TEACHERS HANDBOOK

EduFire Toolkit

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1. Introduction

The handbook, designed to guide teachers in effectively utilizing the developed materials, is an essential component of the EduFire Toolkit project, funded by the European Commission Erasmus+ programme, which involves the combined effort of four partner institutions from three EU countries: Spain, Portugal and Ireland. The project aims to awaken the curiosity and interest of young students in relation to wildfires by exploring and understanding their local community and environment.

The project plans to educate secondary school students (12 to 16 years old) on wildfire risk reduction in the climate change context through a project-based learning (PBL) methodology. For that aim, we have developed a set of multidisciplinary teaching resources to support the students' learning process through working on projects that respond to real-life needs where wildfires and climate change are the main topics, from a STEAM (Science, Technology, Engineering, Arts and Math) approach. The three partner countries represent different educational and wildfire challenges and contexts. The project has co-created, together with environmental education, social sciences and fire and ecology experts, a toolkit with a set of guidelines for teachers, activities, and resources for students, reproducible and adaptable for implementation in other European educational communities, with the aim of helping students to understand and face present and future wildfire challenges.

This Teachers Handbook outlines the project objectives, structure and methodology used. It also identifies the EU competences linked to the curriculum that are developed as part of the project. Evaluation of students' knowledge before the project and after the project are also outlined.

This EduFire Toolkit Teachers Handbook forms part of Intellectual Output 3. For guiding teachers on how to utilize the EduFire materials effectively, the handbook aims to support teachers in introducing project content to students in a concise, easy-to-follow, and engaging format, thereby facilitating meaningful learning experiences related to wildfire prevention and environmental awareness.

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2. Project Objectives

The project objectives are as follows:

- To acquire a critical view of wildfires and its relationship with climate change and landscape management.
- To discover real-world problems, weaknesses, strengths, and opportunities at local scale related to wildfires and climate change. That is, promoting authentic learning that connects them to the real world.
- To build an educated and involved young public on scientific principles related to the role of fire in the ecosystem and forest management.
- To build a close relationship of collaboration and knowledge exchange between local communities, students, teachers, and families.
- To support academic competences and link the content to curriculum standards in each partner country.
- To provide opportunities for students to learn about a range of potential jobs and professional careers (e.g., forest management, farmers, shepherds, etc.).
- To demonstrate and raise awareness about rural life opportunities, integrating a new model of economic development based on uncertainty reduction through environmental knowledge to build resilient societies.
- To raise awareness to students and teachers living in urban areas about how they are also affected by and contributing to climate change and wildfire risk, even if they do not live nearby wildfire-prone areas.
- To raise awareness to students and teachers living in wildland-urban interface areas about the wildfire risk they might face and the preventive actions they can take.
- To help students develop different cognitive and communication skills to share and be aware about wildfires and climate change among the local and international community.

These are in keeping with the objectives of the Erasmus+ programme guidelines.

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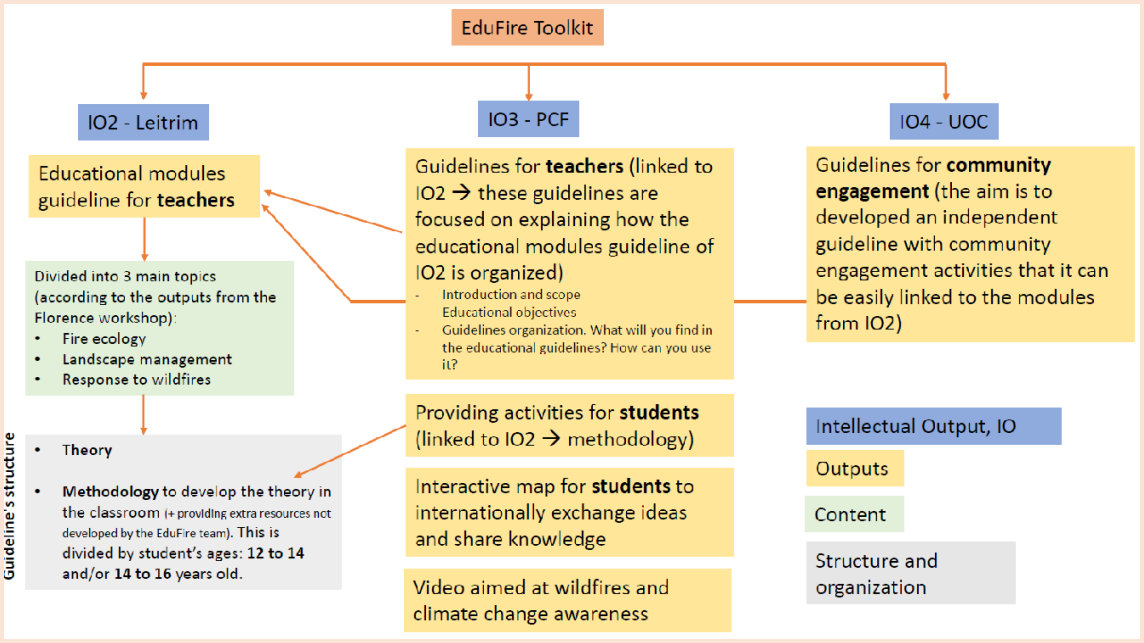
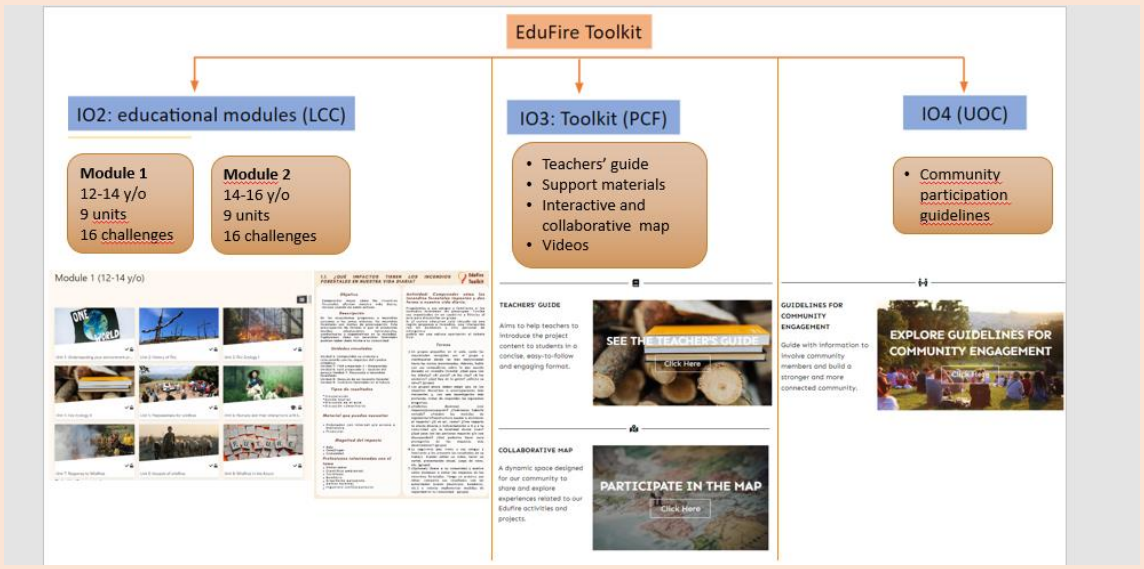
3. Project Structure

