



# NEWSLETTER

06/2018

Nº 7

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## EDITORIAL

Once again, the diploma has been awarded to the best local NASE group of the year, which rewards the quality and work they have done during 2017. It went to the Beijing group in China, led by Professor Dongni Chen. From here we would like to congratulate you. In the next Newsletter we will include an interview with him.

On the other hand, we are pleased that the first Doctoral Thesis on the work of NASE has been done. In the News section you find an interview with its author, Ligia Areas. We encourage you to participate in the UNESCO programme in which NASE participates, on the occasion of the International Day of Astronomy. It is a question of reproducing in your schools or with your students the experiment with which Herschel discovered infrared radiation. It's very easy. The information is in:

[http://sac.csic.es/astrosecundaria/es/proyectos\\_con\\_unesco/ListaProyectosUNESCO.php](http://sac.csic.es/astrosecundaria/es/proyectos_con_unesco/ListaProyectosUNESCO.php)



# NEWS

## FIRST DOCTORAL THESIS ON NASE COURSES

Ligia Areas is one of the most active members of the NASE group in Nicaragua, where courses have been developed in the last eight years. She has done her doctoral thesis on the efficiency of these courses among the teaching staff in Nicaragua. It used the data from questionnaires answered by the participating teachers. She has analyzed them and drawn some conclusions. In this interview she tells us her results.

### ***Ligia, why did you do this thesis?***

Eight NASE courses have been given in eight consecutive years. Somebody asked if it was necessary to continue them. I was convinced that yes, that the new generations of educators and learners must continue to benefit because otherwise the culture of knowing the basics of astronomy would be lost. I wanted to prove this conviction with facts, and I did the research. I passed out a questionnaire to most of the course participants, so that they could tell me how what they had learned in the courses was useful for their teaching. It took me seven months to organize and analyze the responses, and I completed it in November 2017.



### ***What do you think NASE courses bring to teachers?***

Schools often lack laboratories and NASE workshops have allowed teachers to develop skills and creativity in Astronomy and Astrophysics, improving teaching and learning strategies in Natural Sciences and Physics subjects. It should be noted that the official programmes in Nicaragua changed in 2009, and astronomy has been included in the teaching of basic and secondary education and teacher training. The activities of the NASE workshops have a good relationship with these contents.

Astronomy should be in school curricula from the earliest years, as it develops life skills such as observation, questioning, the ability to interpret phenomena, stimulates understanding and reflection, and satisfies the need for astronomy in people.

It is necessary to continue teaching NASE courses indefinitely to sustain the efficiency of educators and learners, and to satisfy the curiosity of people in the functioning of the universe. On the other hand, the subject of Introduction to Astronomy should be incorporated into the Physics course at UNAN-Managua.

### ***How many teachers have taken NASE courses in Nicaragua over the years?***

The NASE courses in Nicaragua have been taught from 2010 to 2017. There were 279 teachers from basic and secondary education, teacher training, higher education, university students and astronomy enthusiasts from all over the country.



## ***What are the most important conclusions?***

I summarize here the main conclusions:

71.8% agreed that the NASE course had been a great satisfaction for them in teaching and learning.

59.0% strongly agreed that the workshops had been useful in designing astronomy teaching activities and the remaining 41.0% agreed.

Equal percentages were asked whether the didactic contents of the NASE course are precise, reliable and objective, as well as being presented in an understandable way.

84.6% used NASE course contents as a means of planning Ministry of Education and/or University programs as part of classroom teaching. The teachers who received the NASE course in 2017 had not yet been able to do so.

For 87.2% of those surveyed (30.8% agree completely, 56.4% agree, 12.8% ns/nc), the knowledge taught in the NASE courses has been satisfactory according to the partial or final tests carried out by the students. For 94.9% (56.4% in total agreement, 38.5% in agreement and 5.1% ns/nc), the interaction between students is of higher quality compared to those stimulated by conventional classes.

100% (61.5% fully agree and 38.5% agree) think that through the different means offered by the NASE course divergent thinking, discussion and debate are encouraged: teachers encourage students to ask questions, reflect and seek answers.

