

## Teaching Experimental Sciences

Code: 102089  
ECTS Credits: 5

**2025/2026**

Degree	Type	Year
Primary Education	OB	3

### Contact

Name: Carme Grimalt Alvaro

Email: carme.grimalt@uab.cat

### Teachers

Carme Grimalt Alvaro

Anna Marba Tallada

Begoña Oliveras Prat

Victor Lopez Simo

(External) Ana Maria Domènech Calvet

### Teaching groups languages

You can view this information at the [end](#) of this document.

### Prerequisites

It is advisable to have passed the module "Teaching and Learning about the Natural, Social and Cultural Environment in Primary Education".

### Objectives and Contextualisation

This module forms part of the Programme of Primary Teacher Education and is intended to deepen the content knowledge and competencies necessary to teach the module "Environmental Knowledge" in primary schools.

This module puts an emphasis on the scientific ideas that should be discussed with primary school students (what we call "content knowledge of school science"). This module also looks at pedagogical approaches that promote an understanding of science as an activity that integrates inquiry, modelling and communication.

The objectives of the module are:

- 1) To identify and discuss basic content knowledge of school science - key ideas - that are studied in primary education.

2) To embed pedagogical approaches that promote an understanding of school science as an activity that integrates inquiry, modelling and communication (doing, thinking and talking).

3) To become familiar with, design and evaluate teaching activities that promote students' development of scientific competencies in primary school.

## Competences

- Design and regulate learning spaces in contexts of diversity that take into account gender equality, equity and respect for human rights and observe the values of public education.
- Design, plan and evaluate education and learning processes, both individually and in collaboration with other teachers and professionals at the centre.
- Develop the functions of tutoring and guidance of pupils and their families, attending to the pupils' own needs. Understand that a teacher's functions must be perfected and adapted in a lifelong manner to scientific, pedagogical and social changes.
- Foster reading and critical analysis of the texts in different scientific fields and cultural contents in the school curriculum.
- Know and apply information and communication technologies to classrooms.
- Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge regarding the respective procedures of education and learning.
- Know the school curriculum for these sciences.
- Maintain a respectful attitude to the natural, social and cultural environment to foster values, behaviours and practices that attend to gender equality, equity and respect for human rights.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Raising and solving problems related to everyday life.
- Reflect on classroom experiences in order to innovate and improve teaching work. Acquire skills and habits for autonomous and cooperative learning and promote it among pupils.
- Understanding the basic principles and fundamental laws of the experimental sciences (physics, chemistry, biology and geology).
- Value science as a cultural event.
- Work in teams and with teams (in the same field or interdisciplinary).

## Learning Outcomes

1. Apply knowledge of science education to critically analyse the curriculum and establish interdisciplinary relations with other curricular areas.
2. Being able to apply scientific knowledge in order to understand and act on the phenomena in everyday life.
3. Being able to evaluate teaching units as a way of guiding the processes for improving the quality of teaching.
4. Being able to use basic models of the experimental sciences in order to interpret and act on the phenomena in everyday life.
5. Being able to use the diversity of cognitive-linguistic skills to reflect on the processes of teaching/learning in the sciences.
6. Being capable of developing innovative didactic units for teaching and learning the scientific content in the area of Environmental Studies that incorporate attention to diversity and the interdisciplinary focus of the curriculum.
7. Demonstrate a critical ability to use a range of cognitive linguistic skills to reflect on processes in the teaching and learning of science.
8. Demonstrate an understanding of science as part of cultural heritage.
9. Demonstrate that attitudes regarding human rights as knowledge and tools for coexistence, as well as gender equality, are identified, practiced and defended.

10. Demonstrate that attitudes regarding sustainability of the natural environment are identified, practiced and defended.
11. Demonstrate the ability to incorporate the above values in the school curriculum.
12. Demonstrate the ability to work in teams when designing a curriculum.
13. Identifying the purposes, content and structure of the experimental sciences in the environmental studies curriculum in primary education.
14. Meaningfully apply ICT resources to educational proposals.
15. Propose new methods or well-founded alternative solutions.

## Content

1. Learning and teaching about the Earth and its changes in primary school.

What are the key ideas? What does the official curriculum include? What are the most common students' previous ideas? How to make them evolve?