The following diagram shows the overall EduFire Toolkit project structure, the content of each Intellectual Output (IO), how the various intellectual outputs are interlinked, and how the content, methodologies and evaluation of the modules have been developed. Additional links to various resources for the delivery of the educational modules are provided for teachers. Evaluation of the Intellectual Outputs and educational modules are in Section 7.





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Intellectual Outputs

There are three Intellectual Outputs developed as part of the project.

Intellectual Output 2 – Educational Modules

In accordance with the project objectives, the two educational modules are designed for students aged 12-14 and from 14-16.

Module's contents are organised in three formats:

- **Units**: Each Module is divided into nine Units, with each one covering and developing a key subject while including interactive activities that allow students to evaluate their understanding of the content. They are meant to support teachers and educators in conducting the Challenges with their students.
- **Challenges**: A list of 31 challenges are aimed at students. Starting with a driving question based on real-life problems, each challenge provides activities, actions and potential research topics connected with the Units contents.
- **Interactive platform**: it is composed of 18 sections aimed at students. It includes a brief context of each Unit and a series of interactive online activities. These can be used by individuals interested in learning about wildfires in an engaging, interactive manner and by teachers looking to introduce the context of the Challenges.

All this content is in the Edufire Toolkit Website using a Learning Management System hosted by Pau Costa Foundation. All of them are free and open-access, and available in four languages (Catalan, English, Portuguese, and Spanish).

For a more detailed presentation of the Units and Challenges contents see Section 6 in this Handbook.

Intellectual Output 3 – Toolkit

In accordance with the project objectives, these educational guidelines for teachers are developed as part of the Toolkit and are linked to the educational modules produced in Intellectual Output 2. The Toolkit also includes support material, a video, as well as an interactive and collaborative map to share Edufire Toolkit implementation examples.

Intellectual Output 4 – Guidelines for Community Engagement

The aim of the Intellectual Output is to develop an independent guideline for community engagement activities that is linked to the modules in Intellectual Output 2 and the Toolkit in Intellectual Output 3.

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4. Project Methodology

The project's methodologies are focused on real-world problems, integrating STEAM and PBL approaches to prepare students for life beyond school. By tackling interdisciplinary challenges, students develop critical thinking and problem-solving skills essential for success. These methods also emphasize teamwork and innovation, equipping students for the demands of the modern world.

The following are the methodologies proposed for use during the project:

- ***Real-World, authentic problems, and contexts.*** *STEAM and PBL philosophies both focus on preparing students for life after school. For students to be ready to address the complex challenges and problems that exist in our world, they must have the opportunity to practice doing so. Requiring students to engage with rigorous problems that have not been contrived for the sake of arriving at one correct answer is key in building their capacity to think critically and to solve problems in the real world.*

- ***Interdisciplinary approach.*** *One of the hallmarks of STEAM education is that students no longer study and practice science, maths, or engineering in isolation. Rather, teachers are now asked to engage students in thought-provoking work that requires them to utilise and make connections among their learning. In similar fashion, the goal of PBL in modelling real-world problems and challenges is to get students to begin to understand that issues in the real-world are rarely connected to one single subject. Students need to be proficient with academic content and skills across the curriculum, and both PBL and STEAM focus allow students opportunities to develop this interdisciplinary view of their learning and of the world.*

- ***Skills needed for success.*** *One of the main goals of both a PBL and STEAM approach to learning is that students leave schools prepared with the skills they need for life. Being able to apply what you know to solve problems is important, and being able to collaborate, communicate, innovate, and think critically are equally necessary to ensure long-term success. Both approaches help students develop the 21st century and future-ready skills they need to live, work, and interact successfully in today's modern world.*

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5. Competences

There are many competences developed at EU level for students undertaking various courses at secondary level. There may be slight differences between one country and another. This section provides details of the EU competences for students that should be complied with during the project.

