



Content Summary



**EduFire
Toolkit**

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THE PROJECT

The EduFire Toolkit is a European project that aims to raise awareness among secondary school students about the link between wildfires and climate change and how individual and collective actions can reduce the risk of wildfires. To this end, we have developed an open access platform with pedagogical resources aligned with the school curriculum.

Education and awareness of future generations play a central role in wildfire prevention. The EduFire Toolkit project has developed several multidisciplinary resources following a project-based learning methodology which aims to encourage the participation of the school community (teachers and secondary school students) in real actions and challenges related to climate change and wildfire risk reduction.

The project addresses several cross-cutting themes related to fire risk, climate change and wildfires and aims to contribute to the various disciplines of the different curricula. The aim of this summary is to show how the themes are related to each other and how all of them promote the participation of the school community. The material is structured to allow its implementation according to the level, pace and specific educational needs, considering the diversity of the community involved.

The methodology adopted allows students to acquire essential knowledge and skills through the creation of projects that respond to real problems. All resources and results of the project will be available for access and will be useful tools to complement teaching and learning processes, and to help the educational community to address the topic of climate change, particularly the risks of extreme wildfires.

The structure of the materials is divided into thematic Units that have different groups of Challenges for two age groups, 12 to 14 years old and from 14 to 16 years old.



THE STRUCTURE OF THE MATERIAL

<i>Unit</i>		<i>Age</i>	<i>Challenges</i>
1	UNDERSTANDING YOUR ENVIRONMENT AND CONNECTING IT TO CLIMATE CHANGE IMPACTS	12 - 14	What impacts do wildfires have on our daily lives?
		12 - 14	Why do we need forests and other landscapes?
		14 - 16	What impacts do wildfires have on our daily lives?
		14 - 16	Are wildfires consequences of climate change?
2	HISTORY OF FIRE	12 - 14	How are fires here there and elsewhere
		12 - 14	We celebrate (with) fire!
		14 - 16	Who owns the forest?
		14 - 16	Is fire culture?
3	FIRE AND WILDFIRES	12 - 14	Is fire friend or foe? Or both?
		12 - 14	Can living creatures other than humans start a fire?
		12 - 14	Which plants are best at resisting wildfires?
		14 - 16	When was the first fire in the world?
		14 - 16	What are the recent trends in wildfires around the world?
4	THE IMPACTS OF WILDFIRES AND CLIMATE CHANGE ON DIFFERENT ECOSYSTEMS AROUND THE WORLD.	12 - 14	Why do wildfires happen? Are wildfires possible on other planets?
		12 - 14	How do animals cope with wildfires?
		14 - 16	Who shapes our landscapes?
5	PREPAREDNESS FOR WILDFIRES	12 - 14	How should we (individuals, households, or local communities) prepare for wildfires?
		12 - 14	How can the emergency services (fire, police, and ambulance) prepare for a wildfire?
		14 - 16	What can be done to prevent wildfires?
6	HUMANS AND THEIR INTERACTIONS WITH THE LANDSCAPE	14 - 16	How can we measure the wildfire risk in our area?
		14 - 16	How do our daily lives impact wildfires?
		12 - 14	How to strengthen ourselves in front of Large wildfires?
7	RESPONSE TO WILDFIRES	12 - 14	How do firefighters try to stop wildfires?
		12 - 14	How does a wildfire grow and spread?
		14 - 16	Who is in charge of controlling wildfires?
8	IMPACTS OF WILDFIRES	12 - 14	How long does it take for an ecosystem to recover after a wildfire?

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<i>Unit</i>	<i>Age</i>	<i>Challenges</i>
	14 - 16	Aftermath of a wildfire: Case study of a nearby wildfire
	14 - 16	Who pays when landscape burns?
9 WILDFIRES IN THE FUTURE	12 - 14	What type of landscape do you want to see in the future?
	14 - 16	What happens if wildfire disappears in the world?
	14 - 16	We act to prevent wildfire risk!



CONTENT

Unit 1 - Understand your environment and connect it to the impacts of climate change.

Purpose: To give a general description of the process of climate change and its linkage to wildfires.

Learning objective: At the end of this unit students will have an understanding of climate change and impacts on wildfire regimes.