2. Learning and teaching about materials and their changes in primary school.

What are the key ideas? What does the official curriculum include? What are the most common students' previous ideas? How to make them evolve?

3. Learning and teaching about living beings in primary school.

What are the key ideas? What does the official curriculum include? What are the most common students' previous ideas? How to make them evolve?

4. Learning and teaching about physical systems in primary school.

What are the key ideas? What does the official curriculum include? What are the most common students' previous ideas? How to make them evolve?

5. Transversal issues: Attitudes towards science, gender and science, field trips, interdisciplinarity

## Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
<hr/>			
Type: Directed			
Seminars	15.5	0.62	
Whole group sessions	22.5	0.9	
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Type: Supervised			
Tutorials	25	1	
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Type: Autonomous			
Students' work	62	2.48	
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Whole group sessions:

Teacher presentations about basic content knowledge. These sessions are offered to the whole group and allow for discussion of the main contents promoting students' active participation. These sessions include activities that can be performed individually, in pairs or in small groups of students, and then, the results of their reflections and discussions are shared with the rest of the group.

#### Seminars:

Workspaces in small groups (1/2 out of the whole group) supervised by the teacher. These sessions are aimed at embedding the contents studied in whole group sessions. Seminars are held at the Lab. Lab coat is required.

Laboratory spaces are a space for reflection. A methodology will be implemented to promote the emergence of ideas by focusing attention on the activity being developed. No computers will be allowed inside.

The 1st class starts at 8h or at 16h for the morning or afternoon groups, respectively (whole group class). A detailed chronogram is published in the Campus Virtual.

#### Tutorials

Tutorials to address queries and questions about the topics studied during the course in order to prepare for the written exam or the assignments to be submitted. Exam review.

#### Students' autonomous work:

Students' elaboration of papers, seminar reports, and tasks related to the whole group sessions. Students search for information and materials, study and preparation for exams, and readings. Digital tools are utilized for preparing and implementing activities related to the subject's content.

#### Transnatura Project.

Transnatura is the title of the multidisciplinary project designed by the teaching teams of 5 subjects in the 3rd year of the Degree in Primary Education. It consists of a two days trip and a night out in Vall de Núria, aimed at providing an intense and formative experience in the natural environment which, besides working on specific objectives of each of the disciplines, also facilitates the approach of transversal aspects such as sustainability, healthy living, coexistence and the relationship between school and nature, among others.

Subjects involved: Didactics of Experimental Sciences, Learning and Development II, Visual Music Education and Learning, Physical Education and Didactics I, Language and Learning.

The departure will be held on the 13rd and 14th of October for groups 21 and 71, and on the 16th and 17th of October for groups 31 and 41, so it involves an overnight stay. Attendance is mandatory. If someone cannot attend it, they will have to prove the reason for missing it and perform compensatory work previously agreed with the teaching team. The activities carried out during the trip will be part of the continuous evaluation of the different subjects. At the beginning of the academic course, each teacher will specify the learning evidence and the corresponding evaluation criteria. A tutorial to present the departure will be held on September 17th from 1:00 PM to 2:00 PM (groups 21 and 31) and from 3:00 PM to 4:00 PM (groups 41 and 71).

With the information available in June we can announce that:

- Price: 50 euros APPROXIMATELY (includes the bus, rack railway, dinner, sleep, breakfast and lunch on the second day).
- The university will offer a bus service to facilitate travel. Alternatively, students can also organize themselves independently to reach the meeting point (Ribes Enllaç rack station).

During the 1st term, the UAB opens a call for scholarships to finance the departure.

Details regarding schedules, prices, itinerary and luggage will be provided at the beginning of the course.

The 1st class starts at 8h or at 16h for the morning or afternoon groups, respectively (whole group class). A detailed chronogram is published in the Campus Virtual.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

### Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Group assessment activities	30%	0	0	14, 7, 12, 11, 10, 9, 13, 15, 2, 3, 6, 4, 5
Individual assessment activities	20%	0	0	14, 7, 8, 10, 13, 15, 2, 6, 4, 5
Written exam about content knowledge	50%	0	0	1, 7, 11, 8, 13, 15, 2, 3, 4, 5

#### CONTINOUS ASSESSMENT

Throughout the course, several activities will be required, even if they do not have an associated grade. This course includes activities for the development of Digital Teaching Competence.

