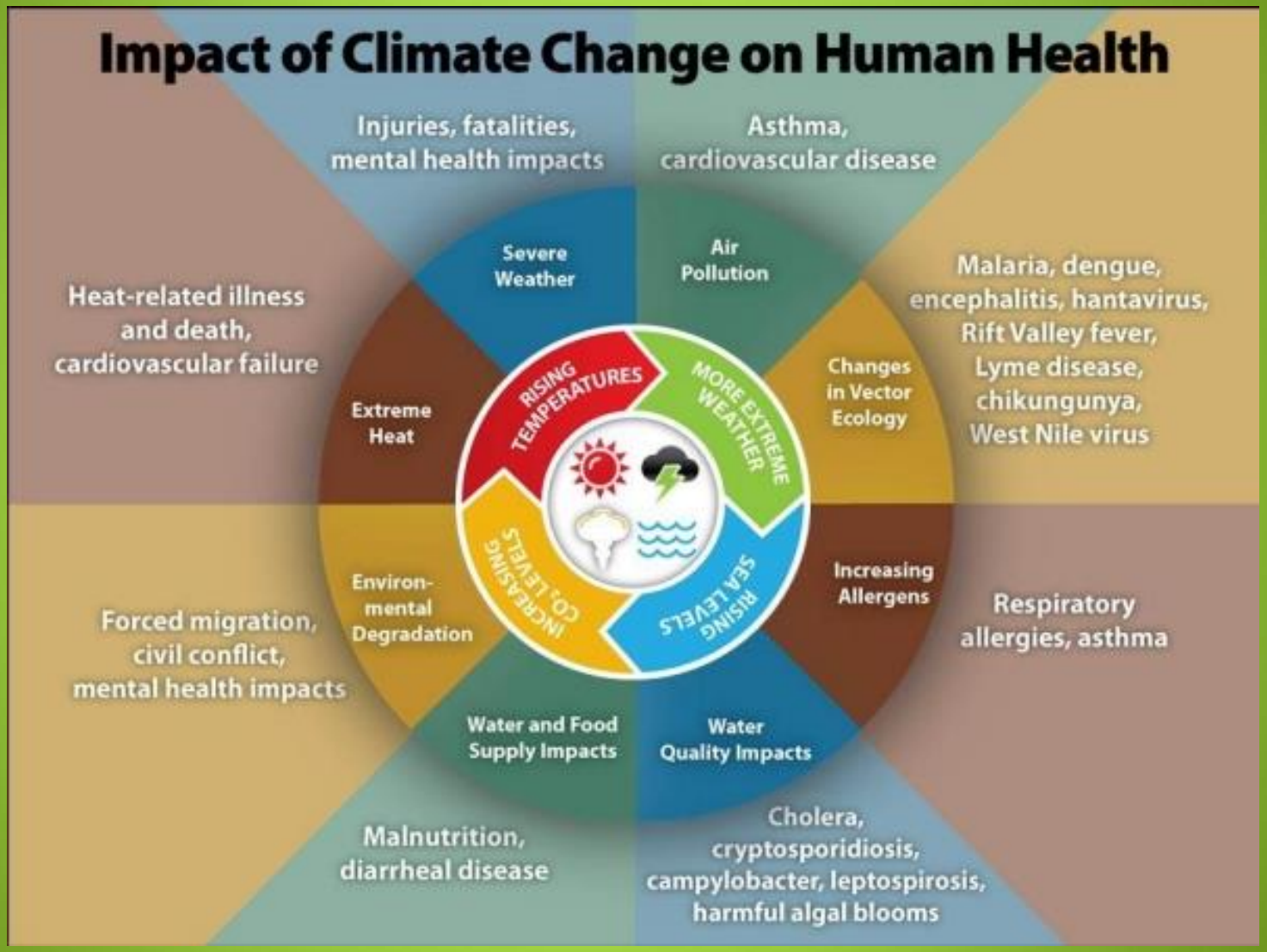
PHENOLOGY INCLUDES MANY SUBJECTS, LIKE :

