

# DIDACTIC/TEACHING GUIDE

## 1. Target students

### 1.1 ASPECTS RELATED TO THE EDUCATIONAL CENTRE/SCHOOL

Context in which the DU is applied: kind of center, location, teachers' profiles, facilities, material, students' profile, families' profiles (socioeconomic level, cultural influences, etc.)

Virgen de la Rosa has been a private school in the city of Burgos for the last 49 years. There are 13 units of Pre-primary, Primary and Secondary Education, with over 320 students. They start at the age of three and finish at sixteen, or eighteen. The school belongs to Fundación Caja de Burgos, a non-profit organization which works for the social benefit of the city of Burgos.

Our educational proposal is inspired by the principles of humanism, aimed at the training of men and women who can approach the ideal of knowledge and character, which define a full existence and a successful journey along life. Throughout the educational process, our school makes explicit reference to certain fundamental values, developed through the axes of culture, solidarity, initiative, nature and socialization.

Each student is treated as a unique human being, with his/her strengths and weaknesses. All of them are regarded as individuals, with particular attention to diversity and specific special needs. We consider that early detection of difficulties, diagnosis and derivation to specialized services in cases which require it, and collaboration with other institutions, are fundamental when you have to give a specific answer to students' diversity.

Our aims are of a broad scope: to achieve the student's total integration in the educational centre, whatever his/her own circumstances and characteristics are, to succeed in the total development of his/her potential, facilitate the adequate

educational answer from teachers and achieve total social integration among their fellow students.

There are currently 23 teachers at the school and 8 of them usually travel with KA2 mobilities with students, apart from other 6 who have participated in KA1 mobilities. Each year more teachers at the school get involved in our Erasmus+ projects, either with in-school activities with their students or in the mobilities.

The school is currently involved in developing three European projects, and has finished two more. In the KA101 projects, teachers are developing new technologies in the teaching of languages, social and natural sciences, and technologies of information and communication, and they have improved their English level for teaching Science. In another project, KA219, the use of the English language is promoted so that the students learn about the common past of all the partners in that project, and thus the feelings of belonging to the European Union grow in them. We also work on another KA219 and KA229 as coordinators: the first one deals with Critical Thinking and Social Media and the second one deals the inclusion of refugees in the society they come to.

Moreover, our school stands out for the application of new technologies in teaching at all levels. The group of teachers follows a process of continuous training in new teaching methodologies. In fact, the education council of the regional government gave the school the ICT quality distinction 4 over 5, for the integration of new methodologies in the teaching. We work together with the UBU on small application projects for the application of science and didactics.

## **1.2 CHARACTERISTICS OF THE STUDENTS**

### **1.2.1. Main characteristics of the class group**

Grade, age. Define psych evolutionary, social, motor, affective and cognitive characteristics of the group to which the DU is addressed.

Cognitive abilities:

- Greater attention span and for longer.
- They master verbal language, which allows them to properly organize thought through their communication and representation functions.
- They are able to reflect on their own activity and on the new contents they are acquiring.
- Make logical deductions.
- Generalize the learning acquired

Emotional abilities:

- They differ in their interests, needs and personal tastes.
- Greater control of emotions, childhood fears disappear, but other worries appear (fear of ridicule, exams ...)
- Moral autonomy gradually evolves, with its own criteria to judge their personal actions and those of others.
- Consolidation of their own identity.
- The sense of justice, of cooperation, appears, which is seen through team games.
- Greater autonomy and self-determination.
- They generally feel insecure with partners of the opposite sex, especially in couples or small groups. They always try to impose themselves on others.

Physical abilities:

- Definitely settles the body schema.
- They globally dominate gesture and movement, through which they are able to express feelings and ideas. They adapt their movements to different media and materials.
- Global development of basic physical abilities. However, due to a growth crisis there is a mismatch between muscle and bone development, causing some difficulties in improving abilities.

- They give somewhat complex and acceptably adequate answers to motor situations presented.
- They control spatial and temporal structures quite well, as well as their interrelationship.
- They develop physically in an important way, so physical exercise, sports, games continue to be decisive for them... Likewise, they are able to work with a certain level within sports activities, which motivate them considerably.

