ECOLitAct

Eco-Literacy and Green Education for Climate Action

ECOLit-Kit

A Toolkit for Educators

Resources

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The ECOLitAct Project

Eco-Literacy and Green Education for Climate Action (ECOLitAct) is an Erasmus Plus Partnerships for Cooperation project co-funded by the European Union. It seeks to empower VET practitioners/educators and learners to counter misinformation related to environment and climate change, and to inspire them to adopt eco-friendly behaviours/attitudes. It seeks to develop digital Green education/training opportunities and material embracing "eco-literacy" (MIL applied to ecology and climate change) and that focus on behavioural/attitude shifts while being available to all, especially to individuals with fewer opportunities and in a digital format. The project will support climate action by inspiring critical thinking, developing digital and MIL skills, and encouraging attitude/behavioural shifts. It will do so by creating learning material compiled in a Toolkit and Handbook. ECOLitAct will further make this learning opportunity available in a self-paced and individualized manner through an educational structure based on a self-assessment tool which will guide each person's learning pathway.

The ECOLit-Toolkit

In the face of critical environmental challenges, the Eco-Literacy Toolkit for VET (Vocational Education and Training) Educators stands as an indispensable resource. Assembled through the ECOLitAct partnership, this toolkit equips educators with essential eco-literacy materials, focusing on open educational resources and learning scenarios covering crucial topics such as tackling misinformation about climate change, climate denialism, climate change, and the broader domain of climate and environment.

This toolkit offers a flexible collection of eco-literacy modules that can seamlessly integrate into existing VET programs. It addresses a wide spectrum of eco-literacy themes, ensuring that educators can prepare their students to understand, combat, and adapt to the pressing issues of our time.

The toolkit enables educators to customize the materials for their unique classroom requirements, ensuring a comprehensive and relevant approach to environmental education.

By harnessing the power of open educational resources and learning scenarios, VET educators can empower the next generation to become informed, responsible, and environmentally conscious professionals. This toolkit represents a significant step toward a sustainable and promising future.

How to use these resources?

The ECOLitAct resources are free educational material which are composed of twenty Open Educational Resources (OERs) and four problem-based Learning Scenarios. This material has been developed for the use of trainers, teachers, and educators in the vocational education and training (VET) sector. The resources can be used directly by educators in their learning activities as engaging ways to both raise the knowledge of learners and encourage them to make educated decisions to change daily behaviours and act in a more sustainable manner. The resources also have the goal of educating learners about how to evaluate the information they read online and about how to search for and filter information, as well as how to use digital tools in a safe, ethical, and critical way.

The resources can also be adapted to the needs of different groups of learners and educators and be integrated individually in diverse contexts.

For doubts, comments, or suggestions, please contact the project consortium team: info@swideas.se

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The Open Educational Resources

1.   Tackling Misinformation

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1.1. How to find and filter information on web searches.

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How to
find & filter information
on web searches

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How to find what you want on the Internet

Tips on how to narrow your search

1.Alternate Search Engines. You may have a preference on a specific search engine, but don't let that limit you. Every search engine has some blind spots, and none of them are perfect.

1.Use Particular Keywords. Your search engine will be able to find the information you seek if you use as specific a set of keywords as you can.

1.Make Your Search Terms Simpler. Stop words (e.g., and, but) should typically not be used in internet searches.

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How to find what you want on the Internet

Tips on how to narrow your search

4. **Embedding quotation marks.** When a search term is enclosed in quotation marks, the search engine is prompted to look for that particular word or phrase.

4. **Discard any unhelpful words.** Any word that has a hyphen, small dash, or minus sign before it is not included in the search.

4. **Avoid Common Search Errors.** The websites that appear first in your search results may have excellent SEO, but that doesn't guarantee that their content is the best. Therefore, even if you've used the best search terms possible, it can still be worthwhile to sift through the search results to find the most relevant information.

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Safe Search on the web by Google

Safe Search can assist you in managing explicit content in your Google search results, whether you use it for yourself, your children, or your employer. Explicit results may contain material like:

- Graphic sex acts, pornography, or other sexually explicit content

- Blood and violence

How does Safe Search by Google work?

SafeSearch on Google Search **can recognize** *graphic violence* **and** *other explicit material.*

- Select **"Filter"** to suppress any detected explicit content. The default setting when Google's systems suspect you might be <u>under 18</u> is this.

- Choose **"Blur"** to blur images of adult content. If none of the aforementioned apply, this is the default setting.
Although explicit text and links may still be visible if they are pertinent to your search, this setting helps blur explicit images.

- You will find relevant results for your search even if they are explicit if SafeSearch is set to **"Off."**

How does Safe Search by Google work?

Your **account, device, or network administrator** *is in charge of your SafeSearch setting, so you are unable to alter it.*

For instance:

- **Parents** and **schools** have the option <u>to disable SafeSearch in Filter for student and child accounts.</u>

- Additionally, SafeSearch in Filter may <u>be locked on public Wi-Fi networks,</u> like those found in airports and libraries.

- Your personal SafeSearch setting **may be overridden** by <u>parental controls on your antivirus software and operating system.</u>

How to filter the web search by Bing

- Content that is **more than 30 days old** may be <u>returned by Bing</u>.

- Use the **freshness** query <u>parameter to guarantee the content that Bing returns is current.</u>

Freshness refers to the webpage's discovery date by Bing, not the date of publication by the publisher.

- You can find out <u>when Bing first found </u>the page **by checking the date Published field of the Webpage object.**

How to filter the web search by Bing

Set your **parameters** according to the following ***time frames***:

- **Day** - Display the most recent 24 hours' worth of webpages that Bing has found.

- **Week** - Return webpages that Bing has recently found within the last week.

- **Month** - Return web pages that Bing has found within the last 30 days by month.

Additional resources:

Title	Link
Tips for safe web browsing	https://www.youtube.com/watch?v=VbwKtSrtt8A
Safe Web Browsing	https://www.youtube.com/watch?v=uN425NbPBKA
Safe Web Browsing - A short awareness video	https://www.youtube.com/watch?v=yv9im3mvpsE
Keeping Kids Safe Online	https://www.youtube.com/watch?v=hCwip9fmoeI
Banking & Payment Protection	https://www.youtube.com/watch?v=6dYYkNX8KRg

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References

- https://www.mindtools.com/abtmh5z/seven-ways-to-find-what-you-want-on-the-internet
- https://support.google.com/websearch/answer/510?hl=en&co=GENIE.Platform%3DAndroid
- https://learn.microsoft.com/en-us/bing/search-apis/bing-web-search/filter-answers#getting-results-from-a-specific-site

Thank you!

Assessment Questions

Answer the following questions:

1. **Name at least three ways how to narrow your search online.**

<u>Answer:</u> The ways to narrow your search online are:

- Alternate Search Engines.

- Use Particular Keywords

- Make Your Search Terms Simpler.

- embedding quotation marks

- Discard any unhelpful words.

- Avoid Common Search Errors.

2. **Safe Browsing by Google offers defence tools against:**

<u>Answer:</u> malware, unwanted software & social engineering on Desktop and mobile platforms

3. **Name at least three ways to filter the web search when using Bing.**

<u>Answer:</u>

- Use the freshness query parameter to guarantee the current content Bing returns.

- You can find out when Bing first found the page by checking the date Published field of the Webpage object.

- Set your parameters according to the following time frames: day, week, month

Safe Web Browsing

What is Safe Browsing by Google?

In order to defend users <u>against phishing attacks</u>,

Safe Browsing

was introduced in 2005.

Since then, it has developed to provide users with tools to defend:

➤ against malware,

➤ unwanted software &

➤ social engineering on desktop and mobile platforms.

Safe Browsing by Google

By alerting users when they attempt to access risky websites or download risky files, Google Safe Browsing contributes to the daily protection.

In order to keep their users safe, Safe Browsing also alerts webmasters when their websites are compromised by malicious actors and assists them in identifying and fixing the issue.

Protections for safe browsing are integrated into all Google products and enable more secure Internet browsing.

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Benefits of the Enhanced Safe Browsing by Google

- checking in real-time against lists of known phishing and malware sites

- the choice to ask Google to run more thorough scans of downloaded files to look for viruses and malware

- protection from attacks that were previously unknown when visiting websites

- tailored defenses based on your level of risk

- customized defense if an attack is found on the account

List of the most common criteria for unwanted software

- It is **misleading** because it makes a value promise that it cannot keep.

- It tries to **trick users** into installing it or installs itself while another program is being installed.

- The user is **not informed** of all its important and primary functions.

- It has **unexpected effects** on the system of the user.

- It is **challenging** to get rid of.

- **Private information** is either transmitted or collected without the user's knowledge.

- It is that it is present because it is bundled with other software. **not disclosed**

Solutions

The user should be able to make simple, understandable decisions during the software installation process. It ought to make the user's value proposition crystal clear.

Easy removal or disable of the malicious software

Software should function as expected once it has been installed and offer the user a distinct value.

Software that transmits or collects a user's private data must be open and honest about doing so.

Social Engineering attack

*(is when a web user is tricked
into doing something dangerous online)*

Phishing: website uses deception to get users to divulge personal data like passwords, phone numbers, or social security numbers. In this instance, the content poses as, or appears to be, a reputable entity, such as a browser, operating system, bank, or administration.

Deceptive content: The content tries to trick you into doing something you'd only do for a reliable source, like sharing a password, calling tech support, or downloading software. It may also contain an advertisement that misrepresents the software on a user's device and encourages them to install unwanted programs.

Third-party services: A third-party service provider is a person who manages a website or other service on behalf of another organization. It might be considered social engineering if you (a third party) run a website for another (a first party) without making the affiliation clear. For instance, if you (the first party) manage a charity website and use a third-party platform to manage donations for your site, the third-party platform must make it clear that it is acting on behalf of the charity website; otherwise, it may be construed as social engineering.

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How to fix the problem?

⭐ Make use of the Search Console; in case your website is registered & have a look at the security issues report.

⭐ Delete misleading content & report it if necessary.

⭐ Look over the outside links (third-party resources) on your website. ; Make sure that any advertisements, images, or other third-party resources that are embedded on your site's pages are not misleading.

⭐ Ask for a security review after removing malicious software.

Additional resources:

Title	Link
Tips for safe web browsing	https://www.youtube.com/watch?v=VbwKtSrtt8A
Safe Web Browsing	https://www.youtube.com/watch?v=uN425NbPBKA
Safe Web Browsing - A short awareness video	https://www.youtube.com/watch?v=yv9im3mvpsE
Keeping Kids Safe Online	https://www.youtube.com/watch?v=hCwip9fmoel
Banking & Payment Protection	https://www.youtube.com/watch?v=6dYYkNX8KRg

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- https://www.google.com/about/unwanted-software-policy.html
- https://developers.google.com/search/docs/monitor-debug/security/social-engineering?visit_id=638233738711663529-1638809728&rd=1
- https://safebrowsing.google.com/

Thank you!

1.2. How to find and filter information on social media.

Content

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Importance and Challenges of finding Information on Social Media

In today's digital age, social media has become a primary source of information for many individuals. All social media platforms offer a vast network of information and communication channels.

Social media also plays a vital role in disseminating information, raising awareness, and mobilizing action on many topics, including environmental. But due to this vast amount of content and the potential for misinformation , it can be challenging to find and filter information on social media.

But the question remains: *"How to find and filter the information we find on social media?"* Here are some strategies:

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1. Identifying reliable sources

Reliable sources are crucial for accessing accurate and reliable information on social media. They provide credible and evidence-based insights that have undergone rigorous scrutiny and review processes.

Examples to find reliable sources on environmental topics on social media:

(1) *Government agencies*: Environmental Protection Agency (EPA), the United Nations Environment Programme (UNEP),

(2)Environmental organizations: World Wildlife Fund (WWF), Greenpeace, and the Sierra Club

(3) *Scientific institutions: universities, research institutes, and scientific journals*

2. Using Hashtags and Keywords

Hashtags and keywords are powerful tools for narrowing down search results and finding specific information on social media platforms.
They help categorize and organize content, making it easier to discover relevant posts and discussions.
Be specific: Using precise keywords or hashtags that directly relate to the information we are seeking.

- Hashtags are words or phrases preceded by the # symbol that create a clickable link to related content.
- Keywords are specific words or phrases that represent the information we are searching for.

#ClimateChange

#GreenLiving

#ZeroWaste

#GreenSkills

#Sustainability

#SaveThePlanet

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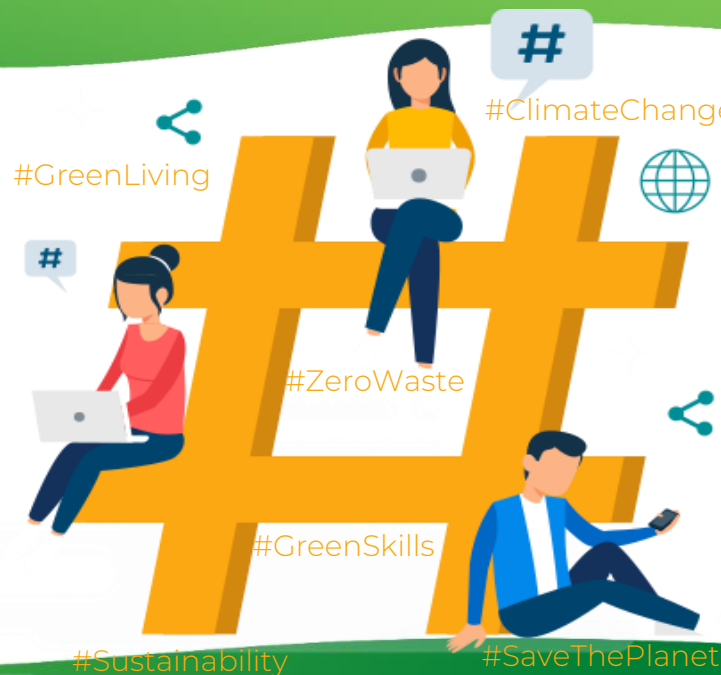
3. Evaluating the Author/Source

Evaluating the credibility of the author or source is crucial for ensuring the reliability of the information we encounter on social media. By assessing the expertise and trustworthiness of the source, we can make informed judgments about the information's accuracy and bias.

Main Factors:

• Consider the author's expertise and qualifications in the field
• Examine the author's previous posts or content to understand their tone, objectivity, and accuracy
• Verify claims and information through fact-checking websites or independent sources.

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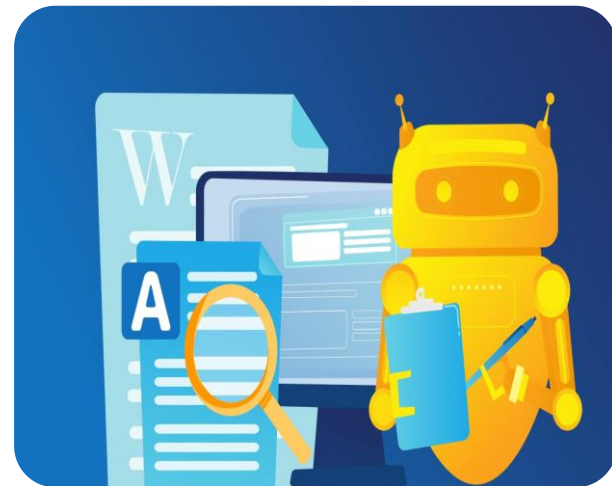
4. Cross-Referencing Information

- Cross-referencing information from multiple reliable sources is essential for verifying accuracy, identifying patterns, and developing a comprehensive understanding of the information we find.
- Consistency across reputable sources strengthens the credibility of information and mitigates the risks of misinformation.
- It helps to mitigate the risks of relying solely on a single source and enhances confidence in the reliability of the information. If multiple reliable sources consistently report similar information, it increases the likelihood of accuracy.

CROSS

REFERENCE
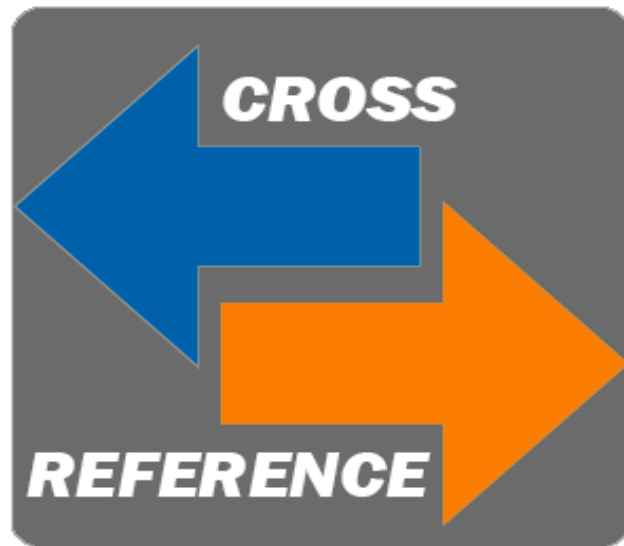
5. Fact-Checking Websites

Fact-checking websites are valuable resources for verifying the accuracy of information found on social media. These websites employ rigorous methodologies to investigate claims, debunk misinformation, and provide reliable information.
Reputable Fact-checking websites:

- *Snopes (www.snopes.com) - It covers a wide range of topics and provides detailed analyses of claims, rumors, and misinformation*

- *FactCheck.org (www.factcheck.org)- It provides unbiased analysis and evidence-based evaluations of political statements*

- *PolitiFact (www.politifact.com) examines the accuracy of political statements, claims, and promises*

- *International Fact-Checking Network (IFCN): is a global network of fact-checkers.*

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6. Being cautious of clickbait and sensationalism

• Clickbait refers to exaggerated or misleading headlines designed to attract attention and increase clicks. Sensationalism involves the use of dramatic or emotional language to generate engagement and shares. Both clickbait and sensationalism are prevalent on social media platforms due to their impact on user engagement.

• By *evaluating headlines*, *checking the source*, *assessing language and tone*, and *cross-referencing w*ith reliable sources, we can identify misleading or unreliable content

7. Using Advanced Search Options

- Leveraging advanced search options on social media platforms empowers us to find and filter information effectively.

- Filtering by date, location, specific accounts, or using hashtags/keywords allows for a more targeted and accurate search experience.

- By utilizing these advanced search features, we can optimize our information gathering process and access the most relevant content on environmental changes.

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7. Always Be critical and skeptical

- Approaching information on social media with a critical and skeptical mindset is crucial for navigating the abundance of content.

- Being critical and skeptical enables us to make informed decisions, contribute to accurate information sharing, and combat the spread of misinformation.

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How can you critically review a post on social media that is spreading misinformation?

1. **Craft your critiques:**

Be specific, not vague. Be active, not passive. Point out problems, but suggest solutions. Your goal is to clearly communicate to the person that they're spreading false or unfunded information. And therefore whether make them delete what they just published or reflect on the topic.

1. **Critic the post and not the person:**

Explain to them that what they have been talking about has no fundamental and is misleading, suggest them some lectures to learn about the topic.

1. **Know your limits:**

Remember that you can't change someone's mind on something or force an idea into their head. You can lead them to a solution or an enlightenment but whatever the outcome is don't take it personally.

References:

Kristina Lerman (2007), Social Browsing & Information Filtering in Social Media.
https://www.researchgate.net/publication/2216262_Social_Browsing_Information_Filtering_in_Social_Media

Peter, S. (2021), *Spotting Misinformation on social media is increasingly challenging. Forbes.com* Spotting Misinformation On Social Media Is Increasingly Challenging (forbes.com)

Reliable scientific sources on the environment and climate change. https://humanists.uk/humanist-climate-action/reliable-scientific-sources-on-the-environment-and-climate-change/

https://www.rainn.org/articles/how-filter-block-and-report-harmful-content-social-media

https://www.voicemag.uk/blog/9268/social-media-and-filtered-information

Assessment

Question 1: Why is it important to critically evaluate the credibility of the author or source of information on social media?

    A. To determine the number of followers or likes the author has.
    B. To assess the author's qualifications and objectivity.
    C. To discover how many hashtags and keywords are used in the content.

Correct Answer:

B. To assess the author's qualifications and objectivity.

Explanation:

Option B is the correct answer because critically evaluating the credibility of the author or source on social media involves assessing their qualifications and objectivity, which are key factors in determining the reliability of the information.

Option A (To determine the number of followers or likes the author has) is incorrect because the popularity of an author or source doesn't necessarily correlate with the accuracy of the information they share.

Option C (To discover how many hashtags and keywords are used in the content) is incorrect because the use of hashtags and keywords is related to searchability and categorization but doesn't directly indicate the credibility of the information.

Question 2: How can advanced search options on social media platforms enhance the process of finding and filtering information?

    A. They enable users to post clickbait headlines.
    B. They allow for more targeted and accurate searches.
    C. They encourage users to rely on a single source.

Correct Answer:

B. They allow for more targeted and accurate searches.

Explanation:

Option B is the correct answer because advanced search options on social media platforms enable users to refine their searches and find information more precisely, making the process of finding and filtering information more efficient and accurate.

Option A (They enable users to post clickbait headlines) is incorrect because advanced search options don't enable users to post content; they are tools for searching and filtering content.

Option C (They encourage users to rely on a single source) is incorrect because advanced search options aim to provide a more comprehensive range of information sources, rather than encouraging reliance on a single source.

Question 3: Why should individuals approach information on social media with a critical and sceptical mindset?

A. It ensures that they believe everything they read.
B. It contributes to the spread of misinformation.
C. It helps them make informed decisions and combat the spread of misinformation.

Correct Answer:

C. It helps them make informed decisions and combat the spread of misinformation.

Explanation:

Option C is the correct answer because approaching information on social media with a critical and sceptical mindset helps individuals make informed decisions and actively participate in combating the spread of misinformation.

Option A (It ensures that they believe everything they read) is incorrect because a critical and sceptical mindset does the opposite – it ensures that individuals do not unquestioningly believe everything they read.

Option B (It contributes to the spread of misinformation) is incorrect because a critical and skeptical mindset is actually an effective strategy to combat the spread of misinformation by encouraging users to verify information and question its accuracy.

1.3.   How to evaluate information online.

Content

Nowadays, all of us are constantly on the move, and with our smartwatches in our hands, scrolling down on the screen, accessing social media, and watching or reading the news from multiple resources and anywhere on the Internet. But have we ever wondered… Are these sources reliable? What am I watching/ reading? Who wrote that? Why did they write that, and what are their intentions? Well, the truth is that most of us do not usually think of this while being in a hurry and constant motion…

In any way, we ought to get used to a certain pattern when accessing a resource online to detect real or fake news. The most crucial aim is to avoid spreading fake news on our various social media profiles, when talking with others, or even spot fake facts and information when we read an article, post, or video. In order to do so, we need to practise and sharpen our critical ability and discover some steps that lead us to detect fake news.

To this, we propose to make a quick test and evaluation in your head while reading the news. It is called the CRAAP[1] test…

But what does it stand for? Let's see it from a closer look…

Currency

> the information's currentness. Is the data up to date and accurate? Are the news recent and the journal articles up to date or at least five years old?

Relevancy

> The relevance of the information to your requirements. Are the facts pertinent to your needs? Do the facts include environmental content?

Authority

> the information's origin. Is the writer competent to write on the subject? Is an authorised author/ organisation who handles environmental issues/ challenges?

Accuracy

> the content's dependability, accuracy, and correctness. Do facts back up the information? Are titles relevant to the environmental issues included?

Purpose

> the basis for the data's existence. What is the information used for? Is it intended to inform, educate, sell, amuse, or persuade the reader about the environmental situation and challenges?

Questions to help you evaluate the credibility of the media sources

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[1] Finding and evaluating reliable news sources - Fake News - Research Guides at Douglas College Library

When we reach a resource online, we should always wonder if it is a reliable resource and if we can trust it.

Let's see what kind of questions we should ask ourselves when we read/ watch something online:

1. Who is the source of this information? Is that clear to the audience, or might the source be the person reporting the news?

2. When did the source get this knowledge? Recently? So long ago, that situation might have changed.

3. Why do they use this source? Do they have the necessary expertise to be trustworthy? Does this fill in a gap in the audience's understanding?

4. Where did the source/ person get this knowledge? Do they have a degree in this field? Training? Work experience? Was the source involved first-hand? If so, does this make their views more credible … or less?

5. How transparent is the reporting? Can the audience determine the sources of information and why they are good choices?

6. What is the source's motive for providing the information? What does this source have to gain or lose? Will this information make the source look better, worse, guilty, or innocent?

7. How does this source know this information? Could I confirm the source's information through government records, other documents, further reporting, or other sources?

8. What is the past reliability and reputation of this source?

Fact-checking of the resources

Now, let's say that you have already applied the **CRAAP** test while reading the news, but you still… feel a little bit confused and not sure about the origin of the resource. What can you do then? In this case, we propose some fact-checking tools that might help you during your research and reading process.

App	Link
Learn to check	https://learntocheck.org/en/
No Alternative facts	http://www.noalternativefacts.net
Code of Principles	IFCN Code of Principles (poynter.org)
Fact checker	Fact Checker - The Washington Post
Fact Check	FactCheck.org - A Project of The Annenberg Public Policy Center
Politifact	PolitiFact

HOW TO SPOT FAKE NEWS

CONSIDER THE SOURCE

Click away from the story to investigate the site, its mission and its contact info.
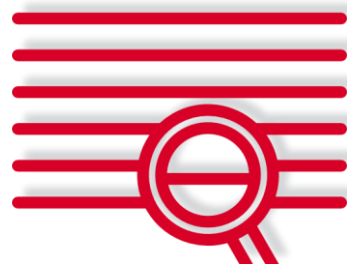
READ BEYOND

Headlines can be outrageous in an effort to get clicks. What's the whole story?

CHECK THE AUTHOR

Do a quick search on the author. Are they credible? Are they real?

SUPPORTING SOURCES?

Click on those links. Determine if the info given actually supports the story.

CHECK THE DATE

Reposting old news stories doesn't mean they're relevant to current events.

IS IT A JOKE?

If it is too outlandish, it might be satire. Research the site and author to be sure.

CHECK YOUR BIASES

Consider if your own beliefs could affect your judgement.

ASK THE EXPERTS

Ask a librarian, or consult a fact-checking site.

Assessment

Mark the statements as True or False:

1. When we reach a source online, there is no need to check its reliability. **F**

Answer: **False.** Exactly! We need to check for its reliability because there is much fake news, misinformation, and propaganda when we read something. Please keep in mind to check the resources.

True. We must be careful what we read because it might be fake news or misinformation in the articles, posts, or even when watching a video! Please keep in mind to check the resources.

2. To evaluate information online, we use the CRAAP test. **T**

Answer: **True.** The CRAAP test is a way to check if what we read, hear, or watch is credible and reliable. The CRAAP test suggests various steps to reach the credibility of the source.

False: We need the steps proposed in the CRAAP test to check the resource. CRAAP stands for Currency, Relevancy, Authority, Accuracy, and Purpose of a resource.

3. CRAAP stands for: Content, Reliability, Authority, Accuracy, Purpose. **F**

Answer: **False.** You are right! The CRAAP test stands for Currency, Relevancy, Authority, Accuracy, Purpose.

True. Oops! The CRAAP test stands for Currency, Relevancy, Authority, Accuracy, Purpose.

4. According to CRAAP, one of the As means of Authority is the information's origin. **T**

Answer: **True.** Yes, exactly! It means the authority is the information's origin. Is the writer competent to write on the subject? Is an authorized author/ organisation who handles environmental issues/ challenges?

False. One of the As in CRAAP means the authority is the information's origin. Is the writer competent to write on the subject? Is an authorized author/ organisation who handles environmental issues/ challenges?

5. According to CRAAP, Purpose is not the basis for the data's experience. **F**

Answer. **False.** You are on the right path! Purpose is the basis for the data's existence. What is the information used for? Is it intended to inform, educate, sell, amuse, or persuade the reader about the environmental situation and challenges?

True. Be careful! Purpose is the basis for the data's existence. What is the information used for? Is it intended to inform, educate, sell, amuse, or persuade the reader about the environmental situation and challenges?

1.4.   How to use the information you find online in an ethical way

Content

Netiquette: What is it?

The term "netiquette" is a combination of the words "net" and "etiquette," which refers to the socially acceptable standards of online behavior. Self-presentation guidelines, behavioral expectations, and acceptable modes of expression are all included in the definition of netiquette. You can avoid offending friends, coworkers, and other members of your social network by using proper netiquette.[2]

More specifically, as internet users, we ought to consider the following:

❖ **The internet is a social extension.** The internet is a new dimension of the world we live in, not a brand-new universe where anything is possible.

❖ **Using the same standards in public and online**. Simply put, this indicates that the social norms prohibiting bigotry and hate speech, child exploitation and pornography, copyright violations, and other types of theft remain in place. The principles of decency, kindness, openness, and treating others with the respect with which we want to be treated should also be upheld.

❖ **Refusing to facilitate online abuse and harassment**. acknowledging that the laws already in place to safeguard citizens' rights and dignity also apply online and that, as necessary, laws are updated to consider these rights in broader contexts. Online theft, harassment, and bullying are still all forms of these offenses, period.