The European Commission works with EU Member States to support and reinforce the development of key competences and basic skills for all, from an early age and throughout life. The Council Recommendation identifies eight key competences needed for personal fulfilment, a healthy and sustainable lifestyle, employability, active citizenship and social inclusion.

The main competences at EU level are as follows:

Literacy

Literacy is the ability to identify, understand, express, create and interpret concepts, feelings, facts and opinions in both oral and written forms, using visual, sound/audio and digital materials across disciplines and contexts. It implies the ability to communicate and connect effectively with others, in an appropriate and creative way.

Development of literacy forms the basis for further learning and further linguistic interaction. Depending on the context, literacy competence can be developed in the mother tongue, the language of schooling and/or the official language in a country or region.

Multilingual

This competence defines the ability to use different languages appropriately and effectively for communication. It broadly shares the main skill dimensions of literacy: it is based on the ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form (listening, speaking, reading and writing) in an appropriate range of societal and cultural contexts according to one's wants or needs. Language competences integrate a historical dimension and intercultural competences. It relies on the ability to mediate between different languages and media, as outlined in the Common European Framework of Reference. As appropriate, it can include maintaining and further developing mother tongue competences, as well as the acquisition of a country's official language(s).

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Mathematical

Mathematical competence is the ability to develop and apply mathematical thinking and insight to solve a range of problems in everyday situations. Building on a sound mastery of numeracy, the emphasis is on process and activity, as well as knowledge. Mathematical competence involves, to different degrees, the ability and willingness to use mathematical modes of thought and presentation (formulas, models, constructs, graphs, charts).

Science, technology and engineering

Competence in science refers to the ability and willingness to explain the natural world by making use of the body of knowledge and methodology employed, including observation and experimentation, to identify questions and to draw evidence-based conclusions. Competences in technology and engineering are applications of that knowledge and methodology in response to perceived human wants or needs. Competence in science, technology and engineering involves an understanding of the changes caused by human activity and responsibility as an individual citizen.

Digital

Digital competence involves the confident, critical, and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.

Personal, social and learning to learn

Personal, social, and "learning to learn" competence is the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career. It includes the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional well-being, to maintain physical and mental health, and to be able to lead a health-conscious, future-oriented life, empathize and manage conflict in an inclusive and supportive context.

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Citizenship

Citizenship competence is the ability to act as responsible citizens and to fully participate in civic and social life, based on understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability.

Entrepreneurship

Entrepreneurship competence refers to the capacity to act upon opportunities and ideas, and to transform them into values for others. It is founded upon creativity, critical thinking and problem-solving, taking initiative and perseverance and the ability to work collaboratively to plan and manage projects that are of cultural, social or financial value.

Cultural awareness and expression

Competence in cultural awareness and expression involves understanding and respect for how ideas and meaning are creatively expressed and communicated in different cultures and through a range of arts and other cultural forms. It involves being engaged in understanding, developing, and expressing one's own ideas and sense of place or role in society in a variety of ways and contexts.

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6. Structure of Units and Challenges

Intellectual Output 2 is divided into the following nine units:

Units	Suitability
Unit 1: Understanding your environment and connecting it to climate change impacts	Students aged 12 - 16
Unit 2: History of fire	Students aged 12 - 16
Unit 3: Fire and wildfires	Students aged 12 - 16
Unit 4: The impacts of wildfires and climate change on different ecosystems around the world.	Students aged 12 - 16
Unit 5: Preparedness for wildfires	Students aged 12 - 16
Unit 6: Humans and their interactions with landscapes	Students aged 12 - 16
Unit 7: Response to wildfires	Students aged 12 - 16
Unit 8: Impacts of wildfires	Students aged 12 - 16
Unit 9: Wildfires in the future	Students aged 12 - 16

Each Unit begins with a short overview, indicating its purpose, learning objective(s), and the main highlights. This is followed by the main content and an outline of the lesson overview that teachers will use. The lesson overview contains the following details:

- Unit driving question
- Challenges related to this Unit, taking into account the age group
- A list of additional online resources
- A glossary with the main concepts included in the Unit

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Challenges

Each Unit contains a few Challenges for the two age groups of students i.e., 12-14 and 14-16. The Challenges have developed learning objectives that address real-world situations and needs. By following the project-based learning (PBL) methodology, a set of driving question(s) has been developed for each Challenge. That is, each Challenge starts with a key question. At the end, students will be able to answer them, thanks to the step-by-step approach used in each unit.

The structure of each Challenge includes the following:

- Aim
- Description
- Linked Units
- Type of expected results
- Material needed
- Scope of impact
- Professions related to the challenge
- Activity description and related tasks

Completion of the Challenges

Teachers introduce the main topic of the Unit to the students in class. This can be by way of a short presentation or a general discussion. Teachers then introduce the Challenges to be completed by the students as part of each Unit. Challenges have been produced for students aged 12-14 and for students aged 14-16. Each Challenge has a driving question to encourage the students to come up with a solution to a real-world problem or issue.