Relational abilities linked to motor skills:

- They are sensitive to the stimuli of others, so it is an educational moment of great interest to awaken positive attitudes based on their future training and appropriate social integration.
- Develop close bonds of friendship between peers. Group relationships are enhanced. Gangs begin to appear, and there is a predilection for friends of the same sex.
- Discrimination or separation on the basis of sex is common and mixed couples are usually "non-voluntary". It is usually easier to generate large mixed groups.
- They collaborate with teachers in their classroom work without major difficulties.
- They work well in a group, which favours the work of acceptance of all, whatever the individual characteristics.
- They gradually create their self-concept by valuing their image before themselves and others. For this, the concept that adults have of them and they show them are of great importance (the teaching staff, in this case, is decisive).
- It is difficult for them to establish situations of dialogue without moments of tension associated with their attempt to impose their opinion, especially of the boys because of their eagerness to reinforce their personality.
- The differences between members of the group of different sexes become very evident and open, especially in couples.

#### 1.2.2. Specific characteristics of the class group

Special needs, extracurricular support, and previous formation, etc.

Since the methodology carried out to implement this unit differs considerably from that used on a day-to-day basis, as far as possible, all students will be provided with concrete, short instructions in positive language, which not only encourage students of attention to diversity, but also the whole group. In addition, efforts will be made to eliminate or at least minimize the greatest number of external stimuli during the explanations, to promote the understanding of the task.

Of the 25 students who make up this group, it is worth mentioning especially the following for requiring special needs:

Two students have specific learning difficulties, one of them needing educational support.

The student who requires educational support presents a low competency level, showing greater difficulty in tasks that require more memorization, but better performance in those that require a more practical performance.

The student who does not require educational support shows difficulties in understanding, problem solving and strategy setting.

A student is diagnosed with Attention Deficit Disorder (ADD).

A student has high-functioning autism spectrum disorder.

## **2. Purpose**

What the training programme is intended to achieve, what the unit provides in comparison to others, what its purpose or goals are.

The purpose of this teaching unit is for our students to learn mathematics while they are practicing their physical skills in the PE classroom.

We can consider as an underlying objective to the previous one that students practice Mathematics in other contexts that are not those of primary education classroom, losing the fear of Mathematics and promoting the taste for PE. It is intended a change of

attitude with these subjects, and perhaps, although it is a very ambitious goal, that students choose in the future a professional life linked to any of the two disciplines that intervene in this DU.

### **3. Course programme**

#### 3.1. Contents. Presentation of the didactic unit

##### 3.1.1. TEACHING AND LEARNING ACTIVITIES

Briefly show the typology of activities that will be present at the DU: introduction, motivation, development, extension, recovery, rules, rewards, etc. (This information must make others able to create new similar activities).

This DU is developed through a gamification in which the participating students have to liberate the inhabitants of Numberland from the evil Plinton. The use of the gamification methodology is considered convenient since in itself it is a measure of attention to diversity, even more, reinforced by the norm for the composition of the groups. This type of methodology increases interest because it guarantees the achievement of challenges through the union of team efforts.

The students are organized in groups of 5, taking into account that they must be egalitarian in terms of gender and inclusive in terms of abilities.

The groups are organized according to the roles of the DU that rotate in each challenge and always start with 10 points and two stars. If the groups ask for assistance, they will subtract two points or a star if they still have them. In each Block they can earn 3 stars depending on whether the competitions take place or not. The keys will be used to liberate your friends from Numberland. 8 keys are needed to unlock them.

To attend to diversity, all DU activities can be adapted depending on the type of need of each student. The challenges themselves are designed to cater to the diversity of our students' learning style or ability. In addition to this measure, we can add or reduce motor difficulty to the development of the Physical Education part of each challenge, taking into account the abilities of our students. Also, in case of movement difficulties, specific roles can be created for students.

#### 3.2. Methodological strategies guiding teachers' intervention

##### 3.2.1. RELATIONSHIP OF DU WITH...

### 3.2.1.1. Inter-disciplinarity

Relationship math-PE and others (how they are related each other). This could be a common paragraph for every DU.

We believe that this DU can inspire students to like and learn more mathematics. The common opinion is that kids do not always like Maths, but they love sport. Using sport, better said Physical Education contents, in mathematical problems and ICT methodology for learning will lead to enlarge student's skills and abilities to model and solve practical problems.

The content of this DU pretends to actively engage the students in the educational process by connecting mathematics and sports. The students who like Maths will develop interest in sports and PE, and vice versa, students interested in sports and PE will develop their Maths skills. While having fun, the students will have to make good decisions and create innovative solutions for their mathematical problem. They will have an opportunity to be active participants in creating the solution of the problem. This approach we believe will be interesting and challenging for all the students, not just for students with good mathematical background.

The students who gain knowledge and skills in Maths can apply their reasoning in different areas of science, as well.

