

TRAINING LESSON 1 - Part 2 (Wood sector)

Title	<ul style="list-style-type: none"> ○ The impact of the wood industry on environment
Part of the training course referred to in this lesson	<ul style="list-style-type: none"> ○ <input type="checkbox"/> Part 1 General information about sustainability and CE Part 2 Specific Information about: <ul style="list-style-type: none"> X Wood sector <input type="checkbox"/> Plastic sector <input type="checkbox"/> Agrifood sector
EQF level	Level 3
Where the lesson was tested	//
General Learning objective(s) according to the Bloom Taxonomy	<ul style="list-style-type: none"> <input type="checkbox"/> Create Produce new or original work (design, assemble, construct, investigate, formulate) <input type="checkbox"/> Evaluate Justify a stand or decision (appraise, argue, defend, critique, select, support) <input type="checkbox"/> Analyze Draw connections among ideas (differentiate, organize, relate, compare, distinguish, test, experiment) X Apply Use information in new situations (execute, implement, solve, use, demonstrate, operate) X Understand Explain ideas or concepts (classify, discuss, describe, identify, locate, translate) X Remember Recall facts and basic concepts (define, duplicate, list, memorize, repeat)
Specific learning objective(s)	<ul style="list-style-type: none"> ● <i>To understand the impact of timber production for the environment;</i> ● <i>To get to know the advantages and disadvantages of wood construction;</i> ● <i>To learn about the impact of deforestation for the planet Earth.</i>
Cognitive, socioemotional and behavioural outcomes based on	<p>SDG 4 Quality Education</p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner understands the important role of culture in achieving sustainability. ● The learner understands that education can help create a more sustainable, equitable and peaceful world. <p><u>Socio-emotional learning objectives:</u></p>

	<ul style="list-style-type: none"> ● The learner is able to recognize the intrinsic value of education and to analyse and identify their own learning needs in their personal development. ● The learner is able to recognize the importance of their own skills for improving their life, in particular for employment and entrepreneurship. ● The learner is able to engage personally with ESD. <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to contribute to facilitating and implementing quality education for all, ESD and related approaches at different levels. ● The learner is able to use all opportunities for their own education throughout their life, and to apply the acquired knowledge in everyday situations to promote sustainable development. <p>SDG 9 Industry, Innovation and Infrastructure</p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner understands the concepts of sustainable infrastructure and industrialization and society's needs for a systemic approach to their development. ● The learner is aware of new opportunities and markets for sustainability innovation, resilient infrastructure and industrial development. <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to argue for sustainable, resilient and inclusive infrastructure in their local area. ● The learner is able to recognize and reflect on their own personal demands on the local infrastructure such as their carbon and water footprints and food miles. <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to evaluate various forms of industrialization and compare their resilience. <p>SDG 15 Life on Land</p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to classify the ecosystem services of the local ecosystems including supporting, provisioning, regulating and cultural services and ecosystem services for disaster risk reduction. ● The learner understands the slow regeneration of soil and the multiple threats that are destroying and removing it much faster than it can replenish itself, such as poor farming or forestry practice. <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to connect with their local natural areas and feel empathy with nonhuman life on Earth. ● The learner is able to create a vision of a life in harmony with nature. <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> ● The learner is able to connect with local groups working toward biodiversity conservation in their area. ● The learner is able to highlight the importance of soil as our growing material for all food and the importance of remediating or stopping the erosion of our soils.
<p>Green skill(s) addressed</p>	<p><input type="checkbox"/> Creative problem-solving</p> <p><input checked="" type="checkbox"/> Management skills</p>



TREE

Micro- and project-based learning
programme for Teaching circular Economy
and Ecological awareness in VET