❖ **Recognizing societal differences**. Respect for cultural differences and tolerance should persist even when national boundaries are irrelevant. To achieve this, one must learn to accept the fact that not all netizens will share the same social values and norms.[3]

Top rules for the ethical way online[4]

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[2] https://www.avast.com/c-netiquette

[3] https://www.webroot.com/us/en/resources/tips-articles/netiquette-and-online-ethics-what-are-they#:~:text=Netiquette%20is%20a%20combination%20of,rules%20for%20acceptable%20online%20behavior.

[4] https://www.avast.com/c-netiquette

1. **Don't misrepresent yourself.**

   - Use sarcasm with caution.

   - Use polite and respectful language.

   - Take care of the grammatic rules

2. **Respect the privacy of others.**

   - Before forwarding an email to someone else, check with the sender.

   - Don't divulge someone's social media account without their permission.

3. **Don't say something online if you wouldn't say it out loud**. Avoid letting your feelings come across online. Interacting through a screen can make you feel invincible and, in the worst-case scenario, remove your social filter. When your words are just squiggles on a screen, it's simple to be direct, impolite, or aggressive.

4. **Obey the rules**. Rules could be a general code of conduct, formatting guidelines, link policies, or even just acceptable discussion topics.

5. **Double check the facts.** Making factual errors is embarrassing and can lead to people losing faith in you or ceasing all communication with you.

6. **Recognize people's schedules and boundaries**. It's normal to feel the urge to share something exciting, but please do not exaggerate by sending long videos, articles, or memes, and respect others' preferences and time schedules.

7. **Stay updated.** If you wish to be active online, take care to stay updated with the latest news and follow the current trends around the topic you handle.

8. **Sending files correctly.** Be careful not to distribute inappropriate content, and respect the recipients' expectations.

9. **Be tolerant** of other people's beliefs and mindsets. Apart from that, we all feel nervous because what we write online seems permanent. Everyone wants to move on from a hastily made, misunderstood statement, so show compassion for others if you want it extended.

Netiquette on social media:[5]

✓ Be respectful and courteous.

✓ Be honest and open when communicating.

✓ Follow the guidelines.

✓ Transmit what you think is useful.

✓ Respect privacy.

✓ Build relationships.

Copyright and acknowledgment of sources[6]:

Copyright

The authors or creators of original works, including those who produce content for the Web, are protected by **copyright.** That implies that you alone, as the content creator, have the authority to either do any of the following or to permit others to do any of the following:

Create and distribute copies of your work, perform or display it in public, and make copies of your work, make "derivative works" (such as modifying, adapting, or using a work in a new way; or converting a work to another medium).

Sources/ References

You must give proper credit for any content you use, regardless of whether it is copyrighted, or subject to the Creative Commons License. Plagiarism, a serious instance of academic misconduct, results from failure to do this. Find out more about using citations and avoiding plagiarism.

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[5] https://guides.libraries.uc.edu/digliteracy/ethics

[6] ibid

Assessment

Answer the following questions:

1. **Name at least three rules of netiquette and elaborate on them.**

<u>Answer:</u> *(the user should write three of the following):*

- Don't misrepresent yourself.

Use sarcasm with caution.

Use polite and respectful language.

Describe in short what happens with the copyright and the acknowledgment of sources.

take care of the grammatical rules

- Respect the privacy of others.

Before forwarding an email to someone else, check with the sender.

Don't divulge someone's social media account without their permission.

- Don't say something online if you wouldn't say it out loud. Avoid letting your feelings come across online. Interacting through a screen can make you feel invincible and, in the worst-case scenario, remove your social filter. When your words are just squiggles on a screen, it's simple to be direct, impolite, or aggressive.

- Obey the rules. Rules could be general codes of conduct, formatting guidelines, link policies, or even acceptable discussion topics.

- Double-check the facts. Making factual errors is embarrassing and can lead to people losing faith in you or ceasing communication.

- Recognize people's schedules and boundaries. It's normal to feel the urge to share something exciting, but please do not exaggerate by sending long videos, articles, or memes, and respect others' preferences and time schedules.

- Stay updated. If you wish to be active online, stay updated with the latest news and follow the current trends around the topic you handle.

- Sending files correctly. Be careful not to distribute inappropriate content, and respect the recipients' expectations.

- Be tolerant of other people's beliefs and mindsets. Apart from that, we all feel nervous because what we write online seems permanent. Everyone wants to move on from a hastily made, misunderstood statement, so show compassion for others if you want it extended.

2. **Describe in short what happens with the copyright and the acknowledgment of sources.**

Answer:

The authors or creators of original works, including those producing Web content, are protected by **copyright.** That implies that you alone, as the content creator, have the authority to either do any of the following or to permit others to do any of the following:

Create and distribute copies of your work, perform or display it in public, and make copies of your work, make "derivative works" (such as modifying, adapting, or using a work in a new way or converting a work to another medium).

You must give proper credit for any content you use, regardless of whether it is copyrighted or subject to the Creative Commons License. Plagiarism, a serious instance of academic misconduct, results from failure to do this. Find out more about using citations and avoiding plagiarism.

3. **Name at least four ways of netiquette on social media.**

Answer:

- Be respectful and courteous.
- Be honest and open when communicating.
- Follow the guidelines.
- Transmit what you think is useful.
- Respect privacy.
- Build relationships.

2. Climate Change

2.1.   Climate Change: A timeline

Content

OER 8

Climate change: a timeline

Causes of anthropogenic climate change

The Earth's climate has always been changing. What distinguishes the current climate change from those before is that it is human-made (anthropogenic) rather than natural. <u>Human influence on the planet has led to global temperatures rising considerably faster than ever before.</u> Additionally, this change is taking place in a period when Earth should be cooling down. You can watch <u>this video</u> to learn more about natural and anthropogenic climate changes.

Causes of anthropogenic climate change

<u>A main aspect contributing to anthropogenic climate change are GHG emissions.</u> When broken down into different sectors, we can see that energy use (electricity, heat and transport) in particular is responsible for a large share of GHG emissions (73.2%).

Other factors, such as deforestation, further contribute to climate change as it decreases the planet's capacity to absorb and store CO_2.

Read more about the causes of climate change <u>here</u>.

<u>Climate Watch</u> provides a tool that allows you to view emissions by sector and country.

Global greenhouse gas emissions by sector
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.

Sources: SciShow (2013), Ritchie & Roser (2020), Encyclopedia Britannica [1] (n.d.), UN (n.d.)
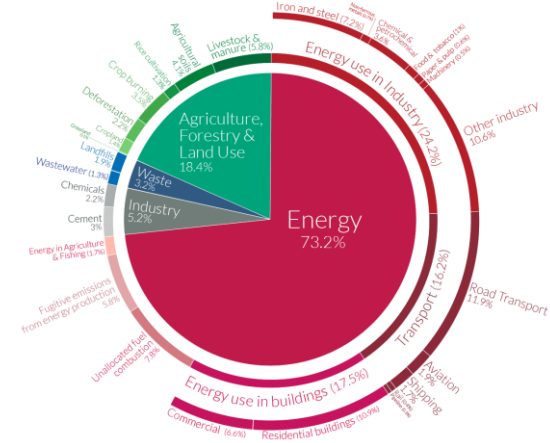
Consequences of anthropogenic climate change

Tipping Points

...are irreversible changes to the planet's eco- and climate systems which trigger further changes. Researchers have identified nine tipping points which we are moving towards. These include:

- Sea ice melting (leading to i.a. rising sea levels)
- Permafrost melting (releasing methane and accelerating global warming)
- The deforestation of the Amazon rainforest (decreasing carbon storage)

While climate change does not affect all regions in the same way, the **consequences of climate change** can be summarised as the following:

- Increasing global temperatures
- Rising sea levels
- More frequent & more severe extreme weather events (storms, droughts, wildfires, floods, ...)
- Loss of species
- Increased food insecurity
- Increased health risks
- Increased poverty & displacement

The higher global temperatures rise above pre-industrial levels the more severe the effects and risks become. Read more <u>here</u>.

Adapted from the Potsdam Institute for Climate Impact Research [https://www.pik-potsdam.de/en/output/infodesk/tipping-elements]

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ca. 1800

Beginning of the Industrial Revolution

The current climate change has become connected with the term *Anthropocene**. Most date its starting point to the Industrial Revolution which led to increased greenhouse gas (GHG) emissions.

1827

Joseph Fourier: Greenhouse theory

He suggests that energy reaching Earth as sunlight must be balanced by energy radiating back into space. However, some of the energy must be kept in the atmosphere – like in a greenhouse – keeping the planet warm.

What is the greenhouse effect? You can watch a video explaining the greenhouse effect and how greenhouse gases work here.

* The term **Anthropocene** was first used by atmospheric scientists suggesting that we are in a new geological epoch (following the Holocene). The Anthropocene has not yet been officially recognised as such, but the term is widely used in political and social science contexts to highlight the decisive role humankind plays in affecting the planet's ecology, climate and geology. Most argue that we entered this epoch with the Industrial Revolution. However, others suggest that extensive agriculture and forest-clearing long before the 1800s already had an extensive impact on the planet. Some date the beginning of the Anthropocene to the Great Acceleration since 1945, when human impact reached an unprecedented intensity.

Sources: Marshall (2006/2009), Clark (2015), History (2022), World Economic Forum (2021a)

Timeline of climate change
19th century

1850s

Eunice Newton Foote

Using glass cylinders, Newton Foote shows that the heating effect theorised by Fourier is higher in humid than in dry air. She finds that the most heating occurs in cylinders containing CO2.

1860s

John Tyndall researches greenhouse gases

Tyndall conducts research on coal gas (CO2, methane, volatile hydrocarbons) which is particularly effective in storing energy, CO2, and vapours as greenhouse gases (GHGs).

1896

Svante Arrhenius: CO2 and temperatures

Interested in the causes for the ice ages, Arrhenius investigates the effect of CO_2 on Earth temperatures. He calculates that reducing or increasing the CO_2 content in the atmosphere could lead to a temperature de-/increase of 5°C.

Sources: Marshall (2006/2009), World Economic Forum (2021a), History (2022), Encyclopaedia Britannica [2] (n.d.)

Timeline of climate change 20th century

1890s-1940s

Temperatures increase by ~ 0.25°C

The temperature increase correlates with increased industrial activity and the burning of fossil fuels as part of it.

1938

Guy Callendar proves temperature increase

Callendar compares historical weather data of the US and North Atlantic region showing that temperatures were increasing. He correlates this trend with measured increases of atmospheric CO2.

1958

Keeling Curve (Mauna Loa Observatory, Hawaii)

Charles Keeling systematically measures CO2 levels. His research results in the Keeling Curve which shows a consistent increase in CO2 concentrations.
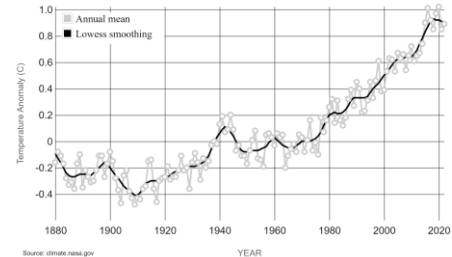
Sources: Marshall (2006/2009), Ghosh (2021), World Economic Forum (2021a), History (2022), Encyclopaedia Britannica [2] (n.d.)

Timeline of climate change
20th century

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1940s-1970s

Global temperatures decrease by 0.2°C

Some falsely predict a new ice age as temperatures drop due to an increase in aerosol* pollutants reflecting sunlight away from the planet. Yet, they only have a short-term effect relative to the long-term warming through CO2.

1974

CFCs and ozone depletion

There is first evidence that chlorofluorocarbons (CFCs)** contribute to the depletion of the ozone layer in the atmosphere.

UV-A
UV-B
UV-C

F
C
Cl Cl

CFC-molecule
(splits ozone into oxygen & chlorine monoxide)

ozone layer

* Aerosols and their impact on Earth's climate are a complex issue. Next to their cooling effect by reflecting sunlight, they can also contribute to global warming, i.e., by impacting albedo effects (the reflective capacity of i.e., ice). Read more about aerosols and their impact <u>here</u>.

**The good news is that as CFCs are no longer in use, the ozone layer is recovering. Learn more about the ozone layer, CFCs, and how the world came to realise that change was necessary in <u>this video</u>.
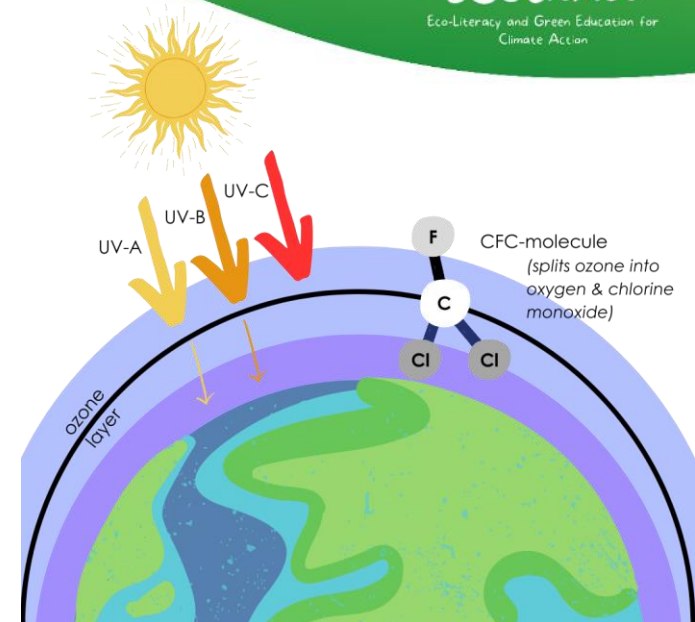
Sources: Marshall (2006/2009), Voiland (2010), History (2022), Encyclopaedia Britannica [2] (n.d.)

Timeline of climate change
20th century

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1980s

Global temperatures rise & heat records

The coldest year of the 1980s was still warmer than the hottest year of the 1880s. The summer of 1988 was the hottest on record until then. It was accompanied by droughts and wildfires.

1990

The planet has warmed by 0.5°C

The first IPCC report finds that global temperatures have risen by 0.5 °C over the past 100 years. It concludes that strong measures against GHG emissions are needed.

1992

UN Framework Convention on Climate Change

At the Earth Summit in Rio, countries sign onto the UNFCCC with the aim to control emissions. They agree on 'common but differentiated responsibilities' referring to countries' historically different levels of emissions*.

* The particulars of climate action are complex: Who needs to act? Do some need to act more than others? Which countries are contributing most to climate change? Which countries have historically contributed most to climate change? How do we calculate this responsibility? Should it matter? Our World in Data provides a set of charts, graphs and maps that showcase global emissions based on both countries' total and per capita emissions. As well as historical emissions, you can also find data on annual emissions here. However, greenhouse gas emissions are not necessarily the only factor to be taken into consideration when determining countries' responsibility for climate change: Consumption and global trade are additional factors that can be taken into consideration.

Sources: Marshall (2006/2009), Ritchie (2019), Ritchie & Roser (2020), World Economic Forum (2021a), History (2022)

Timeline of climate change
20th century

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1995

First Conference of Parties (COP)

The UNFCCC members come together for the first COP in Berlin. They conclude that climate change is likely linked to human action and call for legally binding emissions targets.

1997

COP3 in Kyoto resulting in the Kyoto Protocol

A first treaty that requires specific emissions reductions (for so-called 'developed nations') is created: The Kyoto Protocol.

1998

New heat record

1998 is the hottest year in the hottest decade of the hottest century of the millennium.
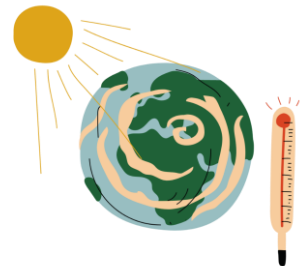
Timeline of climate change
21st century

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2022-2003

Collapse of Larsen B ice shelf & heatwave

2002: The Larsen B ice shelf in Antarctica collapses.
2003: Hottest summer in 500 years causing 30,000 deaths in Europe. Climate change has doubled the risk of heatwaves.

2005

Record number of hurricanes in the USA

2005 replaces 2002 as the second hottest year on record. The US record a record number of hurricanes. The melting of Arctic sea ice and Siberian permafrost speeds up. Scientists warn that the West Antarctic ice sheet is beginning to collapse.

2007

IPCC: link between climate change and human action

The IPCC confirms that the current changing of global climates is linked to human action. The claim that solar activity is responsible for global warming is debunked by a measured decline of it since the 1980s.

Remnants of the Larsen B ice shelf

Source: OVERVIEW on flickr

Timeline of climate change
21st century

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2010s
Increased economic losses

Compared to the 1970s, economic losses due to climate change have increased sevenfold.
2010: Green Climate Fund is established to help developing nations with adaptation and mitigation

2015
Paris Agreement (COP21)

The Paris Agreement is the first global treaty that calls for emissions pledges from 'developing' and 'developed' nations. The signatories agree to try to keep global warming below 1.5°C.

2022
Heat records and increasing GHGs

Global temperatures keep increasing approaching 1.5°C above pre-industrial temperatures. GHGs in the atmosphere, too, are increasing. The past years, accompanied by extreme weather events, have been the hottest on record.
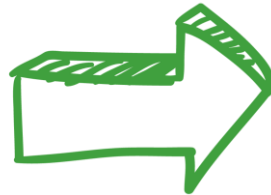
Have a look at how global temperatures have changed from 1850 to 2022 here.

Question 1

What does the term *Anthropocene* **refer to?**

Question 2

Which sector is one of the sectors contributing most to anthropogenic climate change?

a) Waste; b) Energy sector; c) Agriculture, forestry and land use; d) Industry

Question 3

The higher global temperatures rise above pre-industrial temperatures, the greater are the risks and consequences of the impacts of climate change (i.e., extreme weather events).

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Assessment

Question 1

What does the term *Anthropocene* refer to?

Answer: The Anthropocene is a proposed geological epoch – the current one – which is marked by human actions significantly impacting the planet's ecosystems and climate.

Additional information: While the Anthropocene is not (yet) recognised as an official geological epoch, the term is used as a socio-political concept which highlights human impact on the planet. While the Earth's climate has always been changing, human action, particularly since the Industrial Revolution, has led to global temperatures increasing faster than ever before in a period when the Earth should be cooling.

Question 2

Which sector is one of the sectors contributing most to anthropogenic climate change?

a.   Waste; **b) Energy sector**; c) Agriculture, forestry and land use; d) Industry

Additional information: In 2016, the energy sector was responsible for a total of 73.2% of global GHG emissions compared to agriculture, forestry and land use causing 18.4% of emissions, industry 5.2%, and waste 3.2%. Within the energy sector, the biggest sources of GHG emissions are energy use in industry (24.2%) – particularly iron and steel (7.2%) – transport (16.2%) – and especially road transport (11.9%) – and energy use in commercial and residential buildings (17.5%).

Question 3

The higher global temperatures rise above pre-industrial temperatures, the greater are the risks and consequences of the impacts of climate change (i.e., extreme weather events).

True or false?

Additional information: With rising temperatures, risks such as extreme weather events (heatwaves, floods, wildfires, storms) also increase. The more temperatures increase, the more likely it also becomes that we reach various tipping points. When a tipping point, i.e., the loss of sea ice or the melting of permafrost, is reached, it sets in motion a series of irreversible changes. Therefore, every 0.1°C matters, even if we pass the 1.5 °C mark agreed upon in the Paris Agreement.

2.2. Climate change: Individual responsibility

Content

Climate change

Individual responsibility

Introduction

Welcome to this Educational Resource on "Climate Change - The Power of Personal Action." Our planet faces an urgent challenge - climate change. This issue is no longer a distant concern but a reality that affects us all. As a global community, we must recognize the importance of individual efforts in addressing this crisis.

This OER will help you explore the scientific basis of climate change and its profound consequences. You will discover that your actions can play a significant role in shaping the future of our environment and effect climate change. By taking responsibility for our carbon footprint and adopting sustainable choices, we can collectively make a positive impact.

Through knowledge, empowerment, and collective action, we can all contribute to the global effort to combat climate change. Are you prepared to be part of the solution? Go ahead and explore the strength of individual responsibility and chart a path towards a more sustainable future.

Understanding Climate Change

Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.
Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.

The main greenhouse gases that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. Agriculture, oil and gas operations are major sources of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main sectors causing greenhouse gases.

What role do we play as individuals in Climate Change?

As individuals, we play a significant role in climate change. Our daily choices, such as transportation, energy consumption, and consumption habits, collectively contribute to greenhouse gas emissions.

By adopting sustainable practices and reducing our carbon footprint, we can positively impact the environment and help mitigate the effects of climate change. It is crucial for each of us to recognize our responsibility and take action to protect our planet for future generations.

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Quizz: What role do we play
in climate change as individuals?

1. As individuals, we have no significant impact on climate change.

2. Our daily choices, such as transportation and energy consumption, do not influence climate change.

3. By reducing our carbon footprint, we can help mitigate the effects of climate change.

4. Climate change is solely caused by natural processes and has no connection to human activities.

5. Planting trees is an effective way for individuals to offset their carbon emissions.

6. Individual actions to address climate change are not as impactful as government policies and international agreements. ❌ ✅

7. Adopting energy-efficient practices at home and work can positively contribute to combating climate change. ❌ ✅

8. Climate change is a global issue that requires collective effort; individual actions alone cannot solve it. ❌ ✅

9. Engaging in sustainable practices is only relevant for environmental enthusiasts and does not affect the broader community. ❌ ✅

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So, what can we do?

Use less energy at home

Drive less. If you can, walk, bike, or take public transportation

Change energy sources at your home

Travel green(er). Planes burn large amounts of fossil fuels, use trains instead. Avoid unnecessary travels.

Swideos

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IbeRika
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Recycle and compost.

Clean up your environment

Eat less meat.
Opt for vegetables instead.

Speak up! Get involved
and encourage others to participate .

Swideas

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LJUDSKA UNIVERZA VELENJE

IbeRIka
education group gGmbH

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Case Studies and Success Stories

Here is an example of real-life of an individual making a positive impact on climate change.

Do you know Greta Thunberg, a Swedish environmental activist, gained global recognition for her efforts in raising awareness about climate change. Through her "Fridays for Future" movement, she inspired millions of young people worldwide to participate in climate strikes and demand urgent action from governments and policymakers.
Can you think of a person/organisation making an impact in your community?

 Swideas

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Overcoming Challenges and Barriers

Taking actions on your own it is not always easy. There are challenges and barriers individuals face when trying to take climate action.
Here are a few. Which ones apply to you and your community? Use your creativity and offer solutions and strategies to overcome these barriers! Discuss and compare the solutions with your classmates.

Lack of awareness	Financial constraints	Limited access to green technologies
Cultural norms and habits	Time Constraints	Scepticism and Misinformation

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Reference:

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https://www.un.org/en/actnow/ten-actions

https://theyearsproject.com/

Co-funded by the European Union

Assessment

1. **Climate change is primarily a global issue and does not significantly rely on individual actions?**

a) True.

b) Fals.

Correct answer: b).

- Feedback: Bravo, you are right. Climate change refers to long-term shifts in temperatures and weather patterns. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat, and raising temperatures. As individuals, we play a significant role in climate change. Our daily choices, such as transportation, energy consumption, and consumption habits, collectively contribute to greenhouse gas emissions.

Incorrect answers: a).

- Feedback: Incorrect, try again. Don't forget that the main greenhouse gases that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. As individuals, we play a significant role in climate change. Our daily choices, such as transportation, energy consumption, and consumption habits, collectively contribute to greenhouse gas emissions.

2. **Why is it important for individuals to take responsibility for their carbon footprint in the context of climate change?**

a) To increase personal energy consumption.

b) To promote the use of fossil fuels.

c) To collectively make a positive impact on the environment and mitigate the effects of climate change.

d) To prioritize economic growth over environmental concerns.

Correct answer: a).

- Feedback: That's right. It is important for individuals to take responsibility for their carbon footprint because by doing so, they can collectively make a positive impact on the environment and help mitigate the effects of climate change. Recognizing and reducing one's carbon footprint through sustainable choices and actions contribute to the global effort to combat climate change. This is essential for protecting the planet and ensuring a sustainable future for generations to come.

Incorrect answers: b), c) and d).

- Feedback: Not right. If we want to live a healthier world and if we want to leave a better planet for the next generations, it's important for individuals to take responsibility for their carbon footprint because by doing so, they can collectively make a positive impact on the environment and help mitigate the effects of climate change. Recognizing and reducing one's

carbon footprint through sustainable choices and actions contribute to the global effort to combat climate change.

3. **What are the main greenhouse gases responsible for climate change, primarily due to human activities like burning fossil fuels?**

a) Oxygen and nitrogen.

b) Carbon dioxide and methane.

c) Hydrogen and helium.

d) Nitrogen oxide and sulphur dioxide.

Correct answer: b).

- Feedback: Awesome. Carbon dioxide (CO_2) and methane (CH_4) are the main greenhouse gases responsible for climate change due to human activities like burning fossil fuels. When fossil fuels such as coal, oil, and gas are burned for energy, they release carbon dioxide into the atmosphere. This excess CO_2 acts like a blanket, trapping heat from the sun and leading to global warming.

Incorrect answers: a), c) and d).

- Feedback: Try again. Remember that carbon dioxide (CO_2) and methane (CH_4) are the main greenhouse gases responsible for climate change due to human activities like burning fossil fuels. When fossil fuels such as coal, oil, and gas are burned for energy, they release carbon dioxide into the atmosphere. This excess CO_2 acts like a blanket, trapping heat from the sun and leading to global warming. Both of these gases contribute to the greenhouse effect, which is the key driver of climate change by raising temperatures and causing long-term shifts in weather patterns.

2.3.   Carbon Footprint

Content

Climate Change and Global Warming

What Is Climate Change? | United Nations

"Climate change is a long-term **change in temperatures and weather patterns**. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures."[7]

The main greenhouse gasses that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. Agriculture, oil and gas operations are major sources of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main sectors causing greenhouse gasses.

But can the terminology climate change be exchanged with global warming?

 The answer is no. Because when we talk about global warming we refer simply to one of the aspects of climate change, the one that refers to the long - term warming of the planet. For this reason, we affirm that global warming is one of the reactions to climate change.

CO2. Carbon dioxide

What is Carbon Dioxide? How it affects your health & why you should measure | Airthings

"Carbon Dioxide or CO_2 is a greenhouse gas that is natural and harmless in small quantities, but as levels rise it can affect productivity and sleep. CO2 is produced by the air we exhale and CO_2 levels tend to concentrate indoors with less ventilation."[8]

But why is something naturally created bad for our planet?

You have probably heard of CO_2 emissions in the news that as **CO_2 builds up in our atmosphere from fossil fuels** (e.g. coal and oil), it has a warming effect that could change the earth's climate.

Carbon footprint.

What Is Carbon Footprint and Why Does It Matter in Fighting Climate Change? | Earth.Org

In relation to CO2, we might have heard of Carbon footprint.

What is exactly the carbon footprint and why is it important?

"Carbon footprint is the amount of carbon dioxide (CO_2) emissions associated with all the activities of a **person** or **other** entity (e.g., building, corporation, country, etc.). It calculates how a person's or an entity's activities contribute to climate change.

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[7] United Nations. Climate Action, *What is climate change?*

[8] Airthings. *What is Carbon dioxide? How it affects your health & why you should measure.*

It includes direct emissions, such as those that result from fossil-fuel combustion in manufacturing, heating, and transportation, as well as emissions required to produce the electricity associated with goods and services consumed. In addition, the carbon footprint concept also often includes the emissions of other greenhouse gasses, such as methane, nitrous oxide, or chlorofluorocarbons (CFCs)."[9]

But when we're talking about carbon footprint are we referring to climate change or global warming?

The carbon footprint is extremely valuable for measuring our own contribution to climate change. Whether we talk about an individual, an organization, products, services or much more, it is a great tool to see the impact of our activities on the planet. For example, by computing the industrial carbon footprint, an industry can better understand its major sources of emissions and find ways to minimize them.

Can we reduce our emissions?

Individuals and corporations can take a number of steps to reduce their carbon footprints and thus contribute to global climate mitigation. Carbon footprints can be reduced through improving energy efficiency and changing lifestyles and purchasing habits. For example, using public transportation, such as buses and trains, reduces an individual's carbon footprint when compared with driving. Individuals and corporations can reduce their respective carbon footprints by installing energy-efficient lighting, adding insulation in buildings, or using renewable energy sources to generate the electricity they require. For example, electricity generation from wind power produces no direct carbon emissions.

Additional lifestyle choices that can lower an individual's secondary carbon footprint include reducing one's consumption of meat and switching one's purchasing habits to products that require fewer carbon emissions to produce and transport.