The assessment of the Science Education course consists of 3 types of assessment activities:

- Individual exam (50% of the final grade): a final assessment test requiring the development of various questions related to both conceptual and didactic aspects covered throughout the course. This activity is retrievable.
- Individual assessment activities (20% of the final grade):
  - 10% Scientific activity related to Transnatura. This must be submitted in situ during the trip on paper. This activity is not retrievable.
  - 10% Reflection on the design and elaboration of a physical model as a didactic tool. The submission of a group explanation video is required to participate in the assessment. This activity is not retrievable.
- Group assessment activity (30% of the final grade). Group activity where you will put into practice what has been learned, both conceptually and didactically, in relation to the design and implementation of a dialogical scientific activity. A partial submission will be assessed and will have a weight in the final grade. As this activity is not retrievable, it is recommended to have a tutorial with the teacher prior to the final submission.

Finally, throughout the course, some activities will be mandatory, even if they do not have a specific associated grade.

Both individual and group assessment activities must be submitted via the virtual campus.

An unsubmitted assessment activity will be graded with a 0.

To calculate the average, it is necessary to have a minimum grade of 5 on the exam.

To participate in the recovery process, students must have been previously assessed in a set of activities whose weight is equivalent to at least 2/3 of the course grade. The maximum grade for the recovery exam will be 5.

If a student passes the exam but fails the individual assessment activities, if the course average is passing, the course is passed. Otherwise, the course will be failed.

As a guideline, and depending on the number of credits for the course, you should dedicate 68 hours of autonomous work to the course.

As a guideline, and according to the number of credits of the course, you should invest 68h of personal work in the course, according to the following proposal:

Final exam		10h
Individual assessment activities	Transnatura	6h
	Reflective essay physical model	6h
Group assessment activity	Scientific dialogical activity	14h

#### DATES FOR EVALUATIVE ACTIVITIES

##### GROUPS 21 and 41

Final Exam	18/12/25
Individual assessment activities*	Transnatura Task: 13/10/25 (G21) and 16/10/25 (G41)  Individual Reflection of the use of physical models: 13/11/25 (G21-SA), 20/11/25 (G21-SB), 13/11/25 (G41-SA), 20/11/25 (G41-SB)
Group assessment activity*	Dialogical Activity: 04/12/25
Recovery Exam	29/01/26 from 18h-21h (G21 and G41)

##### GROUPS 31 and 71

Final Exam	15/12/25
Individual assessment activities*	Transnatura Task: 13/10/25 (G71) and 16/10/25 (G31)  Individual Reflection of the use of physical models: 03/11/25 (G31-SA), 10/11/25 (G31-SB), 10/11/25 (G71-SA), 17/11/25 (G41-SB)
Group assessment activity*	Dialogical Activity: 24/11/25
Recovery Exam	26/01/26 from 18-21h (G31 and G71)

\*These dates may vary if unforeseen circumstances require a modification of the schedule.

All assessment activities carried out throughout the course must be submitted within the deadline established in the course program.

#### SINGLE ASSESSMENT

The assessment of the science education subject consists of 3 types of evaluation activities:

- Individual exam (50% of the final grade): a final assessment test requiring the development of various questions related to both conceptual and didactic aspects covered throughout the course. A minimum grade of 5 is required to calculate the course average. This activity is recoverable.
- Didactic reflection test on the design, implementation, and analysis of activities (25% of the final grade): Analysis of the design and implementation of a classroom activity and its analysis, considering communicative approaches, difficulties expressed by students, and the evolution of their ideas about the matter model or chemical change. This activity is not recoverable.
- Didactic reflection evaluation on the use of models (25% of the final grade). Analysis of the design of a model to answer a question about the living being model. Didactic reflection on the contribution and limitations of models as a didactic resource. This activity is not recoverable.

The three assessment activities will take place on the same day, 15/12/25 (groups 31 and 71) and 18/12/25 (groups 21 and 41).

In case of failing the exam a recovery exam must be taken. The recovery exam will be held:

- G31 and G71: Monday 26/01/26 from 18-21h.
- G21 and G41: Thursday 29/01/26 from 18h-21h.

If the recovery exam is passed, the maximum grade for the individual exam will be a 5.