The teachers may suggest the various learning methodologies that students may use as part of their project-based learning activities associated with the Challenges. It is up to the students to select the methodologies they consider appropriate for the Challenges.

The students complete the various tasks and present their results at the end of the Challenge. Students are encouraged to be creative in the presentation of their results.

Appendix 2 includes details of the learning methodologies which will help students aged 12 - 16 to apply the theory to real world situations and then come up with solutions to the Challenges they face. The Challenges in each Unit may be completed individually by students or working in groups.

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Unit	Challenges Module 1 (12-14 years old)	Challenges Module 2 (14-16 years old)
1	What impact do wildfires have on our daily lives?	
1	Why do we need forests and other types of landscapes?	Are wildfires a consequence of climate change?
2	How and why are some regions more prone to wildfires than others?	Who owns the forests?
2	How do we celebrate with fire?	Is fire part of our cultures?
3	Is fire a friend or a foe? Or both?	When was the first wildfire in the world?
3	Can living creatures other than humans start a fire?	What are the recent trends in wildfires around the world?
3	Which plants are best at resisting wildfires?	-
4	Why do wildfires happen? Are wildfires possible on other planets?	Who shapes our landscapes?
4	How do animals cope with wildfires?	-
5	How should we (individuals, households, or local communities) prepare for wildfires?	What can be done to prevent wildfires?
5	How do emergency services (fire, police, ambulance) prepare for wildfires?	How can we protect our locality from wildfires?
6	How to strengthen ourselves ahead of large wildfires?	How can we measure the wildfire risk in our area?
6	-	How do our eating habits impact wildfires?

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7	How do firefighters try to stop wildfires?	Who is in charge of controlling fire?
7	How does a wildfire grow and spread?	-
8	How long does it take for an ecosystem to recover after a wildfire?	Aftermath of a wildfire: a case study of a nearby wildfire
8	-	Who pays if a landscape burns?
9	What type of landscape do you want to see in the future?	What happens if wildfires disappear in the world?
9	-	We act to prevent wildfire risk

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7. Evaluation

It is expected that teachers will carry out an evaluation of the student's knowledge about the topic before and after completing the desired activities. The evaluation may consist of an anticipation exercise before the Unit, a post-Unit reflection after the Unit and confirmation that the competences have been delivered. Appendix 3 includes sample questions that may also be used. Details of these evaluation methodologies are included below.

Anticipation Exercise

At the start of each activity, teachers will evaluate students' knowledge of the subject.

Before the activity commences, students will read statements about key topics. The teachers prepare the key statements. The students can choose to agree or disagree using the 'Test your knowledge' template below:

Commence and finish each unit with 'Test your knowledge'.

Test your knowledge

Instructions: Attempt the exercise below, either individually or working together in pairs. Guess your answer.

Revisit this exercise when you complete the Challenge. Have you changed your mind?

Place a tick (√) if you agree or disagree with the statements below.

Name: **Date:**				**Unit:**	
Prior				**After**	
True	**False**		**Statement**	**True**	**False**
		1			
		2			
		3			
		4			
		5			

Score prior	**/5**	**Score After**	**/5**

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Post-Unit reflection

When students complete each Challenge, they carry out a short exercise to assess their learning during the unit.

Three Minutes Reflective Paper

1. Write down the main points worked in this Challenge.
2. Something new that I learned.
3. Something I would do differently.
4. What skills did I develop?

After learning they can revisit and compare their results. These templates could have an online version as well as hard copies.

On completion of each Challenge, students undertake a short online assessment to confirm the key learning points from the unit and to give qualitative feedback on the content of the Challenge.

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Evaluation of Competences

Each Challenge undertaken is linked to several EU competences. On completion of the Challenge, students can also assess if they have developed their EU skills / competences by completing the short table below.

Insert a (**V**) to indicate the skills / competences learned and developed**.**

Communications Cultural awareness and expression	Literacy	Multilingual	Digital	Managing Information and thinking	Maths / Science Being Numerate	Entrepreneurship Being creative	Personal, social, and learning - Working with others

Anticipation Exercise

An anticipation exercise is a strategy that is used before learning commences. The idea is to activate students' prior knowledge and build curiosity about a new topic. The teacher will carry out an anticipation exercise with the students before commencing each activity.

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Appendix 1 – Definitions

STEAM education - *"STEAM (Science, Technology, Engineering, Arts and Maths) education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work and the global enterprise enabling the development of STEAM literacy and with it the ability to compete in the workplace."*

The four C's of STEAM education are:

- Critical thinking
- Collaboration
- Communication
- Creative thinking

Project-Based Learning - *"The core idea of project-based learning is that real-world problems capture students' interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context. Project-based learning helps prepare students for the thinking and collaboration skills required in the workplace". Project based learning is a teaching method in which students gain knowledge and skills by working for an extended period to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. In project-based learning, the project is the vehicle for teaching the important knowledge and skills students need to learn. The project contains and frames curriculum and instruction.*

Learning is best achieved when students have a variety and multiple opportunities to engage in project-based learning. The activities are structured with step-by-step instructions and support to aid learning. We have developed a variety of methodologies to engage, motivate and provide a suitable learning environment (see Appendix 2). They are linked to the curriculum and are age appropriate. In addition, these activities provide a balance of knowledge, understanding, value and skills.