INSECTS
PEST
INVASIONS

PHENOLOGY INCLUDES MANY SUBJECTS, LIKE :

CLIMATE CHANGES

We chose climate changes and the weather


Impact of Climate Change on Human Health
Injuries, fatalities, mental health impacts
Asthma, cardiovascular disease
Severe Weather
Air Pollution
Heat-related illness and death, cardiovascular failure
Malaria, dengue, encephalitis, hantavirus, Rift Valley fever, Lyme disease, chikungunya, West Nile virus
Extreme Heat
Changes in Vector Ecology
RISING TEMPERATURES
MORE EXTREME WEATHER
INCREASING CO2 LEVELS
RISING SEA LEVELS
Environ-mental Degradation
Increasing Allergens
Forced migration, civil conflict, mental health impacts
Respiratory allergies, asthma
Water and Food Supply Impacts
Water Quality Impacts
Malnutrition, diarrheal disease
Cholera, cryptosporidiosis, campylobacter, leptospirosis, harmful algal blooms

Application of the scientific method to a practical case

It is about students learning following the stages of the scientific method

Stages of the scientific method:

1) Observation and approach to a problem or question.

- Note: The trees are changing throughout the year. Flowers sprout from them and they grow and ripen the fruit.
- Question: What causes the changes in ….?

2) Development of hypotheses (look for a possible answer to the problem question).

- The different stages of the life cycle of trees are influenced by temperature.
- The duration of the day (hours of light) determines the appearance of flowers and fruits.
- It can be with one hypothesis, or both.

3) Experimentation (to check the validity of the hypothesis).

- Collection and analysis of data over a period of time sufficient for stages of the plant to be studied occur. (we'll also use the data we extract from the app, map and bug data)

4) Analysis of results.

- Construction of graphs with the values of the parameters to be studied and the observation of the phenomena (one for the temperature and another for the duration of the days) , and to analyze if a relation is observed.

5) Conclusion and communication of results.

- Once the validity of the hypotheses has been determinate, a report is prepared and published with the results.

STUDY OF THE FACTORS THAT INFLUENCE THE VARIOUS CYCLE OF THE CHESTNUTS TREE.
APPLICATION OF THE SCIENTIFIC METHOD TO A PRACTICAL CASE.

- We'll follow the research work 14th November to 28th February
- The aim is for students to learn the stages of the scientific method by working as scientific researchers do.
- Stages of the scientific method:

1) Observation and approach of a problem or question. (we can use the App phenoloGIT and the map)

- Observation: The Chestnus tree is changing throughout the year. Flowers sprout from them and from the fruits grow and mature.
- Question: What are these changes due to?

2) Hypothesis emission (look for a possible answer to the problem question):

- The different stages of the life cycle of trees are influenced by temperature.
- The duration of the day (hours of light) determines the appearance of flowers and fruits.
- **We'll take in consideration both hypothesis.**

3) Experimentation (to check the validity of the hypothesis)

- Collection and analysis of data over a period of time sufficient for the stages of the plant to be studied occur. (we'll also use the data we extract from the app, map and big data)
- *Students take a picture every week of 5 chestnuts tree and apload it on the "phenoloGIT" APP*
- *(you can also store the pictures where you like)*
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- *Every week students also register the temperature and the hours of light each day.*
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- Collection and analysis of data over a period of time sufficient for the stages of the plant to be studied occur. (we'll also use the data we extract from the app, map and big data) in our case we'll do the study from November to the end of February.
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4)Analysis of results.

- Construction of graphs with the values of the parameters to be studied and the observation of the phenomena (one for the temperature and another for the duration of the days), and to analyze if a relation is observed.
-

5) Conclusion and communication of results.