Highlights:

- Origins of anthropogenic climate change.
- Greenhouse effect.
- Social and environmental impacts.
- Aspects of wildfires and climate change problems.
- Climate change and changes in wildfire regimes.

Setting the stage

Climate change is a pressing global issue, which is causing significant changes around the world. Some of the most notable impacts of climate change are the modifications in the frequency, intensity, and season of the year in which natural disasters occur. Europe is no exception, as temperatures continue to rise and extreme weather events, such as droughts, heat waves, floods, and wildfires, become more frequent.

Challenges Unit 1

12–14 years old

[Challenge 1 - What impacts do wildfires have on our daily lives?](#) Aim: to better understand how wildfires affect our daily lives, even when they are not burning.

[Challenge 2 – Why do we need forests and other types of landscapes?](#) Aim: to better understand the multiple roles forests and other types of landscapes have in our lives.

14–16 years old

[Challenge 3 – What impacts do wildfires have on our daily lives?](#) Aim: to better understand how wildfires affect our daily lives, even when they are not burning, including social, economic, and environmental aspects.

[Challenge 4 – Are wildfires a consequence of climate change?](#) Aim: to better understand the causes and the multiple roles of wildfires in the biosphere.



Unit 2 – History of fire

Purpose: To give an overview of the presence and roles of fire in the earth and in human lives.

Learning objective: This unit aims to provide a comprehensive understanding of the different roles of fire through history

Highlights:

- The triangle of fire: the three elements required to produce combustion.
- Fire as part of earth's history: how fire appeared and shaped the earth.
- Use and control of fire by humans: how fire determined human evolution
- Fire as part of human culture: examples of fire roles

Setting the stage

For hundreds of millions of years, fires have been shaping the Earth. About 1 million years ago, hominids learned to control this element, and this resulted in a series of changes that boosted human evolution in a way that would never have been possible without it. Today fire is still very present in our daily lives.

Challenges Unit 2

12–14 years

[Challenge 1 - How are fires here there and elsewhere](#) Aim: To study the history of fires at local, regional, national and/or global levels.

[Challenge 2 - How do we celebrate with fire?](#) Aim: To understand fire as part of a festivity and how to make its celebration safe.

14–16 years old

[Challenge 3 - Who owns the forest?](#) Aim: To develop critical thinking about private forest ownership and to reflect on the consequences of that on wildfires.

[Challenge 4 - Is fire culture?](#) Aim: To better understand the role of fire in diverse cultures.

Unit 3 – Fire and wildfires

Purpose: To identify the causes of fires in rural and natural areas (wildfires) and their relationship with the biotic (e.g., type and amount of vegetation, biodiversity) and abiotic (e.g., relief, meteorology) factors.

Learning objective: At the end of this Unit, students will be able to understand wildfire causes and their relationship with the environment.



Highlights:

- Wildfires as a natural phenomenon.
- The role of fire as an important natural process in many forest ecosystems.
- Fire behaviour, weather, topography, and fuels.
- When is a wildfire dangerous?
- How global change affects wildfires.

Setting the stage

Fires are natural events on Earth. Any vegetated region of the planet can burn if weather conditions allow it and if there is an ignition source. Fire is a chemical reaction that provides light and heat. As an ecological factor, fire brings sudden changes to the environment. It can renew ecosystems, promote nutrient cycling, biodiversity and eliminate disease, but it can also cause irreversible damage.

How is it possible that fire has so many functions in nature and can be beneficial and harmful to the environment? Let's explore that in this Unit!

Challenges Unit 3

12–14 years old

[Challenge 1 - Is fire a friend or a foe? Or both?](#) Aim: To better understand the multiple roles of fire in our lives and in the ecosystems.

[Challenge 2 – Can living creatures other than humans start a fire?](#) Aim: To better understand the natural causes of wildfires and how animals interact with them in the wild.

[Challenge 3 – Which plants are best at resisting wildfires?](#) Aim: To know more about fire-adapted plant species and fire-resilient landscapes.

14–16 years old

[Challenge 4 – When was the first fire in the world?](#) Aim: To better understand the role fire plays in carbon cycling in the biosphere.

[Challenge 5 – What are the recent trends in wildfires around the world?](#) Aim: To better understand the current state of wildfire occurrences around the globe.