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Appendix 2 - Learning methodologies

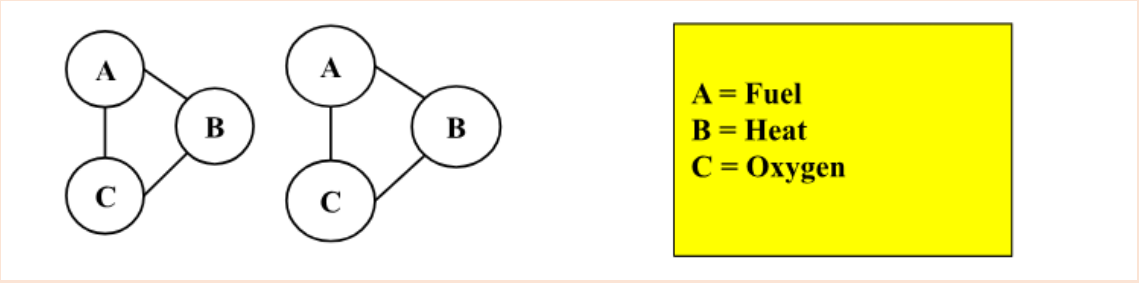
The following is a sample of the many learning methodologies and strategies that may be used by students in completing the Challenges and in implementing their project-based learning activities during the EduFire Toolkit project:

2.1 The Jigsaw Methodology

This technique is a cooperative learning approach that can be used by students working in groups in discussing a topic.

This is an example of the Jigsaw Methodology used to discuss the Fire Triangle.

1. Commence by dividing the class into groups of **3 students** (base jigsaw group)



Divide the information into 3 achievable chunks e.g. A. Fuel, B. Heat and C. Oxygen (Template available) and distribute to students.

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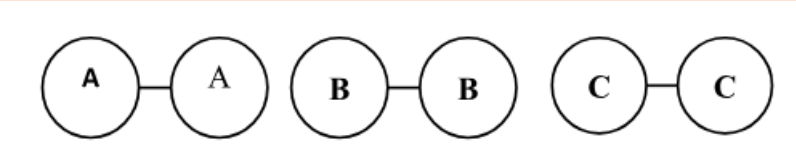
Fuel	Heat	Oxygen
In order for a fire to start there must be something to burn – which is referred to as the fuel. **Fuel** is any kind of combustible substance, (Generally classified under solids, liquids and gases) • **paper, wood ,textiles, Plastics, Rubber** • **oil, flammable liquids** • **gases** The physical characteristics of fuel will determine how easy it burns. e.g. moisture content, temperature, size, shape and quantity.	In addition to a fuel, **heat** must be present for a fire to occur. Most materials give off flammable vapours when exposed to heat. These **flammable vapours** then ignite and cause fire. **Heat** is responsible for the spread of fire as it removes the moisture from nearby fuel, warming the surrounding area and allowing the fire to travel and grow A good example of this would be a forest fire.	In addition to fuel and heat, **oxygen** must also be present for a fire to occur. The air around us is made up of approximately 21% oxygen. Most fires only require at least 16% **oxygen** to burn. As the flammable vapour burn these react with the oxygen and combustion occurs. The **oxygen** acts as the oxidising agent in the chemical reaction we refer to as fire. (This means that when the fuel burns, it reacts with the oxygen to release heat and generate combustion.)

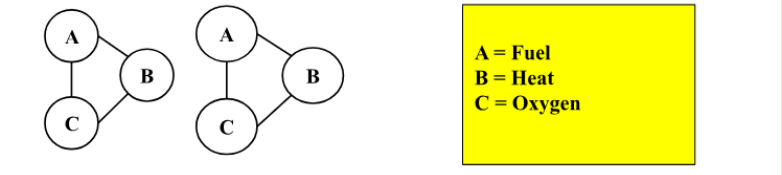
2. Form a new group, working in pairs in an **expert group**, have two students work on the same material e.g. two on Fuel, two students on Heat and two work together on Oxygen and so on…



In the **expert groups**:

a. Students must become familiar with the content and an expert on the topic e.g. A's become experts on Fuel…
b. Decide how best to teach/present the content when they return to the base jigsaw group.

3. Students return to their **base jigsaw group** and each student teachers/presents content on one of the three topics they studied.



Student **A** presents on **Fuel** to the original base jigsaw group

Student **B** presents on **Heat** to the original base jigsaw group

Student **C** presents on **Oxygen** to the original base jigsaw group

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2.2 Carrying out research on websites.

Websites are a superb resource and contain endless amount of information.

However, we need to be able manage information and ensure that the information we research is correct and current.

An important skill or competence is managing information and thinking.

The following questions should be considered when researching information online:

- Who wrote the page? Is it the Government, an organisation, an individual?
- Is it reliable?
- What can the URL tell you?
- What's the bias?
- Is it current?

Using online search engines:

There are numerous search engines. The following are some suggestions when students are researching.

www.duckduckgo.com
www.instagrok.com

Useful Websites: www.Edufiretoolkit.eu

www.etwinning.net

eTwinning: This is a free online platform linking a community of more than 500,000 teachers across Europe. Link in and invite others to participate in this new wildfire education programme.