Now check the following graphics to see where your country stands in the list of countries that are producing the most carbon emissions

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[9] Hamza Badamasi. (2023). *What is carbon footprint and why does it matter in fighting climate change?*. Earth. org
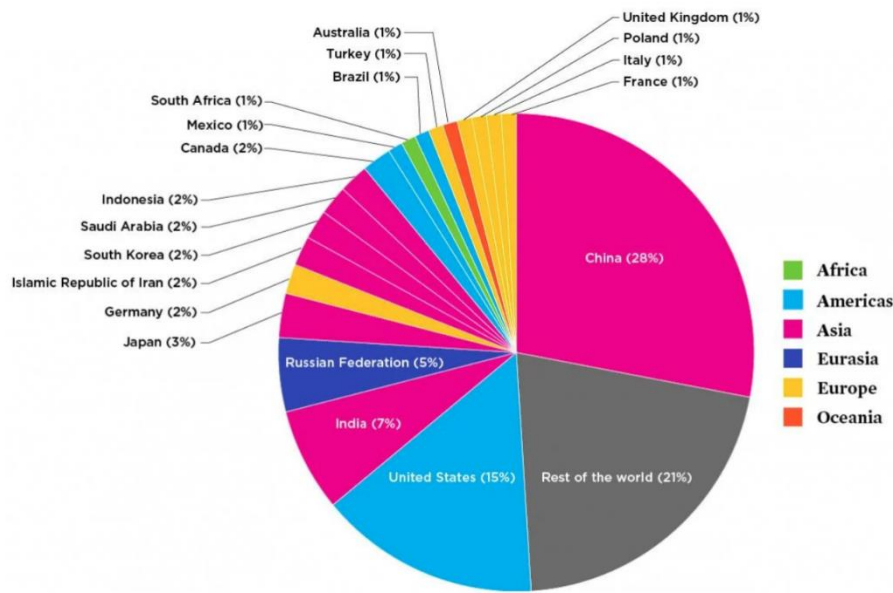
© 2020 Union of Concerned Scientists
Data: Earth Systems Science Data 11, 1783–1838, 2019

Assessment questions:

1) **What is the main driver of climate change since the 1800s, and how does it contribute to the phenomenon?**

a) Changes in the sun's activity

b) Large volcanic eruptions

c) Human activities, such as burning fossil fuels

d) Clearing land and cutting down forests

Correct Answer: c) Human activities, such as burning fossil fuels

Feedback: That's correct! Human activities, particularly the burning of fossil fuels like coal, oil, and gas, have been identified as the main driver of climate change since the 1800s. These activities release greenhouse gases that contribute to the warming of the Earth's climate.

Feedback for Incorrect Answers:

a) Changes in the sun's activity: Not quite. While changes in the sun's activity can influence climate, since the 1800s, human activities like burning fossil fuels have been the primary driver of climate change.

b) Large volcanic eruptions: Almost there. While volcanic eruptions can cause short-term climate fluctuations, human activities have had a more significant and consistent impact on climate change since the 1800s.

d) Clearing land and cutting down forests: Good effort, but this contributes to carbon emissions. However, the main driver of climate change mentioned in the text is related to burning fossil fuels.

2) How does the concept of "carbon footprint" contribute to understanding a person's impact on the environment?

a) It measures the amount of carbon emissions associated with fossil-fuel combustion.

b) It focuses solely on carbon dioxide emissions from various sources.

c) It helps individuals and industries identify major sources of greenhouse gas emissions.

d) It specifically calculates the effects of methane and nitrous oxide emissions.

Correct Answer: c) It helps individuals and industries identify major sources of greenhouse gas emissions. **Feedback**: Well done! The concept of a "carbon footprint" is valuable because it allows individuals and industries to assess and identify the significant sources of greenhouse gas emissions, helping them make informed decisions to reduce their environmental impact.

Feedback for Incorrect Answers: a) It measures the amount of carbon emissions associated with fossil-fuel combustion: Close, but the concept of "carbon footprint" goes beyond just measuring emissions. It also encompasses the overall impact of various activities on climate change.

b) It focuses solely on carbon dioxide emissions from various sources: Not quite. While carbon dioxide emissions are a significant part of the carbon footprint, it also considers other greenhouse gases and their collective impact.

d) It specifically calculates the effects of methane and nitrous oxide emissions: You're on the right track, but the carbon footprint concept is broader, including all activities and emissions contributing to climate change.

3) How can individuals and corporations reduce their carbon footprints to contribute to global climate mitigation?

Choose the correct options.

a) Increasing meat consumption to support sustainable agriculture.

b) Using public transportation like buses and trains.

c) Installing energy-efficient lighting and insulation in buildings.

d) Burning fossil fuels for electricity generation.

e) Purchasing products with higher carbon emissions for greater impact.

Correct Answers: b) Using public transportation like buses and trains. **c)** Installing energy-efficient lighting and insulation in buildings.

Feedback: You're on the right track! To contribute to global climate mitigation, individuals and corporations can indeed reduce their carbon footprints by using more eco-friendly transportation options like public buses and trains (b), as well as by implementing energy-efficient practices like

installing efficient lighting and insulation in buildings (c). These actions help lower emissions and reduce environmental impact.

Incorrect Answers: a) Increasing meat consumption to support sustainable agriculture.

Feedback: Not quite. While sustainable agriculture is important, increasing meat consumption tends to have a higher carbon footprint due to the emissions associated with livestock production.

d) Burning fossil fuels for electricity generation. **Feedback**: Close, but not quite. Burning fossil fuels for electricity generation actually increases carbon emissions and contributes to a larger carbon footprint.

e) Purchasing products with higher carbon emissions for greater impact. **Feedback**: Not accurate. Purchasing products with higher carbon emissions would actually have a negative impact on reducing carbon footprints. Choosing products with lower emissions is a more effective way to mitigate environmental impact.

Great effort in attempting the questions! Remember, understanding and making sustainable choices regarding carbon footprint and climate change is crucial for a healthier planet.

What did you learn about climate change and carbon footprint?

Check it out with our final Quiz !

https://view.genial.ly/6475acc5872f180018e90ca3/interactive-content-what-do-you-know-about-the-carbon-footprint

Have fun and be mindful !!

1. **" Global warming" is**

● The same thing as "climate change"

● One aspect of "climate change" that refers to the long - term warming of the planet. ✔️

(If you have differentiated between the two phenomena you are correct. Global warming and climate change are not exactly the same thing, but the latter is a consequence of current climate change.)

● Both answers are correct.

2. **Which one of the following affirmations regarding CO2 is true.**

● CO2 acts like the glass in a greenhouse by keeping some of the heat from the sun trapped inside the earth's atmosphere. ✔️

(Human activities are changing Earth's natural greenhouse effect. Burning fossil fuels like coal and oil puts more carbon dioxide into our atmosphere.)

● CO2 levels haven't been accelerating fast over the last 2 couple of centuries.

● Co2 emissions don't have to be fast limited.

3. **Select the correct definition of Carbon Footprint**

- the amount of carbon dioxide released into the atmosphere. ✔️

(Globally, the average carbon footprint is closer to 4 tons. Lowering individual carbon footprints doesn't happen overnight! By making small changes to our actions, like eating less meat, taking fewer connecting flights and line drying our clothes, we can start making a big difference.)

- the level of coal mined from mines annually in the world.

- the level of food wasted in a month by an average american healthy family.

- the level of pollution in the sea and air.

4. **Select the sector with the highest CO2 emissions**

- Farming

- Agriculture

- Transport

- Energy production ✔️

1. **Select among the following habits, the ones that can lower your CO2 emissions**

- Fly non stop

- Turn your water heater down ✔️

(The UE also recommends this actions to lower your carbon footprint: Consume local and seasonal products; bring reusable shopping bags and avoid products with excessive plastic packaging; try swapping, borrowing; renting or buying second-hand; cycle or use public transport; turn down the heating by 1°, it will already make a difference.)

Global greenhouse gas emissions by sector
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.

OurWorldInData.org – Research and data to make progress against the world's largest problems.
Source: Climate Watch, the World Resources Institute (2020).
Licensed under CC-BY by the author Hannah Ritchie (2020).

- Don't get politically active

- Opt for a laptop instead of a desktop computer

2. **What EU country produce the highest CO2 emissions:**

- Italy

- Poland

- Germany ✔️

(The 27 member states of the European Union have accounted for about 20% of global cumulative carbon dioxide (CO2) emissions since 1750 (excluding land use, land use change, and forestry). Moreover, amid the global climate crisis, the devastating consequences of human-induced global warming are already seen, predominantly in vulnerable countries of the Global South but also in Europe.)

- Spain

- France

3. **What country in the world produces the highest CO2 emissions:**

- United States

- Japan

- Russia

- China ✔️

(You're doing great! You can click here to check your country's annual CO2 emissions)

- Saudi Arabia

4. **Which of the following statements is right?**

- 85% of organizations in the world aren't concerned about reducing their greenhouse gas emissions

- 96% of organizations in the world have set targets for reducing emissions in at least one scope ✔️

(11% of organizations in the world have cut their emissions in line with their ambitions over the past five years)

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What Is Carbon Footprint and Why Does It Matter in Fighting Climate Change? | Earth.Org

Follow – up activity

You might be curious to know your impact on our planet. Try and calculate your carbon footprint with this very accurate tool developed by Global Footprint Network.

Ecological Footprint Calculator

3. Climate Denialism

DENIAL IS NOT A POLICY

CLIMATE JOBS JUSTICE

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@CLIMATEREALITY   f FACEBOOK.COM/CLIMATEREALITY   The Climate Reality Project

3.1. Climate Denialism: Causes, consequences, effects, and how to counter it.

Content

What is Climate Denialism?

In today's era, when we initiate a search for "Climate change" on search engines, two phrases that surface immediately are "climate change denialism" and "climate change deniers." However, what precisely do these phrases signify, and why are they frequently sought after? Over the recent decades, the subject of climate change and how to mitigate its repercussions has assumed a prominent role in public discourse. Concurrently, another viewpoint emerges, one that challenges the existence of climate change despite compelling evidence - this perspective is referred to as denial.

Even though we encounter noticeable facets of climate change in our everyday experiences (such as perceiving escalating temperatures over the years in urban environments), a segment of society remains entrenched in negating the factual basis of climate change. Some individuals even contend that climate change has perpetually been an inherent part of the natural order, downplaying the role of human influence. This type of reasoning is frequently embraced by those who opt to repudiate the veracity of climate change, adhering to what's known as "magical thinking." This concept encapsulates the belief that one's thoughts, actions, or symbols can exert direct influence on the physical realm, enabling them to evade a disconcerting truth.

In essence, there exist three principal classifications of skepticism toward climate science:

1. Skeptics

2. Agnostics

3. Deniers

Deniers can be further divided into three groups:

1. Naive deniers

2. Conspiracists

3. Opportunists

Regrettably, social media platforms amplify these negationist viewpoints, causing them to disseminate rapidly among the populace. Nevertheless, it's imperative to critically assess these notions. The majority of them lack a scientific foundation and might be motivated by economic interests, such as lobbying by corporations engaged in fossil fuel industries.

Certain experts propose that instead of exclusively concentrating on countering the viewpoints of climate change deniers, efforts should be directed toward combating climate change itself, as denialism often leads to inaction. Education emerges as a potent strategy to counter all forms of negationism. However, in the domain of ecology, environmental education should encompass more than dispelling myths. It should involve a critique of the prevailing beliefs of modernity, including individualism, boundless progress, consumerism, unregulated markets, while also emphasizing diverse ecological equilibriums: internal harmony, solidarity with others, and synchronization with the natural world.

This educational approach should nurture a sense of critical thinking, motivating individuals to question unquestioned assumptions and appraise information impartially. It's imperative to be vigilant against misinformation, which deliberately disseminates inaccurate information to manipulate public opinion and undermine prevailing attitudes. To counter this, it's vital to cross-reference information from various sources, consider alternative perspectives, and be cognizant of potential biases. Misinformation often carries an adverse and detrimental emotional impact, engineered to discredit specific targets.

In conclusion, it's crucial to elucidate the meanings of denialism and deniers within the context of climate change dialogues. Addressing climate change necessitates an emphasis on action rather than exclusively engaging with negationist perspectives. Education plays a pivotal role in countering all forms of negationism, and cultivating critical thinking skills is indispensable for navigating the intricate terrain of information and disinformation.

But how much do we know about climate denialism?

Are there climate denialism arguments that we come across daily?

Let's check out some common arguments in the following activity!
https://h5p.org/node/1405812?feed_me=nps

Match the following affirmations - each number can be matched with one only letter

1. OK, maybe climate change is real, but there's nothing to be done - it's too late.

2. Climate change is good for us.

3. Plants and animals can adapt.

4. Climate change is natural and normal - it's happened in other points in history.

5. This is the coldest winter we have had in ages! So much for global warming.

6. There is no consensus among scientists that climate change is real.

A. There's a difference between climate and weather: Weather fluctuates day in, day out, whereas climate refers to long term trends—and the overall trend is clearly and indisputably a warming one. While the impacts of climate change have only just begun to hit the Global North, farmers in the tropics have been contending with impacts—from droughts to floods to a proliferation of crop-destroying pests—for years.

B. It's true that there have been periods of global warming and cooling—also related to spikes and lulls in greenhouse gasses—during the Earth's long history. But those historic increases in CO2 should be a warning to us: They led to serious environmental disruptions, including mass extinctions. Today, humans are emitting greenhouse gasses at a far higher rate than any previous increase in history.

C. Wrong. There is nearly 100 percent agreement among scientists. Moreover, the UN's Intergovernmental Panel on Climate Change (IPCC) says that global warming is accelerating, and will reach 1.C above pre-Industrial levels around 2030—a full decade earlier than previously forecast

D. Wrong again. Because human-caused climate change is happening so rapidly, species simply don't have time to adapt. Frogs tell the story best: With their semi-permeable skin,

unprotected eggs, and reliance on external temperatures to regulate their own, they are often among the first species to die off when ecosystems tip out of balance—and they're dying off in droves.

E. The evidence points to a clear link between climate change and a surge in modern slavery: When crop failures, drought, floods, or fires wipe out livelihoods and homes, people migrate in the hopes of improving their lot—but can find themselves vulnerable to human trafficking and forced labor and other human rights abuses.

F. If governments, businesses, and individuals begin taking drastic action now, we can keep warming within the 1.5C target set by the Paris Agreement. There are actions you can take —both to make your daily life more sustainable and to push governments and companies to act—to secure a better future

Fill the following table with the right answer

N.	Letter
1	F
2	E
3	D
4	B
5	A
6	C

Assessment

Questions:

1.What's the best definition of Climate denialism?

a. is dismissal or unwarranted doubt that contradicts the scientific consensus on climate change.

b. is dismissal or unwarranted doubt that contradicts the existence of climate change because of religious reasons.

c. is dismissal or unwarranted doubt that contradicts the existence of pollution

Correct answer a : is dismissal or unwarranted doubt that contradicts the scientific consensus on climate change.

Feedback: Correct. Climate denialism is run by people that deny the existence of climate change and in particular they rennegate the words of important scientists on the topic.

Incorrect answer b : is dismissal or unwarranted doubt that contradicts the existence of god

Feedback: Incorrect. The topic of climate denialism isn't related to a religious topic and no words were spread in relation between god and climate change.

Incorrect answer c :is dismissal or unwarranted doubt that contradicts the existence of pollution

Feedback: Incorrect. Climate Change isn't related simply to pollution, pollution is one of the topics touched by the deniers.

2.What are the three categories of climate science desbelief?

    a.   disbelievers, conspirators , atheist

    b.   non - believer, unsure , insicure

    c.   deniers, skeptic, agnostic

Incorrect answer a :disbelievers, conspirators , atheist

Feedback: Incorrect. These three categories aren't related to scientific topics

Incorrect answer b : self - conscious, unsure , insecure

Feedback : Incorrect. These are adjectives and not categories

Correct answer a : deniers, skeptic, agnostic

Feedback: Correct. Many people who do not accept the findings of climate science often mark themselves as "skeptics". Deniers are those who don't believe in the existence of climate change at all. Agnostics are those who don't take any position on the topic.

3.What is "magical thinking"?

    a.   the idea that your behaviors and thoughts can have magical properties

    b.   the belief that one's ideas, thoughts, actions, words, or use of symbols can influence the course of events in the material world.

    c.   the terminology magical thinking is related to movies and books and can't be used when related to the reality

Incorrect answer a : the idea that your behaviors and thoughts can have magical properties

Feedback: Incorrect. Even though it might seem by its name the name magical thinking isn't related to some sort of myth that human beings might possess magical abilities.

Correct answer b : the belief that one's ideas, thoughts, actions, words, or use of symbols can influence the course of events in the material world.

Feedback: Correct. magical thinking presumes a causal link between one's inner, personal experience and the external physical world.

Incorrect answer c: the terminology magical thinking is related to movies and books and can't be used when related to the reality

Feedback: Incorrect. Magical thinking is strictly related to our reality

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And if you want to learn more about climate denialism check out the following Bibliography

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4.   Climate & Environment

4.1. What is the difference between Climate & Environment?

Content

"Climate" is part of the "environment"

Climate and environment are often talked about as if they were one and the same concept, but the meanings behind these terms differ. Nonetheless, the two are tightly woven together.

- **Climate** describes the conditions at a given location. This is connected to weather but is used to describe general trends over a longer period of time, rather than a short period, as is the case with weather reports. Climate includes things like temperature, amount of precipitation, frequency of extreme weather conditions and more.

- On the other hand, **Environment** describes a much larger picture, and is a collection of all possible conditions that exist in a given place. This can include climate, topography, biodiversity, how it is to live a certain place, and anything else that is included in the surroundings. Thus, climate is a part of the environment, and climate contributes to creating environment.

Climate change and Environmental change

Climate change and environmental change are two terms
that are often used interchangeably, but they have
distinct differences.

- **Climate change** refers to the long-term changes in the
  average weather patterns that have come to define the
  regions on Earth.

- **Environmental change** refers to the changes in the
  environment, including physical, biological, and
  cultural changes, brought about by natural or human
  activities

What is Climate change?

The term **Climate change** is used to describe the observable shift in weather patterns that has occurred throughout time. When we talk about climate, we're talking about the long-term average of the weather. Conditions including wind speed, humidity, and rainfall are included.

While shifts in climate have always been present, the term Climate change is typically used to describe the **temperature rises** that have been seen since the middle of the 20th century. Because of this temperature rise, ice sheets and glaciers throughout the planet are melting, and the oceans are warming. This climate change may also be to blame for the recent uptick in the frequency of extreme weather occurrences.
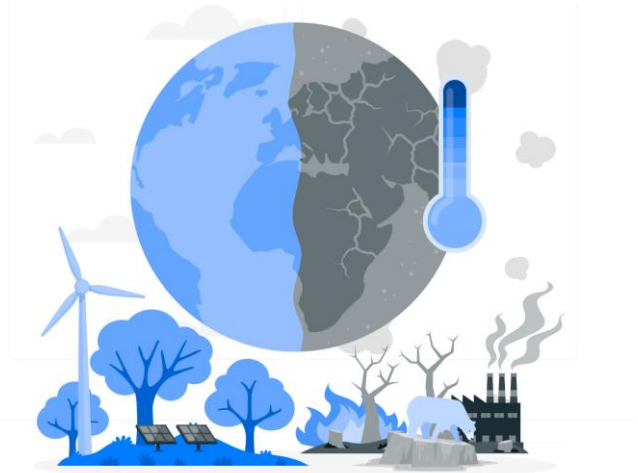
Causes of Climate change

There are several causes of Climate change:

- **Atmospheric Composition** - In terms of maintaining a comfortable temperature, some gases, namely greenhouse gases, play a crucial role. Carbon dioxide and methane are two gases that are well-known for their ability to trap heat in the atmosphere. It is well knowledge that when there is a substantial shift in the atmospheric concentration of greenhouse gases, average global temperatures will shift as well.

- **Milankovitch cycles** - The velocity and orientation of Earth and the other planets shift somewhat as they circle the sun. Precession, obliquity, and eccentricity alterations are the three most common forms of variation. The rotation of Earth with respect to the sun is called precession. Obliquity refers to the axial tilt angle of the Earth. A changing climate is a result of all of these variables.

- **Solar activity** - Solar activity, sometimes known as solar weather, is another factor that affects global temperatures. Space weather is affected by solar flares, which are caused by the sun's atmosphere.

Human influence on Climate change

Human influence on climate change is a well-established scientific fact. Human activities, particularly the burning of fossil fuels (such as coal, oil, and natural gas) for energy, have significantly increased the concentration of greenhouse gases in the atmosphere. This enhanced greenhouse effect has led to a warming of the Earth's surface and changes in climate patterns.

Here's how human activities contribute to climate change:

➢ **Burning Fossil Fuels** - The combustion of fossil fuels for energy (in transportation, electricity generation, heating, and industrial processes) releases large amounts of CO2 into the atmosphere. CO2 is a major contributor to the enhanced greenhouse effect.

➢ **Industrial Processes** - Various industrial activities release greenhouse gases, such as methane and nitrous oxide, as byproducts. These gases have a much higher heat-trapping potential than CO2 but are present in smaller quantities.

➢ **Agriculture** - Agricultural practices, including rice cultivation and livestock production, produce methane and nitrous oxide emissions. Livestock, particularly cattle, produce methane during digestion (enteric fermentation), and manure management also releases methane.

➢ **Land Use Changes** - Altering land surfaces, such as urbanization and changing land use patterns, can influence local and regional climate conditions.

➢ **Deforestation** - Trees absorb CO2 from the atmosphere during photosynthesis, acting as a carbon sink. When forests are cleared for agriculture, logging, or urban development, this carbon storage is reduced, leading to higher atmospheric CO2 levels.

What is Environmental change?

The term Environmental change can apply to a wide range of phenomena that alter the state of the planet's or a specific area's natural ecosystems. Atmospheric variables, such as temperature shifts, geological forces, such erosion and weathering and tectonism, and biological factors, like the introduction of invasive species, are all agents of environmental change.

➢ **Geological factors** - Geology is crucial to the health of the planet. Volcanoes, erosion, and weathering are the three most significant geological processes that alter the Earth's surface.

➢ **Biological factors** - Significant environmental change can also be triggered by the introduction of new creatures. This also covers alien creatures that have successfully invaded a new area.

Differences between Climate change and Environmental change

The following table highlights the major differences between Climate change and Environmental change

Characteristics	Climate change	Environmental change
Nature	Climate change mainly relates to changes in atmospheric conditions	Environmental change also involves other factors that don't necessarily involve atmospheric processes, such as biological and geological factors
Categorization	Climate change is a subset of the category of environmental change	Categories that include climate change
Containment level	Climate change is less contained than environmental change in general since human-induced climate change is a relatively new problem	Environmental change has been a problem for a while
Human influence	Humans have only been primary drivers of climate change for about the past century	Humans have been major drivers of environmental change almost since the dawn of behavioral modernity in Homo sapiens

In conclusion, Climate change and Environmental change are two distinct concepts, each with its own causes, time frame, and impacts. Climate change is primarily driven by human activities and has a global impact, while Environmental change can be caused by both natural and human factors and can have a more localized impact.

Understanding the difference between the two is essential for addressing the challenges that both Climate change and Environmental change present to the planet and its inhabitants.

Questions

1) How would you define climate change?
   - a. Changes in the environment caused solely by human activities
   - b. Short-term variations in weather patterns due to natural causes
   - c. Long-term alterations in average weather patterns of a region
   - d. Changes in cultural practices driven by technological advancements

2) Which of the following activities releases greenhouse gases with a higher heat-trapping potential than CO_2?
   - a. Burning fossil fuels
   - b. Industrial Processes
   - c. Agriculture
   - d. Land Use Changes

3) What are the three most significant geological processes that contribute to changing the Earth's surface?
   - a. Weathering, erosion, and introduction of new species
   - b. Volcanoes, weathering, and erosion
   - c. Atmospheric variables, erosion, and weathering
   - d. Biological factors, erosion, and tectonism

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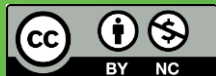
Co-funded by the European Union

Assessment

1) How would you define climate change?

a. Changes in the environment caused solely by human activities (WRONG)

Feedback: While human activities significantly contribute to climate change, the term encompasses natural processes and human-induced factors. It's not solely caused by human activities.

b. Short-term variations in weather patterns due to natural causes (WRONG)
Feedback: Climate change refers to long-term alterations, not short-term variations in weather patterns. It involves changes that occur over extended periods rather than immediate or temporary variations.

c. Long-term alterations in average weather patterns of a region (CORRECT)
Feedback: This option accurately defines climate change. It refers to the long-term shift in average weather patterns—temperature, precipitation, wind, and more—over a significant period, often decades or centuries.

d. Changes in cultural practices driven by technological advancements (WRONG)
Feedback: This choice refers to societal and cultural changes influenced by technology rather than the environmental shifts denoted by climate change. It doesn't directly relate to the alteration in weather patterns or the environment.

2) Which of the following activities releases greenhouse gases with a higher heat-trapping potential than CO2?

a. Burning fossil fuels (WRONG)
Feedback: While burning fossil fuels is a significant source of carbon dioxide (CO2) emissions, it's important to note that other activities release greenhouse gases with a higher heat-trapping potential than CO2. These activities contribute to other greenhouse gases like methane (CH4) and nitrous oxide (N2O), which have higher global warming potentials (GWPs) than CO2.

b. Industrial Processes (CORRECT)
Feedback: Some industrial processes release greenhouse gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These gases have significantly higher heat-trapping potentials than carbon dioxide (CO2), contributing more to the greenhouse effect.

c. Agriculture (WRONG)
Feedback: While agriculture, especially certain practices like livestock farming and rice cultivation, does contribute to greenhouse gas emissions, the predominant gas emitted is methane (CH4), which has a higher heat-trapping potential than CO2, but not as high as certain industrial processes.

d. Land Use Changes (WRONG)
Feedback: Land use changes, such as deforestation and forest degradation, can lead to the release of stored carbon dioxide (CO2) from vegetation and soil. While this contributes to CO2 emissions, it doesn't directly involve gases with higher heat-trapping potentials than CO2.

3) What are the three most significant geological processes that contribute to changing the Earth's surface?

a. Weathering, erosion, and introduction of new species (WRONG)

Feedback: Weathering and erosion are indeed significant geological processes that alter the Earth's surface, but the introduction of new species falls under biological/ecological processes rather than geological ones. So, while weathering and erosion are relevant, the inclusion of introducing new species makes this answer incorrect in the context of geological processes.

b.   Volcanoes,   weathering,   and   erosion   (CORRECT)
Feedback: Volcanoes, weathering, and erosion are indeed among the most significant geological processes that contribute to changing the Earth's surface. Volcanic activity can lead to the creation of new landforms, weathering breaks down rocks and materials, and erosion involves the movement and transportation of these broken down materials, reshaping the Earth's surface.

c.   Atmospheric   variables,   erosion,   and   weathering   (WRONG)
Feedback: While erosion and weathering are indeed crucial geological processes, atmospheric variables such as changes in climate, temperature, or atmospheric pressure are more linked to meteorology and atmospheric science than primary geological processes. While they can indirectly influence geological processes, they are not among the three most significant geological processes in changing the Earth's surface.

d.   Biological   factors,   erosion,   and   tectonism   (WRONG)
Feedback: Erosion is a relevant geological process, but biological factors (such as the impact of living organisms on the Earth's surface) fall more within the realm of biology and ecology rather than geology. Tectonism refers to the movement of the Earth's lithospheric plates, which is a significant geological process; however, it is less directly related to surface changes compared to the other listed processes.

4.2. How are climate and environmental issues connected to the economic system?

Content

Climate Change and the Economic System

"The evidence gathered by the Review leads to a simple conclusion: the benefits of strong and early action far outweigh the economic costs of not acting" (Stern Review, 2016 cited by LSE, 2023). This was the conclusion of the British Stern Review, published in 2006. It found that while taking action to prevent global temperatures from increasing further brings with it considerable costs, inaction would be even more expensive (LSE, 2023).
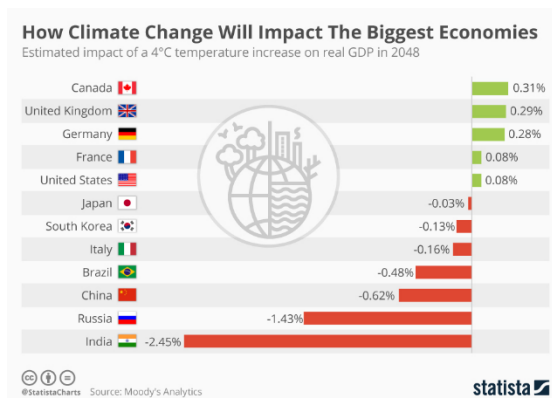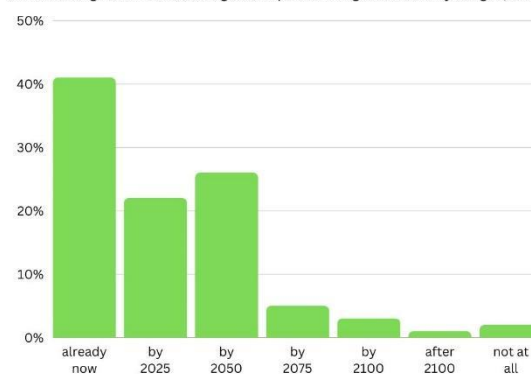
Climate change has an economic impact. While it could reduce the global GDP by 18% until 2050 if global temperatures rise by 3.2°C, low-income countries are affected most (IMF, 2022). As a result, economic inequalities on a global level are increased. Garthwaite (2019) explains that "the gap between the economic output of the world's richest and poorest countries is 25% larger today than it would have been without global warming". Simultaneously, various economic sectors and groups of individuals within society – particularly already marginalized groups – are negatively impacted by climate change (Field et al., 2014; Gabrielsson, 2015; Leichenko & O'Brien, 2019; Cho, 2019). Climate-related extreme weather events such as floods and storms result in economic losses due to damage to property and infrastructure. Sectors such as agriculture and forestry, fisheries, and tourism are particularly impacted by climate change. Increased stress and demand on energy supplies impact both the economy as a whole as well as individuals who must pay more for electricity. And, as with rising temperatures the risk of various diseases increases, costs for health care are likely to increase as well (Cho, 2019).