At the same time, we cannot forget that gender equality must be linked to the right to education. As teachers we must facilitate safe and inclusive learning environments. In some countries there is still a small educational gap between girls and boys, we want to reduce it and empower them in vocations typically stereotyped as masculine.

### 3.2.1.2 Intra-disciplinarity

Linkage with previous and subsequent with other DU's to be carried out throughout the course.

In order for the development of the didactic unit to be as satisfactory as expected, it is advisable to implement it during the third term, since it will be necessary to master the basic contents of each of the blocks in which each subject is structured:

The contents of Mathematics correspond to the following content blocks:

Numbers

Measure

Geometry

Statistic and probability

The contents of Physical Education are structured in four content blocks:

Body knowledge

Motor skills

Games and sports activities

Physical activity and health.

3.3. Assessment: what, how and when to assess knowledge, how to monitor follow-up and achievement.

The evaluation is carried out in each challenge. It is the students themselves who collect the evidence of the knowledge acquired from PE and mathematics in the classroom notebook provided. At the end of each session, the co-evaluation and self-evaluation of the group is done. In turn, the teachers, observing the development of the activities, fill in the skills rubric.

The rating is made up of three items:



Challenge qualification, all students start with two stars, which will allow them to ask to overcome the challenges. When they asked they lose a star or two points if they no longer have stars. Students receive a feedback at the end of each challenge, based on the points and stars achieved.

Block qualification, where the teacher assesses the skills developed, which allows obtaining the keys. In the classroom, the feedback of the session is done so that the students are aware of the level of competence acquisition.

Self-assessment and co-assessment, also in the final 10 minutes, the students carry out this part.

#### 3.4. Duration and schedule, timing of the intervention

The didactic unit is made up of 11 lessons structured into 4 blocks. The main objectives of lessons 0 and 11 are the presentation and reflection of the results, respectively, whereas the rest are divided into 3 parts.

Lessons 1, 4 and 7 are the first one of each block, and they will be implemented in the classroom. During the remaining lessons the activities will be developed through the gamification challenges.

Each session will last 50 minutes, structured as follows:

5 minutes: material preparation.

5 minutes: review of the lesson dynamic.

30 minutes: activities development.

5 minutes: discussion of the data collected.

5 minutes: co-evaluation.

#### **4. Didactic support**

The following questions were raised in relation to human and material resources. Teachers involved: who they are, how they resolve doubts, whether they are all in the classroom at the same time, and the teaching materials used.

This DU is designed for learning mathematics in the development of the PE class, so in principle the presence of the mathematics teacher would not be necessary at the same time as the PE teacher. Although, on the other hand, all the students will be doing their challenges at the same time, so it would be advisable to have a support teacher so that the doubts of several teams can be solved at the same time, since not all the teams will be performing the same task-challenge at the same time.

The material will be freely available and will be prepared in the Gymnasium warehouse, so that the group that needs it can use it on demand.

All groups will have a paper notebook provided by the teacher and a mobile device connected to the Internet. In the notebook they will write down the results and describe the challenges they are doing, and then, in the last minutes of the session, go to the classroom and with the mobile device, write down their results in a spreadsheet shared with their classmates. In this sheet they will check if the calculations they have made on paper have been corrected, in addition to seeing the partial and total markers of each activity online. In this way they will calculate their challenge scores, the stars obtained and the saving keys.

#### **5. Student services**

##### **5.1. ATTENTION TO DIVERSITY**

Aimed at breaking boundaries about gender in Math and Physical Education: gender features, special needs, adaptations, enrichments, etc.

All activities do not consider gender skills, so that all students, regardless of gender, can successfully develop the challenges regardless of gender.

To support this circumstance, when forming groups of superheroes, it will be taken into account that they have gender equality in their formation. In addition, we consider that the groups have to be balanced in skills in PE and Maths in the training, thereby ensuring that it is the students themselves who offer support to their colleagues who need it.

The very methodology of gamification is a measure of attention to diversity, since it offers the student different types of challenges, with different curricular levels. This makes it easier for the teacher to select the most appropriate activities if there is a group with special needs. This situation would be unlikely due to the very formation of inclusive groups and thus their different capacities remain diluted in the group.

The resources available to the students facilitate inclusion, as there are different possibilities of carrying out an activity adapting the materials to the group.

The challenges are designed so that with small particular modifications they can be developed by those students with different abilities. If they have different motor skills, they can always act as a team to overcome these difficulties.