EXAMPLE OF THE CASTELLDEFELS PILOT (UOC)

(1) As there were students from different countries (Spain, Portugal, Czech Republic and France) and most of the activities during this pilot were organised to get to know the local context of Castelldefels and its surroundings, in some of the activities we created a comparative approach, so the foreign students could also connect the content we were addressing with their local reality. It was the case of this guided online research activity. Students had access to the links via their Chromebooks and were expected to look for the information and answer the questions, after discussing among themselves. They also had access to a Google Form to send their answers. We didn't have time to discuss all their answers, but teachers were circulating while they were working on this activity, so they could identify if they were having problems and give feedback on their comments.

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Map Quiz

1. Climate change impacts in Europe:

https://experience.arcgis.com/experience/5f6596de6c4445a58aec956532b9813d/page/home/

- How can climate change affect the area where you come from?

- Which climate-related hazards will be more likely: droughts, heavy rain and flash floods, wildfires, coastal flooding?

2. **Employment in agriculture, forestry and fishing:** https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231011-1

- Are agriculture, forestry and fishing activities important in your region?

- How can it affect forest fire risk or biodiversity loss?

3. Wildfire Risk Viewer:

https://effis.jrc.ec.europa.eu/apps/fire.risk.viewer/

- What is the wildfire risk situation in your region: high, intermediate or low?

- And what about the population, ecological and economic vulnerability (more risk exposure)?

4. **FireNews**:

https://effis.jrc.ec.europa.eu/apps/firenews.viewer/

- Look for Fire-Related news in your country during the last five years. Choose one.

5. **Copernicus Emergency Management Service**:

https://emergency.copernicus.eu/mapping/#zoom=2&lat=25.89862&lon=33.82273&layers=0BT00

- Is there any emergency alert in the region you come from? Is it a natural hazard?

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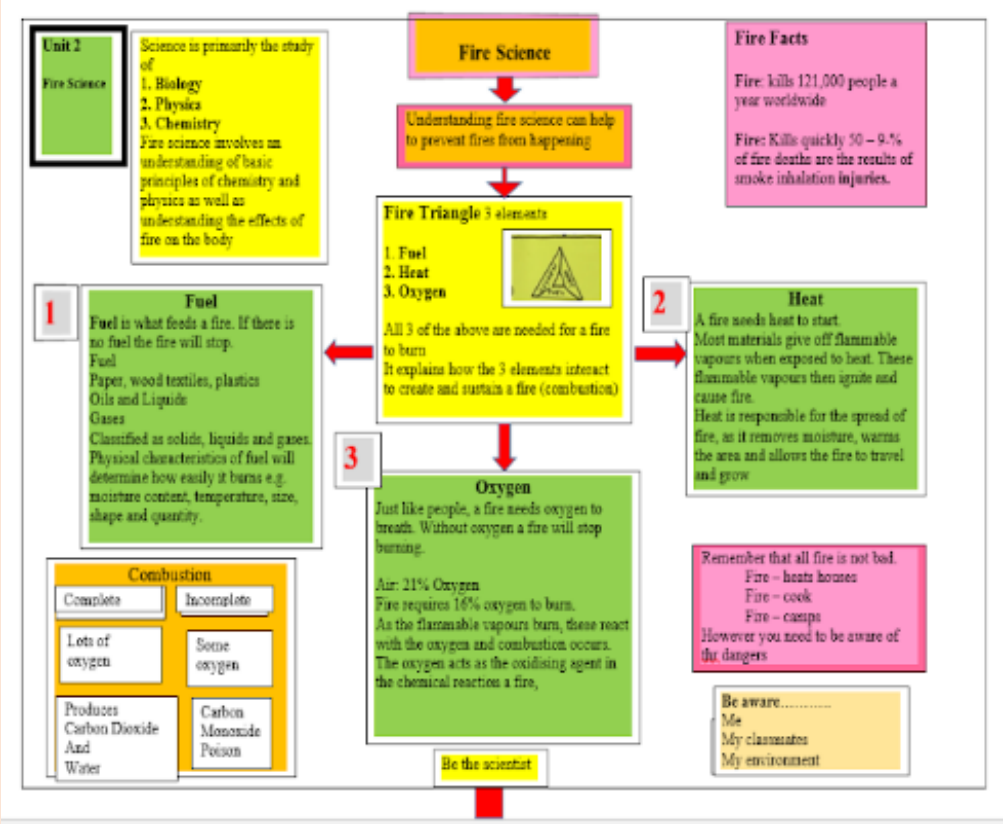
2.3 Mind maps .... Being Creative

How to create a mind-map?

Take a blank sheet of paper, ideally A3 or A4. Turn your page to landscape.



Commence in the centre. Start with an image or key word. Next develop links, branches, colours, images and key points.

This is an example of a mind map developed to discuss the 'Fire Triangle'.

Mind maps are a great visual stimulus for summaries/commencing a topic. You may hand draw or why not use technology tool to create mind maps such as:

http://mind42.com/

http://freemind.sourceforge.net/wiki/index.php/Main_Page

http://www.edrawsoft.com/freemind.php https://bubbl.us/

www.coggle.it

Mindmaps are a superb stategy for the following:

- Recall at the beginning of the next unit
- An aid for students to create their own summary about the concepts covered in a unit

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2.4 Wordles

Wordles are a tool for producing clouds of words. These can be used in a variety of ways. The most prominent words represent the words that appear most frequently in the text.