To the question that if the activities of the NASE course are varied and rich, transcend the use of memory, facilitate understanding and reasoning, making the contents active and efficient, the vast majority, 97.4% responded positively (76.9% agree completely, 20.5% agree and 2.6% ns/nc).

Finally, 97.4% (69.2% fully agree and 28.2% agree, 2.6% ns/nc) confirmed that the didactic methodology used in the NASE course encourages positive attitudes towards the study, maintains the interest in the follow-up of the subject, that means the course motivates the student.

The vast majority, 94.9%, used the documentation provided in the training session. Of the resources available on the NASE website, 59.0% have taken advantage of power points; 61.5% have benefited from teaching materials; 56.4% have used books; 64.1% have used photographs; and 53.8% have used useful links.

The teaching staff has used the following workshops as teaching and learning tools: Local horizon and sundial (61.5%), Stellar, solar and lunar motion simulators (46.2%), Earth-Moon Sun System: Phases and eclipses (69.2%), The briefcase of the young astronomer (30.8%), Solar spectrum and sunspots (51.3%), Life of the stars (35.9%), Astronomy outside the visible (28.2%), Expansion of the universe (56.4%), Solar system and Exoplanets (51.3%).

For 97.4%, the NASE course was their first contact with astronomy. After the training 71.8% have not participated in any more training activities on astronomy and 97.4% considered that their concept of astronomy had changed. These results indicate that it is vital to develop other projects related to the didactics of astronomy to enrich teaching and learning.



# COURSES



## 98 NASE Course in Guatemala June 22-24, 2017



The Course was held at the facilities of the Escuela de Formación de Profesores de Enseñanza Media (EFPEM) of the University of San Carlos. It was carried out thanks to the collaboration of the General Department for Teaching (DIGED), EFPEM, the School of Physical and Mathematical Sciences (ECFM) and the collaboration of participants and instructors from previous NASE courses. It wasn't about beginners.

The course was very satisfactory for the attendees, although the observations planned for the end of the first two days could not be made because of the rain, as the course took place in the middle of two consecutive tropical storms.



## 99 NASE course in Managua (Nicaragua) - July 24-26, 2017



This was the 8th NASE course held in Managua. Teachers of Natural Sciences from the Teacher Training Colleges of the cities of Chinandega, Estelí, Carazo, Chontales, Managua and Matagalpa participated, as well as teachers and final year students from the Faculties of Education and Languages, Science and Engineering and Economic Sciences belonging to UNAN-Managua. There were 38 participants, of whom 60% had hardly had any contact with astronomy before.

In the final survey, they expressed their satisfaction with the efforts made by the teachers to prepare and carry out the workshops and conferences successfully.



## 100 NASE Course in Guizhou (China) - October 16-20, 2017



It was the first NASE course to be held outside the capital Beijing. 67 teachers from all over China participated. For example, Mr. Mi is a professor at Qiannan Normal University, Mrs. M. Zhuo works as a teacher at Kunming 1st kindergarten, Mr. Zhang is at North-West Normal University, Gansu Province, etc. In general, it was not their first contact with astronomy.

## 101 NASE Course in Cluj (Romania) - October 30-4, 2017

In cooperation with La Cité des Sciences Themes. Forty teachers participated.

In general, they had hardly had any contact with astronomy. One person even commented in the final survey that his only contact was the horoscope on television, and that he now saw things differently.



## 102 NASE Course in Shizuishan, China - November 2-3, 2017

This course was held in cooperation with the Beijing Planetarium and the Shizuishan Science and Technology Museum. It was sponsored by the Chinese Association of Science and Technology, as part of its project in the Schools of Western China.

Forty primary school teachers participated, who had not previously had contact with this science. They especially appreciated the activities on the movement of the Moon in the sky, and in general they all took 2 or 3 activities to do in their classes. They especially appreciated the activities on the movement of the Moon in the sky, and in general they all took 2 or 3 activities to do in their classes.



## 103 NASE Course in Tunis (Tunisia) November 14-17, 2017

In cooperation with Tunisia Ministry of Education and La Cité des Sciences à Tunis.



The participating teachers came from all parts of Tunisia, because the organizers wanted to transmit the call to all regions of the country.

There were 48 participants, all of them teachers at the level of 12-18 years old.

They appreciated the organization very much, and appreciated the availability of the trainers.