Impacts on Different Sectors

More intense and more frequent extreme weather events are likely to increase costs and decrease predictability for most industries (IPCC, 2018; Leichenko & O'Brien, 2019). Below you find two case studies through which you can learn about the economic impact of climate change on agriculture and energy generation.

Case 1: Food Insecurity in Detroit

Agriculture is one of the sectors most affected by climate change as new pests and diseases, more and heavier rainfalls and snowmelts, and more frequent and intense heat (waves) and droughts decrease crop productivity and quality (Field et al., 2014; som Castellano & Moroney, 2018;

Leichenko & O'Brien, 2019). For every 1°C that global temperatures increase, overall crop production is likely to decrease by 5 to 15% (Cho, 2019). As a result of crop failures there may be price shocks, as well as generally increased food prices, which in turn increases food insecurity especially for already vulnerable areas and populations.

Detroit (USA) is a so-called "food desert". Food deserts are characterized by a lack of access to fresh and healthy food. Additionally, racial inequalities and high levels of poverty make a large part of the population there particularly vulnerable to food prices which may increase due to the impact of climate change on the agricultural industry (Paddeu, 2017).
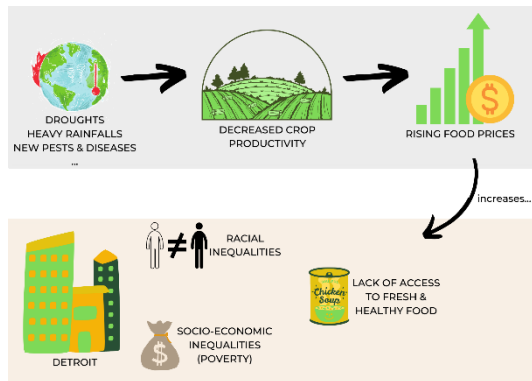
Case 2: Energy Crisis in Brazil

Energy demand increases as power generation becomes less reliable and water supplies are stressed (Cho, 2019). Most of Brazil's energy generation is based on hydropower. As more frequent and severe droughts deplete water levels, energy prices are likely to increase (EIA, n.d.) In 2020, hydropower made up 66% of all electricity generated. The rest was made up of wind and solar (11% combined), fossil fuels (12%), biomass (8%) and nuclear (2%). The reliance on one main source of electricity poses a risk both in terms of the economy and energy security due to climate change. In 2021, a record drought pushed Brazil into an energy crisis as water reserves at hydropower plants got to their lowest level in 91 years (Al Jazeera, 2021). This led to calls to reduce energy consumption and to energy prices increasing drastically.

Responses to the Economic Impacts of Climate Change

A transition to renewable energies, hybrid and electric vehicles, and carbon capture and sequestration technologies etc. may provide part of the solution as they are more sustainable alternatives to conventional approaches (Cho, 2019). If expanded, they can not only contribute to mitigating climate change, but also to buffer the negative consequences climate change has on the economy, i.e., by creating more jobs in these sectors. When combined with market innovations to make these alternatives more affordable, this approach can strengthen the economy (Horowitz, 2022).

Many EU member states offer some sort of incentives for purchases of hybrid or electric vehicles (EVs). In Sweden, for instance, owners of low-emission vehicles were, until recently, eligible to a bonus if their car was licensed after July 2018 (Transportstyrelsen, 2022).

The German government incentivizes small photovoltaic (PV) systems on single- and multiple-household buildings, commercial property, and mixed-use properties through tax breaks. Owners won't have to pay income tax on the electricity generated by their PV system (Diermann, 2022). At the same time the government intends to boost solar and wind power by expanding their use and making them less expensive (Appunn, 2021).

In recent years, circularity has been increasingly promoted as a model for sustainability. It considers and extends products' end-of-life. Instead of them ending up in landfill when they are no longer in use, they are reused or recycled, thus reducing waste and resource use (Nicolaus, 2021; European Parliament, 2023).

> If you would like to learn more about practical solutions and climate action including its links to the economy, you might want to watch the documentary *Tomorrow* (2015) by Cyril Dion and Mélanie Laurent.

Activity
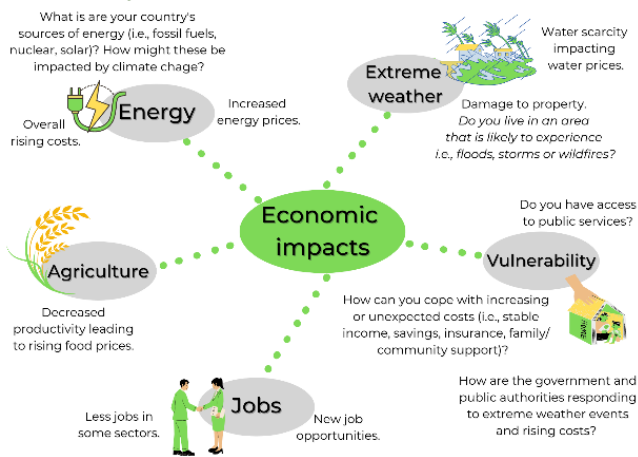
Take a few minutes to reflect about how climate change could impact you economically. You can use this graphic as a starting point.

Choose one area – for instance, agriculture or energy production – and research how it connects climate change and the economy in your own national context. Use the following questions to guide your research:

● What resources are necessary in this sector?

● What resources and methods are used in this sector in your country? Is there a reliance on one in particular?

● Which effects of climate change are likely to impact access to these resources and the efficiency of these methods?

● Are there alternatives and strategies that could help to cope with climate change impacts?

● How is this likely to affect the economy more generally? (Consider factors such as damage and losses, decreased or increased productivity, the loss and creation of jobs, …)

● How is this likely to impact individuals, and socio-economic inequalities?

● What could possible solutions be? How can these impacts be made less severe?

Questions

1) True or false? All countries' economies are impacted equally by climate change.

Correct answer: False.

● *Feedback:* Correct! Low-income countries are impacted to a greater extent than high income countries. One of the reasons for this is that high income countries generally have a greater adaptation capacity and can therefore respond more effectively to the effects of climate change. Another factor is that many high-income countries have comparatively cold climates. As temperatures increase (within limits) productivity, i.e., in agriculture, is likely to increase and people's health improves, which benefits the economy. For warm climates, however, the opposite is the case. Thus, while the economies of countries such as the United Kingdom and Germany are likely to benefit from climate change, other countries such as India are likely to experience severe negative impacts.

Incorrect answer: True.

- Feedback: Try again! Low-income countries are actually impacted to a greater extent than high income countries. One of the reasons for this is that high income countries generally have a greater adaptation capacity and can therefore respond more effectively to the effects of climate change. Another factor is that many high-income countries have comparatively cold climates. As temperatures increase (within limits) productivity, i.e., in agriculture, is likely to increase and people's health improves, which benefits the economy. For warm climates, however, the opposite is the case. Thus, while the economies of countries such as the United Kingdom and Germany are likely to benefit from climate change, other countries such as India are likely to experience severe negative impacts.

2) How are climate change, agriculture and the economy connected?

a. Since global warming makes farming more difficult, less people want to work in agriculture leading to food shortages and higher food prices.

b. Extreme weather events such as droughts may lead to decreased agricultural productivity which results in economic losses and increased food prices.

c. The unpredictability of harvests leads to economic fluctuations and instability.

d. They aren't.

Correct answer: b

- Feedback: Exactly! In particular, marginalized groups within society are vulnerable to rising food prices and price shocks due to crop failures. The impact of climate change on the agricultural sector, therefore, not only impacts the economy in general but also impacts individuals and increases socio-economic inequalities.

Incorrect answers: a; c; d

- Feedback: Not quite. What tends to happen is that extreme weather events such as droughts lead to worse harvests and crop failures. Farmers lose money and food prices increase. This particularly affects already marginalized groups and thereby further increases socio-economic inequalities.

3) Which factors have contributed to Brazil's energy crisis in 2021 which resulted in an increase in electricity costs? (more than one answer can be correct)

a. A reliance on one main source of electricity.

b. The phasing out of fossil fuels.

c. Storms and wildfires destroyed infrastructure that is essential for power generation.

d. A severe drought depleted water reserves for hydropower plants.

Correct answers: a & d

- Feedback: Correct! Brazil relies to a large extent on hydropower to generate electricity. Due to a severe drought, water reserves were depleted making it more difficult to generate energy. As a result, electricity prices increased.

Incorrect answers: b & c

- Feedback: That is not what happened. Brazil relies to a large extent on hydropower to generate electricity. Due to a severe drought, water reserves were depleted making it more difficult to generate energy. As a result, electricity prices increased.

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4.3. How are climate and environmental issues connected to the health system?

Content

Climate and environmental issues are closely interconnected with the health system in several ways. The impact of environmental factors on human health is a complex and multifaceted issue that has far-reaching consequences. Some of the key connections between climate/environmental issues and the health system include:

➢ **Air quality and respiratory health** - Poor air quality due to pollution and increased levels of greenhouse gases can exacerbate respiratory diseases such as asthma, bronchitis, and other lung conditions. Particulate matter, ozone, and pollutants emitted from vehicles and industrial processes can lead to respiratory distress and chronic health issues.

➢ **Extreme weather events** - Climate change is linked to an increase in the frequency and intensity of extreme weather events such as hurricanes, heatwaves, floods, and wildfires. These events can lead to injuries, displacement, mental health issues, and the spread of waterborne and vector-borne diseases.

➢ **Vector-borne diseases** - Changes in temperature and precipitation patterns can affect the distribution and behavior of disease-carrying vectors like mosquitoes and ticks. This can lead to the spread of diseases like malaria, dengue fever, Lyme disease, and more, affecting both local and global health systems.

➢ **Water quality and waterborne diseases** - Changes in precipitation patterns and rising temperatures can impact water quality, potentially leading to contamination of water sources and the spread of waterborne diseases such as cholera and other gastrointestinal infections.

➢ **Food security and nutrition** - Climate change can disrupt agricultural systems, leading to crop failures, reduced yields, and changes in food availability. These changes can impact nutrition and food security, leading to malnutrition and related health issues, particularly in vulnerable populations.

➢ **Mental health** - Natural disasters, loss of livelihood due to environmental changes, and displacement from homes can contribute to increased stress, anxiety, depression, and other mental health disorders. The uncertainty and anxiety associated with climate-related events can have long-lasting impacts on mental well-being.

➢ **Heat-related illnesses** - Rising temperatures can increase the frequency and intensity of heatwaves, leading to heat-related illnesses such as heat exhaustion and heatstroke. Vulnerable populations, including the elderly and those with preexisting health conditions, are particularly at risk.

➢ **Infrastructure and health services** - Extreme weather events and other environmental disasters can damage critical infrastructure, including hospitals and health clinics. This can disrupt healthcare services and access to medical care, particularly in areas prone to such events.

➢ **Displacement and refugee health** - Climate-related events, such as sea-level rise and extreme weather, can lead to displacement and migration of populations. Displaced individuals often face challenges in accessing healthcare, clean water, and sanitation, increasing their vulnerability to health issues.

> ➤ **Biodiversity Loss and Zoonotic Diseases** - Environmental degradation and biodiversity loss can disrupt ecosystems and bring humans into closer contact with wildlife, increasing the risk of zoonotic diseases (diseases transmitted from animals to humans), as seen with diseases like COVID-19 and Ebola.

These connections underscore the importance of a comprehensive approach to addressing both climate/environmental issues and healthcare. Collaboration between environmental scientists, healthcare professionals, policymakers, and communities is crucial to mitigate the health impacts of climate change and ensure the resilience of health systems in the face of environmental challenges.

Assessment

1) How can poor air quality impact human health?

> **a. It causes skin diseases (WRONG)**

Feedback: This answer is incorrect. The primary purpose of the "Grow Recycling" app is not specifically focused on identifying waste through barcodes. While some recycling apps might utilise barcode scanning for identification, it is not the primary purpose of the "Grow Recycling" app.

> **b. It leads to cardiovascular diseases (CORRECT)**

Feedback: This answer is correct. The primary purpose of the "Grow Recycling" app is to educate and engage children in learning about waste reduction, recycling, and environmental conservation. It aims to teach kids about the importance of recycling and reducing waste in a way that's informative and engaging.

> **c. It improves respiratory health (WRONG)**

Feedback: This answer is incorrect. The "Grow Recycling" app doesn't primarily focus on providing real-time sorting instructions for waste. While some apps offer guidance on how to sort or recycle various materials, it's not the main objective of the "Grow Recycling" app.

> **d. It enhances immune system function (WRONG)**

Feedback: This answer is incorrect. The "Grow Recycling" app does not primarily serve the purpose of assisting with waste drop-off times. Some recycling apps might offer information about waste drop-off locations or schedules, but it's not the central aim of the "Grow Recycling" app.

2) How can changes in temperature and precipitation patterns affect vector-borne diseases?

> a. They have no effect on disease transmission (WRONG)
Feedback: Changes in temperature and precipitation patterns can significantly impact the transmission of vector-borne diseases. These alterations can influence the habitats of disease vectors and the survival of pathogens, thereby impacting disease transmission.

> b. They decrease the lifespan of disease vectors (WRONG)
Feedback: While changes in temperature and precipitation can affect the lifespan of certain disease vectors, the impact is not always a decrease. In some cases, altered environmental conditions might extend the lifespan of certain vectors, which could potentially affect disease transmission.

> c. They have no impact on the spread of diseases (WRONG)
Feedback: Changes in temperature and precipitation patterns can indeed impact the spread of vector-

borne diseases. These alterations can affect the geographical distribution and prevalence of disease vectors, influencing the spread of diseases they carry.

d. They can affect the distribution and behaviour of disease-carrying vectors (CORRECT)

Feedback: Changes in temperature and precipitation patterns can significantly impact the distribution, behavior, and abundance of disease-carrying vectors. Warmer temperatures, for instance, might expand the geographical range of certain vectors, allowing them to survive in regions where they previously could not. Likewise, alterations in precipitation patterns can create breeding habitats for disease vectors or influence their seasonal activities.

3) How does climate change impact food security and nutrition?

a.   It   increases   crop   yields   (WRONG)
Feedback: Climate change often brings about extreme weather events, such as droughts, floods, and unpredictable shifts in temperature patterns. These changes can adversely affect crop yields rather than increase them. Warmer temperatures, for instance, can lead to heat stress in crops, affecting their growth and productivity. This option is incorrect as climate change typically hampers crop yields.

b.   It   has   no   effect   on   agriculture   (WRONG)
Feedback: Climate change significantly impacts agriculture due to changes in temperature, precipitation patterns, and the increased frequency of extreme weather events. These changes have visible and adverse effects on agriculture, affecting crop growth, livestock health, and overall food production. Therefore, saying climate change has no effect on agriculture is incorrect.

c.   It   disrupts   agricultural   systems   and   reduces   yields   (CORRECT)
Feedback: This option is correct. Climate change disrupts agricultural systems by creating unfavorable conditions for crops. It leads to reduced yields due to factors such as changing weather patterns, increased pests and diseases, water scarcity, and other environmental stressors. These disruptions contribute to food insecurity and pose challenges to global nutrition by limiting the availability and access to nutritious food.

d.   It   improves   food   availability   (WRONG)
Feedback: Climate change, in most cases, reduces food availability due to its adverse impacts on agriculture. It leads to decreased crop yields and can affect livestock health, subsequently reducing the overall availability of food. This option is incorrect as climate change tends to hinder food availability rather than improve it.

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4.4. How can climate and environmental issues be included in education?

Content

Welcome to this comprehensive educational resource that explores how to effectively include climate and environmental issues in education.

As global challenges like climate change and environmental degradation continue to impact our world, it is essential to equip students with the knowledge, skills, and values needed to become responsible stewards of the

Figure 1 - Photo by Surface on Unsplash

environment. This stands alone Open Educational Resource will provide practical strategies and real-life examples to demonstrate how educators can integrate climate and environmental issues across various educational contexts, fostering environmental awareness and inspiring positive action among students.

As educators, you play a pivotal role in nurturing environmentally conscious citizens and fostering positive change for a sustainable future. By applying the strategies and examples shared in this module, you can inspire your students to become agents of change, making a real difference in addressing global environmental challenges. Remember, by nurturing a generation of environmentally aware and empowered individuals, you contribute to building a healthier and more sustainable world for generations to come.

OER content:

• Topic 1 - Understanding the Relevance of Climate and Environmental Issues

• Topic 2 - Strategies for Integrating Climate and Environmental Issues in Education

• Topic 3 - Inspiring Environmental Consciousness through Classroom Practices

• Topic 4 - Assessing the Environmental Progress

• Some practical examples on how to effectively include climate and environmental issues in education:

• Annex 1 – Example o an assessment tool for assessing the environmental progress.Topic 1 - Understanding the Relevance of Climate and Environmental Issues

• Climate and Environmental Challenges

Define climate and environmental issues and analyse their significance in shaping the planet's ecological health and human well-being. Let students share their views and demonstrate their knowledge.

Example of an activity:

Explore and discuss how nature is affected: Look for local/national example at how climate change and environmental problems impact nature, like animals, plants, and the places they live. Ask them to define the challenges.

• Climate Change: Causes and Impacts

Discuss the root causes of climate change, exploring the consequences on weather patterns, ecosystems, and communities.

Example of an activity: Read or watch the story about a place where climate change happened and see how people dealt with it. You can replace the suggested case study with a local one if available. Encourage students to suggest preventative actions and solutions.

Case Study:

Shishmaref, Alaska - Battling Coastal Erosion

Shishmaref is a small Inupiaq community located on Sarichef Island, off the coast of Alaska, USA. For generations, the community has thrived by relying on the Arctic's rich natural resources. However, in recent decades, Shishmaref has faced a formidable challenge due to climate change-induced coastal erosion. (https://www.outsideonline.com/gallery/meet-one-villages-grappling-climate change/)

Source: https://www.outsideonline.com/gallery/meet-one-villages-grappling-climate-change/

• Environmental Degradation: Threats to Biodiversity

Investigate various forms of environmental degradation, such as habitat destruction, pollution, and deforestation, and their effects on biodiversity and ecosystems.

Activity:

➢ *Discuss why forests are essential and what happens when they are cut down too much.*

➢ *Research about places where animals and plants lost their homes because of cutting trees or building on their land.*

Topic 2 - Strategies for Integrating Climate and Environmental Issues in Education

• Curriculum Integration: Making Connections Across Subjects Discover how to integrate climate and environmental concepts into different subjects, such as science, social studies, and geography, to promote interdisciplinary learning. Use examples/activities from Topic 1 and have a look in section Practical examples at the end of this module.

• Project-Based Learning for Real-World Impact

Encourage students to engage students in project-based learning initiatives that address local environmental challenges, fostering critical thinking and problem-solving skills. Make research what is available in local environment.

• Nature-Based Education: Outdoor Learning and Exploration Embrace nature-based education by conducting outdoor classes and field trips, fostering a deeper connection to nature and ecological understanding. Use planed trips to implement this idea.

Topic 3 - Inspiring Environmental Consciousness through Classroom Practices ➢ Green Campus Initiatives: Leading by Example

Implement eco-friendly practices within the educational institution, such as waste reduction, energy conservation, and water management, setting a positive example for students. Promote projects that include such activities. You can use ECOLitAct as example.

➢ Environmental Literacy and Climate Literacy Programs

Establish specialized programs focused on building students' environmental and climate literacy, encouraging them to become informed advocates for sustainability.

➢ Community Partnerships for Environmental Action

Create partnerships with local environmental organizations, providing students with opportunities to participate in community-based environmental projects and conservation efforts.

Topic 4 - Assessing the Environmental Progress

Create assessment tools to measure students' understanding of climate and environmental issues, celebrating their contributions to environmental conservation. There is an example of such assessment tool in Annex 1.

Practical examples on how to effectively include climate and environmental issues in education:

➢ In the science class, students can conduct experiments to understand the greenhouse effect and its role in climate change, promoting climate literacy.

➢ Geography lessons can include case studies on the impact of deforestation on local ecosystems, fostering environmental awareness.

➢ Organize a school-wide eco-initiative to reduce single-use plastic consumption, encouraging students to take part in environmental action. ➢ Plan a field trip to a nearby national park, where students can observe and appreciate the diverse flora and fauna, emphasizing the value of biodiversity.

➢ Engage in a community clean-up drive, instilling a sense of responsibility for environmental stewardship among students.

➢ Organize a debate on sustainable development, encouraging critical thinking and discussion about balancing human needs with

environmental conservation.

➢ Encourage students to create awareness campaigns using digital media, advocating for climate action and environmental protection.

Annex 1 – Example of an assessment tool for assessing the environmental progress

This assessment aims to evaluate students' comprehension of climate and environmental issues and their engagement in environmental conservation activities.

The assessment tool not only evaluates students' knowledge of climate and environmental issues but also celebrates their active involvement in environmental conservation. By acknowledging their contributions, students are motivated to continue their efforts as environmental stewards, making a positive impact on the planet and inspiring others to act.

Assessment

Multiple-Choice Questions:

    a) What is the primary cause of climate change?
        i) Deforestation
        ii) Greenhouse gas emissions
        iii) Ocean currents
        iv) Volcanic eruptions
    b) Which of the following is a consequence of environmental degradation?
        i) Increased biodiversity
        ii) Clean air and water
        iii) Habitat destruction
        iv) Enhanced ecosystem resilience
    c) Why is it important to reduce our carbon footprint?
        i) To increase energy consumption
        ii) To decrease greenhouse gas emissions
        iii) To promote deforestation
        iv) To encourage excessive waste generation

➢ **Reflection and Portfolio Submission:**

Ask students to create an environmental conservation portfolio showcasing their individual or group efforts in addressing climate and environmental issues. The portfolio should include the following elements:

• Documentation of eco-friendly practices adopted in daily life. • Photos, videos, or written accounts of participation in environmental initiatives or conservation projects.

• Personal reflections on the impact of their contributions and the importance of environmental stewardship.

➢ **Environmental Project Presentation**

Group Presentation: Divide students into groups and ask them to prepare a presentation on an environmental conservation project they have undertaken. Each group should:

• Explain the purpose and goals of their project.

• Share the methods used to address a specific environmental challenge. • Present outcomes and lessons learned from the project.

• Highlight the positive impact on the environment and the local community.

➢ **Scoring:**

Knowledge Assessment (Part 1): Each correct answer receives 1 point. a) What is the primary cause of climate change?

Correct Answer: ii) Greenhouse gas emissions

b) Which of the following is a consequence of environmental degradation? Correct Answer: iii) Habitat destruction

c) Why is it important to reduce our carbon footprint?

Correct Answer: ii) To decrease greenhouse gas emissions.

Portfolio evaluation based on effort, creativity, and the scope of activities. Assign points accordingly.

Evaluation based on content, organization, and effective communication. Assign points accordingly.

NOTE! Recognize and celebrate students' efforts and achievements in environmental conservation through an awards ceremony, eco-fair, or public exhibition. Showcase their portfolios and project presentations to the school community and local stakeholders. Acknowledge outstanding contributions with certificates or eco-friendly prizes.

Reference:

➢ The European Environment Agency: https://www.eea.europa.eu/en ➢ National Geographic (www.nationalgeographic.com/environment) ➢ United Nations Environment Programme (UNEP) (www.unep.org) ➢ Intergovernmental Panel on Climate Change (IPCC) reports (www.ipcc.ch) ➢ World Wildlife Fund (WWF) (www.worldwildlife.org)

➢ The Nature Conservancy (www.nature.org)

➢ The Guardian - Environment section (www.theguardian.com/environment)

5. Climate Behaviour

5.1. How to support climate action?

Content

OER20

Climate behaviour: How to support climate action?

Co-funded by the European Union

While there often is a lot of emphasis on individual responsibility to take climate action and adopt environmentally friendly behaviours, it is important to bear in mind that climate action is not only a question of preference or determination. Structural factors such as norms, institutions, infrastructures and socio-economic inequalities influence both our behaviour and our options. Focusing solely on individuals' potential to tackle climate change may overlooks systemic causes for climate change, the responsibility of corporations and the need for structural change (Leichenko & O'Brien, 2019; Cohen, 2021). Yet, at the same time arguing for structural change only, devalues and downplays the ability of individuals to change social norms and take collective action (ibid.). To effectively solve climate change, change is needed on both the structural and the individual level.

Activity: In the following checklist you find some behaviours and actions that determine individuals' impact on the environment and climate. Go through the list to reflect on your own behaviours and attitudes. Mark the statements that apply to you. At the end of the checklist, you will find the way to calculate your score.

Transport

❑ I use a hybrid or electric car. (1 point)

❑ I usually use public transport. (2 points)

❑ I usually walk or cycle. (3 points)

❑ When I travel long distance, I tend to do so by bus or train. (1 point)

Diet

- ❑ I only rarely eat meat, fish and other animal products. (1 point)

- ❑ I don't eat meat, but eggs and dairy are part of my diet. (2 point)

- ❑ I am following a plant-based diet. (3 point)

- ❑ I usually buy seasonal produce. (1 point)

- ❑ I usually buy local. (1 point)

- ❑ I usually buy organic food. (1 point)

Consumption and waste

❑ I usually only buy new clothes when the ones I own are broken beyond repair. (1 point)

❑ I repair my electronic devices and only buy new ones when it is absolutely necessary. (1 point)

❑ I tend to buy second hand. (1 point)

❑ I only buy new clothes when the old ones a broken beyond repair, and then I buy second-hand. (2 points)

❑ When possible, I buy plastic-free products. (1 point)

❑ I hardly ever throw away food. (1 point)

Energy use

o   I use energy saving/ LED lightbulbs. (1 point)

o   I switch off lights and electronic devices when I don't need them and unplug chargers when they are not in use. (1 point)

o   I hang my clothes instead of using a tumble dryer. (1 point)

o   I frequently delete old emails as well as files from my cloud storage. (1 point)

o   The electricity I use comes from renewable energy sources. (2 points)

o   I have solar panels installed on my roof. (2 points)
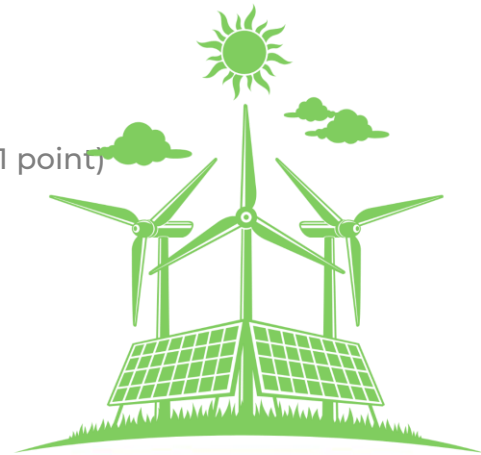
Political action and awareness raising

❑ I discuss climate change (and climate action) with family, friends and/or colleagues. (1 point)

❑ I sign petitions. (1 point)

❑ Who I vote for is influenced by considerations on climate change. (1 point)

❑ I push my school/ university/ workplace to become more sustainable. (2 points)

❑ I actively engage with local and/or national politicians to push them to take more climate action. (2 points)

❑ I am involved in one or several organisations and/or activist movements for climate action. (2 points)

Results

Calculate your result by adding together the points indicated after each option in the checklist which applies to you. The total indicates the impact of your climate behaviour.

0-14 points: low environmental impact

- Adapting our behaviour to reduce emissions can be difficult and not all actions may be realistically possible for everyone. However, following this self-reflection, you will find material that might inspire you to take steps to improve your impact on the planet.

15-29 points: moderate environmental impact

- You're definitely on the right track when it comes to climate action. Following this self-reflection, you will learn about even more steps you can take to improve your climate behaviour.

30-44 points: high environmental impact

- Well done! It seems like you have already taken a good number of steps to reduce your impact on the planet. Keep up the good work! You might even find some more inspiration in the following material on actions for the climate.

How to contribute to climate action

According to the UN, if one billion individuals took practical steps to reduce their impact on the planet, it would be possible to reduce global carbon emissions by up to 20% (UNEP, 2020). Here are some ideas on how you can reduce your carbon footprint and thereby contribute to climate action.

Avoid traveling by plane.

Switch to renewable energy.
Install solar panels on your roof if you can.

Cycle or walk instead of taking the car.

Eat more plant-based.

If you need a car, drive electric.

Buy seasonal and locally grown products.

ECOLitAct
Eco-Literacy and Green Education for Climate Action

How to contribute to climate action

Reduce waste. For instance, by planning your meals in advance, buying only what you need, and shopping plastic-free.

Repair and reuse instead of throwing away.

Buy i.e., clothes and furniture that last. Consider buying second-hand.

Speak to the people you know to raise awareness and exchange ideas.

Talk to your local political representatives.

Which are the most effective actions?