- Once the validity of the hypotheses has been determined, a report is prepared and published with the results.
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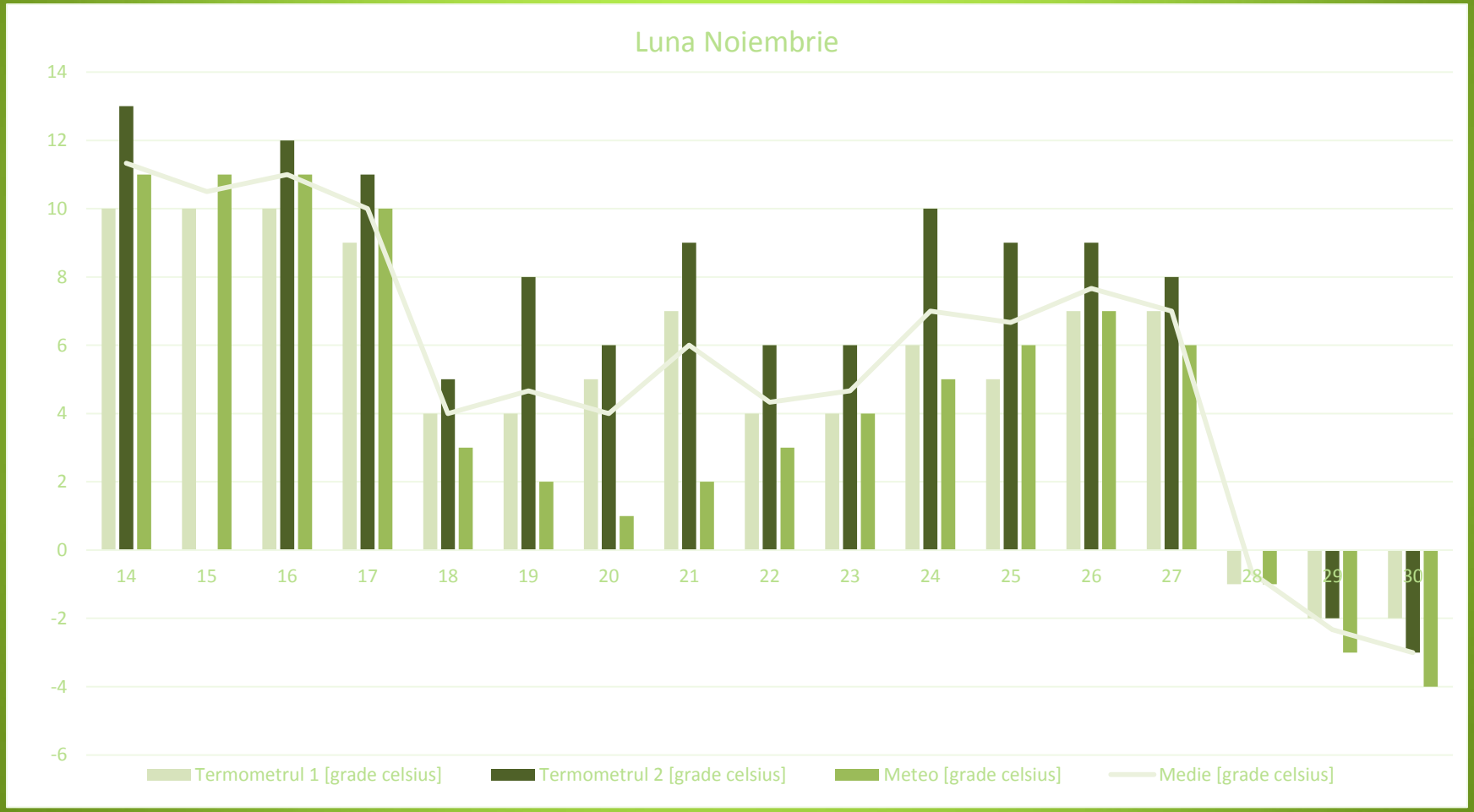
NOVEMBER 2018, TEMPERATURES