Wordles can be used for:

- Commencing a lesson: What might this lesson contain?
- Summarising a Unit / concept.
- Testing and recall.
- Literacy skills, students must complete their understanding of the key words.
- (This could be orally, peer assessment where students test each other or a written assignment.
- Remember: students must be able to say, spell, explain and apply words to real life situations.
- Have students create a wordle using online tools.

This is an example of a wordle created by the BFireSafeatSchool project about the concept of 'safety'.

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2.5 Placemats

In this strategy, students are divided into groups of 4 students and gathered around a visual stimulus known as a “placemat”. [Fig 2.5]

The “placemat” is organised with sections for each student to record their ideas individually and in the centre section for students working together to consolidate their ideas.

Students individually think and write down their ideas on their own individual section of the placemat. Then students share ideas and come to a consensus written into the centre of the ‘placemat’.

It’s an ideal opportunity for students to learn from each other and listen to different perspectives.

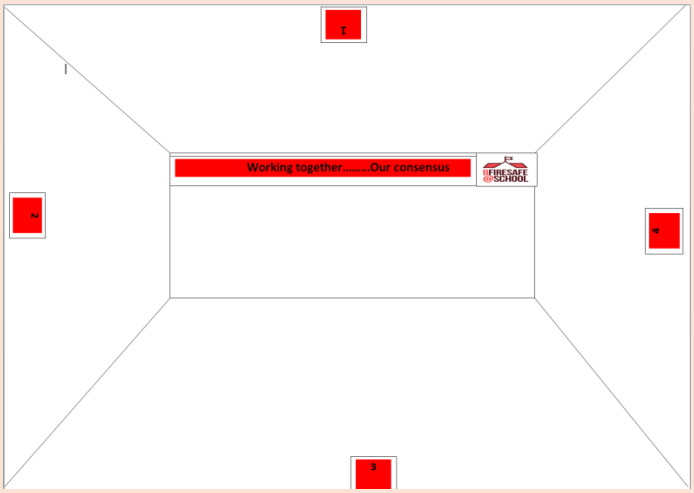
This strategy will enable students to:

- Reflect on their learning
- Feel that their ideas are valued in a group
- Extend their learning by listening to the ideas of others

The placemat strategy can be used with a wide variety of ways:

- To activate the sharing of prior knowledge
- To share problem-solving techniques
- Used to summarise
- Used to review learning

Fig 2.5 Placemat



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2.6 My Little Book Methodology

1. Divide the challenges to be undertaken by the students into a number of small parts.

2. Teach the students how to create 'The Little Book '.

Preparing the little book for use

Instruct students to:

- Write the title of the book on the front cover e.g. Challenge 1
- Write their name on the front cover
- Number each page
- Place a title (e.g., definition term) on each page

Using the Little Book

Each student is given a slip of paper with a small amount of information.

They learn their piece of information and write it in their own words on the appropriate page in their book. The teacher takes back the slips of paper (to ensure that they explain the information to each other and do not simply copy it).

The students' task is to fill their book.

Student A teaches student B the piece of information he/she has learned. When student A is satisfied that student B knows it, student B writes it onto the appropriate page in his/her book and student A checks that B knows the information and then initials the page to confirm this.

Student B then does the same.

The students circulate around the class until they have all completed their little book.

Note

It is recommended that students teach their piece of information at least three times before being given permission to teach something they have been taught by a classmate.

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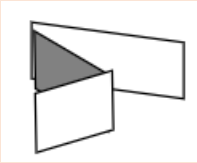
Making the Little Book

Take an A4 piece of blank paper

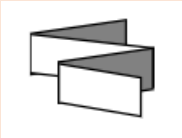
1. Fold it in two on the long side

2. Fold in two along the short side

3. Fold the front part in two back on itself



4. Fold the back part back on itself – there should now be an accordion type of movement possible



5. Split the top of the front and the back of the accordion

You now have a book with five leaves (one very thick leaf in the middle)

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Appendix 3 – Sample Pre and Post Tests for students

Pre and Post Test for Students

Before students embark on the EduFire Toolkit programme, we need to carry out a Pre-Test with them to test their knowledge of wildfires in advance. After the students complete the programme, we will undertake the same test again to confirm the learning. This test can be set up using Microsoft or Google Forms.

Some typical questions that could be asked include:

1. What hazards do wildfires bring?

   a. Flooding and storm damage
   b. Fire and smoke
   c. Erosion and landslides
   d. Strong winds and falling objects.

2. Which of the following conditions would make a wildfire weaker?

   a. Increased oxygen
   b. Increased precipitation
   c. Increased heat
   d. Increased fuel

3. In what type of area would a wildfire burn more intensely?

   a. An area with mostly grass.
   b. An area with mostly shrubs
   c. An area with no fallen trees
   d. An area with lots of fallen trees.

4. What are some ways that wildfires can positively impact nature?

   a. Wildfires remove weeds and mice from farmer's fields.
   b. Wildfires clear the land so that new buildings can be built.
   c. Wildfires clear dead vegetation for new plants to grow.
   d. Wildfires rarely have a positive impact on nature.

5. How does wind affect a wildfire?

   a. Wind can blow out a wildfire like blowing out candles on a birthday cake.
   b. Wind can blow rain onto a wildfire, which would put the fire out.
   c. Wind can provide more oxygen to a fire, making the fire spread more quickly.
   d. Wind has no effect on the spread of wildfires.