#### GENERAL ASPECTS OF THE EVALUATION

The feedback and grading of assessment activities and the exam will be provided no later than 20 working days after their submission.

Attendance at field trips is mandatory. There is no minimum mandatory attendance for seminars. For this reason, this course does not offer the possibility of opting for the synthesis assessment test.

In case of not passing the final individual test, the final grade will be 4.5 (if the course average is equal to or higher than this grade) or the average grade obtained (if it is lower than 4.5).

To participate in the recovery process, students must have been previously assessed in a set of activities whose weight is equivalent to at least 2/3 of the course grade. If this is not achieved, the course will be graded as Not Assessable.

To pass this course, students must demonstrate good general communication competence, both orally and in writing, and a good command of the vehicular language(s) listed in the teaching guide. In all activities (individual and group), linguistic correctness, writing, and formal presentation aspects will be taken into account. Students must be able to express themselves fluently and correctly and must show a high degree of comprehension of academic texts.

An activity may be returned (not assessed) or failed if the teaching staff considers that it does not meet these requirements.

Please note that, in the case of the Catalan language, in the 1st and 2nd years, students are required to have a linguistic competence equivalent to Level 1 for Early Childhood and Primary Education Teachers; and from the 3rd year of the Degree, students must have demonstrated a competence equivalent to Level 2 for Early Childhood and Primary Education Teachers (more information on these levels at:

<https://www.uab.cat/web/estudiar/graus/graus/competencia-linguistica-1345737529755.html>

In accordance with UAB regulations, plagiarism or copying of any work will be penalized with a 0 as the grade for that work, losing the possibility of recovery, whether it is an individual or group work (in this case, all group members will receive a 0). If during the completion of an individual work and/or in-class test, the teaching staff considers that a person is attempting to copy or is discovered with any type of document or device not authorized by the teaching staff, the work will be graded with a 0, with no option for recovery. A work, activity, or

exam will be considered "copied" when it reproduces all or a significant part of another student's work. A work or activity will be considered "plagiarized" when a part of an author's text is presented as one's own without citing the sources, regardless of whether the original sources are in paper or digital format.

Students must refrain from using any type of technologies, tools, and artificial intelligence systems or others that may lead to academic fraud in the academic activities they develop. Specific validations may be carried out to guarantee authorship and the acquisition of competencies in case of suspicion of academic fraud. If the academic fraud is confirmed, the work will be graded with a 0, with no option for recovery, whether it is an individual or group work (in this case, all group members will receive a 0).

For other more general aspects, the General Evaluation Criteria and Guidelines of the Faculty of Education Sciences are followed.

## Bibliography

### Relevant bibliography

\*Furman, M. (2016) Educar mentes curiosas: la formación del pensamiento científico y tecnológico en la infancia. Es pot descarregar des de <https://expedicionciencia.org.ar/wp-content/uploads/2016/08/Educar-Mentes-Curiosas-Melina-Furman.pdf>

National Research Council (2012) A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Es pot descarregar gratuitament des de nap.edu/13165

\*Philippakos, Z.A; Howell, E. & Pellegrino, A. (2021). Design-Based Research in Education: Theory and Applications. Guilford Press.  
<https://www.guilford.com/books/Design-Based-Research-in-Education/Philippakos-Howell-Pellegrino/978146254>

\*Skamp, K. (2014). *Teaching primary science constructively*. 5<sup>th</sup> Edition. Cengage Learning.

### Basic Bibliography

\*Arcà, M. (1990). *Enseñar Ciencias. ¿Cómo empezar? Reflexiones para una educación científica de base*. Barcelona: Paidós.

\*Driver, R. I alt (1989) *Ideas científicas de la infancia y la adolescencia*. Madrid. Morata.

Giordan, A. (1988). *Los orígenes del saber: de las concepciones personales a los conceptos científicos*. Sevilla: Díada Editores.