Personal choices to reduce your contribution to climate change

Low Impact — < 0.2 tCO₂e
Moderate Impact — 0.8-0.2 tCO₂e
High Impact — > 0.8 tCO₂e

Seth Wynes & Kimberly Nicholas, 2017; Environmental Research Letters
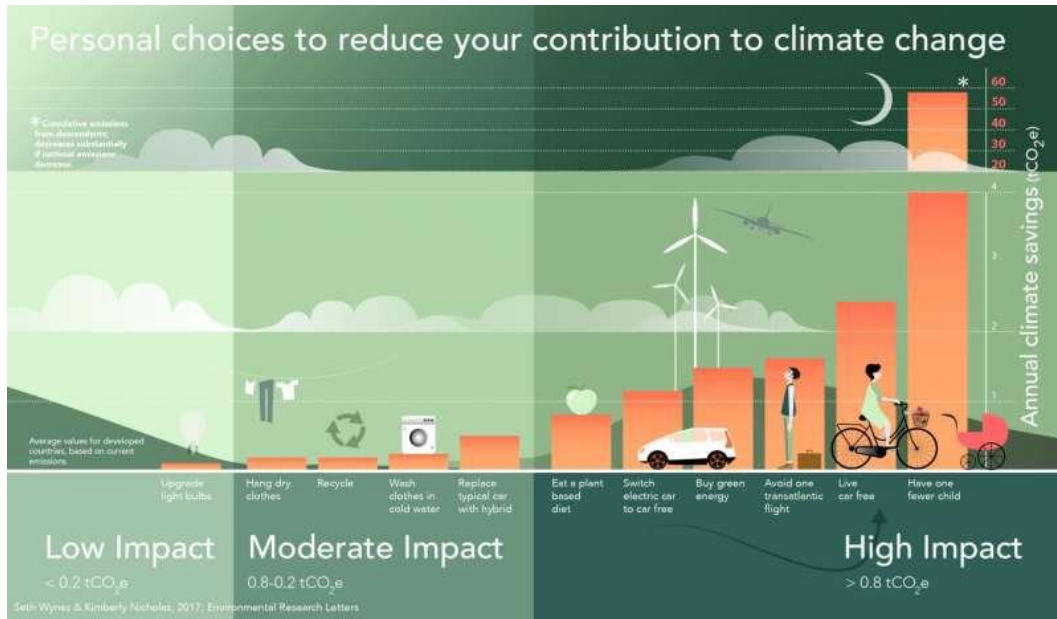
In 2017, Seth Wynes and Kimberly Nicholas published their research findings on the most effective actions to take to reduce individual contributions to climate change. The greatest impact, according to them, is the choice to have one child less. This would reduce the contribution of a person living in a developed country to climate change by 58.6 tonnes of CO2 equivalent (CO2e). The next greatest impact is living car-free, saving 2.4 t CO2e yearly, followed by avoiding air travel, switching to green energy, and following a plant-based diet.

Particularly, the finding that having one fewer child would have the greatest positive impact sparked debate. If you are interested to learn more about the issue you can find more insights here:
- DW, 2017
- Vox, 2021

Action Plan for Climate Action

Now that you have an overview of the steps you can take to contribute to climate action, and which of these are the most effective ones, have another look at the self-assessment checklist you reflected on in the beginning. Use the following questions to build an action plan for climate action.

- In which areas could you improve your climate behaviour?

- In which areas can you realistically improve your climate behaviour – considering i.e., your financial situation, medical conditions and access to resources and infrastructure?

- Which is your goal for this identified area?

- Which steps can you pursue to achieve your goal?

- When will you accomplish each step? Draw a timeline that helps you have a clear calendar. Don't forget to add deadlines for each of the steps!

- Who can help you on accomplishing your steps?

- Who can remind you of completing this action plan so that you truly commit to it? Share your action plan with someone who you think can be your reminder!

Questions

1) True or false? Individual action is vital to fighting climate change.

2) Up to how much of the global carbon emissions could be reduced by the individual actions of one billion people?
a) 10%   b) 20%   c) 30%   d) 40%

3) Which are the most effective choices – in the correct order - someone can take to reduce their carbon footprint?

    a) No air travel. Live car-free. One fewer child. A plant-based diet.
    b) One fewer child. Live car-free. Recycle. No air travel.
    c) No air travel. Live car-free. One fewer child. Recycle.
    d) One fewer child. Live car-free. No air travel. A plant-based diet.

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References

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Assessment

Questions

1. True or false? Individual action is vital to fighting climate change.

Correct answer: True.

- Feedback: You are correct. Yet, while it is true that individual action is essential to tackling climate change, it is important to remember that individual action alone is not the solution. Overcoming structural and systemic hurdles is equally necessary.

Incorrect answer: False.

- Feedback: Try again. While it is true that we need to overcome structural and systemic hurdles in order to fight climate change, individual action is also necessary. Neither individual action nor structural change alone will provide the solution we need.

2) Up to how much of the global carbon emissions could be reduced by the individual actions of one billion people?

a.   10%   b) 20% c) 30% d) 40%

Correct answer: b

- Feedback: Correct! According to the UN, if one billion people took individual action to reduce their carbon footprint, as much as 20% of global emissions could be reduced.

Incorrect answers: a, c, d

- Feedback: That was the wrong answer. According to the UN, if one billion people took individual action to reduce their carbon footprint, as much as 20% of global emissions could be reduced.

3) Which are the most effective choices – in the correct order - someone can take to reduce their carbon footprint?

   a) No air travel. Live car-free. One fewer child. A plant-based diet.

   b) One fewer child. Live car-free. Recycle. No air travel.

   c) No air travel. Live car-free. One fewer child. Recycle.

   d) One fewer child. Live car-free. No air travel. A plant-based diet.

Correct answer: d

- Feedback: Spot on! According to a study by Wynes and Nicholas (2017) having one child less saves an average of 58.6 t CO2e each year. This is followed by living car-free (2.4 t CO2e/year), avoiding one transatlantic flight (1.6 t CO2e/year), and following a plant-based diet (0.8 t CO2e/year). Meanwhile, recycling is four times less effective than adopting a plant-based diet.

Incorrect answers: a, b, c

- Feedback: Have a second look at this. According to a study by Wynes and Nicholas (2017) having one child less saves an average of 58.6 t CO2e each year. This is followed by living car-free (2.4 t CO2e/year), avoiding one transatlantic flight (1.6 t CO2e/year), and following

a plant-based diet (0.8 t CO2e/year). Meanwhile, recycling is four times less effective than adopting a plant-based diet.

6. Waste & Recycling

6.1. How to avoid waste and why recycling?

Content

Avoiding waste is an important step in reducing our environmental impact and promoting sustainability. Here are some tips and strategies to help you minimize waste in various aspects of your life:

➢ **Reduce single-use items** - Single-use plastics and other disposable items contribute significantly to waste. Replace them with reusable alternatives, such as water bottles, shopping bags, coffee cups, and food containers.

➢ **Practise the 5 R's** - Refuse, Reduce, Reuse, Recycle, and Rot. Try to refuse unnecessary items, reduce what you do need, reuse items when possible, recycle materials properly, and compost organic waste.

➢ **Buy in bulk** - Purchasing items in bulk reduces packaging waste. Bring your own reusable containers to stores that offer bulk sections for items like grains, nuts, and cleaning supplies.

➢ **Compost** - Composting your food scraps and yard waste can divert a significant amount of waste from landfills. It also creates nutrient-rich soil for your garden.

➢ **Meal planning** - Plan your meals to reduce food waste. Only buy what you'll actually consume, and find creative ways to use leftovers.

➢ **Donate or sell** - Instead of throwing away items you no longer need, consider donating them to charity or selling them. This extends the life of the item and prevents it from becoming waste.

➢ **Repair instead of replace** - If something breaks, try to repair it before considering replacement. This applies to clothing, electronics, appliances, and more.

➢ **Minimise packaging** - Choose products with minimal packaging, and opt for products with eco-friendly packaging materials when possible.

➢ **Use cloth instead of disposable** - Replace paper towels, napkins, and disposable wipes with reusable cloth alternatives.

➢ **Opt for digital** - Reduce paper waste by opting for digital receipts, documents, and communication whenever possible.

➢ **Conscious shopping** - Think before you buy. Ask yourself if you really need the item and if it aligns with your values and lifestyle.

➢ **DIY cleaning products** - Make your own cleaning products using simple ingredients like vinegar, baking soda, and essential oils. This reduces the need for single-use plastic cleaning bottles.

➢ **Upcycling** - Get creative and repurpose items you might otherwise discard. Turn old clothes into rags or craft projects, or transform glass jars into storage containers.

➢ **Proper recycling** - Learn about your local recycling program and follow their guidelines. Improper recycling can lead to contamination and items being sent to the landfill.

➢ **Educate** - Spread awareness about waste reduction among your family, friends, and community. Education is key to driving change.

➢ **Minimalist lifestyle** - Embrace a minimalist lifestyle, focusing on experiences and meaningful possessions rather than accumulating excess stuff.

➢ **Cloth shopping bags** - Always carry reusable shopping bags with you to avoid using plastic bags.

➢ **Reduce water waste** - Conserve water by fixing leaks, using a broom instead of a hose for cleaning, and using water-saving appliances and fixtures.

➢ **Eco-friendly packaging** - When you need to ship items, use eco-friendly packaging materials like recycled paper and cardboard.

➢ **Mindful consumerism** - Think about the environmental impact of the products you buy. Choose products that are durable, repairable, and made from sustainable materials.

Remember, making small changes can have a big impact over time. Choose the strategies that work best for you and your lifestyle, and gradually incorporate more waste-reducing practices into your daily routine.

The impact of recycling

Recycling is a process that involves collecting and processing materials that would otherwise be discarded as waste, converting them into new products, and reintroducing them into the market. Recycling has a range of **environmental, economic, and social impacts** that contribute to sustainability and resource conservation. Here's a breakdown of the key impacts of recycling:

➢ **Resource conservation** - Recycling helps conserve valuable natural resources such as minerals, metals, and forests. By reusing materials, we reduce the need to extract and process raw materials from the earth, which can have detrimental effects on ecosystems and landscapes.

➢ **Energy savings** - The energy required to extract, refine, and process raw materials is often much higher than that needed to recycle materials. Recycling can significantly reduce energy consumption and associated greenhouse gas emissions. For instance, recycling aluminium requires about 95% less energy than producing aluminium from raw materials.

➢ **Reduced landfill and incineration** - Recycling diverts materials from landfills and incinerators, reducing the demand for new landfill space and decreasing the emissions of greenhouse gases and pollutants that result from waste decomposition and incineration.

➢ **Less pollution** - The extraction and processing of raw materials can lead to pollution of air, water, and soil. Recycling reduces the demand for these processes, which in turn reduces pollution and its associated negative impacts on human health and the environment.

➢ **Economic benefits** - Recycling industries create jobs in collection, processing, manufacturing, and distribution of recycled products. This contributes to local economies and can stimulate innovation in green technologies.

➢ **Raw material price stability** - When recycling rates are high, it can stabilise the prices of certain commodities by reducing the reliance on fluctuating global markets for raw materials.

➢ **Conservation of biodiversity** - Recycling reduces the need for new resource extraction, which can contribute to the protection of ecosystems and biodiversity by minimising habitat destruction and ecosystem disruption.

➢ **Climate change mitigation** - Recycling reduces the emissions of greenhouse gases associated with the extraction, processing, and transportation of raw materials. By reducing these emissions, recycling plays a role in mitigating climate change.

➢ **Public awareness and education** - Recycling initiatives can raise public awareness about the importance of waste reduction and responsible consumption. This can lead to broader adoption of sustainable behaviours.

➢ **Longer product lifecycles** - Recycling extends the lifespan of materials and products by incorporating them into new items. This contrasts with the linear "take-make-dispose" model and encourages a circular economy where resources are used more efficiently.

➢ **Reduced pressure on ecosystems** - Recycling helps lessen the impact on natural ecosystems that would otherwise be disrupted due to resource extraction and waste disposal.

➢ **Global impact** - While recycling has local benefits, its impact is also felt on a global scale. Reduced resource consumption and pollution in one region can have positive ripple effects on others.

However, it's important to note that recycling is most effective when combined with **waste reduction** and **responsible consumption practices**. Not all materials are equally easy to recycle, and some materials may degrade in quality after multiple recycling cycles. To maximise the impact of recycling, it's crucial to **consider the entire lifecycle of products and materials**, from production to disposal.

Assessment

1) What are the 5 R's of waste reduction?

a.   Recycle,   Repurpose,   Reuse,   Refill,   Refuse   (WRONG)
Feedback: This sequence includes many of the principles associated with waste reduction, but the order is not in line with the commonly accepted "5 R's."

b.   Refuse,   Reduce,   Recycle,   Rot,   Reuse   (CORRECT)
Feedback: This sequence represents the widely recognized "5 R's of waste reduction," promoting the best practices for minimising and managing waste. It correctly includes the principles of refusing, reducing, recycling, composting (rot), and reusing.

c.   Replace,   Reuse,   Recycle,   Repair,   Refill   (WRONG)
Feedback: Although these actions are related to sustainability and waste management, this sequence doesn't accurately represent the commonly acknowledged "5 R's" of waste reduction.

d.   Refuse,   Repair,   Recycle,   Reuse,   Rot   (WRONG)
Feedback: This sequence, much like option 'b,' comprises crucial actions for waste reduction. However, it doesn't match the widely accepted sequence of the "5 R's" of waste reduction.

2) What is the primary goal of recycling?

a.   Generating   profits   from   waste   (WRONG)

Feedback: While generating profits can be a byproduct of recycling in some cases, it is not the primary goal of recycling. Recycling primarily aims to promote sustainability by reusing materials and reducing waste.

b.   Disposing   of   materials   efficiently   (WRONG)

Feedback: Recycling is distinct from disposal. The primary goal of recycling is not to dispose of materials but rather to reprocess them for reuse, aiming to reduce the amount of waste that goes to landfills or incineration.

c.   Collecting   valuable   resources   for   resale   (WRONG)

Feedback: Although recycling involves collecting valuable resources from discarded materials, the primary objective is not for immediate resale. Rather, it's about reprocessing these resources to convert them into new products or materials.

d.   Converting   discarded   materials   into   new   products   (CORRECT)

Feedback: This is the correct answer. The primary goal of recycling is to take discarded materials, process them, and turn them into new products. Recycling aims to conserve resources, reduce waste, and lower the environmental impact by giving used materials a new life rather than being discarded.

3) What is a notable environmental benefit of recycling in terms of pollution?

a. Recycling   increases   pollution   due   to   increased   transportation   (WRONG)

Feedback: This statement is incorrect. While transportation is involved in the recycling process, the overall impact of transportation on pollution is generally minimal compared to the environmental benefits of recycling. Recycling aims to reduce pollution through various means, not increase it.

b.   Recycling   has   no   impact   on   pollution   levels   (WRONG)

Feedback: This is incorrect. Recycling does have an impact on pollution levels, but it is a positive impact. It helps in reducing pollution by conserving resources, reducing energy consumption, and minimising waste, thereby lessening the pollution caused by the production of new materials.

c. Recycling reduces pollution by decreasing the demand for extraction   (CORRECT)

Feedback: This is the correct answer. Recycling helps reduce pollution by decreasing the need for extracting raw materials from the environment. By reusing materials, there is less demand for extracting, mining, and processing new resources, which in turn reduces pollution associated with these extraction processes.

d. Recycling leads to pollution through waste processing (WRONG)

Feedback: While waste processing can have its own environmental impacts, recycling itself is aimed at reducing pollution and lessening the strain on the environment caused by excessive resource extraction and waste accumulation. The overall goal of recycling is to mitigate pollution and resource depletion.

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6.2. How to recycle in Sweden?

Content

Video on YouTube.

Assessment

1) Who, in Sweden, is responsible for waste management?

    a. Municipalities

    b. Counties

    c. The national government

    d. Private companies

Correct answer: a. Municipalities

- Feedback: Correct. In Sweden, it is the municipalities' responsibility to organise waste management and recycling. Therefore, how exactly waste management and recycling works may depend on where in Sweden you live – your municipality usually provides information on this online.

Incorrect answers: b. Counties; c. The national government; d. Private companies

- Feedback: Incorrect. In Sweden, it is the municipalities' responsibility to organise waste management and recycling. Therefore, how exactly waste management and recycling works may depend on where in Sweden you live – your municipality usually provides information on this online.

2) What can you do with furniture which is broken or which you no longer want to have? (More than one answer can be correct.)

    a. Bring it to a recycling centre (*återvinningscentral*)

    b. Resell it online or on a flea market (*loppis*)

    c. Donate it to a second-hand shop

    d. Put it outside your building on the street or by the waste collection station

Correct answers: a. Bring it to a recyclng centre (återvinningscentral); b. Resell it online or on a flea market (loppis); c. Donate it to a second-hand shop

- Feedback: You are spot on! If the furniture is still in a good condition, you can give it a second life by reselling or donating it. If it is broken beyond repair, you can dispose of it for free at a recycling centre or have them pick it up at your place for a small fee.

Incorrect answer: d. Put it outside your building on the street or by the waste collection station

- Feedback: Please do not do this. If the furniture is still in a good condition, you can give it a second life by reselling or donating it. If it is broken beyond repair, you can dispose of it for free at a recycling centre or have them pick it up at your place for a small fee.

3) True or false: All envelops need to be sorted as paper waste.

Correct answer: False.

- Feedback: You're right. While you should throw padded envelops into the bin for paper waste, normal envelops are considered residual waste.

Incorrect answer: True.

- Feedback: Unfortunately, it is a little more complicated than that. While you should throw padded envelops into the bin for paper waste, normal envelops are considered residual waste.

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6.3.   How to recycle in Italy?

Assessment

1) What should be done with organic waste in Italy?

a. It should be mixed with non-organic waste (WRONG)

Feedback: Mixing organic waste with non-organic waste is not an environmentally friendly or efficient method. Organic waste, such as food scraps and yard waste, can be beneficially repurposed through composting rather than being sent to landfills.

b. It should be thrown in the regular trash bin (WRONG)

Feedback: Placing organic waste in the regular trash bin is not the most sustainable approach. When organic waste is disposed of in regular trash, it often ends up in landfills, contributing to environmental issues such as methane production.

c. It should be separated for composting (CORRECT)

Feedback: Separating organic waste for composting is the environmentally conscious and correct method. Composting organic waste allows for its transformation into nutrient-rich compost, which can be used to enrich soil and support plant growth. This practice helps reduce waste in landfills and supports sustainable agricultural practices.

c. It should be burned for energy production (WRONG)

Feedback: Burning organic waste for energy production is an approach used in waste-to-energy plants. However, this method can release pollutants into the atmosphere and may not be the most sustainable option. Composting organic waste is a more ecologically sound method for managing it.

2) What is the purpose of eco-centers in many Italian municipalities?

a. To provide recreational spaces for residents (WRONG)

Feedback: This answer is incorrect. Eco-centers in Italian municipalities are not primarily established to offer recreational spaces for residents. They serve a different purpose related to waste management and environmental sustainability.

b. To host local farmers' markets (WRONG)

Feedback: This answer is incorrect. While farmers' markets can be part of municipal initiatives, it's not the primary purpose of eco-centers. The functions of an eco-center are more oriented toward waste management and environmental concerns.

c. To collect only electronic waste (WRONG)

Feedback: This answer is incorrect. Eco-centers in Italian municipalities are not solely focused on electronic waste collection. They typically accept a broader range of recyclable and non-recyclable materials for proper disposal and recycling.

d. To allow residents to drop off specific types of waste not collected through   regular pickup (CORRECT)

Feedback: This answer is the most accurate. Eco-centers in many Italian municipalities primarily serve as facilities where residents can drop off specific types of waste that might not be collected through regular curbside pickup. These centers often accept various types of waste, including recyclables, hazardous waste, bulky items, and materials that require special handling for proper disposal.

3) What is the primary purpose of the "Grow Recycling" app?

a. Identifying waste through barcodes (WRONG)

Feedback: This is an incorrect purpose for the "Grow Recycling" app. The app does not primarily

focus on identifying waste through barcodes.

b. Teaching children about waste reduction (CORRECT)

Feedback: This is the correct purpose of the "Grow Recycling" app. The app is designed to educate and engage children in learning about waste reduction and recycling practices.

c. Providing real-time sorting instructions (WRONG)

Feedback: While this could be a useful feature for a recycling app, it is not the primary purpose of the "Grow Recycling" app. The main focus is not on providing real-time sorting instructions.

d. Assisting with waste drop-off times (WRONG)

Feedback: The "Grow Recycling" app does not primarily focus on assisting with waste drop-off times. It's more centred around educating children about waste reduction rather than logistical aspects of waste drop-off.

OER 11: How to recycle in Italy

How to recycle in Italy?

Recycling practices can vary from region to region in Italy, but there are general guidelines and practices that are commonly followed throughout the Country.

In Italy, waste is typically separated into different categories before disposal. The most common categories include:

➢ **Plastic and Metal** - This category includes plastic bottles, containers, metal cans, and aluminum foil
➢ **Glass** - Glass bottles and jars are collected separately. They are often color-coded for easier sorting
➢ **Paper and Cardboard** - Newspapers, magazines, cardboard boxes and paper packaging go in this category
➢ **Organic Waste** - Food scraps, plant materials and other organic waste should be separated for composting
➢ **Batteries and e-waste** - Some items, like batteries, light bulbs, and electronics, should not be disposed of with regular household waste, many municipalities have specific collection points for these items
➢ **Non-Recyclable Waste** - Items that cannot be recycled, such as certain types of packaging or contaminated materials, go in this category

Recycling Bins

Most cities and towns in Italy provide recycling household bins for each category of waste. These bins are often color-coded to match the categories.

Residents are expected to sort their waste accordingly and place it in the appropriate bins.

Look for recycling symbols on packaging to identify the material and the appropriate bin for disposal.

Recycling collection in Italy

➢ **Collection Schedule** - Different types of waste are collected on specific days of the week. Check with your local municipality to find out the collection schedule for your area.

➢ **Composting** - If your municipality provides organic waste collection, make sure to separate your food scraps and other organic materials for composting. This helps divert organic waste from landfills.

➢ **Eco-Centers** - Many municipalities have eco-centers where residents can drop off specific types of waste that can't be collected through regular curbside pickup, such as electronics, hazardous waste and bulky items.

➢ **Public Recycling Bins** - Public recycling bins are often available in public spaces, parks, and near commercial areas. These bins are typically labeled with the types of materials they are meant to collect.

➢ **Educational Campaigns** - Italian municipalities often run educational campaigns to inform residents about proper recycling practices, so keep an eye out for local announcements, brochures, or online resources.

➢ **Community Participation** - Recycling works best when the community is actively involved. It's important to encourage neighbors and friends to follow proper recycling practices.

➢ **Waste Collection Regulations** - Regulations can vary based on the municipality, so it's essential to familiarize yourself with the specific rules and guidelines for waste collection in your area.

Apps for recycling in Italy

There are several recycling apps and resources available in Italy to help residents with proper waste disposal, recycling, and environmental awareness. Here are a few apps that are popular:

➢ **Junker** - One of the most advanced and popular apps on the topic of recycling collection is Junker. It is a real assistant that can recognize a product from the barcode or even from a simple photo. After identifying the product, the app lets us know in real time what materials it is made of and how it should be sorted.

➢ **Rifiutologo** - This application (like Junker) allows users to identify the type of waste by writing down the product name or by photographing the barcode. It also answers users' questions about proper recycling and (for some areas) provides information about eco-stations, special collections, and waste drop-off times.

➢ **Riciclario** - This application aims to help citizens not only to recycle well, but also to reduce waste generation with a lot of useful information. In addition to serving citizens, it is also proposed as a tool for municipalities and collection service operators.

➢ **Raccolta Comune** - This app contains a range of personalized information on the separate collection of municipalities that have adopted it, and also allows the citizen to interact directly with the collection service operators.

➢ **Grow Recycling** - This is a different app from previous ones. In fact, its purpose is to help parents and teachers teach children to sort waste in the right way, thus learning how to care for the planet.

Additionally, local municipalities and waste management authorities may have their own apps or resources to help residents with recycling and waste disposal practices specific to each area.

Questions

1) What should be done with organic waste in Italy?
        a. It should be mixed with non-organic waste
        b. It should be thrown in the regular trash bin
        c. It should be separated for composting
        c. It should be burned for energy production

2) What is the purpose of eco-centers in many Italian municipalities?
        a. To provide recreational spaces for residents
        b. To host local farmers' markets
        c. To collect only electronic waste
        d. To allow residents to drop off specific types of waste not collected through regular pickup (CORRECT)

3) What is the primary purpose of the "Grow Recycling" app?
        a. Identifying waste through barcodes
        b. Teaching children about waste reduction
        c. Providing real-time sorting instructions
        d. Assisting with waste drop-off times

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6.4.   How to recycle in Germany?

Content

Video on YouTube.

Assessment

Now that you learned about recycling in Germany, let's check what you know:

1. In which garbage bin would you put cigarette butts?

   a. in the yellow one along with other waste that isn't organic. *(It is true it isn't organic, but unfortunately it isn't recyclable)*

   b. in the black one because there's no way to recycle it - *CORRECT: The black bin is for all the trash we cannot recycle in any way.*

   c. in the blue one because there's paper on them. *(Paper cannot be always recycled, for example when it is burnt and mixed with tar)*

2. In which garbage bin would you put a bunch of cardboard boxes left from moving?

   a. on the street, some people can find it useful *(This generates more unnecessary trash and it doesn't promote recycling)*

   b. in the yellow bin because paper can be recycled *(Yes, paper can be recycled but you need to use the blue bin for that)*

   c. in the blue bin for paper and cardboard - *CORRECT (Every building has a blue bin and you can easily put it there and not leave it on the street)*

3. In which garbage bin would you put the remains of vegetables and fruit?

   a. in the brown bin along with all the organic garbage - *CORRECT (Organic trash can be used for compost)*

   b. in the black bin because I won't use them again - *(The black bin is only for non recyclable materials)*

   c. in the yellow bin for all kinds of recycling - *(There's an specific bin for organic waste and it's the brown bin)*

6.5. How to recycle in Greece?

Good Practices in Greece

Clean energy in Greek islands:

the example of Chalki island[10]

Some information and facts about the island:

> Greek island and municipality Halki, is located in the Dodecanese archipelago in the Aegean Sea, about 9 kilometers (6 miles) west of Rhodes.
>
> It is the smallest inhabited island in the Dodecanese with a surface area of 28 km2 (11 sq mi). It belongs to the Rhodes regional division.
>
> Its 330 permanent residents, who are mostly concentrated in the only village of Emporio during the summer, are there year-round.

Why is Chalki different from rest of Greece:

The Greek government has launched an initiative to turn Greek islands into role models for a green economy, energy independence, and eco-mobility, starting with the smaller, unconnected islands.

> Chalki began a project **to electrify its transportation** in April 2022 by switching to electric vehicles. Along with the cars, the island constructs a PV plant with the intention of giving all of its residents access to electricity.

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[10] https://clean-energy-islands.ec.europa.eu/countries/greece/chalki

The innovative program in detail [11]:

- There are **no** bins on the whole island; instead, the municipality distributed **waste bags** for free in all businesses and households.

- Four (4) bag colors; **red, yellow, blue, and white** (each for a different kind of waste)

- On **Monday, Wednesday, and Friday**: door-to-door pick up of aluminum

- On **Tuesday & Thursday**: door-to-door pick up of recycling packages only

- During the **summer season,** there are waste pick-up services even on **weekends**

- Chalki has achieved **70% of recycling**, while Greece's recycling percentage is about 20%.

Watch some of the initiatives done in the last five years in Greece here:

➢ Clean up day in the islands of Sikinos & Folegandros:

https://www.youtube.com/watch?v=2Wzb8cytHlo

➢ "Healthy Seas 2016" – clean up day in Makronisos:

https://www.youtube.com/watch?v=_fnUQgYhOGA

➢ Clean-up day on the island of Mykonos by *All for Blue:*

https://www.youtube.com/watch?v=Vluu_-aG3ME

Find out more details for several of the Greek environmental organisations here:

Organisation	Link
All for blue	https://allforblue.org/keep-aegean-blue/
HELMEPA	https://www.helmepa.gr/en/ethelontikoi-katharismoi-stin-ellada
Stavros Niachros Foundation	https://www.snf.org/en/work/grants/grants-database/clean-up-greece-program-2007/
We4all	https://we4all.com/
Ecological Recycling Company	http://www.ecorec.gr/ecorec/index.php?lang=en
Greenpeace Greece	https://www.greenpeace.org/greece/

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[11] https://kede.gr/en/the-innovative-recycling-program-in-the-island-of-halki/

Recycling methods in Greece

Co-funded by the European Union

General guidelines & current situation

Greece **recycles 7%** of its plastic waste

However:

Recycling is still a difficult & frequently ineffective process that

- consumes a lot of energy and
- depends on a secondary market for the recycled materials, even though.

There are different types of recycling waste in Greece, and we can realise this from the different bin colours. The main bins around Greece are:

- The yellow bin
- The blue bin
- The green bin
- The brown bin

The most common recycling bins in Greece

>> Τι ρίχνουμε στον μπλε κάδο...