At the time of evaluation, and due to the very nature of the activity, each group competes with itself, with which the maximum score can be reached based on the characteristics of the individuals in each group.

It will be the characteristics of each group that determine the measures to be taken, considering that in itself, this DU is contemplating various capacities that the students may have or carry out.

In the group there are students with special needs that we will describe:

Taking into account the characteristics of the student with Attention Deficit Disorder (ADD), the following methodological adaptations will be developed:

His place in the classroom will be at the front, close to the teacher to catch his attention frequently and to be able to keep track of his work, making sure he is concentrated.

Using positive reinforcement, praise and encouragement.

Making him participate in class by encouraging him to speak, respond or comment.

Showing interest while performing a task and encourage him to keep working.

Asking him frequently for examples, similar situations... to keep his attention and better understand what his knowledge is.

Checking your workbook almost daily to check that you have completed the task assigned.

When you play the role of secretary, you will have a timer and an estimated time of completion of each activity or step of the class. (Break down tasks).

In the performance of roles in which they find greater difficulty, they will have the help of a partner-companion. The objective for them is to assume the responsibilities of all roles and to promote their self-esteem and improve their self-concept.

To facilitate the learning and performance in the classroom of the student with high-functioning autism spectrum disorder, we will do the following adaptations:

Communicate the messages using short phrases and direct statements without double meanings using clear language, avoiding the use of turns of phrase, jokes, examples; and if they are used, explain them clearly.

Provide more time for the student to respond or start an assignment.

We will carefully select the colleagues that make up your work group, previously clarifying the tasks that each one must perform based on the role assigned that day.

We will provide cards in different colors for each role, specifying their main functions on the front.

Tasks will be broken down into a sequence of steps.

After the explanations, make sure that the student has understood the instructions or instructions that are provided in a group.

Use positive reinforcement.

Clearly define the workspace of each group.

The secretary will have a clock or stopwatch to control the time needed for each activity.

Students with specific learning difficulties will be favored by the methodology of the didactic unit, and in addition, other measures will be taken:

Working in a group allows them to interact with equals and to be able to receive their help continuously in case they need it or request it. They will be continually encouraged to do so.

The evaluation system is not centered on a single written test, but the instruments are diversified: work sheets, skills rubric, classroom notebook.

Graphics and images will be included in the worksheets, carefully selecting the relevant and essential aspects that we want all students to learn.

Provide a glossary of new terms that will appear during the teaching unit.

Extend working time during the performance of the role of secretary.

In the performance of the role of mathematician he will have the help of a clock and a scale. We will provide you with an approximate duration for each challenge in such a way that we ensure that the group is capable of meeting all the objectives set in the session.

Reinforce the tasks that you perform correctly.

In the case of students with high abilities, extension tasks will have to be added. Due to the very nature of the challenges, it will be taken into consideration that the difficulty

will increase along the path of Mathematics. When working with spreadsheet it is easy to extend the challenges. Statistical calculations can be extended by obtaining metadata, arithmetic calculations can be made more complex. You can even have the student program the spreadsheet for use by the entire group, drawing attention to the group.

## 5.2. COMPLEMENTARY AND EXTRACURRICULAR ACTIVITIES

If existed, time and way to carry out, contributions, etc. (For example, outdoor and extracurricular activities, science coffee, on-line meetings, treasure hunting, collaborative task with other grades, etc.)

Among other things, it can be indicated whether materials can be lent to students or whether audiovisual resources will be made available to them.

Other activities that should be done to complement the vocations among the girls will be a conference for women who are developing their professional activity in the world of Physical Education or sports and in the world of mathematics. With this type of activity we will gain confidence among students by showing them how other women have developed their professional lives in these fields. Of course, this initiative may also influence men due to the successful nature of those involved.

On the other hand, there are many activities in which the figure of women in science and technology is extolled, promoting their role in the scientific and technical development of our society. Taking advantage of this pull, visits to this type of exhibition may be planned to encourage scientific vocations.

Attendance at women's group sport matches may also be considered complementary activities to this UD, since it is about escaping from gender stereotypes linked to the practice of a specific sport.

All the material that has been created in this DU is available to anyone interested in learning. The project that includes this didactic unit has a YouTube channel where the videos produced by the schools that are implementing the DU and sharing their resources with the students are uploaded.

Both teachers and students will have a Web page at their disposal, where they will also have access to all the materials generated in the RIMAS project related to the implementation of didactic units similar to this one.

## 6. Other information

### REFERENCES

APA styling (7<sup>th</sup> Ed.)