Tabel luna Noiembrie				
Coloană	Termometrul 1 [grade celsius]	Termometrul 2 [grade celsius]	Meteo [grade celsius]	Medie [grade celsius]
14	10	13	11	11,3
15	10	13.5	11	10,5
16	10	12	11	11,0
17	9	11	10	10,0
18	4	5	3	4,0
19	4	8	2	4,7
20	5	6	1	4,0
21	7	9	2	6,0
22	4	6	3	4,3
23	4	6	4	4,7
24	6	10	5	7,0
25	5	9	6	6,7
26	7	9	7	7,7
27	7	8	6	7,0
28	-1	0	-1	-0,7
29	-2	-2	-3	-2,3
30	-2	-3	-4	-3,0

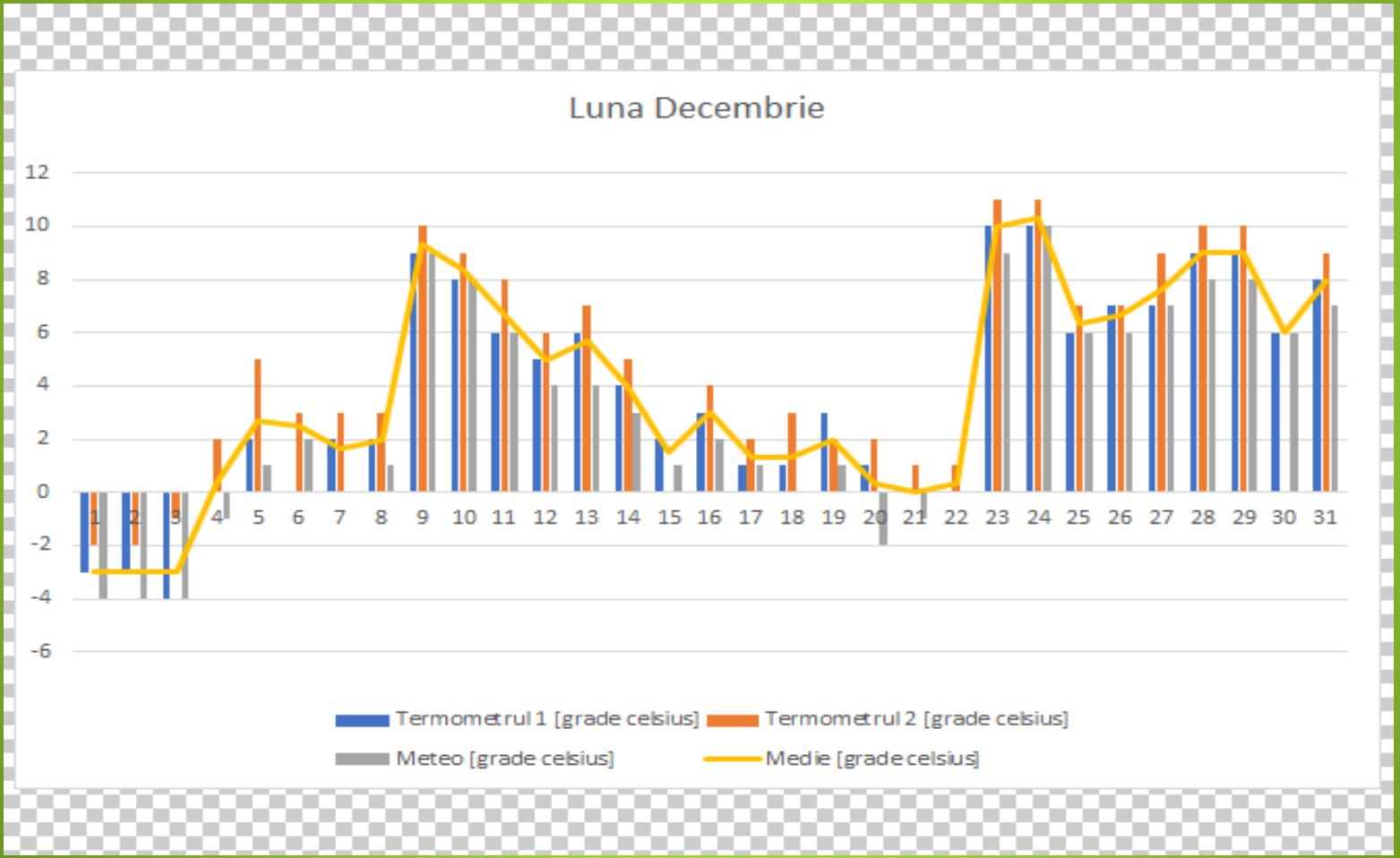
November 2018, Temperature's diagram



DECEMBER 2018, TEMPERATURE ‘S TABLE

Tabel luna Decembrie				
Zile	Termometrul 1 [grade celsius]	Termometrul 2 [grade celsius]	Meteo [grade celsius]	Medie [grade celsius]
1	-3	-2	-4	-3,0
2	-3	-2	-4	-3,0
3	-4	-1	-4	-3,0
4	0	2	-1	0,3
5	2	5	1	2,7
6	2.5	3	2	2,5
7	2	3	0	1,7
8	2	3	1	2,0
9	9	10	9	9,3
10	8	9	8	8,3
11	6	8	6	6,7
12	5	6	4	5,0
13	6	7	4	5,7
14	4	5	3	4,0
15	2	2	1	1,5
16	3	4	2	3,0
17	1	2	1	1,3
18	1	3	0	1,3
19	3	2	1	2,0
20	1	2	-2	0,3