Unit 4 – The impacts of wildfires and climate change on different ecosystems around the world

Purpose: This topic provides information on how climate change affects wildfires in different ecosystems around the world.

Learning objective: At the end of this unit students will have an understanding of climate change and impacts on wildfire regimes.

Highlights:

- The importance of biodiversity and variety in ecosystems.
- Distribution of major terrestrial habitat types (Biomes).
- Fire in ecosystems: Fire-dependent ecosystems, Fire-sensitive ecosystems, Fire-independent ecosystems. Type of schemes.

Setting the stage

The impacts of wildfires and climate change on ecosystems around the world are profound and far-reaching. Climate change has been linked to an increase in the frequency, intensity, and duration of wildfires, which in turn has significant consequences for various types of ecosystems.

Challenges Unit 4

12–14 years

[Challenge 1 - Why do wildfires happen? Are wildfires possible on other planets?](#) Aim: To better understand what are the essential elements to produce fire. When all these elements are present in the right conditions, a fire can start and continue to burn. Discover if there are other planets where the conditions are proper for the fire to occur.

[Challenge 2 – How do animals cope with wildfires?](#) Aim: To better understand the impacts of wildfires on wildlife. Discover that there are animals that benefit from wildfires, others that have several strategies to cope with it and others that are adversely affected. Knowing the recovery of the wildlife after a fire

14–16 years old

[Challenge 3 – Who shapes our landscapes?](#) Aim: To better understand the relationship between humans, wildfires, wildlife and land configuration. Discover that human activity affects landscape configuration and composition, and that landscape configuration and composition have an important role in wildfire and wildlife, so all the actors are part of a dynamic system.



Unit 5 – Preparedness for wildfires

Purpose: Review the many issues that emergency services and local communities must consider in preparation for wildfires.

Learning objective: In this lesson, students and teachers will analyze the steps required by emergency service personnel and the local community in preparing for wildfires.

Highlights:

- Emergency services preparedness.
- Community Preparedness.
- General fire safety tips.

Setting the stage

Preparedness is one of the four phases of the emergency management cycle. Preparation can be defined as the 'state of preparation'. In relation to wildfires, this applies to both emergency services and local communities. This Unit explores not only how emergency services, particularly fire and rescue services, can prepare, but also how local communities and other stakeholders can be ready for wildfires.

Challenges Unit 5

12–14 years

[Challenge 1 – How should we \(individuals, families and local communities\) prepare for wildfires?](#)

Aim: To understand how individuals, households, and the local community should prepare for a wildfire. Consider the steps to be taken before a wildfire occurs.

[Challenge 2 – How can the emergency services \(fire, police, and ambulance\) prepare for a wildfire?](#)

Aim: To understand how the emergency services prepare for a wildfire.

14–16 years old

[Challenge 3 – What can be done to prevent wildfires?](#)

Aim: To understand the measures that other agencies can take to prevent wildfires.



Unit 6 – Humans and their interactions with the landscape

Purpose: To give a general description of the interactions between humans and landscapes and a description of our landscape management activities and their linkage to wildfires.

Learning objective: At the end of this unit students will have an understanding of how humans influence the type of wildfires in the landscapes, and what can we do to have landscapes where wildfires have fewer negative impacts. In this Unit, students and teachers analyze landscape management practices and who it can contribute to wildfire prevention and resilience.

Highlights:

- Integrated fire management for resilient landscapes.
- Fuel management and landscape management.
- Nature-based solutions: Prescribed fires, Livestock, forestry, agriculture, recovery/adapt natural processes.
- Public education, fire management programs, sustainable production and consumption, fire prevention products (RDF).
- Land uses controversies and conflicts.

Setting the stage

A field without farmers and herders is a breeding ground for fires, since the extensive herd eats vegetation. The best fire prevention policy is to maintain a living, balanced and sustainable rural environment, in which traditional activities, such as extensive agriculture and livestock, are compatible with the other needs of the territory.

Challenges Unit 6

12–14 years

[Challenge 3 - How to strengthen ourselves in front of Large wildfires?](#)

Aim: To better understand how social and environmental resilience is in the context of wildfires.

14–16 years old

[Challenge 1 - How can we measure the wildfire risk in our area?](#) Aim: To better understand wildfire risk based on its components (hazard, exposure and vulnerability). Measuring wildfire risk can help to understand which components most affect your community.