ΠΑΡΑΚΑΛΩ
ΟΧΙ ΣΚΟΥΠΙΔΙΑ!
εδώ, μόνο
Ανακύκλωση
Συσκευασιών

Paper
Aluminum
Plastic
Glass
Cans

ΑΝΑΚΥΚΛΩΣΗ
ΓΥΑΛΙΝΩΝ
ΣΥΣΚΕΥΑΣΙΩΝ
GLASS PACKAGING recycling

Glass
only

Paper only

Organic waste
(food)

All kind of household
waste with bags

Batteries
only

Recycling in return –
Plastic, glass & metal only

How to recycle

- ✔ Keep your packaging and containers separate from the rest of your household trash.

- ✔ You should leave the caps on the bottles and place both caps and bottles in the blue trash.

- ✔ Ensure that all packaging is spotless.

- ✔ To make cartons more recyclable, flatten them and take off any sticky tape.

- ✔ Never place packaging in bags. Put it in loosely.

- ✔ Never place household waste other than recycling in the blue recycling bins.

- ✔ Wait until it is emptied if the container is full or overflowing; alternatively, locate another blue bin.

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Items that can be recycled
(according to HERRCO – Hellenic Recovery Recycling Corporation)

✔ Aluminum paper, food trays, soda and beer cans, large tins from the previous storage of cheese and olive oil, etc.

✔ Newspapers, magazines, paper, and wrapping paper.

✔ Paper bags, cardboard, pizza boxes, Tetrapak (but only if they are free of oil or food residue), and Tetrapak (which seems to be a very complicated one).

✔ Clean yogurt pots, shampoo, and cleaning product bottles, as well as plastic bags and containers for fruits and other foods.

✔ Glass (although the blue bell bins are the best option because they make sorting much easier for glass) only for drinks and food served in glass containers.

Items that cannot be recycled

- Plastic gloves
- Plastic brushes
- Medical items
- Electric items
- Bulbs
- Plastic cutlery
- Pens
- Styrofoam
- Paper smaller than A4

- Photography paper
- Razors
- Toothbrushes
- Toys
- Plastic furniture and plant pots
- Straws
- Ceramics
- Glass that was a mirror or a window glass or a glass table

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Assessment

Answer and elaborate on the following statements:

1. **Describe the recycling system in Greece shortly.**

Answer: Greece recycles 7% of its plastic waste. There are different colored bins where you can throw your waste. For example, the yellow bin is for paper only, the blue bins are for mixed recycled waste, e.g., paper, aluminum, plastic, glass, and cans, the green bin is for general waste, and the brown bin is for organic waste (food).

2. **Please name at least three basic bins used in Greece and describe their purpose.**

Answer: The yellow bin is for paper only.

The blue bins are for mixed recycled waste, e.g., paper, aluminum, plastic, glass, and cans.

The green bin is for general waste.

The brown bin is for organic waste (food).

3. **Please name at least five items that cannot be recycled in Greece.**

Answer: Products that cannot be recycled:

Plastic gloves, Plastic brushes, Medical items, Electric items, Bulbs, Plastic cutlery, Pens, Styrofoam, Paper smaller than A4, Photography paper, Razors, Toothbrushes, Toys, Plastic furniture and plant pots, Straws, Ceramics, Glass that was a mirror or a window glass or a glass table

6.6.   How to recycle in Slovenia?

Assessment

1. **What is the aim of recycling?**

    a) To get rid of the waste in our homes.

    b) To reduce the consumption of usable materials.

    c) To provide more jobs.

    d) To prevent air pollution.

Correct answers: b) and d).

-   Feedback: Well done! The aim of recycling is to reduce the consumption of usable materials, to reduce the consumption of raw materials (for example: wood) and at the same time to prevent air pollution by burning waste, water and soil pollution by dumping waste in landfills (landfills are hidden places, usually in nature, where people improperly dispose of waste and thus pollute nature dangerously).

Incorrect answers: a) and c).

-   Feedback: Not the answers we were looking for. It's sounds good to get rid of all waste in homes and to increase employability, but the aim of recycling is to reduce the consumption of usable materials, to reduce the consumption of raw materials (for example: wood) and at the same time to prevent air pollution by burning waste, water and soil pollution by dumping waste in landfills (landfills are hidden places, usually in nature, where people improperly dispose of waste and thus pollute nature dangerously).

2. **Can individual in Slovenia collect other materials as well** *(beside paper, glass, and packaging)*?

    a) Yes

    b) No

Correct answers: a).

-   Feedback: Correct. In Slovenia you can, besides paper, glass and packaging also collect/recycle other types of waste separately - waste electrical and electronic equipment, used batteries, waste medicines and waste tyres.

Incorrect answers: b).

-   Feedback: Sorry, wrong answer. Unfortunately, humans produce a lot of different waste, so we must approach the problem in the right way. In Slovenia you can, besides paper, glass and packaging also collect/recycle other types of waste separately - waste electrical and electronic equipment, used batteries, waste medicines and waste tyres.

3. In Slovenia, which type of waste is typically collected in brown bins for composting?

    a) Plastic waste

    b) Garden and kitchen organic waste

    c) Glass waste

Correct answer: b).

-   Feedback: Awesome. Slovenia often uses brown bins for the collection of organic waste, which includes items like food scraps and garden trimmings, to be composted. You can only put biological waste in the brown bin in bio gradable and paper bags or newspaper and NOT plastic bags.

Incorrect answers: a) and c).

-   Feedback: Sorry, try again. Each bin has a different colour for collecting different waste in Slovenia. Brown bins are those who are meant for collection of organic waste, which includes items like food scraps and garden trimmings, to be composted. You can only put biological waste in the brown bin in bio gradable and paper bags or newspaper and NOT plastic bags.

How to recycle in Slovenia?

Importance of acting responsable

Co-funded by the European Union

What is recycling?

Is the recovery of used, waste materials in a production process. The aim of recycling is **to reduce the consumption of usable materials**, to reduce the consumption of raw materials *(for example: wood)* and at the same time **to prevent air pollution** by burning waste, water and soil pollution by dumping waste in landfills *(landfills are hidden places, usually in nature, where people improperly dispose of waste and thus pollute nature dangerously)*. Recycling is therefore an extremely important part of modern waste management, where each and every one of us can add a piece to the puzzle. Not only does this result in new products, but it also saves natural resources.

We throw away a lot of goods and accumulate a variety of more or less harmful waste. The solution to reducing waste is SEPARATE WASTE COLLECTION - RECYCLING. In this way, waste can be used as a secondary fuel.

Recycling symbol.

A responsible attitude towards the environment starts with a responsible attitude towards waste in every home. If we dispose of waste without separating it, we are contributing to the most expensive way of managing waste. But systematic separation does the opposite - it reduces the cost of waste management at household and societal level. What's more, by separating regularly, we reduce the amount of waste, the costs of waste management, the amount of energy needed to produce new products, the pollution of the environment, and we make recycling possible.

In addition to paper, glass and packaging, Slovenia also collects other types of waste separately - waste electrical and electronic equipment, used batteries, waste medicines and waste tires. These types of waste do not go to an eco-island, but must be taken to a collection centre, while some can be dropped off at technical goods shops, pharmacies or tire changers.

What can be recycled?

You can recycle **glass**, **paper**, **fabrics**, **metals**, **electronics** and **plastics**. To make recycling easier and faster, it is very important to know which container each item goes in, so that the materials can be cleaned and processed into material suitable for new products at the collection centre.

In the processing of **plastic** packaging waste goes through several phases: separation, grinding, cleaning, heating, melt granulate, a new product.
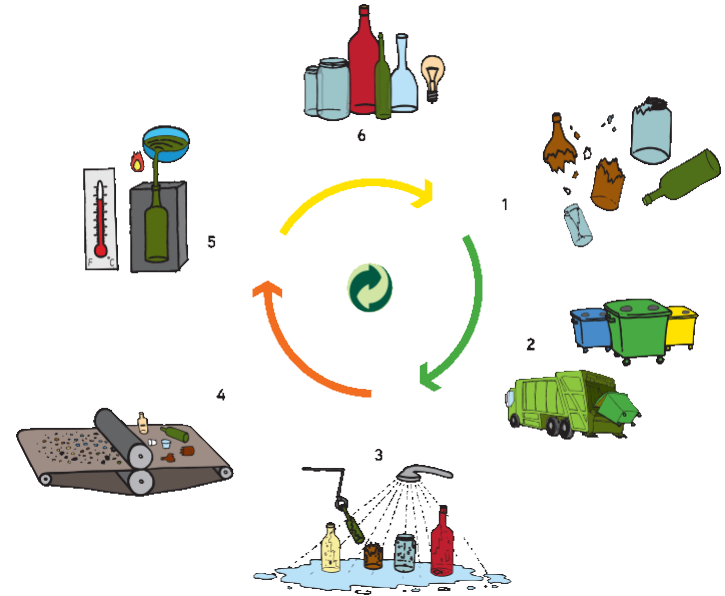
Processing of glass has three main stages: crushing, dissolution, casting.

Recycling of scrap **metal** packaging takes place in several stages: separation, sorting, heating, melting, new product.
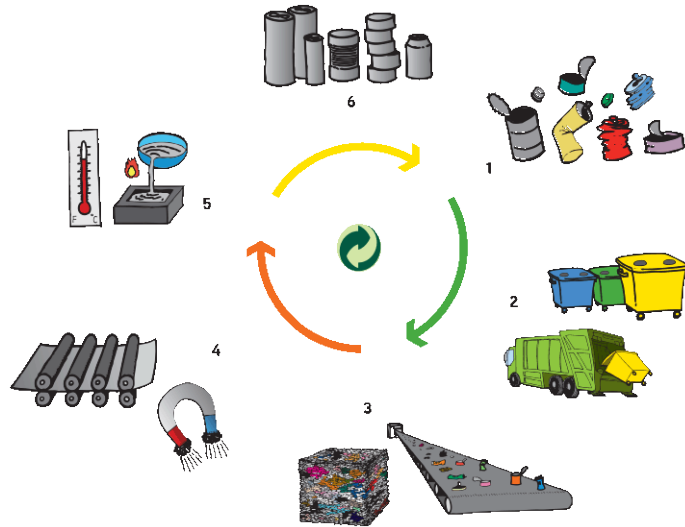
… that metal packaging can be recycled repeatedly without loss of quality.

… that recycling one aluminum saves up to 90 percent of the energy needed to produce new one.

… that recycling a single aluminum cans saves enough energy to watch TV for 3 hours.

… the disposal of waste in nature may cause pollution of soil, water and air.

… that most of the products we buy, during the production causes greenhouse gas emissions.

… in Europe we recycle 2,5 million tons of metal packaging, with which we save nearly 4 million tons of CO2 per year.

Waste situation in Slovenia

Like everywhere else in the world, the amount of waste in Slovenia has been increasing. Slovenia produces on average over 8 million tons of waste per year. More than a million tons thereof is municipal waste, amounting to 495 kg of waste per capita. Hazardous municipal waste accounts for 6,700 tons of all municipal waste, but efforts to reduce it have already proved successful.

In the past, most municipal waste ended up in landfills. With amendments to legislation, through policy instruments and by establishing municipal waste management center's, this trend has been reversed, with the proportion of separately collected waste and the recycling rate both increasing. This has made Slovenia one of the European countries with the highest recycling rate for municipal waste (59%).

Important! You can only put biological waste in the brown bin in bio gradable and paper bags or newspaper and NOT plastic bags.

| Packaging | Biological waste | Paper | Glass | Other waste | Edible oil |

Why is it necessary to separate waste?

Some packaging waste can be recycled and turned into new products. With recycling we save natural resources like trees, water, oil, minerals. Within the processing also use less energy-consuming than getting a raw material.

By separately collecting packaging waste, we also reduce the proportion of waste that end up in landfill. Thus extend the life of landfills and reduces the need for building new ones.

Where can I leave waste?

In Slovenia, the separately collected waste from households goes in the public drop off containers *(packaging, paper, glass)* or in one of 120 collection centers *(information about their operation can be found on the company website Slopak - www.slopak.si*). Some waste may also be left in shopping centers *(waste batteries, lamps)*, vulcanizer when changing tires *(waste tires)* and pharmacies *(a waste medicines)*.

In the **public drop off container** there is a group of containers for separate waste collection. They are designed for the collection of waste that can be recycled. On the public drop off container stand container for packaging, paper and glass, and biological waste container.

Collection center is covered or uncovered space, equipped for separate collection and temporary storage of all kinds of separate fractions. There are several large containers, equipped with a sign, what is in a particular container.

What can be taken into the collection centers?

- paper and cardboard of all types and sizes, including packaging waste-paper and cardboard,
- glass of all sizes and shapes, including packaging waste glass,
- plastics, including packaging waste from plastic or composite materials,
- metal waste, including waste containers of metal
- wood, including packaging waste wood,
- clothes
- textile
- edible oils and fats,
- paints, inks, adhesives and resins containing no hazardous substances
- detergents that do not contain hazardous substances
- batteries,
- electrical and electronic equipment that does
  not contain hazardous materials
- bulky waste.

Interesting facts

Waste

- The average person generates 33 tones of household waste in his/her life.
- In Slovenia each of us creates 436 kg of waste per year.
- 2/3 of the waste can be reprocessed or reused.
- In Slovenia we separately collect 36 % of waste.
- In the period 2005-2010, Slovenia produced an average of almost 436 kg of municipal waste per capita per year in the EU-27 average of 520 kg of waste per capita per year.
- In 2010 we fully processed almost 5.9 million tons of waste (16% more than in 2009), 64% through recycling.

Waste packaging

- Plastic bottle decomposes 450 years. This is 7 average human lives.
- 4% of total oil consumption in the world is consumed for the production of plastics.
- From 25 recycled PET bottles we can make one fleece jacket.
- Clothes, toys, hangers can be made from waste packaging.
- By recycling 1 kg of plastic packaging we save 2 kg oil and 1.5 kg of CO_2 emissions.
- From 10 milk packages we can make a puzzle.

Waste tires

- 16.000 tires is recycled per year.
- Recycled tires can be found in more than 60 new products.

Biodegradable waste

- 30% of all waste is biodegradable.
- 16 Olympic swimming pools of food are thrown away by Europeans every day.

Waste-paper

- 1 ton of recycled paper saves 17 trees.
- Production of recycled paper reduces air pollution by 95%.
- By recycling 1 kg of paper packaging, we save 1/5 of the tree and 40 liters of clean water.

Glass

- Recycling one bottle saves enough energy to light 11-watt bulb for 20 hours.
- Glass can be recycled many times without losing its quality.
- By recycling 1 kg of glass packaging we save 300 g CO2 emissions and 1/3 of the energy needed for the production of bottles from ore.

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All pictures/photos are taken free from https://pixabay.com/.

7. Mitigation and Consumption

7.1. How to buy products with lower carbon footprint and less biodiversity.

Assessment

1. The carbon footprint of a product refers to the total amount of carbon dioxide it emits during its entire life cycle.

   a) True.

   b) Fals.

Correct answer: a).

- Feedback: Good job. The carbon footprint of a product indeed refers to the total amount of carbon dioxide (CO_2) it emits throughout its entire life cycle, which includes production, transportation, use, and disposal.

Incorrect answer: b).

- Feedback: Try again. The world is facing a climate crisis and it is important that we all do our part to reduce our carbon footprint. The carbon footprint of a product indeed refers to the total amount of carbon dioxide (CO_2) it emits throughout its entire life cycle, which includes production, transportation, use, and disposal.

2. Why is it important to reduce your carbon footprint?

   a) To increase energy consumption.

   b) To support fossil fuel industries.

   c) To mitigate the effects of climate change and promote sustainability.

   d) To encourage the use of disposable products.

Correct answer: c).

- Feedback: Well done. It is crucial to reduce your carbon footprint because it helps mitigate the effects of climate change. A smaller carbon footprint means fewer greenhouse gas emissions, like carbon dioxide (CO_2), are released into the atmosphere. Reducing your carbon footprint also promotes sustainability by conserving natural resources and fostering a more environmentally friendly way of living.

Incorrect answers: a), b) and d).

- Feedback: Sorry, wrong answer. Remember that by implementing various strategies, you can significantly reduce your carbon footprint while shopping and contribute to a more sustainable future. Therefore, it is crucial to reduce your carbon footprint because it helps mitigate the effects of climate change. A smaller carbon footprint means fewer greenhouse gas emissions, like carbon dioxide (CO_2), are released into the atmosphere. Reducing your carbon footprint also promotes sustainability by conserving natural resources and fostering a more environmentally friendly way of living.

3. **What are two factors that contribute to the biodiversity impact of a product?**

   a) Product colour and packaging.

   b) Product brand and popularity.

   c) The materials used and production practices.

   d) Product price and availability.

Correct answer: c).

- Feedback: Awesome. Two significant factors that contribute to the biodiversity impact of a product are the materials used in its production and the production practices employed. The materials used can have an impact if they are sourced from endangered or threatened species, which can harm biodiversity. Production practices are also crucial; if a product is made using unsustainable farming methods or harms ecosystems during its production, it can have a detrimental effect on biodiversity.

Incorrect answers: a), b) and d).

- Feedback: Ups, not correct. Remember that biodiversity refers to the variety of life on Earth, including the variety of species, ecosystems, and genetic diversity within species. It is important to protect biodiversity because it helps support and sustain healthy ecosystems. There are two significant factors that contribute to the biodiversity impact of a product are the materials used in its production and the production practices employed. The materials used can have an impact if they are sourced from endangered or threatened species, which can harm biodiversity. Production practices are also crucial; if a product is made using unsustainable farming methods or harms ecosystems during its production, it can have a detrimental effect on biodiversity.

How to buy products with lower carbon footprint & less biodiversity impact

Open Educational Resource No. 15

The world is facing a climate crisis and it is important that we all do our part to reduce our carbon footprint.

One way we can do this is by making more environmentally conscious choices when we shop.

In this resource, we will explore the importance of reducing carbon footprint and minimizing biodiversity impact when making product choices.

By the end of this resource, you will have the knowledge and skills necessary to make informed decisions that contribute to a sustainable future. Let's dive in!

Question: What is a carbon footprint?

A carbon footprint refers to the total amount of greenhouse gas emissions, particularly carbon dioxide (CO_2), released into the atmosphere as a result of human activities. These activities include burning fossil fuels for energy, transportation, manufacturing, and various other processes that contribute to the emission of greenhouse gases.

The main source of emissions is fuel combustion during transportation, while domestic and commercial activities also contribute to carbon dioxide and other gas emissions. Additionally, harmful components released during electricity generation and industrial processes contaminate the air, water, and soil.

Carbon footprint is a very important aspect to assess the impact of carbon dioxide emissions on the environment and also the role of people, organizations, and society to make this happen day by day. The more you pollute the environment with your actions, the deeper you make the carbon footprint on the earth.

The Carbon Footprint

Source: Carbon FootPrint – Effects & How to Reduce it? https://www.geeksforgeeks.org/what-is-carbon-footprint/

ECOLitAct

Activity: Calculate your personal Carbon Footprint!

How do we live? What do we eat? How do we get around? Our daily way of live has a huge impact on our planet. Day by day, CO2 emissions are created by driving cars, heating, cooking, working, celebrating and flying. Think about the following situations:

- How do you usually commute to school or work? (e.g., walk, bike, car, public transportation)
- How much time do you spend using electronic devices (computer, smartphone, etc.) each day?
- What type of foods do you consume most frequently? (e.g., vegetarian, meat-based)
- Do you recycle regularly, and what other waste reduction practices do you follow?
- How often do you buy new items instead of reusing or buying second-hand?

- You can use online carbon footprint calculators to check your carbon footprint. Find out the amount of CO2 emissions created by your personal way of life with ease, using the myclimate footprint calculator.:
  https://co2.myclimate.org/en/footprint_calculators/new

ECOLitAct

How to reduce your carbon footprint when shopping

Shopping directly impacts your carbon footprint, the measure of greenhouse gas emissions associated with your activities. The production, transportation, packaging, and energy consumption of goods and services all contribute to your carbon footprint. Even waste generation and food choices play a role. By making sustainable shopping choices, such as opting for eco-friendly products, supporting local and energy-efficient options, and reducing waste, you can significantly reduce your carbon footprint and contribute to a greener, more sustainable future.

Swideas

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ECOLitAct

Discover the power of sustainable shopping with these practical steps to reduce the impact of your purchases on the environment.

By making conscious choices, you can positively influence your carbon footprint and promote a greener lifestyle.

From eco-friendly product selections to responsible waste management, this list will empower you to play an active role in preserving the planet's health while enjoying the benefits of more environmentally conscious shopping.

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- **Choose local & seasonal products.** Choosing goods sourced nearby reduces transportation needs and lowers carbon emissions. Additionally, picking seasonal fruits and vegetables reduces the demand for energy-intensive greenhouse cultivation or long-distance transportation.
- **Opt for sustainable packaging when purchasing products.** Seek items with eco-friendly or minimal packaging. Excessive packaging leads to waste and increases the product's carbon footprint.
- **Evaluate the lifespan and durability of the product, before making a purchase.** Investing in high-quality items that last longer reduces the need for frequent replacements, resulting in decreased resource consumption and carbon emissions from manufacturing processes.

ECOLitAct

- **When shopping for electronics or appliances, choose products that are energy-efficient.** Energy-efficient devices consume less electricity during use, leading to reduced carbon emissions and lower energy bills.
- **Bring your own bags.** Avoid single-use plastic bags, which contribute to plastic pollution and require substantial energy and resources to produce.
- **Embrace the principles of "reduce, reuse, recycle" by exploring secondhand or thrift stores.** Buying gently used items extends their lifespan and prevents them from ending up in landfills. This approach reduces the demand for new products and the associated carbon emissions from their manufacturing.

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- **Support sustainable businesses.** There are many businesses that are committed to sustainability. When you shop with them, you are supporting their efforts to reduce their environmental impact.
- **Go green when going shopping.** Consider walking, biking, or using public transportation whenever feasible to reduce carbon emissions from personal vehicles. If driving is necessary, consider carpooling or combining errands to minimize fuel consumption.
- **Minimize food waste** by planning your meals and buying only what you need. Food production contributes significantly to global greenhouse gas emissions. Reducing food waste helps lower the carbon footprint associated with food production, transportation, and disposal.

What is biodiversity?

Biodiversity refers to the variety of life on Earth, including the variety of species, ecosystems, and genetic diversity within species. It is important to protect biodiversity because it helps support and sustain healthy ecosystems. Having a diverse environment gives all kinds of life the ability to better cope with changes and stress in the world around them. Fertile soil and pollination are made stronger because of biodiversity. When an area is less diverse, these resources get weaker as well.

ECOLitAct

Discover your eco-conscious decision-making skills with this **True/False exercise** on reducing the impact of shopping.

Test your knowledge and understanding of sustainable consumer choices as we explore various ways to make a positive difference for the environment. From selecting eco-friendly materials to supporting biodiversity protection, this engaging exercise will empower you to become a more informed and environmentally responsible shopper.

Let's dive in and see how well you can navigate the path to a greener future!

1. Opt for products made from unsustainable materials. This means choosing products that are made from materials that are non-renewable, non-recyclable, or non-biodegradable. Some examples of unsustainable materials include virgin plastic, Styrofoam, and products with excessive packaging.
•True
•**False**

2. Avoid products that are made from endangered or threatened species. This includes products made from ivory, fur, and tortoiseshell.
•**True**
•False

3. Choose products that are produced in a way that minimizes harm to the environment. This means choosing products that are produced using sustainable farming practices, that are not tested on animals, and that are not packaged in excessive amounts of plastic.
- **True**
- False

4. Prefer products that require long-distance transportation. This will help to support global trade and international cooperation.
- True
- **False**

5. Choose products that are Fairtrade certified. This means that the products were produced in a way that benefits the farmers and workers who produced them.
- **True**
- False

6. Avoid supporting organizations that work to protect biodiversity. There are many organizations working to protect biodiversity around the world. You should refrain from donating money, volunteering, or spreading the word about their work.
- True
- **False**

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- **References:**

How To Reduce Your Carbon Footprint By Shopping Sustainably:
https://www.solandspirit.com/blogs/1/how-to-reduce-carbon-footprint-by-shopping-sustainably
Easy ways to reduce your carbon footprint:
https://www.savethestudent.org/shopping/reduce-carbon-footprint.html
Carbon FootPrint – Effects & How to Reduce it?
https://www.geeksforgeeks.org/what-is-carbon-footprint/
myclimate footprint calculator:
https://co2.myclimate.org/en/footprint_calculators/new

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The Learning Scenarios

1. How to counter fashion waste.

Problem-based learning scenario

Climate/environmental behaviour

Countering fashion waste
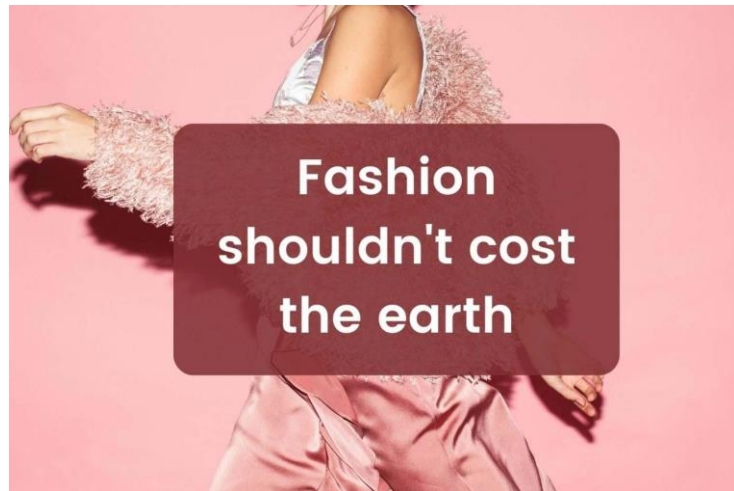
ABOUT THE LEARNING SCENARIO

The present learning scenario aims to raise awareness among students in vocational education about the environmental impact of fashion waste and encourage sustainable practices in the fashion industry. Students will explore real-life situations through videos, engage in problem-solving activities, and propose solutions to address fashion waste.

Duration:

Approximately 2 weeks

Content:

- Introduction to the topic
- The problem
- Finding solutions (Assignment)
- The Quiz
- Information about fashion waste
- Reference

Materials

- 3 videos
    - https://www.youtube.com/watch?v=tLfNUD0-8ts
    - https://www.textilemountainfilm.com/
    - https://www.youtube.com/watch?v=bOOI5LbQ9B8
- Fashion waste calculator: Fashion Footprint Calculator (thredup.com)
- Quiz

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Eco-Literacy and Green Education for Climate Action

STEP 1 – INTRODUCTION TO THE TOPIC

Make a general introduction to the topic, but let students share their perspective. Initiate the discussion by asking some guiding questions. This way you can explore students' prior knowledge and awareness of the topic but also encourage critical thinking and reflection on their own shopping behaviours and their role in countering fashion waste.

1. How often do you buy new clothes, and what factors influence your purchasing decisions?

2. Have you ever considered the lifespan of the clothes you own? Do you tend to keep them for a long time, or do you frequently replace them?

3. Do you know what fast fashion is? If so, can you describe how it differs from other types of fashion?

4. Are you familiar with the concept of "sustainable fashion" or "ethical fashion"? What do you think these terms mean?

5. Have you ever thought about the environmental impact of the fashion industry? What comes to mind when you hear the term "fashion waste"?

STEP 2 – THE PROBLEM

Now watch the following videos: (day 1-2)

⇒ **Video Session 1:**

About the video:

"The video titled 'The True Cost of Fast Fashion' illuminates concerning environmental ramifications of the fast fashion industry. With a staggering production of 80 billion items annually, excessive consumption has led to a mounting crisis of fashion waste, as most garments ultimately end up in landfills. This urgent issue highlights the necessity to address the impact of fast fashion on our planet. Clothes recycling and processing facilities, such as Savanna Rags in Nottingham, handle just 25% of discarded clothes globally, while over 300,000 tonnes of clothes are disposed of in British landfills each year, making it the fastest-growing waste category. The growing middle class in emerging markets has driven the demand for cheaper fashion, with global clothing sales projected to potentially triple by 2050."

LINK: https://www.youtube.com/watch?v=tLfNUDO-8ts

Now open the discussion. Here are some questions you can use:

Questions:

- How did the video make you feel about the environmental impact of fast fashion? Did anything surprise or shock you?

- What role does excessive consumption play in contributing to the fast fashion waste crisis? How can individuals make more conscious choices to reduce their impact?

- What are some potential solutions to countering the problem of fashion waste highlighted in the video? How can individuals, companies, and governments work together to address this urgent issue?

- Reflect on your own shopping habits and wardrobe management. Do you think there are areas where you can make more sustainable choices? If so, what changes could you make?

- As students, what role do you think you can play in raising awareness about fast fashion waste and promoting sustainable fashion practices within your communities and schools?