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6. Which of the following is most likely to happen in future?

a. Future wildfires will be more severe than in the past
b. Future wildfires will be less severe than in the past
c. Future wildfires will be as severe as in the past
d. Future wildfires will behave randomly without a trend.

7. Which of the following policies is likely to increase wildfire risks?

a. Encourage residents to remove overgrown tree branches and shrubs around their homes.
b. Make small, controlled burns in heavy vegetation areas.
c. Build new power lines in mountainous areas to support electricity demand.
d. Reduce permits to build new homes in remote forest areas.

EXAMPLE OF THE CASTELLDEFELS PILOT (UOC)

As these students use regularly Google Classroom we prepared an online survey, so we could collect more easily their answers and show the graphs that Google Forms produce in real-time on the blackboard. They had to answer the questions in pairs. Once finished, we discussed the results, identifying which answers were correct or not and why.

What do we know about forest fires and climate change?

This is just to test your previous knowledge. Don't worry if you don't know something or your answer is wrong. Discuss the question with your partner before sending the answers.

1. Have any of you experienced a forest fire in your area? [Choose only one]

- Yes
- Not me, but someone close to me.
- No.

2. Select the affirmations that you think are correct. [Choose all that apply]

- Fire is a destructive force that must be eliminated from nature.
- Fire can be dangerous for ecosystems and people.
- Fire can be an ally -a friend- to manage forests and to enhance biodiversity.

3. Do you know which elements are needed to produce fire? [Choose only one]

- Heat, fuel, and oxygen
- Smoke and fuel
- Oxygen, nitrogen, and heat

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4. Which conditions will make a fire more dangerous? [Choose all that apply]

- Rainy weather and lots of green vegetation
- Dry weather with scarce vegetation
- Dry weather and lots of dry vegetation
- Sunny weather and no vegetation

5. Can goats, sheep and donkeys, among other herbivores, reduce the risk of large forest fires? [Choose only one]

- Yes
- No
- Sheep and goats do, but donkeys don't.
- No, only wild animals can do it.

6. During a wildfire, what should we do if we live near the forest? [Choose only one]

- Confine at home
- Evacuate
- It depends on the firefighters' orders.

7. After a wildfire, the vegetation… [Choose only one]

- ...resprouts and the landscape will be the same as before.
- ...it depends on the case, and it can generate a new landscape.
- ...never resprout, and we need to replant trees again.

8. How does climate change affect forest fires? [Choose only one]

- Wildfires have no connection to climate change.
- More frequent heatwaves and droughts increase and intensify the probability of wildfires.
- Despite rising temperatures, it will not affect wildfires.

9. Do you think climate change and large wildfires are a threat to biodiversity? [Choose only one]

- Yes.
- No, only climate change is a risk for biodiversity. Some ecosystems need fire.
- No, biodiversity has nothing to do with climate change or wildfires.

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10. Who should decide the best strategies to manage climate change and wildfires? [Choose only one]

- Only scientists that are expert on these topics.
- Scientist and politicians.
- Scientists, politicians and big companies.
- We all need to inform ourselves and take action for what we think is right

At the end of the pilot, we did not ask the same questions again, as we already had discussed the right answers in the classroom. Instead, we asked them to fill out a questionnaire (this time as a printed sheet) to collect what they had learned as a result of the pilot, answering the open questions that guided each of the community engagement activities we had organised for the whole week. We also, asked them for a general evaluation of the activities. They answered them in pairs.

EXAMPLE OF THE TARADELL PILOT (PCF)

At the beginning of the pilot test, the trainers write the three questions on the board and the students must answer each question individually on a different post-it. Each question is answered on a different post-it color.

- What do you know about wildfires and climate change?
- How do you think wildfires and climate change might affect your town or your home?
- Do you think you can do something to mitigate the effects of wildfires and climate change?

Afterwards, all the post-its are collected and placed on the board as the answers are discussed.

At the end of the pilot test, the following form by google forms was made:

Post-pilot Edufire Toolkit Student Form

- Write 3 things you know about wildfires and climate change.
- How do you think wildfires and climate change might affect your town or your home?
- Do you think you can do something to mitigate the effects of wildfires and climate change?
- After doing the Edufire activities, is there anything you have changed your mind about?
- What topic would you like to know more about?
- What improvements do you think could be made to the project to make it more understandable and engaging for students?
- Did you have a good time doing the activities? (Rate from 1 to 5, 1 being that you didn't have a good time at all and 5 being that you really enjoyed it)

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- Rate from 1 to 5 (with 1 being the lowest score and 5 the highest) the results obtained from the activities (interviews and recording of the podcast, reporting and recording with Canal 9 and Can Costa exhibition)
- Rate the knowledge acquired from 1 to 5, with 1 being that you think you have learned little and 5 being that you think you have learned a lot.
- Briefly explain the answer to the previous question.
- Did you enjoy participating in the Edufire Toolkit project (being 1 that you didn't like it at all and 5 that you really liked it)?
- Rate all the activities from 1 to 5 (1 being that you didn't like it at all and didn't find it interesting and 5 that you really liked it and found it very interesting) (rating of each activity)
- Which activity did you like the most and why?
- Which activity did you like least and why?
- Rate what grade you think you would get from your notes (from 1 to 5 (best grade))
- Rate from 1 to 5 your attitude (attention and participation) in the following activities: (rating of each activity)
- Anything else you want to share with us or add?

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