Giordan, A. (2001). *El meu cos, la primera maravella del món*. Barcelona: la Campana

\*Izquierdo, M.; Aliberas, J. (2004) *Pensar, actuar i parlar a la classe de ciències*. Bellaterra: Servei de Publicacions UAB

\*Izquierdo, M (ccord) (2011). *Química a Infantil i Primària*. Ed Graó\*

Jorba, J.; Sanmartí, N. (1994) *Enseñar, aprender y evaluar: un proceso de regulación continua*. Madrid: Centro de Investigación y Documentación Educativa

\*Márquez, C, Prat, A (coord.) (2010). *Competència científica i lectora a Secundària. L'ús de textos a les classes de ciències*. Barcelona: Dossiers Rosa Sensat, 70

Martí, J. (2012). *Aprendre ciències a l'educació primària*. Barcelona: Graó

NGSS Lead States (2013). Next Generation Science Standards: For states, by states. Washington, DC: The National Academy Press.

\*Pujol, R.M. (2001). Les ciències, més que mai, poden ser una eina per formar ciutadans i ciutadanes. *Perspectiva escolar*, 257, 2-8.

Ramiro, E. (2010). *La Maleta de la ciència: 60 experiments d'aire i aigua i centenars de recursos per a tothom*. Barcelona: Graó.

\*Pujol, R.M. (2003). *Didáctica de las Ciencias en la educación primaria*. Madrid: Síntesis

\*Sanmartí, N. (2007). *10 ideas clave. Evaluar para aprender*. Barcelona:Graó

\*Skamp, K. (2012). *Teaching primary science constructively*. 4<sup>th</sup> Edition. Cengage Learning.

Oficial documents

Al web següent i trobareu el currículum vigent així com d'altres documents d'orientació curricular

<https://xtec.gencat.cat/ca/curriculum/primaria/>

Innovation and research journals (open acces or UAB acces)

Alambique. <http://alambique.grao.com>

Enseñanza de las ciencias. Revista de Investigación y Experiencias Didácticas. <https://ensciencias.uab.es/> (en obert)

Ciències: Revista del Professorat de Ciències d'Infantil, Primària i Secundària. <https://revistes.uab.cat/ciencies> (en obert)

Aula de Innovación Educativa

Perspectiva Escolar

Infancia y Aprendizaje

Webs of interest

CDEC (Centre de Documentació iExperimentació en Ciències) <https://serveiseducatius.xtec.cat/cesire/>

Projecte Primary Science (1995). Nuffield Foundation.

<http://www.nationalstemcentre.org.uk/elibrary/collection/448/nuffield-primary-science>

Projecte Seeds of Science, Roots of Reading. University of California Berkeley

<http://www.scienceandliteracy.org/>

Aplicatiu de Recobriment Curricular (materials didàctics del CDEC) <http://apliense.xtec.cat/arc/cercador>

Guies Habitat per a l'educació ambiental

<https://www.sostenible.cat/article/guia-habitat-activitats-per-a-educacio-ambiental>

Grup Kimeia, [grupkimeia.blogspot.com.es](http://grupkimeia.blogspot.com.es)

Other

Harlen, W. (2010). Principios y grandes ideas de la educación en Ciencias.

[http://www.gpdmatematica.org.ar/publicaciones/Grandes\\_Ideas\\_de\\_la\\_Ciencia\\_Espanol.pdf](http://www.gpdmatematica.org.ar/publicaciones/Grandes_Ideas_de_la_Ciencia_Espanol.pdf)\*

Mapes conceptuais de continguts en progressió d'aprenentatge (del Science Continuum P10, Victoria, Australia)

<https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/science/continuum/pages/concep>

\*Couso, D., Jimenez-Liso, M.R., Refojo, C. & Sacristán, J.A. (Coords) (2020) *Enseñando Ciencia con Ciencia*. FECYT & Fundacion Lilly. Madrid: Penguin Random House. Document en línea:  
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<https://www.fundacionlilly.com/es/actividades/citas-con-la-ciencia/index.aspx>\*

\* Written by women

## Software

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## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	211	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	212	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	311	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	312	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	411	Catalan	first semester	afternoon
(PLAB) Practical laboratories	412	Catalan	first semester	afternoon
(PLAB) Practical laboratories	711	English	first semester	afternoon
(PLAB) Practical laboratories	712	English	first semester	afternoon
(TE) Theory	21	Catalan	first semester	morning-mixed
(TE) Theory	31	Catalan	first semester	morning-mixed
(TE) Theory	41	Catalan	first semester	afternoon
(TE) Theory	71	English	first semester	afternoon