⇒ **Video Session 2**

About the video:

The video "TEXTILE MOUNTAIN - THE HIDDEN BURDEN OF OUR FASHION WASTE" highlights the environmental impact of fashion waste in Kenya. The easy availability and low cost of second-hand clothes have led to a culture of disposability, resulting in large volumes of discarded garments ending up in landfills and polluting rivers. The lack of proper waste management contributes to respiratory diseases and poses environmental hazards. However, the video also showcases initiatives like "New Wardrobe" and "Soko" that promote sustainable fashion practices and encourage clothing sharing within local communities. These efforts aim to address the challenges of fashion waste and create a more environmentally conscious approach to fashion consumption.

LINK: https://www.youtube.com/watch?v=UC4oFmX8tHw&t=719s (EN)

Original LINK: https://www.textilemountainfilm.com/ (several languages available)

Use the following questions to stimulate thoughtful discussions among the students, encouraging them to critically think about the environmental impact of fashion waste and the potential solutions to create a more sustainable and conscious fashion industry.

● How does the easy availability and low cost of second-hand clothes contribute to the culture of disposability in Kenya, as depicted in the video? What are the consequences of this culture on the environment and society?

● Describe the environmental impact of fashion waste in Kenya, as shown in the video. How do discarded garments end up in landfills and rivers, and what are the potential hazards associated with improper waste management?

● Reflect on the concept of clothing sharing presented in the video. How can clothing sharing contribute to reducing fashion waste and promoting a more environmentally conscious approach to fashion consumption?

● Discuss the role of consumer behaviour in influencing fashion waste. How can individuals make more responsible choices when it comes to fashion consumption, and what impact can these choices have on the overall industry?

● The video highlights the importance of creating awareness about fashion waste and its impact. How can individuals, organizations, or schools contribute to raising awareness and educating others about this issue?

● Imagine you are a part of a local community in Kenya facing the challenges of fashion waste. What initiatives or actions would you propose to address this issue and promote sustainable fashion practices?

● Reflect on your own clothing consumption habits. How can you personally contribute to reducing fashion waste and supporting sustainable fashion, even if you don't live in Kenya?

⇒ **Video session 3**

The last video presents women recycling clothes in India. It describes the job od recyclers and their personal experience when dealing with fashion waste. The video is a good example of seeing western lifestyle from a different point of view.

LINK: https://www.youtube.com/watch?v=bOOl5LbQ9B8

NOTE! You can introduce fashion footprint calculator that students can use to calculate their fashion related footprint.

LINK: Fashion Footprint Calculator (thredup.com)

Source: Carbon study commissioned by independent research firm Green Story Inc.

STEP 3 – FINDING SOLUTIONS (ASSIGNMENT)

Instructions:

Problem-Solving Activity (Day 3 - Day 6):

- Divide students into small groups (5-6 per group) and assign them specific tasks related to the problem of fashion waste.

- Each group will conduct research on various aspects, such as the environmental impact of textile production, the role of consumer behaviour, and sustainable fashion alternatives.

- Students will explore existing recycling and upcycling initiatives and assess their feasibility and effectiveness.

- Each group will identify potential barriers to implementing sustainable fashion practices and propose solutions.

Proposed Solutions (Day 7 - Day 8):

- Groups will present their proposed solutions to counter fashion waste to the rest of the class.

- Encourage a constructive peer review session, where other students can provide feedback and suggestions to strengthen each proposal.

Action Plan (Day 9 - Day 10):

- As a class, create a collective action plan that outlines concrete steps to promote sustainable fashion practices in the school and the local community.

- Assign roles and responsibilities to students to implement the action plan.

Assessment: (Day 11 – Day 14):

- Assess students' engagement, critical thinking, and creativity during the problem-solving activity and proposal presentations.

- Evaluate the effectiveness of the proposed action plan in promoting sustainable fashion behaviour within the school and community.

- Encourage students to reflect on their learning journey and the potential long-term impact of their actions.

Figure 2 - Source: Jigsaw campaign

STEP 4 – THE QUIZ

1. What is the term that describes the quick turnover of fashion trends and the move towards cheap, mass-produced clothing?

  - A) Slow fashion

  - B) Fast fashion

  - C) Eco fashion

  - D) Vintage fashion

  - Answer: B) Fast fashion

2. What percentage of global emissions is the fashion industry responsible for, according to the UN?

  - A) 2-4%

  - B) 8-10%

  - C) 12-14%

  - D) 16-18%

  - Answer: B) 8-10%

3. Which country in Europe has the highest clothing consumption per person, according to MPs?

  - A) France

  - B) Germany

- C) Italy

- D) UK

- Answer: D) UK

4. Which natural resource is used for the production of cotton, which uses about 2.5% of the world's farmland?

- A) Water

- B) Oil

- C) Wood

- D) Coal

- Answer: A) Water

5. Which synthetic material requires an estimated 342 million barrels of oil every year for the fashion industry?

- A) Nylon

- B) Polyester

- C) Acrylic

- D) Spandex

- Answer: B) Polyester

6. Which process involves the manual shredding of clothes and pulling them apart into their fibres, which has existed for centuries?

- A) Mechanical recycling

- B) Chemical recycling

- C) Biological recycling

- D) Thermal recycling

- Answer: A) Mechanical recycling

7. Which concept aims to reduce waste and pollution by keeping garments in use and reuse for as long as possible?

- A) Circular fashion

- B) Ethical fashion

- C) Minimalist fashion

- D) Organic fashion

- Answer: A) Circular fashion

8. Which type of recycling allows to turn textiles into new raw materials, such as chemical recycling?

  - A) Upcycling

  - B) Downcycling

  - C) Monocycling

  - D) Regenerative cycling

  - Answer: D) Regenerative cycling

9. Which quiz can help you assess your fashion footprint and compare it with the global average?

  - A) Fashion Calculator

  - B) Fashion Quiz

  - C) Fashion Meter

  - D) Fashion Scale

  - Answer: A) Fashion Calculator

10. Which video explains the principles of circular fashion and shows some examples of how it works in practice?

  - A) The True Cost of Fast Fashion

  - B) The Future of Fashion is Circular

  - C) How to Recycle Your Clothes

  - D) What is Sustainable Fashion?

  - Answer: B) The Future of Fashion is Circular

SOME BASIC INFORMATION ABOUT FASHION WASTE

KEY STATISTICS
Global Textile Waste
TheRoundup.org

Up to **100 BILLION**
new garments are made each year

The World Produces
92 Million Tons
of textile waste every year

87%
Of materials used to
make clothing
END UP IN LANDFILL

That's one truckload
EVERY SECOND

60%
of all new clothing
materials are actually
PLASTIC

Textile Production Causes
42 MILLION TONS
of plastic waste per year
and contributes

9%
of annual microplastic
pollution added to our oceans.

1%
Of clothes are
RECYCLED INTO NEW GARMENTS

TheRoundup.org

Sources: UNEP, Global Fashion Agenda, Ellen MacArthur Foundation, Science Advances

Fashion waste poses significant environmental concerns due to the excessive production and consumption of clothing. The main concerns include the large volume of discarded garments ending up in landfills, low utilization rates of clothing items before disposal, the environmental impact of textile production and disposal, the prevalence of synthetic fabrics contributing to microplastic pollution, and the limited recycling of discarded clothing. These issues highlight the urgent need for more sustainable practices and a shift towards a circular fashion economy to address the environmental consequences of fashion waste.

Figure 3 - Source:
https://www.europarl.europa.eu/news/en/headlines/soci
ety/20201208STO93327/the-impact-of-textile-
production-and-waste-on-the-environment-infographics

The manufacturing of clothing is responsible for 2-8% of annual greenhouse gas emissions. This is more than all international flights and maritime shipping combined. Additionally, our collective washing of clothing containing synthetic materials accounts for 35% of all ocean microplastics, and the industry overall is responsible for 20% of all industrial wastewater. The cotton industry pollutes with heavy use of pesticides affecting people, groundwater and biodiversity. Each year 150 million trees are razed for rayon or viscose. And every year landfills and incinerators fill with 40 million tons of discarded clothing.

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(https://www.earthday.org/driven-to-shop-the-psychology-of-fast-fashion/)

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Fast Fashion Is Creating an Environmental Crisis

BY ALDEN WICKER ON 09/01/16 AT 6:40 AM EDT https://www.newsweek.com/2016/09/09/old-clothes-fashion-waste-crisis-494824.html

BBC, The real price of buying cheap clothes; https://www.bbc.com/news/business-49248921

OXFAM, NEW SHOCKING FACTS ABOUT THE IMPACT OF FAST FASHION ON OUR CLIMATE; https://www.oxfam.org.uk/oxfam-in-action/oxfam-blog/new-shocking-facts-about-the-impact-of-fast-fashion-on-our-climate/

Mazatec. How do I create problem-based (PBL) scenario? https://www.mazetec.org/blog/how-do-i-create-problem-based-pbl-scenario/

2.   How to counter food waste.

Scenario

Imagine that your municipality is running a contest for residents to reduce food waste. Households that manage to reduce their food waste by 20% in 6 months will win an electrical car to contribute to their efforts to fighting against climate change.

You decide that you would like to give it a try and join the contest.

However, you are facing a few obstacles:

- How will you go about identifying how much food waste you produce?

- How will you communicate the issue of food waste to your family to make sure that they are also committed to the contest?

- What are the possible solutions for you to reduce your food waste?

- How will you build a plan to start implementing these solutions and assess the results?

To overcome these obstacles, we will take you through different activities.

● **Identifying your food waste**

2 whiteboards or empty walls will be needed.

Invite learners to reflect on their own daily lives. First, invite learners to write the following on different post-its:

- The food type that they mostly waste (1 post-it per food type)

- The main reasons why food is wasted in their households (1 post-it per reason) (e.g., expiry date was reached, got rotten, etc.)

Then, invite the learners to post, on one whiteboard, the post-its corresponding to the type of food. This whiteboard may already be divided by food type, leaving some space for each of the food types (cereals, legumes, vegetables, fruits, meat, fish, bread and pastries, and others).

On the other whiteboard, learners may post the reasons why food is wasted in their households.

Once all the post-its have been posted, cluster with the learners the food waste per food type and note which food types are wasted the most. Then, cluster the main reasons why food is wasted. Note: are there any commonalities or differences that are worth noting?

● **Reflection**

Invite the learners to reflect:

- Which are the types of food that are mostly wasted?

- Which are the main reasons why food is wasted?

- Why do they think this happens?

Then, give learners 5-10 minutes to share their reflections.

- **Communicating the issue – Understanding the causes and consequences of food waste**

Now, invite learners to come together to research the main causes and consequences of food waste. Bring learners into groups of 3-4 people and share with them the resources below (see Informational Texts – Introduction and Fact Sheet I) to aid their search. Encourage learners to also research more sources and compile information.

- **Discussion**

Invite the learners to answer the following questions with their group:

- What are the main consequences of food waste?

- What is the impact of it?

- What is the importance of countering food waste?

Then, give group 5 minutes each to present the results to the rest of the groups.

- **Searching for solutions**

Bring learners into groups of 3-4 people (perhaps the same as before) and invite them to reflect on solutions they could apply at home to reduce their food waste. They can reflect on the inspirational ideas below (see Informational Texts – Fact Sheet II) and are encouraged to also research additional solutions on the Internet.

- **Sharing of possible solutions**

Allow each group 5 minutes to present the solutions they came up with and explain why they think these are relevant. Encourage discussion among the learners and allow them to debate or ask questions to each other.

Introduction

When you think about climate change, what comes to your mind first? Which challenges do you think about? Likely, your mind jumps to issues such as greenhouse gas emissions through transportation or energy consumption, or deforestation. In comparison, food waste may seem like a drop in the ocean. After all, what difference are a few thrown-out leftovers going to make?

As it turns out, food waste is a major global environmental challenge, and the UN is aiming to cut global food waste by 50 percent until 2030 (BBC, 2020; Lai, 2021; UN, 2021). Worldwide, a third of all food, which amounts to 2.5 billion tonnes yearly, is wasted or lost. This means that if food waste was a country, it would be the third largest greenhouse gas emitter, only surpassed by China and the United States (Lai, 2021). The EU alone produces 59 million tonnes of food waste every year, or 131 kg per capita, which represents seven percent of the EU's greenhouse gas emissions (European Commission, n.d.).

Generally speaking, food waste is a term applied to food that is thrown away instead of being consumed. It can be further divided into two subcategories: food loss and food waste. Food loss occurs early on in the supply chain; during production (i.e., farming and harvesting), storage, processing or transportation and distribution. Food waste refers to food that is wasted in retail (i.e., supermarkets and restaurants) and households (Harvard School of Public Health, n.d.; Lai, 2021). In

the EU, more than half of all discarded food (69 percent) falls into the category of food waste, with households being responsible for 53 percent of wasted and lost food. Looking at food waste only, households are the main contributors to it on a global level as well, with 61 percent in 2019 (European Commission, n.d.).

But why does food waste have such a big negative impact on the planet? Producing food requires resources: Crops need to be watered, livestock, too requires water as well as food, machinery consumes fuel and electricity. Both the transport of food to the customer and the transportation of food waste requires additional energy, and the decomposing waste releases greenhouse gasses into the atmosphere. Food that goes to waste unnecessarily raises food demand. As food production increases, so does its impact on the planet. It amplifies pressure on water and land resources contributing to land degradation and deforestation – and thus to biodiversity loss – and increases emissions from energy use and waste itself (Harvard School of Public Health, n.d.; BBC, 2020; Eurostat, 2020; Lai, 2021; UN, 2021)

Fact Sheet 1: Causes of food waste

Food waste can occur at any point from the production of food up until it reaches the consumer (Lai, 2021). Food may be lost or thrown away due to various factors and reasons including diseases and pests during farming, overproduction and the decision to discard produce that is considered too 'ugly' to be sold, and insufficient meal and shopping planning and lack of information on an individual level (European Commission, n.d.; Harvard School of Public Health, n.d.; Lai, 2021).

Causes within the food industry include:

- Overproduction

- Production errors resulting in produce not meeting specifications and quality standards

- Damage to produce and packaging, as well as inadequate storage

- Intentional waste by throwing away 'ugly' fruit and vegetables

- Standardised portion sizes at resturants and canteens leading to leftovers that need to be thrown away

- Miscalculations of customer numbers in catering and restaurants

- Promotions such as 'buy two get one free' leading to impulsive (over-)buying

- Too large packaging sizes, or packages that are difficult to empty completely (European Commission, n.d.)

Causes on an individual level (within households) include:

- Insufficient shopping and meal planning

- A busy daily life and conflicting priorities leading to shortcomings in food management

- Inadequate storage (i.e., having the fridge set on the wrong temperature)

- Lack of knowledge about or misinformation on 'best before' and 'use by' labels

- Lack of knowledge about or misinformation on the impacts of food waste (European Commission, n.d.)

Can you think of any other factors that result in the generation of food waste? Feel free to add them to the list – you can conduct an online research or take examples from your own life.

Fact Sheet II: Benefits of reducing food waste and possible solutions

Reducing the amount of food that is wasted would have a positive impact on food security as well as the planet as it would contribute to lower pressure on resources and decrease greenhouse gas emissions. It would also reduce costs within the food industry and linked to waste disposal, as well as for individuals when they buy only the food they need (Harvard School of Public Health, n.d.; UN, 2021).

On a structural level changes and actions to reduce food waste include:

- Feeding food waste to animals, or turning it into bioenergy and natural fertiliser

- Packaging that is designed to increase shelf-life

- Reducing the time between harvest and consumption (i.e., promoting local produce)

- Replacing 'buy two get one free' promotions with discounts on soon-out-of-date products

- Cooperations between supermarkets and food banks to give away produce that cannot be sold anymore

- Apps designed to help consumers plan their meals and shop in ways that prevents food waste

- Governments can implement education campaigns and provide incentives for food producers and retailers who reduce food waste, and i.e., donate surplus produce to food banks (Harvard School of Public Health, n.d.; UN, 2021)

Considering that most food is wasted by households, there are a number of steps you can take to reduce your own food waste:

- Use food saving apps such as TooGoodToGo

- Look for local food sharing initiatives

- Use leftovers

- Freeze food which you are not using (both prepared meals and individual ingredients such as fruit, vegetables, eggs, yogurt and cheese)

- Learn about how to store food correctly: What needs to be stored in the fridge? Keep your fridge at 1-5 degrees Celcius

- Educate yourself on labels ('best before', 'use before')

- Plan your meals, and shop intelligently (make a shopping list and avoid shopping when you are hungry, buy only as much as you need)

- Imperfect fruit and vegetables are still perfectly edible

- Keep track of the food you have at home and until when you should use it

- When possible, choose a smaller plate and refill if you are still hungry – both at home and when eating out

- Take away leftovers when eating out (Harvard School of Public Health, n.d.; European Commission, 2019; BBC, 2020)

Feel free to do more research on possible ways to reduce food waste, and to add the solutions you find or can think of to these lists!

Action Plan
- **INDIVIDUAL ACTION PLAN**

Now that you have understood the main food types that are wasted and the reasons for it, seen the issues associated with food waste, and come to some solutions to it, it's time to build your action plan to win that contest!

To do that, you will work on the template below. When working on it, try to think about the possible solutions you came across and reflect on which ones could work well in your daily life. Be careful! Some solutions can seem more time consuming to one person or the other, so try to think hard on what your issues, your time availability, and what commitment will be.

After completing the action plan, you will be invited to share what you developed with the rest of the group.

Suggestion: Then, to make sure you identified your issues well and that your plan is suited to reducing your own food waste, we encourage you to use the next week to work on the tool "Assessing the household food waste" to better understand what your food waste looks like and identify the main points you can improve on. After gathering your Food Waste Assessment Table results, you can use them to improve your plan and make it doable, easily implemented, and efficient for you to reduce your food waste.

- Taking into account your perception of how your food waste is generated, which are the solutions that better apply to you?

    -
    -
    -
    -
    -

    o Which solutions could help you reduce your food waste the most, hence having a high impact on your performance?

        -

- ▪
- ▪
- ▪
- ▪

  o Which solutions are the easiest to implement?

  - ▪
  - ▪
  - ▪

- Now, take a moment to place the solutions you mentioned on the following table. For instance, those solutions that are easy to implement and have a high impact, should be placed in cell 1. On the other hand, those which have an average impact and are difficult to implement should be placed in cell 8. Take into account that one cell can fit several solutions!

	Easy to implement	Not easy nor difficult to implement	Difficult to implement
High impact	1	3	5
Average impact	2	4	6
Low impact	7	8	9

- Observe the solutions you placed in cell 1. These should be your priority as they are easy to implement for you and have a high impact on reducing your food waste. It is time to build a plan for you to implement them and reduce your food waste!

*If you did not place any solutions on cell 1 because you felt like there are no solutions with high impact and easy to implement, go ahead and take those solutions you placed in cells 2 or 3.

Complete the following table for each solution by replacing the text in red:

Action Plan	
Proposed solution	Write here the solution you are working on
Goal of the proposed solution	What are you willing to achieve by implementing this solution? Try to set a SMART goal! SMART goals are Specific, Measurable, Attainable, Realistic/Relevant, Time-bounded. For example: I will reduce my fruit waste by a 70% by the end of March.

Action Plan	Actions	steps you plan to take to achieve your proposed solution's goal.
	Persons in charge	who will be handling each step?
	Timeline	deadline for each step
	Resources	assets you need to allocate for each step
	Potential barriers	factors that can potentially hinder the completion of each step
	Outcomes	desired result for each step
Evidence of Success	Which indicators will you use to assess whether you've reached your proposed solution's goal?	
Tracking and Evaluation Process	How will you track your progress to make sure you'll reach your proposed solution's goal?	

- Great job! You've got a plan to implement your solutions with highest impact and lowest effort. Go ahead and implement your plan!

*Recommendation: We suggest you start only with solutions in cell 1 because these are the ones that are likely to achieve the best results. We also believe it is better to start small by implementing only a couple of action plans at a time. If you would design an action plan for all the possible solutions you could potentially implement, this could be too much to do at once! It could become overwhelming and make you give up. That's the reason why we recommend starting small.

Nevertheless, with time and as you achieve the goals you set for those solutions within cell 1, you can go ahead and design your action plans for those solutions in other cells! The more you can do, the better. But always remember that it is better to take small and slow steps, staying consistent, rather than trying to do too much and not being able to achieve your goals.

Good luck in your journey towards reducing your food waste! By doing so, you are contributing to a better and healthier planet, feel proud of yourself!

Materials

- 2 whiteboards or empty walls

- Markers

- Pens

- Post-its

Data Collection Tools

- **Scale to weigh food wasted**

- **Assessing the household food waste**

Assessing the household food waste

Learners first assess their household food for a week. They may use the following Food Waste Assessment Table to keep record of: amount of food wasted, type of food, the reason why the food was wasted (expiry date, cooked too much, got rotten, etc.)

To fill in the table, consider:

*Food type: fruit, cereals, legumes, meat, etc.

*Amount of food wasted per each type of food. You'll have to weigh it on a scale!

*Why was it wasted? It got rotten, we cooked too much, expiry date, etc.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Food type: Cereals							
Amount of food wasted							
Why was it wasted?							
Food type: Vegetables							
Amount of food wasted							

Why was it wasted?							
Food type: Legumes							
Amount of food wasted							
Why was it wasted?							
Food type: Fruit							
Amount of food wasted							
Why was it wasted?							
Food type: Meat							
Amount of food wasted							
Why was it wasted?							
Food type: Fish							
Amount of food wasted							
Why was it wasted?							
Food type: bread and pastries							
Amount of food wasted							

Why was it wasted?							
Food type: others							
Amount of food wasted							
Why was it wasted?							

By the end of the week, learners may reflect on the following questions:

- What's the total amount of food you wasted during this week (in grams)?

- Which are the types of food with the highest waste weights?

- What are the main reasons why food becomes waste?

References

BBC (2020) Food Waste: What is it and how does it affect the environment?, accessible at: https://www.bbc.co.uk/newsround/54466096

European Commission (n.d.) *Food Waste*, https://food.ec.europa.eu/safety/food-waste_en

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Lai, Olivia (2021) *What is Food Waste*, accessible at: https://earth.org/what-is-food-waste/

UN (2021) *Food waste: a global problem that undermines healthy diets*, accessible at: https://news.un.org/en/story/2021/09/1101532

3. Countering misinformation about climate topics.

Step 1. Form the groups.

- According to the size of your class, divide the learners into groups of four for better collaboration and in case of small classes you may divide them into two.

- The members of each group will work as journalists and each group will represent a different TV channel or newspaper/ magazine.

- The members will work as reporters, so they need to find out and cross check information online, prepare their findings in a presentation and finally present them to the whole class.

Step 2. Topic and objectives

Introductory Activity– Engaging previous knowledge:

Start the discussion by asking participants how much they know about the different types of fake news - disinformation, misinformation, and propaganda. If they are not aware of precise definitions, ask them about their opinion. Following a brief discussion, explain the differences among these terms and provide examples. Show the examples online and write down the definitions on a flipchart.

Problem given:

The caption depicts a cormorant that became trapped in a massive oil spill. According to the media and broadcasts at that time and the foreign news agencies, this occurred after the oil fields in Kuwait were bombed by Iraqi planes.

Based on the information you have, work in groups and:

- discuss what you see in the picture and guess what this caption is about.

- you may now make use of the internet and your knowledge so far and indicate if the above information is real or fake.

- Do you know any misinformation examples from previous war incidents that caused environmental pollution?

Figure 4 - Source: https://www.rizospastis.gr/story.do?id=11599616

Context:

This scenario is for a high school environment class. The scenario can be adapted to focus on different types of fake news around the internet and in press, such as misinformation about war and/ or environmental challenges and issues.

Objectives:

By the end of this scenario, the learners should be able to:

- develop critical thinking in environmental issues,

- be aware of ways to fact check the news,

- know how to seek for and find the real news,

- cross check the reliability of what they read,

- recognise, if the excerpts they read are real or induce propaganda/ misinformation.

Materials

• Informational texts or images, presentations on environmental pollution caused by wars.

• Presentation tools, such as PowerPoint, Canva, Google Sheets, flipcharts, etc.

Answer:

This photograph of the cormorant remains even today as a symbol of the "war of propaganda" in the Persian Gulf. What had happened? During the allied operations against Iraq, a photograph of a cormorant that had fallen into the huge oil slick after the bombing of Kuwait's oil fields by Iraqi planes was broadcast by foreign news agencies during the Iraqi- Kuwait war.

The photo was accompanied by a caption about the enormity of the ecological disaster caused by the Iraqis. One more reason to justify the American raid. But a few hours later, it turned out that the photo of the cormorant had nothing to do with the events. It had been taken months ago, off the coast of Brittany, when a huge slick was created in the English Channel after an oil tanker sank.

Step 3. Investigation on the topic through informational texts
What Exactly Is Climate Misinformation?

Climate misinformation refers to false or misleading information about climate change that distorts scientific evidence, misrepresents the causes and effects of climate change, or downplays the urgency of addressing the issue. It encompasses a wide range of claims, narratives, and arguments that seek to sow doubt, confusion, or apathy regarding the reality and severity of climate change. Climate misinformation can be spread through various channels, including social media, news outlets, political discourse, and vested interests seeking to maintain the status quo.

In the age of information, misinformation about climate change proliferates on social media platforms, creating confusion and hindering collective action. Despite overwhelming scientific consensus, various misleading claims continue to circulate, undermining efforts to address the existential threat of climate change. Here the aim is to debunk some of the most prevalent misinformation surrounding climate change.

Claim 1: A 'Grand Solar Minimum' will halt global warming.

Misconception: Some argue that a natural decrease in solar activity, known as a Grand Solar Minimum, will counteract global warming caused by human activities.

Reality: While a Grand Solar Minimum is a genuine phenomenon, scientific evidence indicates that its potential cooling effect is insufficient to offset anthropogenic warming. Human-induced greenhouse gas emissions remain the primary driver of climate change.

Claim 2: Global warming is beneficial.

Misconception: Certain narratives suggest that global warming will create more habitable conditions and reduce cold-related deaths.

Reality: While it's true that some regions may experience temporary benefits from warming, such as milder winters, the overall impacts of climate change are profoundly negative. Rising temperatures exacerbate extreme weather events, disrupt ecosystems, and threaten food security, outweighing any localised benefits.

Claim 3: Climate change action will impoverish people.

Misconception: Opponents of climate action argue that transitioning away from fossil fuels will harm economic growth and disproportionately affect the poor.

Reality: While fossil fuels have historically driven economic development, the long-term costs of inaction far outweigh the short-term benefits. Studies indicate that unchecked climate change could

significantly reduce global GDP due to increased risks from extreme weather events and resource scarcity, disproportionately impacting vulnerable communities.

Claim 4: Renewable energy is unreliable and ineffective.

Misconception: Critics claim that renewable energy sources, such as wind and solar power, are unreliable and incapable of meeting energy demands.

Reality: While renewable energy systems may face challenges, technological advancements have significantly improved their reliability and efficiency. Instances of blackouts attributed to renewables are often misrepresented, overlooking systemic failures in energy infrastructure management. Moreover, renewable energy offers long-term sustainability benefits, outweighing any short-term drawbacks.

Climate misinformation poses a significant obstacle to meaningful action on climate change. By understanding and debunking common misconceptions, we can empower individuals to make informed decisions and advocate for evidence-based policies. Addressing climate change requires collective effort, grounded in scientific understanding and responsible communication. As we confront the greatest challenge of our time, combating misinformation is essential to safeguarding the future of our planet and its inhabitants.

COP26: The truth behind the new climate change denial

When someone deliberately spreads misinformation with the intent to mislead, it is called **disinformation**.

What is climate disinformation? | Global Witness

Much of this intentionally misleading content about climate change or renewable energy has been supported by a handful of industries, particularly the fossil fuel industry, and often conceived by conservative think tanks and front groups. Then various "influencers" can help to amplify it into **fake news**.

Fake news is **false or misleading information presented as news**.

What effect does it have?

In the context of climate change, misinformation can be seen in the types of behaviour and information which casts doubt on well-supported theories, or in those activities which attempt to discredit climate science.

Why does it matter?

Misinformation, disinformation and fake news about climate change is an obstacle to meaningful climate action.

Understanding the issues associated with climate requires an agreement on a set of basic climate facts which are available from reputable organisations.

11 Interesting Climate Change Facts | Earth.Org

How does it spread?

Some people seek to encourage doubt, scepticism and denial about climate facts. Their aim is to limit the impact of scientific knowledge and prevent action leading to the rejection of climate mitigation policies.

A network of organisations is involved in financing, producing, and amplifying climate misinformation.

Excerpt 1

Navigating the Seas of Climate Misinformation and Corporate Accountability

The battle against climate misinformation and the distortion of climate facts persists as a parallel narrative to efforts aimed at reducing emissions and implementing effective policies. In today's digital age, where information spreads rapidly through

social media and online platforms, the dissemination of misleading information, images, and videos plays a significant role. This misinformation seeks to sow doubt, confusion, and complacency regarding the urgency of addressing climate change.

Across the internet, news outlets, and social media platforms, millions of views and shares of articles and videos contribute to the spread of misinformation. Let's delve into a typical example below.

Misinformation abounds in the realm of climate science, with various instances aimed at undermining the scientific consensus. For instance, climate sceptics once circulated a graph supposedly showing global cooling trends in the 1970s to cast doubt on climate science. However, further analysis revealed that the graph misrepresented scientific data by cherry-picking isolated cooling trends while disregarding the overall warming trajectory.

