**Scientix Lesson plan**

**Title**

**DRONES IN OUR TOWN?**

**Author (s)**

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**Subjects**

Languages: Basque, Spanish and English, Technology, Physics

\***Note**: this interdisciplinary proposal has been designed to be carried out by several language teachers in cooperation with at least one STEM teacher (from physic or/and technology).

Classroom sessions should be organised in the timetable as a continuous (2 days) where each specialist teacher works with the students following the nature and the order of the activities. Students work on it as a whole project.

Target students already have a B2-C1 level in Basque and Spanish, and A2-B1 in English.

**Aim of the lesson**

At the end of the lesson, the students will be able to:

* Develop their communication skills
* Use ICT tools in the results of their teamwork research, “A proposal to regulate the use of simple drones in our town”, in order to be aware of the relevance of the drones and their applications, as well as the security needed.

**Age of students:**

17-18 years old (Upper Secondary)

**Time**

Preparation time: 4h

Teaching time: 9h or more depending of the Extension Activities.

**Teaching material**

Online resources:

1. Euronews video to introduce a delivery service in Iceland using drones.

<https://www.euronews.com/2018/09/24/watch-pie-in-the-sky-iceland-embraces-growing-drone-delivery-service>

1. Wikipedia article in English about the components and use of drones (unmanned aerial vehicle (UAV): <https://en.wikipedia.org/wiki/Unmanned_aerial_vehicle>
2. Euronews video to introduce drones’ applications: <https://www.euronews.com/2018/09/24/drones-that-save-lives-when-technology-helps-in-emergency>
3. News article in Spanish, about a woman’s real accident by drone: <https://www.diariovasco.com/gipuzkoa/201507/26/creia-habia-caido-nunca-201507260758.html>

News article about drone related injury: <https://www.bbc.com/news/technology-26921504>

1. Wikipedia article about Spanish legislation on drones:

<https://es.wikipedia.org/wiki/Veh%C3%ADculo_a%C3%A9reo_no_tripulado>; EU Drone regulations :<http://www.europarl.europa.eu/news/en/press-room/20180607IPR05239/eu-wide-rules-for-safety-of-drones-approved-by-european-parliament>

1. News article in Spanish, ¿Dónde se puede pilotar un dron en Gipuzkoa?

<https://www.diariovasco.com/tecnologia/pilotar-dron-gipuzkoa-20181017120353-nt.html>; Where to fly a drone in France: <https://aerophoto-drones.bzh/2017/01/30/fly-a-drone-in-france-for-foreigners-and-regulation/>

1. **[Geogrebra](https://ikt.ekigunea.eus/eu/aplikazioak/geogebra)** [for mathematical representations of graphs.](https://ikt.ekigunea.eus/eu/aplikazioak/geogebra) [www.geogebra.org](http://www.geogebra.org/)

Offline:

* Domestic drone or photograph
* Computers, Internet
* Regular paper and pens
* Blackboard

**21st century skills**

This didactic proposal incorporates knowledge and skills from:

* 3 languages and STEM areas ([Global awareness, awareness about languages, global technological issues](http://www.p21.org/about-us/p21-framework/256))
* Local geography, Government and civics
* Cooperative teamwork approach
* Search of information from diverse sources and languages; promoting digital literacy
* Analysis of information and analysis technical objects (drones); promoting critical thinking
* Reflection about future jobs