Funded by
the European Union

	<p>X Forward-thinking <input type="checkbox"/> Impact quantification</p> <p><input type="checkbox"/> Monitoring skills X Life-cycle management</p> <p>X Analytical skills <input type="checkbox"/> Science skills</p> <p>X Lean production <input type="checkbox"/> Waste management</p> <p><input type="checkbox"/> Maintenance and repair skills <input type="checkbox"/> Environmental auditing</p> <p>X Pollution prevention X Ecosystem management</p> <p>X Eco-design <input type="checkbox"/> Other _____</p>
Duration	20 min.
Structure and content of the lesson	<p>INTRODUCTION</p> <p>Increasing demand for low-cost wood production gives a possibility of a multi-billion dollar business of illegal and unsustainable lumbering in forests across the globe. According to some estimates, violation of laws in the wood sector accounts for 8-10% of global production. 40-50% of all lumbering happens in some of the most valuable forests on earth. Consumption of tropical timber by the U.S. and other industrial countries is one of the main causes of tropical deforestation.</p> <p>The timber products market consists of sales of wood products by organisations, sole traders and partnerships that produce products derived from wood. Businesses that produce lumber, plywood, veneers, wood containers, wood flooring, prefabricated wooden buildings etc. are included into this industry. Wood production includes sawing, planning, shaping, laminating, and assembling wood products into bolts or timber.</p> <p>Asia Pacific was the largest region in the timber production market in 2021. North America was the second largest region in lumber production. The other biggest wood production countries are: Argentina, Australia, Austria, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, India, Indonesia, Italy, Japan, Malaysia, Mexico, Netherlands, Peru, Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, UK, USA.</p> <p>TOPIC 1: WOOD AND ENVIRONMENT</p> <p>Wood has played a very important role in the history of mankind. Early humans used it as fuel, building material, furniture, paper, tools, weapons etc. Demand for timber increases each year, causing conflicts between neighbouring states over control of this resource. Attitude of people towards wood remains unchanged over centuries, and methods to develop and manage woods are still almost the same as it was hundreds of years ago. Wood is something that people take for granted: timber was a part of our lives for a long time and we can't imagine living in different ways.</p> <p>Wood is believed to be the most environmentally friendly material for building homes or businesses:</p>

- Wood products are produced from naturally renewable resources. More wood is grown each year in the United States than cut.
- Waste is almost eliminated when trees are used to make timber products. Wood waste is used as an energy source to help power various production facilities. Less energy is needed to produce wood products than to make concrete and steel.
- Wood products are durable and contribute to the long life of a wooden house. Wood products store carbon, and that means it reduces the amount of carbon in the atmosphere.
- It is easy to recycle wood products for other uses. Wood contributes less to the greenhouse effect than steel or concrete.

Burning timber at homes creates indoor pollution as wood and charcoal produce smoke on burning. The extent of this issue depends on the type of wood and the quality of charcoal, both of these become of worse quality. Users of wood then suffer from respiratory and eye problems.

The disastrous effect caused by cutting trees and logging, includes loss of species of plants and animals, soil erosion, desert expansion etc. Cutting trees influences the species population that live in the forest. If the preparation of lumber is out of control, it can cause extinction to biodiversity.

Causes of deforestation:

- Agriculture;
- New constructions;
- Urbanisation.

Effects of deforestation:

- Effects of deforestation on animals and plants;
- Effects of deforestation on local people;
- Deforestation for food production may cause food insecurity problems;
- Soil erosion is one of the main issues of deforestation;
- Deforestation has a great impact on climate change.

Solutions to deforestation:

- To eat less meat products;
- To consume less and more consciously;
- To decrease consumption, more reuse;
- No to use fossil fuels and palm oil;
- To show good examples and raise awareness to the communities.