They discovered new ways of teaching, based on practice.



## 104 NASE Course in Santiago de Chile (Chile) - January 8-11, 2018

In cooperation with the Chilean Society of Astronomy.

It has been especially useful because of the change in the curriculum for secondary education in Chile, which introduces astronomy as a subject of the Natural Sciences since 2017, forming part of the Physical axis.

The professors stated that in their training these topics have not been dealt within a very in-depth manner, that they have few didactic tools and that the course has been of high impact for those who are already facing the challenge of teaching the subject since 2017, the first year of the implementation of the new plan.

## 105 NASE Course in Panama, February 19-22, 2018

In cooperation with the National Secretariat of Science, Technology and Innovation of Panama (SENACYT).

The didactics used to understand the topics covered were highly valued, as were the variety of activities, the simplicity, excellent didactics and low cost of the workshops.

There were 37 attendees, most of whom were middle school teachers, although there were also some from primary and university schools.

## 106 NASE Course in Pedro Vicente Maldonado (Ecuador) - March 5-7, 2018

In cooperation with Ministry of Education and National Polytechnic School.



# MATERIAL

## RED SUNSETS

In the last Newsletter we talked about the green lightning. In this one we're going to talk about red sunsets.



The colour of the sky depends on the dispersion of Rayleigh

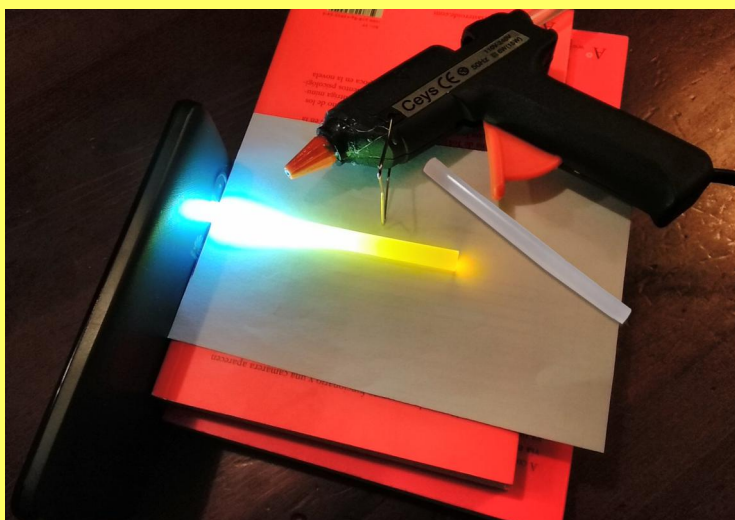
The NASE book "14 Steps. . ." available at [www.naseprogram.org](http://www.naseprogram.org) explains the dispersion of Rayleigh, responsible for the blue sky. When a beam of light passes through the atmosphere, which contains particles in suspension of smaller size than the wavelength of the colors, the photons are scattered. The degree of dispersion is inversely proportional to the fourth power of the wavelength. This means that the blue photons disperse much more than the rest.

Many blue photons of sunlight change direction as they pass through the atmosphere, and reach our eyes from any direction. That makes us see the blue daytime sky.

At sunset, light passes through more atmosphere and contains far fewer blue photons. Sunlight takes on the typical reddish yellow hue of sunsets.



Experience with an overhead projector



With a hot-melt silicone rod.

The experience that comes in the book quoted, with an overhead projector and a glass of diluted milk solution is good, but has the disadvantage that it is increasingly difficult to get an overhead projector for transparencies. Here we offer you a very easy alternative.

These are the silicone rods for hot-melt guns. They are almost transparent, but not entirely. If the white light from a phone flashlight is passed through, you can see perfectly how the blue photons scatter and a reddish-yellow light remains. You can find many practical materials on the NASE website (in Spanish and English):

[http://sac.csic.es/astrosecundaria/es/material\\_complementario/MaterialComplementario.php](http://sac.csic.es/astrosecundaria/es/material_complementario/MaterialComplementario.php)

[http://sac.csic.es/astrosecundaria/es/material\\_complementario/MaterialComplementario.php](http://sac.csic.es/astrosecundaria/es/material_complementario/MaterialComplementario.php)