**Lesson Plan**

| **Name of activity** | **Procedure** | **Time** |
| --- | --- | --- |
|  **Introduction** | First, the students are divided in four teams. They start exploring the news (see online resource 1 from the list above) proposed by the teacher and watch the “Pie in the sky? Iceland embraces growing drone delivery service”. They work collaboratively on the comprehension of the texts in English, following ordinary language methodology:* The teacher(s) asks the students about their knowledge and interest about the topic “Drones” (e.g. Have you ever seen/used a drone? What do you know about drones? Do you think they have an important or significant use to you? etc.); **Individual assessment**: assign a mark from 1 to 4 giving opinion about the interest of the topic.
* The teacher(s) presents the lesson plan of “Drones in our town?” and explains the main aim of the lesson (a teamwork research, “A proposal to regulate the use of simple/drones in our town”).
 |  30mins |
|  **Activity 1** |  Students identify how a simple drone works by:* Reading information from given sources (see online resource 2 above) in English, as well as additional information researched by each team. They work together on the comprehension texts in English.
* Analyzing the structure of a real drone and its instructions for use in the classroom. (The teacher shows a simple drone found in toyshops nowadays or a photograph and asks them to analyze it. If possible, a drone is brought to the school and shown to the kids).
* Drawing and labelling the main features of the drones.
 |   |
|  **Activity 2** | The teacher shows the online resource 3 regarding the use of drones. Students identify and discuss in teams the current applications of drones using the internet. They investigate any future possibilities of drones in order to cooperate with the whole class and create a common list proposing new applicationsthat could be developed.\*Extension: This activity could be extended from the language point of view, considering [21st-century skills (Information, media and technology skills)](http://www.p21.org/our-work/p21-framework), asking the student to analyze media in order to:* Understand both how and why media messages are constructed, and for what purposes.
* Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors.
 |   |
|  **Activity 3**  | Students reflect and discuss on the needs of a legal regulation for the use of drones in town. To do that, they:* Listen to the oral presentation of the teacher in Spanish about “A woman’s real accident by drone” / in English about another real drone accident (see online resource 4 above) and they give their opinion (oral or writing) about the accident.
* Search, read and create a written list or text in Spanish/national language containing the most basic legal rules for drone used in their country, starting from the preliminary source “Legislación en España/ EU drone use regulations” (see online article 5).
 |   |
|  **Activity 4** | Once the students have learned the basic functioning features of the drones, as well as their most common uses and the real risks involved, they focus on the planning how to allow the circulation of drones in their town. For that students:* Study and design a basic proposal drawing a local map that show possible zones where drones could circulate in students’ town/region in safe conditions.
* Discuss and write in Basque/ national language the most realistic uses and rules of drones in town taking into account the circulation rules proposed previously. The diversity of types of drones can help distributing the work among groups, depending on their interest (post-delivery drones, camera drones, security drones, pesticide drones etc).
* Listen to the feedback assessment by the teacher about the quality of the map and originality of the proposal made by each team for drone circulation.
 |   |
| **Activity 5** | After drawing some specific proposals for drones’ circulation in activity 4, the students study the movement of drones from the kinematic point of view, applying their learnings from the ordinary Physics lessons as follows:* Investigate and write a kinematic formula and graphs that describe at least one displacement of the drone between two points of the town, taking into account a given time of delivery and speed of the drone. For example, drone goes from a point A to a point B in the map, with a constant velocity in a given time or distance C-D accelerating etc. These typical exercises from secondary physics cannot be presented in this short document).
* Students could use the Tracker software presented in the STEM is Everywhere MOOC to obtain mathematical parameters from kinematic formulas, as well as **Geogrebra** for mathematical representations of graphs. www.geogebra.org
 |  |
| **Activity 6** | In order to be aware of the relevance of the drones and their applications, as well as the security needed, the students: * Prepare the content for their presentation using common ICT applications (text processor, slides, collected videos, etc.)
* Present orally the conclusions of their investigation teamwork in Basque/national language to other group of secondary students (those studying arts for example or those of younger age) in ten minutes.
* Assessment by peers: students assess the teams during the presentations, following a given rubric: Clarity of the presentation (voice, language level (vocabulary, etc.); Quality of documents presented (relevance of content concepts, etc.); Feasibility of the proposal for the Drone Service presented; Quality of responses given to other pupils during presentation.
* Do at the end the individual assessment from 1 to 4, the interest and development of the lesson.

\*An alternative communication procedure could be used: creating a written brochure by each working team to present a future drone service in town and the characteristics of that service. |  |
|  |  |  |

**Assessment**

* **(20%) Self evaluation:** short personal diary writing what each student has done and expressing what has really learnt in each activity.
	+ What I did / How I did
* **(50%) Teacher’s feedback** about:
	+ Participation during the introductory activity and teamwork responsibilities in all tasks. Not sufficient/ Acceptable/ Good /Excellent
	+ Final presentation of the work. A team mark about the teamwork.
	+ Assessment of the quality of the map and originality of the proposal made by each team for drone circulation
* **(30%) Peer assessment** during the presentation, following a rubric
	+ Clarity of the presentation (voice, language level, etc.)
	+ Quality of documents presented (relevance of content concepts, etc.)
	+ Feasibility of the proposal for the Drone Service
	+ Quality of responses given to other pupils during presentation

**Student feedback**

In the beginning, students assess from 1 to 4 the interest of the topic (introductory activity) following by the interest and development at the end.

**About Scientix**

Scientix promotes and supports a Europe-wide collaboration among STEM (Science, Technology, Engineering and Mathematics) teachers, education researchers, policymakers and other STEM education professionals. If you need more information, check the [Scientix portal](http://www.scientix.eu/home), or contact either the [Scientix National Contact Point](http://www.scientix.eu/national-contact-points) or Scientix Ambassadors in your country.