



## IDENTIFYING DATA

### Experimental sciences

Subject	Experimental sciences			
Code	O05G120V01302			
Study programme	Grado en Educación Primaria			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Galician			
Department				
Coordinator	Prieto Lage, Miguel Ángel			
Lecturers	Fraga Corral, María Prieto Lage, Miguel Ángel			
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Web				
General description	<p>(*)Nesta materia, estudaranse os principios básicos e as leis fundamentais das ciencias experimentais, de maneira que o alumno adquira a formación necesaria neste ámbito, para o exercicio da súa actividade profesional.</p> <p>O seu contido desenvolverase considerando os máis cotiáns feitos e fenómenos da nosa contorna, orientando ao alumno, á formulación e resolución de problemas asociados coas ciencias á vida cotiá.</p>			

## Training and Learning Results

Code	
A1	Students have shown to have and understand knowledge in an area of study based on general secondary education, and are at a level in which they can have recourse to advanced textbooks and also to have updated knowledge on the progress made in their field of study.
A2	Students know how to apply knowledge in their work or vocation in a professional manner and have competences that are usually proven through preparation and defence of arguments and problem-solving in their area of study.
A3	Students have the ability to gather and interpret relevant data (usually within their study area) to make judgements that include a reflection on the relevant social, scientific or ethical issues.
A5	Students have developed the necessary learning skills to undertake further studies with a high degree of autonomy.
B1	Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge that encompasses the teaching and learning procedures.
B2	Design, plan and evaluate teaching and learning processes, both individually and in collaboration with other teachers and professionals from the centre.
B3	Effectively address language learning situations in multicultural and multilingual contexts. Encourage reading and critical appreciation of texts from the various scientific and cultural domains contained in the syllabus.
B4	Design and regulate learning spaces in diversity contexts, to address gender equality, equity and respect for human rights that constitute the values of citizenship training.
B5	Promote coexistence in and out of the classroom, solve discipline problems and contribute to peaceful resolution of conflicts. Encourage and appreciate effort, perseverance and personal discipline in students.
B6	Know how primary education schools are organised and the diversity of actions in their operation. Perform functions of mentoring and guidance to students and their families, addressing the singular learning needs of students. Assume that the performance of teaching needs to be refined and adapted to scientific, pedagogical and social changes throughout life.
B7	Collaborate with the different sectors of the educational community and of the social environment. Take on the educator dimension of the teaching role and promote democratic education for active citizenship.
B8	Maintain a critical and autonomous relationship with regard to knowledge, values and public and private social institutions
B9	Appreciate individual and group responsibility for achieving a sustainable future
B10	Reflect on classroom practices to innovate and improve teaching. Acquire habits and skills for autonomous and cooperative learning and promote them among students.

- B11 Know and apply the information and communication technologies in classrooms. Selectively discern audio-visual information that contributes to learning, civic training and cultural wealth.
- B12 Understand the role, possibilities and limits of education in today's society and the key competencies that affect the primary education schools and their professionals. Know quality improvement models that can be applied to educational centres.
- C25 To know the basic principles and the fundamental laws of experimental sciences (Physics, Chemistry, Biology and Geology).
- C26 To know the school curricula of these sciences.
- C27 To identify and solve problems of a scientific nature in everyday life.
- C28 To understand science as a cultural phenomenon.
- C29 To understand the mutual influence between science, society and technological developments, as well as the appropriate behavior on the part of citizens to attain a sustainable future.
- C30 To develop and evaluate curricular contents through use of appropriate teaching resources and to promote the acquisition of basic competencies by students.
- D1 Capacity for analysis and synthesis
- D2 Capacity for organisation and planning
- D3 Oral and written communication in the native language.
- D4 Knowledge of foreign language
- D5 Knowledge of computing related to the field of study
- D6 Capacity for information management
- D7 Troubleshooting
- D8 Decision-making
- D9 Team work
- D10 Work in an interdisciplinary team
- D11 Work in an international context
- D12 Skills in interpersonal relationships
- D13 Recognition of diversity and multiculturalism
- D14 Critical reasoning
- D15 Ethical commitment
- D16 Autonomous learning
- D17 Adaptation to new situations
- D18 Creativity
- D19 Leadership
- D20 Knowledge of other cultures and customs
- D21 Initiative and an entrepreneurial spirit
- D22 Motivation for quality
- D23 Awareness about environmental issues.

