UAB
Universitat Autònoma de Barcelona

# Games and Mathematical Activities in Primary Education

Code: 102058
ECTS Credits: 6

2025/2026

| Degree | Type | Year |
|---|---|---|
| Primary Education | OT | 4 |

## Contact

Name: Lluis Albarracin Gordo

Email: lluis.albarracin@uab.cat

## Teachers

David Lobo Sanchiz

## Teaching groups languages

You can view this information at the end of this document.

## Prerequisites

It is recommended that students enrolled in this subject have been enrolled and have successfully passed the following subjects of mathematics education: "Mathematics for teachers", first year; "Mathematics learning and curriculum", second year; "Management and innovation in the mathematics classroom", third year.

## Objectives and Contextualisation

GOALS

- Knowing, contextualizing, practicing and classifying some of the main abstract games across different world regions and throughout time periods.

- Exploring the relationships between games and mathematics from the perspective of the didactical contexts that emerge in the teaching of mathematics in Primary Education.

- Analyzing and designing game contexts for the cycles of Primary Education and in relation to mathematical strategies and curricular contents.

- Understanding the potential of games as mathematically rich activities that allow to develop a positive vision of mathematics while enacting cooperative work.

## Competences

- Analyse, reason and communicate mathematical proposals.
- Critically analyse personal work and use resources for professional development.
- 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.
- Incorporate information and communications technology to learn, communicate and share in educational contexts.
- Know and apply information and communication technologies to classrooms.
- Know how primary schools are organised and about the diversity of actions involved in running them.
- 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.
- Maintain a critical and autonomous relationship with respect to knowledge, values and public, social and private institutions.
- 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.
- Stimulate and value effort, constancy and personal discipline in pupils.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Value the relationship between mathematics and sciences as one of the pillars of scientific thought.

## Learning Outcomes

1. Adapt teaching and learning programs and activities to pupil diversity.
2. Analyse the goals of mathematics education at different stages of primary education.
3. Analyse the indicators of sustainability of academic and professional activities in the areas of knowledge, integrating social, economic and environmental dimensions.
4. Design innovative teaching sequences from contexts that provide recreational mathematics.
5. Design teaching and learning sequences that connect different mathematical topics.
6. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
7. Identifying, designing and communicating concepts, facts and phenomena of different sciences capable of being modelled using mathematical concepts.
8. Propose viable projects and actions to boost social, economic and environmental benefits.
9. Propose ways to evaluate projects and actions for improving sustainability.
10. Understand and critically evaluate educational software and related web-based resources in the gaming world that are suitable for teaching and learning mathematics.
11. Understand, appreciate and apply mathematical games in teaching and learning in this field.
12. Understand recreational didactic situations involving mathematics, both inside and outside the classroom, to promote independent learning and cooperative work.

## Content

1. Introduction:

1.1. Playful mathematics and "serious" mathematics.

1.2. Mathematical activity, games and mathematical recreations throughout history.

1.3.The application of games to decision-making: competitive games and collaborative games. The dilemmas

2. Board games and problem solving

2.1. Strategy games (Games of alignments, Search games, Games of connections, Games of Mancala)

2.2. The determination of winning strategies: The small strategy games (Nim and Nimbus games)

2.3. Other board games (games on paper and various pawn games).

3. Games with random intervention

3.1. Systems to generate situations of chance

3.2. Traditional games and probability

4. Mathematical recreations, a resource for the classroom: Enigmas and recreational problems

4.1. Numerical, geometric and logical recreations

5. Learning mathematics and recreational activities

5.1. Examples of mathematical and recretational activities in the school

## Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|---|---|---|---|
| Type: Directed | | | |
| Directed | 45 | 1.8 | 10, 12, 11, 4 |
| Type: Supervised | | | |
| Tutorials and follow-up | 23 | 0.92 | 10, 12, 11, 4 |
| Type: Autonomous | | | |
| Autonomous | 75 | 3 | 10, 12, 11, 4 |

The teaching and learning methods of this subject are based on interactive dynamics of whole-group and small-group face-to-face participation.
The main tenets are as follows

- 15 hours for presentations of the teacher (whole-group)
- 12,5 hours for analyses of board games (small-group)
- 12,5 hours for mathematical recreation workshops (small-group)
- 5 hours for computer lab sessions (whole-group)
- 5 hours for student presentations and other assessment tasks (whole-group)