THE MYTH OF THE 1970s GLOBAL COOLING SCIENTIFIC CONSENSUS BY THOMA S C . PETERSON , WILLIA M M . CONNOLLEY , AN D JOH N FLECK.pdf

Another notorious case is the manipulation of climate data known as "Climategate." Sceptics seized upon hacked emails from climate scientists, alleging misconduct and data falsification. Despite subsequent investigations finding no evidence of scientific malpractice, the damage to public trust in climate science was already done.

The Independent Climate Change Email Review - Library

A symbol of misinformation in the climate discourse is the controversy surrounding the "hockey stick graph," illustrating a sharp increase in global temperatures in recent decades. Despite efforts to discredit it, numerous independent studies have reaffirmed its validity and the reality of anthropogenic climate change.

Global-scale temperature patterns and climate forcing over the past six centuries

Furthermore, the narrative of environmental responsibility often places undue emphasis on individual actions, such as reducing single-use plastic consumption or recycling efforts. However, there exists a significant disparity between the environmental impact of individual behaviours and that of large corporations.

While consumers are urged to minimise their use of single-use plastics, a substantial portion of ocean pollution stems from industrial sources, notably the fishing industry. Massive amounts of plastic waste, including discarded fishing nets, are irresponsibly dumped into the oceans annually, posing a significant threat to marine ecosystems.

Despite this reality, big corporations often shift blame onto individual consumers, deflecting attention from their own environmental footprint. Ad campaigns and corporate messaging tout the importance

of recycling and reducing plastic consumption while ignoring the systemic issues perpetuated by industrial pollution.

For instance, the focus on reducing consumer plastic waste overlooks the significant environmental damage caused by abandoned fishing gear, which constitutes a considerable portion of ocean plastic pollution.

THE RECYCLING MYTH- MALAYSIA AND THE BROKEN GLOBAL RECYCLING SYSTEM

To effectively address environmental degradation, it's crucial to hold corporations accountable for their actions. This necessitates greater transparency, regulation, and corporate responsibility measures to ensure that industries prioritize sustainability over short-term profits.

Excerpt 2

Climate change misinformation fools too many people – but there are ways to combat it.

In recent decades, we have watched climate change shift from being an abstract threat discussed on the news to an increasingly common presence in everyday life. As the frequency and intensity of heatwaves, floods and other extreme weather events has risen, so has public concern about climate change. A 2019 poll found 80% of people were fairly or very worried, while a more recent survey ranked climate change as the most important issue.

The results

 YouGov and The Conversation, asked 1,722 people in the UK to read five real and four fake news headlines about climate change. Almost half (46%) mistakenly believed that "Scientists disagree on the cause of climate change" and 35% incorrectly thought that "Scientists believe the Sun has impacted the Earth's rise in temperature".

However, most respondents also correctly identified fake headlines such as "Carbon dioxide levels are tiny. They can't make a difference" (70%) and "Melting an ice cube in a measuring cup full of water doesn't raise the water level, so melting icebergs cannot raise sea levels" (68%).

Over half of respondents correctly guessed the real headlines "More than one million species are at risk of extinction by climate change" (65%), "Earth had its second warmest year in recorded history in 2019" (62%), and "The worst impacts of climate change could be irreversible by 2030" (55%).

But only 15% knew that "Switching to jet fuel made from mustard plants would reduce carbon emissions by nearly 70%" was false, and only 34% were right in thinking that "Enough ice melted on a single day to cover Florida in two inches of water".

We also asked people how much trust they had in certain sources of climate change information. While online influencers (6%), social media outlets (7%), tabloid newspapers (13%), politicians (20%), journalists (30%), broadsheet newspapers

(37%), and broadcast media outlets (38%) were among the least trusted sources, the vast majority trusted academics (67%) and their own friends and family (59%) to convey information about climate change that was trustworthy.

A majority of those we surveyed thought accurate reporting was important, with 78% saying that climate change misinformation is very or fairly damaging to efforts to tackle the climate crisis.

When asked about media coverage of climate change, 39% claimed that media reporting overall was too abstract, with excessive focus on the future rather than the issues of today. Similarly, 29% thought media coverage was confusing, citing too many conflicting opinions (55%) and a distrust of politicians (55%) and news outlets (54%).

Finally, most respondents (59%) were worried about climate change, with an even larger majority (80%) reporting a general willingness to make relevant lifestyle changes to stem the crisis.

What this means

Despite widespread awareness of the problems caused by fake news, many people we surveyed didn't recognize their own role in this process. While the large majority worried about the effects of climate change misinformation and said that they didn't share it themselves, 24% reported hardly ever fact-checking the information they read.

This could suggest the public aren't sure which sources are reliable, making them more vulnerable to the very misinformation they see as damaging to the cause of tackling climate change.

Clearly, more can be done to educate people on how to distinguish real from fake climate change information. One way to do this is through a process called inoculation, or pre-bunking.

Just as vaccines train cells to detect foreign invaders, research has shown that stories which pre-emptively refute short extracts of misinformation can help readers develop mental antibodies that allow them to detect misinformation on their own in the future. Recent work has even used games to help people detect the larger strategies that are used to spread misinformation about climate change.

Although social media companies such as Facebook have started to debunk climate myths on their platform, politicians and social media outlets appear to have an untrustworthy reputation. This was not the case for sources with perceived expertise on the topic, such as scientists. We therefore recommend that the trust held towards experts should be harnessed, by more frequently disseminating their views on social media and in traditional media outlets.

Through years of research on the topic, we have identified several ingredients for trustworthy science communication. These include debunking myths and falsehoods, reliably informing people (don't persuade), offering balance but not false balance (highlight the weight of evidence or scientific consensus), verifying the quality of the underlying evidence, and explaining sources of uncertainty.

If communicators want to earn people's trust, they need to start by displaying trustworthy behaviour.

Source: as edited and adopted by [*Climate change misinformation fools too many people – but there are ways to combat it*](#)

Step 4. Planning

Now that you have read and learned about the dis-misinformation about climate topics on media, work in groups again and **search through the Internet for possible solutions and develop a plan with ways to reduce or fight propaganda.** To present your answers:

-   use the additional resources to help you with your research,

-   use the following table as a template and draft to organise the material you will find,

- use presentation tools for your findings.

Additional resources:

Title	Link
What is climate disinformation	https://www.globalwitness.org/en/blog/what-climate-disinformation/
Five climate change science misconceptions debunked	https://theconversation.com/five-climate-change-science-misconceptions-debunked-122570
Climate disinformation database	https://www.desmog.com/climate-disinformation-database/
Who can you trust?	https://impact.economist.com/sustainability/social-sustainability/data-point-trust-issues
WWF 10 Myths about climate change	https://www.wwf.org.uk/updates/here-are-10-myths-about-climate-change
The Future of Truth and Misinformation Online	https://www.pewresearch.org/internet/2017/10/19/the-future-of-truth-and-misinformation-online/

Action Plan

Possible solution 1	
Goal of the possible solution	
How this solution/ proposal fights/ reduces misinformation	

Copy and paste this table as many times you wish according to the solutions you will find.

Step 5. Assessment

In this learning scenario we will make use of the **formative assessment**. Students will represent their findings in the classroom, and they will assess understanding through class participation and group discussion. Formative evaluation aims to track student progress and provide ongoing feedback that instructors can use to improve their instruction and that students can use to enhance their learning.

During each activity the trainers can gather information about the participants' engagement, cooperation with each other, interest on the topic and willingness to communicate and exchange ideas and knowledge. It is a good idea to keep notes during the training session and write down phrases, words being said and interesting things that happened.

By the end of the session, teachers can test learners' knowledge in multiple ways. It might happen during discussion or through activities. In this case, we propose the following formative assessment methods, and teachers may choose the one that fits better to their needs:

1. Online (on Google Jamboard) or in-person classes you may use flipcharts or even empty walls and ask your participants to write on post-it notes the following:

What are mis-disinformation about climate topics?	Present some of the fake news & facts	Present some ways to fight misinformation.

2. Or use the following quiz crated on Mentimeter. You can use the questions themselves or adjust them to your class needs and requirements.

References:

Carnegie Mellon University. (n.d.). *Formative vs Summative Assessment - Eberly Center - Carnegie Mellon University*. https://www.cmu.edu/teaching/assessment/basics/formative-summative.html#:~:text=The%20goal%20of%20summative%20assessment,a%20midterm%20exam m

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Results – My Eco Track. (n.d.). https://myecotrack.eu/results/

4. Diminishing plastic waste.

Scenario 4 [Waste]: Diminishing plastic waste

ECO-LITERACY AND GREEN EDUCATION FOR CLIMATE ACTION (ECOLITACT)

PROJECT No: 2022-1-SE01-KA220-VET-000086868

Scenario Overview

You are a group of environmental enthusiasts and concerned citizens who are deeply troubled by the growing problem of plastic waste in your community.

Plastic waste poses significant threats to the environment, wildlife, and human health. You have decided to take action and come together to address this issue head-on.

By actively engaging in this problem-based learning scenario, your group will not only gain a deeper understanding of the plastic waste issue but also contribute to the well-being of your community and the environment.

Problem Statement

Your community faces a rising issue of plastic waste pollution, impacting local ecosystems, waterways, and public spaces. You believe that it is essential to find innovative and sustainable solutions to diminish plastic waste and promote responsible plastic consumption in your community.

Learning Objectives

o To understand the environmental impact of plastic waste
o To explore the causes and sources of plastic waste in your community
o To identify and evaluate potential solutions to diminish plastic waste
o To develop an actionable plan to address the problem and raise awareness in your community
o To assess the effectiveness of your proposed solutions

Plastic waste in Europe

o *Plastic Waste Generation* - Europe is a significant producer of plastic waste. In 2018, Europe generated approximately 30.1 million metric tons of plastic waste.

o *Plastic Waste Recycling Rate* - The European Union has been working to improve plastic waste management and recycling. As of 2020, the EU's plastic recycling rate was around 42.4%. However, recycling rates can vary significantly from one European country to another.

o *Plastic Packaging* - Plastic packaging constitutes a significant portion of plastic waste in Europe, estimated at around 40% of all plastic produced. Efforts have been made to reduce single-use plastics and promote more sustainable packaging options.

o *Single-Use Plastics* - The EU has taken measures to reduce single-use plastics. The Single-Use Plastics Directive, adopted in 2019, aims to ban or limit the use of certain single-use plastic products such as straws, cutlery, and plates.

o *Microplastics* - Microplastics, tiny plastic particles, have become a concern in Europe's waterways and oceans. They can originate from various sources, including the breakdown of larger plastic items and microbeads in personal care products.

Problem Investigation

As a group, you will conduct a thorough investigation into the plastic waste problem in your community.

Your investigation should include:

o Collecting data on the amount and types of plastic waste generated
o Identifying the main sources of plastic waste (e.g., households, businesses, public events)
o Analyzing the impact of plastic waste on local ecosystems, wildlife, and human health
o Interviewing local experts, environmental organizations, and community members to gather insights

Solution Development

With a better understanding of the problem, your group will brainstorm and develop potential solutions to diminish plastic waste.

Your solutions should:

o Address the identified sources of plastic waste
o Promote responsible plastic consumption and recycling
o Consider the feasibility and cost-effectiveness of each solution
o Be sustainable and environmentally friendly

Action Plan

After evaluating your potential solutions, your group will create a comprehensive action plan to tackle the plastic waste problem in your community.

Your action plan should include:

o Specific steps for implementing each solution
o A timeline for the execution of your plan
o Allocation of responsibilities among group members
o Strategies for raising awareness and engaging the community
o A budget and funding sources, if necessary

Evaluation and Reflection

Once you have implemented your action plan and worked on diminishing plastic waste in your community, it's time to evaluate the effectiveness of your efforts.

Your evaluation should involve:

o Measuring the reduction in plastic waste over a specified period
o Gathering feedback from community members and stakeholders
o Assessing the overall impact on local ecosystems, wildlife, and human health
o Reflecting on the challenges faced and lessons learned throughout the project
o Identifying opportunities for further improvement and sustainable practices

Conclusions

This problem-based learning scenario empowers you and your group to take action and make a positive difference in your community by addressing the pressing issue of plastic waste.

As you work through each stage of this scenario, you will gain valuable knowledge and skills in environmental conservation, problem-solving, and community engagement.

Final Assessment questions

- How has your understanding of the environmental impact of plastic waste evolved as a result of participating in this activity?
- Can you identify specific causes and sources of plastic waste in your community that you were unaware of before engaging in this scenario?
- Describe any innovative or unexpected solutions to diminish plastic waste that emerged during your group's brainstorming sessions. How did these ideas change your perspective?
- Did your group encounter any unexpected challenges or obstacles while implementing your action plan? How did you adapt and overcome them, and what did you learn from these experiences?

References

- "Plastic waste and recycling in the EU: facts and figures", (2023), European Parliament https://www.europarl.europa.eu/news/en/headlines/society/20181212STO21610/plastic-waste-and-recycling-in-the-eu-facts-and-figures
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Thank you!

ECO-LITERACY AND GREEN EDUCATION FOR CLIMATE ACTION (ECOLITACT)

PROJECT No: 2022-1-SE01-KA220-VET-000086868

Co-funded by the European Union

5. How to reduce your carbon footprint.

The Learning Scenario

Problem given: *Some people place great pressure on the environment.* There are many households that find themselves in the top 1% of polluters in the EU. They have carbon footprints that are 22 times larger than the safe limit of 2.5 tonnes. On average, people in this group emit greenhouse gasses equivalent to 55 tonnes of CO_2 per person per year.

What are the main causes of Co2 emissions? How can you reduce your carbon footprint?

In the following learning scenario, you will learn about the main causes and the best solutions to reduce Co2 emissions.

Context: This scenario is for VET learners. It can be adapted to other sectors and to solve other problems related to the topic of carbon footprint.

Objectives of the learning scenario:

1. learn about Carbon Footprint and environmental issues;

2. focus on your habits and how good/ bad they can be for our planet;

3. find possible changes you can make on a daily basis to reduce your bad impact on the environment;

4. learn how to provide and show solutions to an environmental problem

Step 1. The groups.

The participants in the learning scenario are divided into groups.

Each group chooses a **fictional private household**, between the following:

Family one					
Member	Mother	Father	Son	Daughter	
Job	lawyer	teacher	university student	middle school student	
Diet	pescatarian	omnivorous diet	omnivorous diet	omnivorous diet	

Grocery details	the family often buys processed and packaged food				
Travel habits	travels often for work	travels a couple of times a year for family holidays	travels a few times a year with his friends	travels a couple of times a year for family holidays	
Main Travel transport	plane	plane	car or bus	plane	
Financial Status of the family	medium/average family				
House type	Freestanding running water, constructed with brick and concrete				
Electricity consume	the house generates electricity and is averagely energy efficient				

Family two					
Member	Mother	Mother	Son	-	
Job	doctor	currently unemployed	primary school	-	
Diet	vegan	vegan	omnivorous diet	-	
Grocery details	The family tries to buy as much bio food as possible but not always.				
Travel habits	travels a couple of times a year for family holidays	travels a couple of times a year for family holidays	travels a couple of times a year for family holidays	-	

Main Travel transport	plane	plane	plane	-	
Financial Status of the family	above the average family				
House type	duplex, constructed with steel and other				
Electricity consume	the house generates energy from renewable resources				

Family three					
Member	Father	-	Son	Son	
Job	movie producer	-	high school	high school	
Diet	omnivorous diet	-	omnivorous diet	vegetarian	
Grocery details	The family mainly buys high quality unprocessed and unpackaged food.				
Travel habits	travels up to 20 times a year because of his job	-	travels a few times a year to visit the mother	travels a few times a year to visit the mother	
Main Travel transport	private jet or plane		plane	plane	
Financial Status of the family	wealthy family				
House type	Luxury Condominium, constructed with steel and other				

Electricity consume	the house generates electricity and is avery energy efficient

Family four					
Member	Father	Mother	Daughter	Daughter	Son
Job	electrician	nurse	high school	Phd student	high school
Diet	omnivorous	omnivorous	omnivorous	omnivorous	omnivorous
Grocery details	The family mainly buys processed and packaged food.				
Travel habits	travels a couple of times a year for family holidays	travels a couple of times a year for family holidays	travels a couple of times a year for family holidays	travels a few times a year to visit her family.	travels a couple of times a year for family holidays
Main Travel transport	car or bus	car or bus	car or bus	plane	car or bus
Financial Status of the family	average family				
House type	multi storey apartment, constructed with brick and concrete				
Electricity consume	the house generates electricity and is low energy efficient				

Step 2. Investigate the topic
Climate Change and Global Warming
What Is Climate Change? | United Nations

"Climate change is a long-term **change in temperatures and weather patterns**. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human

activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures."[12] The main greenhouse gasses that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. Agriculture, oil and gas operations are major sources of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main sectors causing greenhouse gasses.

But can the terminology climate change be exchanged with global warming?

The answer is no. Because when we talk about global warming we refer simply to one of the aspects of climate change, the one that refers to the long - term warming of the planet. For this reason, we affirm that global warming is one of the reactions to climate change.

CO2. Carbon dioxide

What is Carbon Dioxide? How it affects your health & why you should measure | Airthings

"Carbon Dioxide or CO_2 is a greenhouse gas that is natural and harmless in small quantities, but as levels rise it can affect productivity and sleep. CO2 is produced by the air we exhale and CO_2 levels tend to concentrate indoors with less ventilation."[13]

But why is something naturally created bad for our planet?

You have probably heard of CO_2 emissions in the news that as **CO_2 builds up in our atmosphere from fossil fuels** (e.g. coal and oil), it has a warming effect that could change the earth's climate.

Carbon footprint.

What Is Carbon Footprint and Why Does It Matter in Fighting Climate Change? | Earth.Org

In relation to CO2, we might have heard of Carbon footprint.

What is exactly the carbon footprint and why is it important?

"Carbon footprint is the amount of carbon dioxide (CO_2) emissions associated with all the activities of a **person** or **other** entity (e.g., building, corporation, country, etc.). It calculates how a person's or an entity's activities contribute to climate change.

It includes direct emissions, such as those that result from fossil-fuel combustion in manufacturing, **heating, and** transportation, as well as emissions required to produce the electricity associated with goods and services consumed. In addition, the carbon footprint concept also often includes the emissions of other greenhouse gasses, such as methane, nitrous oxide, or chlorofluorocarbons (CFCs)."[14]

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[12] United Nations. Climate Action, *What is climate change?*

[13] Airthings. *What is Carbon dioxide? How it affects your health & why you should measure.*

[14] Hamza Badamasi. (2023). *What is carbon footprint and why does it matter in fighting climate change?.* Earth. org
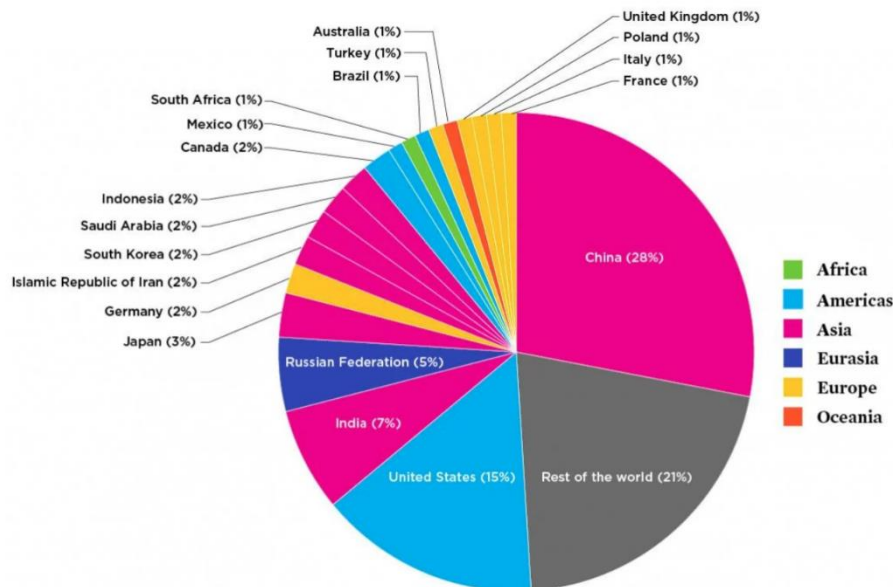
Can we reduce our emissions?

Individuals and corporations can take a number of steps to reduce their carbon footprints and thus contribute to global climate mitigation. Carbon footprints can be reduced through improving energy efficiency and changing lifestyles and purchasing habits. For example, using public transportation, such as buses and trains, reduces an individual's carbon footprint when compared with driving. Individuals and corporations can reduce their respective carbon footprints by installing energy-efficient lighting, adding insulation in buildings, or using renewable energy sources to generate the electricity they require. For example, electricity generation from wind power produces no direct carbon emissions.

Additional lifestyle choices that can lower an individual's secondary carbon footprint include reducing one's consumption of meat and switching one's purchasing habits to products that require fewer carbon emissions to produce and transport.

Now check the following graphics to see where your country stands in the list of countries that are producing the most carbon emissions

© 2020 Union of Concerned Scientists
Data: Earth Systems Science Data 11, 1783–1838, 2019

Step 3. What's your carbon footprint?

Now that you learned about Carbon Footprint, each group takes the following test about Carbon Footprint. **The answers to the quiz should be given depending on the habits and characteristics of the fictional family you choose.**

Consider each member of the family singularly and discuss every question of the quiz in the group before answering.

Ecological Footprint Calculator

Take your time to discuss the results of the "Ecological Footprint calculator" and collect the results of what is causing the most amount of Co2 emissions in your fictional family.

Step 4. Planning.

Given the problem of Co2 emissions in Europe, and after

learning about Carbon Footprint and your impact on our planet,

What do you think would be the <u>smartest and most efficient way</u> for your household to reduce your carbon footprint?

Step 5. Summative assessment and Presentation

Now that you found a solution to your problem, gather the information and summarize it. Work on a presentation to share your findings with the whole class!

Step 6. Follow – up activity

What did you learn about the topic of Carbon Footprint?

Let's find that out with our quiz

https://view.genial.ly/6475acc5872f180018e90ca3/interactive-content-what-do-you-know-about-the-carbon-footprint

Have fun and be mindful !!

1. **" Global warming" is**

- The same thing as "climate change"
- One aspect of "climate change" that refers to the long - term warming of the planet. ✔️

(If you have differentiated between the two phenomena you are correct. Global warming and climate change are not exactly the same thing, but the latter is a consequence of current climate change.)

- Both answers are correct.

2. **Which one of the following affirmations regarding CO2 is true.**

- CO2 acts like the glass in a greenhouse by keeping some of the heat from the sun trapped inside the earth's atmosphere. ✔️

(Human activities are changing Earth's natural greenhouse effect. Burning fossil fuels like coal and oil puts more carbon dioxide into our atmosphere.)

- CO2 levels haven't been accelerating fast over the last 2 couple of centuries.
- Co2 emissions don't have to be fast limited.

3. **Select the correct definition of Carbon Footprint**

- the amount of carbon dioxide released into the atmosphere. ✔️

(Globally, the average carbon footprint is closer to 4 tons. Lowering individual carbon footprints doesn't happen overnight! By making small changes to our actions, like eating less meat, taking fewer connecting flights and line drying our clothes, we can start making a big difference.)

- the level of coal mined from mines annually in the world.

- the level of food wasted in a month by an average american healthy family.

- the level of pollution in the sea and air.

4. **Select the sector with the highest CO2 emissions**

- Farming

- Agriculture
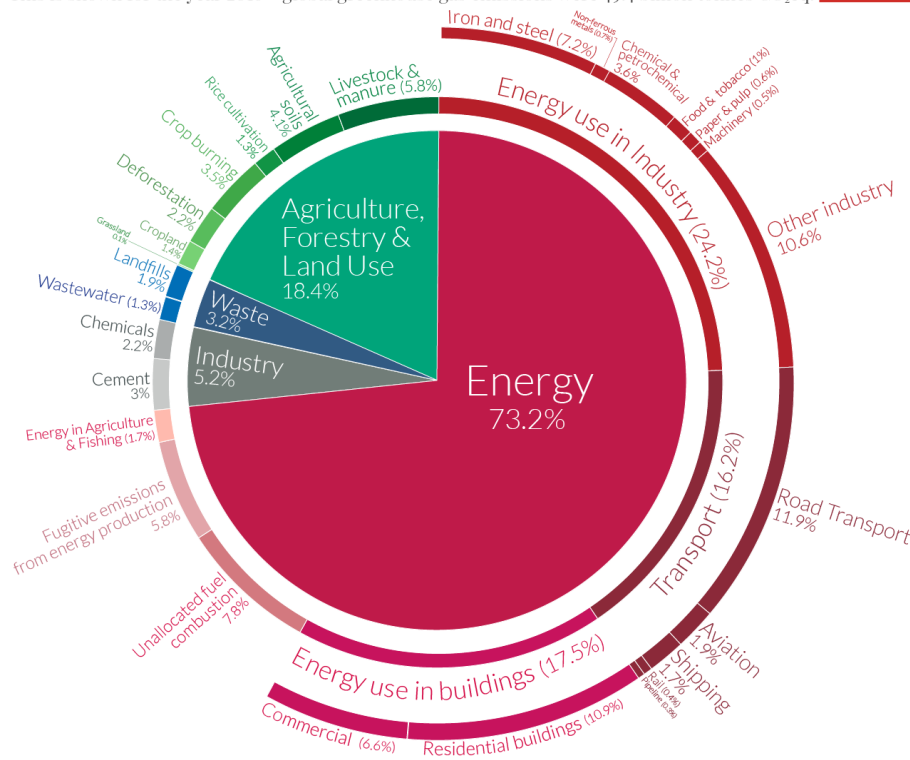
- Transport

- Energy production ✔️

Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

Our World
in Data

1. **Select among the following habits, the ones that can lower your CO2 emissions**

- Fly non stop
- Turn your water heater down ✔️

(The UE also recommends this actions to lower your carbon footprint: Consume local and seasonal products; bring reusable shopping bags and avoid products with excessive plastic packaging; try swapping, borrowing; renting or buying second-hand; cycle or use public transport; turn down the heating by 1°, it will already make a difference.)

- Don't get politically active
- Opt for a laptop instead of a desktop computer

2. **What EU country produce the highest CO2 emissions:**

- Italy
- Poland
- Germany ✔️

(The 27 member states of the European Union have accounted for about 20% of global cumulative carbon dioxide (CO2) emissions since 1750 (excluding land use, land use change, and forestry). Moreover, amid the global climate crisis, the devastating consequences of human-induced global warming are already seen, predominantly in vulnerable countries of the Global South but also in Europe.)

- Spain

- France

3. **What country in the world produces the highest CO2 emissions:**

- United States

- Japan

- Russia

- China ✔️

(You're doing great! You can click here to check your country's annual CO2 emissions)

- Saudi Arabia

4. **Which of the following affirms is right?**

- 85% of organizations in the world aren't concerned about reducing their greenhouse gas emissions

- 96% of organizations in the world have set targets for reducing emissions in at least one scope ✔️

(11% of organizations in the world have cut their emissions in line with their ambitions over the past five years)

Self – assessment questions

1. Question 1: What contributes to carbon footprints?

  - A. Eating more vegetables

  - B. Using renewable energy sources

  - C. Traveling frequently by plane

Correct Answer:

C. Traveling frequently by plane

Traveling frequently by plane is a significant contributor to carbon footprints because air travel generates substantial carbon dioxide (CO2) emissions. The burning of jet fuel releases CO2 and other greenhouse gasses into the atmosphere, contributing to climate change.

Why A and B are Wrong:

A. Eating more vegetables: While a diet rich in vegetables may have environmental benefits, it's not the primary factor contributing to carbon footprints discussed in the context.

B. Using renewable energy sources: Using renewable energy sources is an environmentally friendly choice that reduces carbon footprints. Therefore, this option is not the correct answer in the context of factors contributing to carbon footprints.

2. Question 2: How can carbon footprints be reduced?

- A. Eating more processed foods

- B. Using energy-efficient appliances

- C. Driving long distances daily

Correct Answer:

B. Using energy-efficient appliances

Using energy-efficient appliances reduces carbon footprints because they consume less energy, which typically comes from fossil fuels. This reduces the greenhouse gas emissions associated with energy consumption.

Why A and C are Wrong:

A. Eating more processed foods: Consuming processed foods doesn't directly relate to reducing carbon footprints. In fact, some processed foods may have a larger carbon footprint due to their production and packaging.

C. Driving long distances daily: Driving long distances daily increases carbon footprints because it involves the burning of gasoline or diesel fuel, leading to higher CO2 emissions. Therefore, this is not the correct answer for reducing carbon footprints.

3. Question 3: Which country produces the highest CO2 emissions in the world?

- A. Italy

- B. Japan

- C. China

Correct Answer:

C. China

Explanation: China is the country that produces the highest CO2 emissions in the world. This is due to its large population, extensive industrial activities, and high energy consumption.

Why A and B are Wrong:

A. Italy: Italy is not the highest emitter of CO2 in the world. It has a smaller industrial output and population compared to China.

B. Japan: Japan is not the highest emitter of CO2 either. While it has a significant industrial base, it doesn't surpass China in terms of total emissions.

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