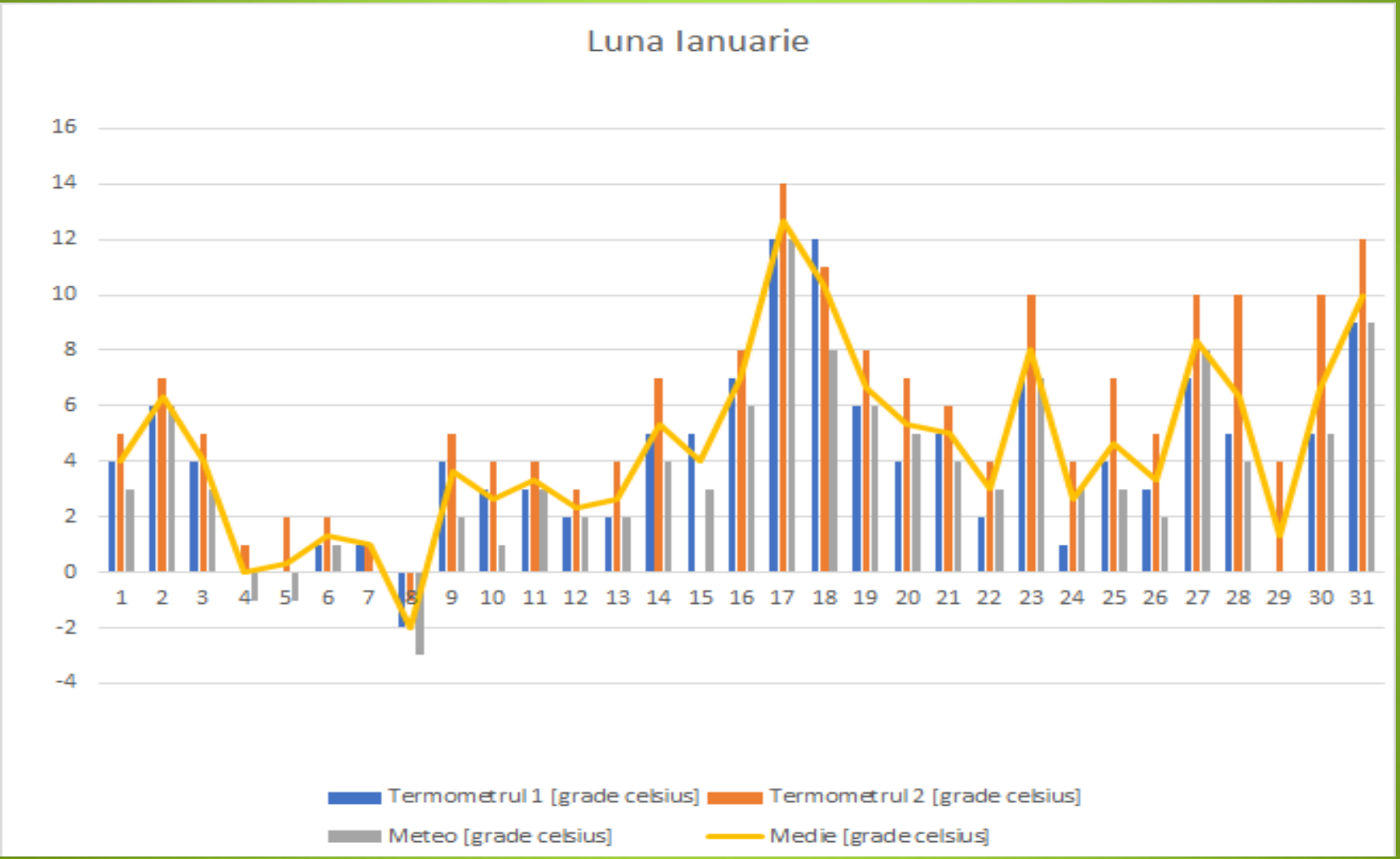
DECEMBER 2019, TEMPERATURE'S DIAGRAM



JANUARY 2019, TEMPERATURE'S TABLE

Tabel luna Ianuarie				
Zile	Termometrul 1 [grade celsius]	Termometrul 2 [grade celsius]	Meteo [grade celsius]	Medie [grade celsius]
1	4	5	3	4,0
2	6	7	6	6,3
3	4	5	3	4,0
4	0	1	-1	0,0
5	0	2	-1	0,3
6	1	2	1	1,3
7	1	1	-	1,0
8	-2	-1	-3	-2,0
9	4	5	2	3,7
10	3	4	1	2,7
11	3	4	3	3,3
12	2	3	2	2,3
13	2	4	2	2,7
14	5	7	4	5,3
15	5	5	3	4,0
16	7	8	6	7,0
17	12	14	12	12,7
18	12	11	8	10,3
19	6	8	6	6,7
20	4	7	5	5,3