[Challenge 2 – How do our daily lives impact wildfires?](#)



Aim: To better understand how the social and economic development models impact wildfire risk.

Unit 7 – Response to wildfires

Purpose: To identify the hazards, the conditions under which wildfires start and the conditions and materials with which firefighters work.

Learning objective: At the end of this Unit, students will be able to understand why and how the fire service responds to wildfires.

Highlights:

- How do fire services respond to wildfires?
- Hazards Associated with Wildfires
- Risks of the wildfires
- Offensive Operations

Setting the stage

Wildfire response is a complex, multi-agency effort involving European collaboration, state and local authorities, as well as voluntary and community organizations. Usually, the Fire Services are at the heart of the response phase, but they usually need to be coordinated with other actors, such as Civil Protection, the Police or the Health Services, to name just a few.

Challenges Unit 7

12–14 years

[Challenge 1 – How do firefighters try to stop wildfires?](#)

Aim: To understand how firefighters try to stop wildfires when they are burning.

[Challenge 2 – How does a wildfire grow and spread?](#)

Aim: To better understand how a wildfire once started grows and spreads.

14–16 years old

[Challenge 3 – Who is in charge of controlling wildfires?](#)

Aim: To understand that there are several bodies responsible for controlling wildfires before and after their occurrence.



Unit 8 – Impacts of wildfires

Purpose: To give a general explanation of the aftermath of a wildfire and know proposals to reduce the impact.

Learning objective: By the end of this unit, students will understand the ecological and socioeconomic impacts of a wildfire and to know adaptation strategies to reduce its impact.

Highlights:

- Post-fire impacts: ecosystem services.
- Fauna and flora adaptation strategies.
- Socioeconomic impacts of wildfires
 - Economic impacts
 - Health impacts
- Distribution of impacts.

Setting the stage

The consequences of a wildfire refer to the conditions and changes that occur when the fire is extinguished, and the affected area begins to recover. The impacts of a wildfire can be challenging and transformative for ecosystems, communities, and economies.

Challenges Unit 8

12–14 years

[Challenge 1 - How long does it take for an ecosystem to recover after a wildfire?](#) Aim: To understand that in some cases, ecosystems can start recovering relatively quickly, while in others, the recovery process may take several years or even decades.

14–16 years old

[Challenge 2 – Aftermath of a wildfire Case study of a nearby wildfire](#) Aim: To learn about who suffers from and who is held responsible for the extinction of and the recovery from a wildfire.

[Challenge 3 – Who pays when landscape burns?](#) Aim: to better understand the causes and the multiple roles of wildfires in the biosphere.



Unit 9 – Wildfires in the future

Purpose: To give a general description of wildfires in the future in the context of climate change and know proposals to adapt to this new situation.

Learning objective: This unit aims to provide a comprehensive understanding of the multifaceted challenges associated with wildfires in the future.

Highlights:

- How will climate change affect wildfire trends?
- Living with wildfires
- What can be done to point to that desired landscape?
- How can we all contribute?

Setting the stage

Climate change and land-use change are expected to intensify wildfires, with projections indicating a global increase in extreme fires of 14% by 2030, 30% by 2050 and 50% by the end of the century, according to a new report by the United Nations Environment Programme and GRID-Arendal. While not all fires are harmful and some serve ecological purposes, the increased frequency and severity of wildfires poses a significant challenge.

Challenges Unit 9

12–14 years

[Challenge 1 -What type of landscape do you want to see in the future?](#)

Aim: To better understand the impact of human activity on the landscape and how to make correct management. This could help to improve the landscape's resilience against wildfires. Discover how you can contribute to improving this resilience and how we must configure our landscape to achieve this objective.

14–16 years old

[Challenge 2 - What happens if wildfire disappears in the world?](#)

Aim: To better understand the relationship between wildfires and the landscape configuration. Discover that some landscapes and ecosystems are fire-dependent, and without wildfires, the ecosystem would not be the same. Others are fire-independent and fire-sensitive, where the interactions between fire and the ecosystems differ from fire-adapted and dependent ecosystems.



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Challenge 3 -We act to prevent wildfire risk

Aim: To learn what society can do in front of wildfire risk. To engage community actors to take action in wildfire risk prevention.

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