TOPIC 2: WOOD CONSTRUCTION: THE ENVIRONMENTAL BENEFITS

Wood is one of the oldest building materials that is used by people. It was used to build such buildings as: Neolithic long houses, Temples of Jerusalem, the cedars of Lebanon etc. A Large number of fires, the most significant of them was Chicago's Great Fire in 1871—led the construction workers to think about taller buildings that could be built close to each other. In the end of 19th and in the beginning 20th centuries, concrete and steel was in use for construction of taller buildings. Wood was used only for interior details, and sometimes exterior decoration. Wood only

	<p>was a supporting material for building concrete and steel houses.</p> <p>Advantages of wood construction:</p> <ul style="list-style-type: none"> ● Wood produces CO₂. It reduces energy consumption as well as CO₂ emissions into the atmospheres. When trees grow, CO₂ is also kept inside of them. ● Wood is much lighter than concrete. It weighs about a fifth of the weight of concrete and it should be dried when used in the construction of buildings. Wood is also cheaper and easier to transport. ● Easier to reuse. Wood can be used as a structure in a building for more than 100 years. After that, the reuse can happen. Especially, large elements can be reused. After several times, it can also be remade into other wood products, such as chipboard etc. It can be burned as biomass. ● A more pleasant indoor air and less damage when an earthquake happens. The better indoor climate is guaranteed as it regulates moisture and heat, creating a comfortable and stable indoor climate. The acoustics are also better in a wooden building, as there is less echoing. Wooden constructions can better withstand earthquakes, since it can absorb shocks better than bricks and concrete. <p>Disadvantages of wood construction:</p> <ul style="list-style-type: none"> ● Wood rots. Mould and mildew can also be issues when wooden constructions are taking place, though the problems could be solved if appearance of moisture is controlled, windows are sealed properly, and other preventive measures are taken. ● Structural limitations. Wood is often chosen for traditional houses, especially those in a timber frame style. Some designs are difficult when relying on wood frame construction. ● Risk of fire. Measures like, the application of fire retardants and the installation of sprinkler systems can limit the risk of fire in a wooden building, but the risk of fire in the early stage of construction should be a matter of consideration. ● Building limitations. While the International Code Council has become more accepting of wood construction, still wooden buildings cannot be taller as others. <p>CONCLUSIONS</p> <p>Wood is better than many other materials, at least from a point of view of carbon neutrality. Though, if we use it as fuel and control of use disappears, issues of air pollution and deforestation arise. But we can't cut down all the trees: if you cut down one tree from a forest it is different from cutting the entire forest! People should be more responsible towards cutting forests. Many different types of organisations exist to help manage, educate, police, and certify producers. Various kinds of trees - like animals, and ecosystems, can also become endangered or at risk.</p>
<p>References</p>	<p>D'Costa K. (2015). A story of wood. https://blogs.scientificamerican.com/anthropology-in-practice/a-story-of-wood/ MT Copeland (2020). All about wood construction: advantages & disadvantages. https://mtcopeland.com/blog/all-about-wood-construction-advantages-</p>

	<p>disadvantages/ Nguyen T. (2017). Wood production, its environmental impacts and what the finnish think about the matter. http://globetamk.weebly.com/blog/wood-production-its-environmental-impacts-and-what-the-finnish-think-about-the-matter Southern Forest Products Association (2022). Wood & The Environment. https://sfpa.org/lumber-info/wood-the-environment/ The Business Research Company (2022). Wood products global market report. https://www.thebusinessresearchcompany.com/report/wood-products-global-market-report Van Sante M. (2022). The benefits of building with wood: environmentally-friendly, reusable and light. https://think.ing.com/articles/benefits-of-building-with-wood-environmentally-friendly-reusable-light World Wildlife Fund for Nature (2022). Overview. https://www.worldwildlife.org/industries/timber Youmatter (2020). What is deforestation? definition, causes, consequences, solutions. https://youmatter.world/en/definition/definitions-what-is-definition-deforestation-causes-effects/</p>
<p>Interactive questions for R3</p>	<p>1. Which is the percentage of land covered by forest on our planet? a) 30 percent b) 15 percent c) 44 percent</p> <p>2. According to the International Labour Organization, how many people are employed in the forest sector? a) 20.4 million b) 13.7 million c) 5.1 million</p> <p>3. Why does cutting down trees increase global warming? a) Trees soak up carbon dioxide b) Trees provide shade which counteracts global warming c) Trees absorbs the sun's energy without radiating back into the atmosphere</p> <p>4. Timber frame homes reduce your carbon footprint. a) True b) False</p> <p>5. Which of the following is the advantage of wood as a construction material? a) It is lightweight and versatile b) It is fireproof c) It is termite-resistant</p> <p>6. Which of the following is the disadvantage of wood as a construction material? a) It is vulnerable to fire b) It is vulnerable to insects c) Both of the above</p>
<p>Keywords</p>	<p>lumber industry, deforestation, wood construction.</p>