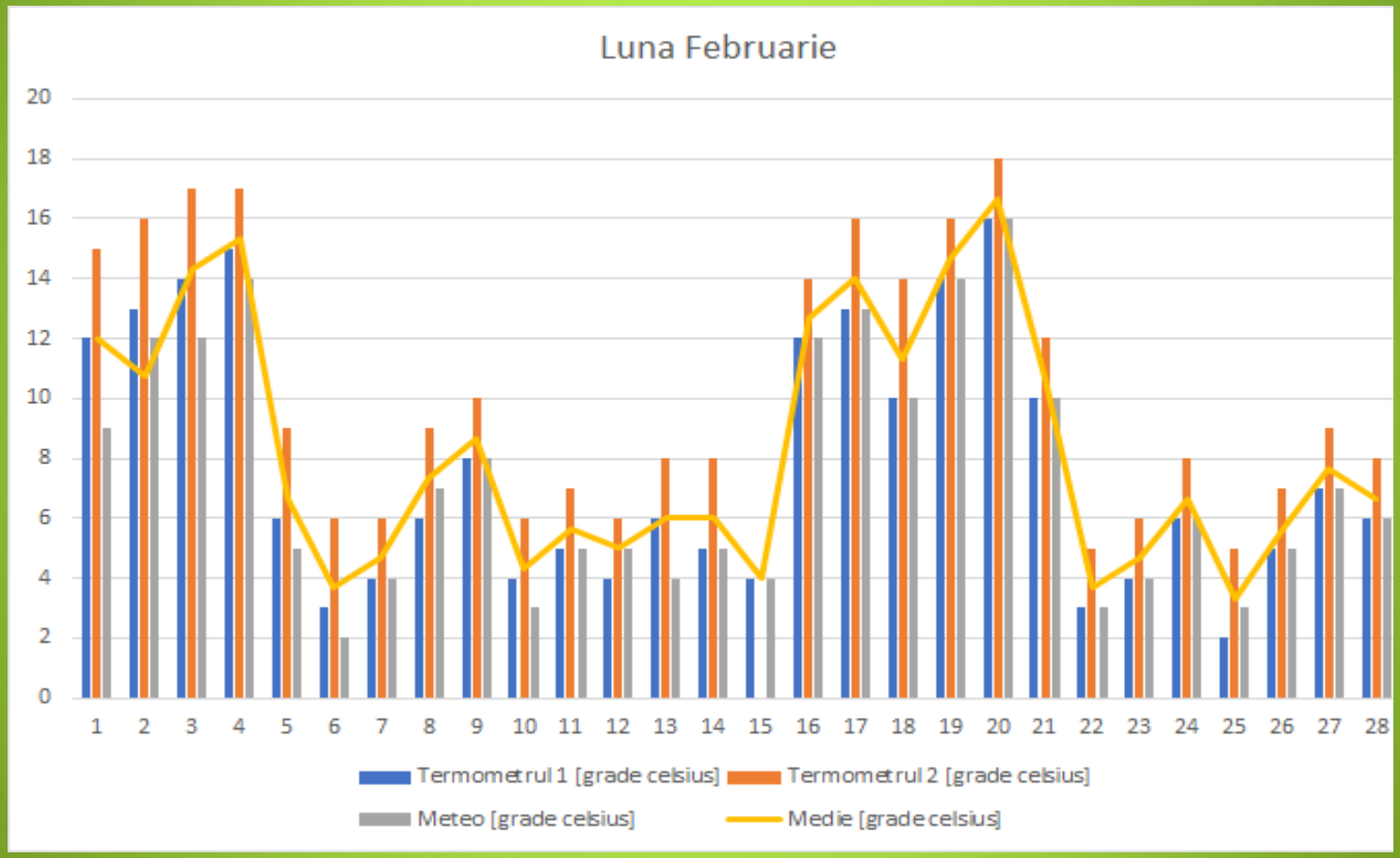
JANUARY 2019, TEMPERATURE'S DIAGRAM



FEBRUARY 2019, TEMPERATURE'S TABLE

Tabel Luna Februarie 2018				
Zile	Termometrul 1 [grade celsius]	Termometrul 2 [grade celsius]	Meteo [grade celsius]	Medie [grade celsius]
1	12	15	9	12,0
2	13	16	12	10,8
3	14	17	12	14,3
4	15	17	14	15,3
5	6	9	5	6,7
6	3	6	2	3,7
7	4	6	4	4,7
8	6	9	7	7,3
9	8	10	8	8,7
10	4	6	3	4,3
11	5	7	5	5,7
12	4	6	5	5,0
13	6	8	4	6,0
14	5	8	5	6,0
15	4	6	4	4,0
16	12	14	12	12,7
17	13	16	13	14,0
18	10	14	10	11,3
19	14	16	14	14,7
20	16	18	16	16,7

FEBRARY 2019, TEMPERATURE'S DIAGRAM



THE TEAM THAT MAKED THE MEASUREMENTS WAS FOSTED FROM: ADINA CHIRTAN AND ANDREEA FOAMETE, GOOD JOB!

ROMANIAN TEAM WOULD LIKE TO THANK YOU FOR YOUR PATIANCE! (PHOENOLOGY IS A BIG TOPIC, ISN'T?!)