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 |
|---|---|---|---|---|
| Classroom participation (Individual) | 10% | 1 | 0.04 | 10, 12, 11, 4 |
| Didactic design of games (group activity) | 20% | 2 | 0.08 | 1, 10, 12, 11, 5, 4, 6, 8 |
| Final written test (Individual) | 40% | 2 | 0.08 | 3, 2, 10, 12, 11, 4, 9 |
| Practice of recreation design (in pairs) | 15% | 1 | 0.04 | 5, 4, 7 |
| Practice of text analysis (Individual) | 15% | 1 | 0.04 | 2 |

CONTINUED ASSESSMENT

The students must participate in all lessons in order to have their activities assessed (up to 20% of incidences is contemplated). Moreover, the ordinary evaluation call will not be accomplishedfor students who have not submitted all the assessment activities within the corresponding deadlines and whose qualification is minimun 5 for each of these activities, including the written test. For these cases, there will be an extraordinary evaluation call where the maxium qualification will be 5. The dates of submission or accomplisment of the assessment activities are as follows:

- Practice of analysis author/article-book/game: 6th October 2025
- Practice of design and resolution of a recreation type: 17th November 2025
- Final written test: 15th December 2025
- Design of classroom activities and presentation: 12th January 2026

| Activities of continued assessment | Qualification % |
|---|---|
| Classroom participation (individual) | 10 |
| Practice of analysis author/article-book/game (individual) | 15 |
| Practice of design and resolution of a recreation type (pair) | 15 |
| Final written test (individual) | 40 |
| Design of classroom activities and presentation (small group) | 20 |

The extraordinary assessment call will be January 26, 2025. The students who do not overcome a qualification of 3.5 in course average qualification will not have the right to be evaluated in the extraordinary call.

There is no synthesis assessment.

UNIQUE ASSESSMENT

The students will have to submit and accomplish two activities each weighting 20%, alongside the same written test posed to students of the continued assessment group, weighting the remaining 40% of the subject qualification, all to be developed on 12th December 2025. For each asssement activity in the table below, the students will need to reach a minimum qualification of 5 (including the written test) for access to the subject evaluation. The extraordinary assessment call applied will be equal to the call for the students of the continued assessment group, to be developed on 26th January 2026 as well.

As well as:

- In all activities, communicative competence will be taken into account, to the point that any activity may be returned if there are shortcomings in expression or spelling.

- The grade of a group work is not necessarily the individual grade of the students in that group.

- Copying or plagiarizing material in any assessment activity implies a zero in the subject. The use of generative Artificial Intelligence tools to supplant the student's learning activity will imply a zero in the subject.

- The grades obtained in each of the assessment activities will be delivered to the student within 15 working days. Once the grades have been delivered, the student will be able to review the grade at the times agreed upon by the teacher.

## Bibliography

Recommendations of some texts

Albarracín, L. (2021). Una secuencia de actividades para desarrollar la visualización usando un videojuego. Enseñanza de las Ciencias, 39(2), 181-199.

Comas, O. (2005). *El món en jocs.* RBA-La Magrana.

Deulofeu, J. (2003). *131 juegos matemáticos*. Martínez Roca.

Fomín, D. et al. (2012). *Círculos matemáticos.* SM & RSME.

Gardner, M. et al. (2018). *¡Ajá! Paradojas que te hacen pensar.* RBA.

Grunfeld, F. (1978). *Juegos de todo el mundo.* UNICEF-Edilan.

Guzmán, M. (2003). *Cuentos con cuentas.* Nívola.

Paenza, A. (2017). Gardner para aficionados. Juegos de matemática recreativa. SM & RSME.

Wells, D. (1992). *The penguin book of curious and interesting puzzles*. Penguin Books

Recomendations of some webpages

Jareño, Joan. Calaix +ie. http://xtec.cat/~jjareno

NRICH Enriching Mathematics. http://nrich.maths.org/frontpage

CREAMAT. http://srvcnpbs.xtec.cat/creamat/joomla

DIVULGAMAT. http://www.divulgamat.net

## Software

No specific software will be used. However, there can be, in accordance with the types of game-based learning activities, related open access software.

## 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 |
|---|---|---|---|---|
| (TE) Theory | 20 | Catalan | first semester | morning-mixed |