<p>Questions for reflection</p>	<ol style="list-style-type: none"> 1. Can you name some wood products? 2. What are the largest regions of wood production? 3. Why is wood an environmentally friendly material? 4. What problems does wood production cause? 5. What are the causes, effects and solutions to deforestation? 6. Can you name some facts about the history of wooden buildings? 7. What are the advantages and disadvantages of wooden construction? 8. How do governments try to adapt wooden constructions to urban areas?
<p>Additional resources</p>	<p>Articles:</p> <p>Better Factory (2021). Furniture and Wood Industry: The forests and the obligation of taking care of the oxygen source of Europe. https://betterfactory.eu/furniture-and-wood-industry-the-forests-and-the-obligation-of-taking-care-of-the-oxygen-source-of-europe/</p> <p>Propopulus (2018). The wood industry has a key role to play in building a bio-economy. https://propopulus.eu/en/the-wood-industry-has-a-key-role-to-play-in-building-a-bio-economy/</p> <p>Fowler T. (2011). Supply and demand of wood and wood industry https://wsri.org/supply-and-demand-of-wood-and-wood-industry/</p> <p>Hill C., Zimmer K. (2018). The environmental impacts of wood compared to other building materials. https://propopulus.eu/en/the-wood-industry-has-a-key-role-to-play-in-building-a-bio-economy/</p> <p>Butler R. A. (2019). Consequences of Deforestation. https://rainforests.mongabay.com/09-consequences-of-deforestation.html</p> <p>Cudby S. (2014). Everything you should know about sustainable wood. https://www.wood-finishes-direct.com/blog/everything-you-should-know-about-sustainable-wood/</p> <p>Hurmekoski E. (2017). How can wood construction reduce environmental degradation? https://efi.int/sites/default/files/files/publication-bank/2018/efi_hurmekoski_wood_construction_2017_0.pdf</p> <p>Guiles J. (2022). Evaluating the Environmental Performance of Wood Building Materials. https://www.esf.edu/center/eis/woodmaterials.html</p> <p>Adler V., Pecina-Lopez D. (2022). Wood as a housing construction material: what are its benefits? https://blogs.iadb.org/ciudades-sostenibles/en/wood-as-a-housing-construction-material-which-are-its-benefits/</p> <p>Video material:</p> <p>Wood Reduces the Environmental Impact of Buildings: https://www.youtube.com/watch?v=UxANY2My6A0</p> <p>Deforestation Effects on Climate: https://www.youtube.com/watch?v=Nc7f5563azs</p> <p>What happens if you cut down all of a city's trees? https://www.youtube.com/watch?v=zarlI9bx6FI</p> <p>The Calculation Error - or: Why Burning Wood is not Carbon Neutral https://www.youtube.com/watch?v=YC4tqu8-oSo</p> <p>Climate 101: Deforestation National Geographic https://www.youtube.com/watch?v=lc-J6hcSKa8&t=34s</p> <p>Why All Buildings Should Be Timber https://www.youtube.com/watch?v=ieBVNgMkcpw</p> <p>Wood or Cold-Formed Steel Construction: Which should you use? https://www.youtube.com/watch?v=w5AM2_A2Hmc</p>

<p>Icons & related info for the hints of the PowerPoint presentation</p>	<p> This hint is used to show sources on further information according to the topic.</p> <p> This hint indicates that something important is written.</p> <p> This hint indicates a question/task for reflection.</p>
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