### Expected results from this subject

Expected results from this subject	Training and Learning Results			
(*)	A1	B8	C25	D1
	A2	B9	C30	D2
	A3	B10		D3
	A5	B11		D4
				D5
				D6
				D7
				D8
				D9
				D10
				D11
				D12
				D14
				D15
				D16
				D22
(*)2.Conocer el currículo escolar de estas ciencias.	A5	B1	C26	
		B2		
		B3		
		B4		
		B6		
		B7		

(*)3. Plantear y resolver problemas asociados con las ciencias a la vida cotidiana.	A2 A3	B8	C25 C27 C28 C29	D3 D6 D8 D9 D17 D19 D23
(*)4. Valorar las ciencias como un hecho cultural, reconociendo la mutua influencia entre ciencia, sociedad y desarrollo tecnológico, así como las conductas ciudadanas pertinentes, para procurar un futuro sostenible.	A3	B5 B9 B12	C28 C29	D1 D13 D15 D18 D20 D21 D22 D23

## Contents

Topic	
(*)1. Las Ciencias Experimentales. Ciencia □ Tecnología -Sociedad	(*)1.1. Las Ciencias experimentales. 1.2. Evolución y estado actual. 1.3. Interacción Ciencia □ Tecnología □ Sociedad
(*)2. Metodología científica	(*)2.1. El método científico. 2.2. Magnitudes y medidas. 2.3. Expresión de datos numéricos. Lenguaje científico
(*)3. La materia y su diversidad en la Naturaleza	(*)3.1. Clases y propiedades de la materia 3.2. Estados de agregación. 3.3. Disoluciones
(*)4. Materia y energía	(*) 4.1. Fuerzas y magnitudes relacionadas con la fuerza. 4.2. Clases y formas de transferencia de energía. Fuentes de energía. 4.3. Diversas interacciones de la materia con la energía: cambios físicos y cambios químicos
(*)5. Máquinas y tecnologías	(*)5.1. Fundamento de distintas máquinas. 5.2. Los nuevos materiales y la tecnología

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	46	61
Problem solving	15	0	15
Laboratory practical	15	0	15
Presentation	2	10	12
Mentored work	3	40	43
Introductory activities	2	0	2
Objective questions exam	1	0	1
Objective questions exam	1	0	1

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

	Description
Lecturing	Presentation by the teacher of the contents on the subject matter under study, theoretical bases and/or guidelines of a work, exercise, or project to be developed by the student.
Problem solving	Activity in which problems and, or exercises related to the subject are formulated. The student must develop the appropriate or correct solutions through routine training, the application of formulas or algorithms, the application of procedures for transforming the available information, and the interpretation of the results. It is often used as a supplement to the master's lesson.
Laboratory practical	Activities to apply knowledge to specific situations and to acquire basic and procedural skills related to the subject of study. They are developed in specific spaces with specialized equipment (scientific-technical laboratories, language laboratories, etc.).
Presentation	Presentation by the students to the teacher and, or a group of students on a topic about the content of the subject or the results of a work, exercise, or project... It can be carried out individually or in groups.
Mentored work	The student, individually or in a group, prepares a document on the topic of the subject or prepares seminars, investigations, reports, essays, summaries of readings, conferences, etc. It is generally an autonomous activity of the student(s), including searching and collecting information, reading, managing the bibliography, and writing.

Introductory activities    Activities aimed at making contact and gathering information about the students, as well as presenting the subject.

### Personalized assistance

Methodologies	Description
Problem solving	The attention of the student will be given personally in the hours assigned to each student in the middle group and in the tutoring hours.
Laboratory practical	The attention of the student will be done personally in the hours assigned to each student in the middle group.
Mentored work	The attention to the student will be carried out face-to-face during the hours assigned to each student in the middle group and during tutoring hours and not face-to-face through the platform or email.
Tests	Description
Objective questions exam	

### Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practical	Attendance (85% attendance will be required), attitude and work in the laboratory. Laboratory practice questionnaires.	20	A2	B2 B10	C25 C26 C27 C29	D1 D2 D5 D6 D7 D8 D9 D10 D12 D14 D16 D22 D23
Mentored work	Quality of the work and its presentation. The resolution of practical cases and problems exposed in the classroom will be valued.	30		B1 B2 B3 B4 B5 B6 B7 B8 B9 B11 B12	C28 C29 C30	D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D21 D22 D23
Objective questions exam	Knowledge acquired through relationship questions, definitions, lost words, etc. will be assessed. To pass the subject, a score equal to or higher than 5 out of 10 must be achieved.	25				
Objective questions exam	Knowledge acquired through exercises resolution and practical problems will be assessed. To pass the subject, a score equal to or higher than 5 out of 10 must be achieved.	25				

### Other comments on the Evaluation

In order to take advantage of the continuous evaluation, it will be necessary to attend the classroom-laboratory teaching sessions in 85% of the face-to-face time, with an ideal use.

To pass the subject it is necessary to achieve a minimum score of 50% in each of the sections that are valued and the presentation of a practical work with a theme related to the subject.

Those students who cannot attend the classroom-laboratory sessions will have to speak with the teacher at the beginning of the course, to specify the obligatory practical work that they will have to present. In this case, the evaluation criteria will be: individual practical work up to 30% and final exam up to 70%.

In the final exam, questions whose degree of difficulty is similar to those considered in the classroom and laboratory work are raised.

1st Call: The final grade will be obtained by the percentage sum of each one of the qualifications of the classroom assignments, laboratory practices and short answer tests. In any case, it will be necessary to achieve a minimum passing grade in each of the established sections. If the subject is not passed, the competences not acquired will be evaluated in the July call.

2nd Call: Those students who have passed any of the parts that are evaluated in the first call, will keep the note that will be added and weighted to the one they obtain in the section that is evaluated in this second call.

The parts of the subject passed in the 1st opportunity, will not be subject to evaluation in the 2nd, being considered, therefore, as approved in that academic year.

The official dates of the exams can be consulted on the website of the faculty in the space "exam dates".

In coherence with the inclusive nature that characterizes the Faculty of Education and Social Work, this guide may be adapted to meet the specific educational support needs of students enrolled in the PIUNE (PAT) program.

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## Sources of information

### Basic Bibliography

Catala Mireia, **las ciencias en la escuela. Teoría y prácticas**, Laboratorio educativo, 2002

Chang R, **Química**, MacGrawHill InterAmericana, 2001

Izquierdo, Merce, **Química en infantil y primaria.**, Grao, 2012

Perales Palcio, FJ ;Jose María Garrido y Mercedes Galdon Delgado, **Ciencia para educadores**, Prentice-Hall, 2008

### Complementary Bibliography

Baker, J., **50 Cosas que hay que saber sobre Física.**, Ariel, 2009

Domenech, X y Peral, J, **Química Ambiental de sistemas terrestres.**, Reverte, 2006

Emsley, J, **Moléculas en una exposición. Retratos de materiales interesantes en la vida cotidiana.**, Ediciones Península,, 2000

Fernández Panadero J., **¿ Por qué el cielo es azul ? La Ciencia para todos.**, Paginas de Espuma, 2004

Fisher, Len., **Como mojar una galleta: la ciencia en la vida cotidiana.** , Debolsillo, 2004

Moreno,R. y Cano, L., **Experimentos para todas las edades.**, Rialp, 2008

Pinto Cañon G., Martínez Ureaga, CastroA.C.M., **Química al alcance de todos.**, Pearson Education, 2006

Vinagre Arias, F, **rase una vez el aire**, Filarias,, 2003

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## Recommendations

### Subjects that continue the syllabus

Experimental sciences teaching 1/O05G120V01402

Experimental sciences teaching 2/O05G120V01502

Environmental education for development/O05G120V01901

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### Subjects that it is recommended to have taken before

Education: Design and development of the primary education curriculum/O05G120V01201

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## Other comments

This subject is complemented with the mandatory subjects of Didactic of the Experimental Sciences I, Didactic of the Experimental Sciences II, and the optional subject of Environmental Education.

This subject is framed in an Empower engaged with the sustainability of the surroundings and of the people. Attending this philosophy, this subject will promote educational practices based on materials of low environmental impact in coherence with the principles of sustainability (ODS).