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| **MODULE 5** | **THE IMPACTS OF THE ENVIRONMENTAL PROBLEMS AND CLIMATE CHANGE** |
| **PART 3** | **CLIMATIC AND ENVIRONMENTAL CHALLENGES** |
| **Lesson 1** | **How do environmental problems affect human health?** |

**SUMMARY**

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# 1. COURSE TIME, TARGET AND TOPIC

* **Age of target students:** 15+
* **Teaching time:** 1 hour
* **Disciplines:** English, biology, social studies
* **Title:** How do environemntal problems affect human health ?

# 2. COURSE OBJECTIVES

## Competences promoted in this lesson:

* Communication in foreign languages competency
* Digital competency
* Learning to learn competency
* Social and health-related competencies

## Lesson objectives:

* Students explain the direct and indirect impacts of environmental problems, including pollution and climate change, on human health.
* Students reach data and analyze the data to draw conclusions about the diseases derived from pollutants.

# 3. LEARNING – TEACHING PROCESSES

There are 4 activities in this lesson:

1. **ENGAGE:** watch a short clip from a 2000 film entitled ‘Erin Brockovich’ and answering the water pollution related questions.
2. **EXPLORE: Digging time** (students look for data on the internet and prepare short presentations concerning the impact of various environmental problems on human health)
3. **EXPLAIN: What have you dug out?** (presentation of the key findings)
4. **EXTEND: At the doctor’s** (students play role plays to further explore the impacts of environmental problems on human health)

# 4. EVALUATION

The evaluation is described in the last part of document.

# 5. DOCUMENTS

### ENGAGE

### *Watching a short video*

1. Ask the students to watch a short clip from a 2000 film entitled ‘Erin Brockovich’ and answer the questions:

* Why doesn’t the woman want to drink this water? (Suggested answers: It’s contaminated/ intoxicated with the same poisonous element that ruined the health of the hundreds of plaintiffs who are represented by Erin Brockovich and the legal office she works for).
* What are they talking about in this video? (Suggested answers: The scene presents a legal assistant arguing about a financial offer certain compensation should amount to. She vividly describes how high the compensation should be comparing it to the price of her interlocutors’ internal organs and multiplying it. She asks her interlocutors what kind of price they would be ready to pay for their internal organs such as a spine or a uterus).
* Why in your opinion does she do it? (Suggested answers: Because she is dealing with an extremely serious issue: consuming intoxicated water affects every organ in the human body).

A link to the video : <https://youtu.be/C029muI7bFw?feature=shared>

*In case the link is deleted from youtube, feel encouraged to use the original film. The video presents the famous scene in which Erin Brockovich confronts Mr Walker and Mrs Sanchez and encourages her to drink water which comes from the source which might be polluted by the company represented by them.*

Once the students answer the questions summarise this part of the lesson by saying that the scene presents a legal assistant employed by a small law firm confronting a large corporation. In fact, it is a negotiation time. Erin is arguing about a financial offer certain compensation should amount to.

Ask the students the next set of questions: Is the water you are drinking safe to drink? How do you know? It looks clean. It smells clean. But is it clean? Are you sure? 1.8 billion people around the world are drinking faecally contaminated water.

Why do you need water? (you can’t live without it) The teacher needs to underline that water is one of the most basic things we need to live/survive.

What are the other ones? (students number: air, food, safety, health…)

It is clearly visible that a majority of them is connected with the length and quality of our lives. There is also one more factor linking them together: natural environment.

### EXPLORE

### *Digging time*

Divide the students into pairs or small groups. Assign each group with 2 environmental problems. If there are more students in the class, then one issue might be assigned to each group.

Group 1: pollution from vehicle emissions & industrial activities, temperature rise

Group 2: air pollution from PM 2.5 and NO2 (Nitrogen Dioxide) & changes in temperature and precipitation patterns

Group 3: exposure to benzene, asbestos and heavy metals & climate change affecting crops and food security

Group 4: pollution from lead and mercury & climate change: frequent heatwaves

Group 5: air and water pollution and their influence on the human mind and outer layer of a human body & climate change – induced natural disasters & environmental degradation and their influence on displacement, migration and conflicts

Each group has to do the research on the assigned problems: relate to data, numbers and how they affect humans.

10 minutes to do it and after this time they present their findings briefly.

### EXPLAIN

### *What have you dug ?*

The students present the results of their findings. The answers will vary, however, they will probably include such illnesses:

Group 1 : allergies, inflammation, oxidative stress, immunosuppression, and mutagenicity in cells throughout our body, impacting the lungs, heart, brain among other organs and ultimately leading to disease, e.g. cancer, brain strokes, heat strokes, heart attacks. Source : [Air quality, energy and health (who.int)](https://www.who.int/teams/environment-climate-change-and-health/air-quality-energy-and-health/health-impacts)

Group 2 : asthma, chronic pulmonary disease, coughing, allergies, strokes, hypertension, heart attack, stress. Source : [Changes of PM2.5 and O3 and their impact on human health in the Guangdong-Hong Kong-Macao Greater Bay Area | Scientific Reports (nature.com)](https://www.nature.com/articles/s41598-024-62019-w)

Group 3 : various cancers, e.g. leukaemia, malnutrition, internal organ shrinking leading to permanent organ damage and death, immigration, wars. Source : [Lead poisoning (who.int)](https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health)

Group 4 : coma, convulsions, death, permanent intellectual disability, heart strokes, heat strokes, death, stress, immigration, wars, heat exhaustion. Source : <https://www.who.int/health-topics/heatwaves>

Group 5: depression, anexiety, stress, allergies, death, immigration, wars, deterioration in brain functions, development of neuropsychiatric diseases, diarrhea, skin irritation, starvation. Source : [How does water pollution affect human health? (medicalnewstoday.com)](https://www.medicalnewstoday.com/articles/water-pollution-and-human-health" \l "water-pollution-and-human-health)

### EXTEND

### *At the doctor’s*

1. Explain to students that they will participate in a role-play activity to further explore the impacts of environmental problems on human health. In the pairs they did the previous task, they are going to play the roles of doctors and patients (If the number of students is uneven, there might be a parent with a child visiting a doctor).
2. Depending on the amount of time that is left, either provide each pair with a scenario related to a specific environmental problem and its health impacts (e.g., a patient suffering from respiratory problems due to air pollution) or prepare stations across the whole classroom which will be approached by the students. Prepare props: aprons (from science labs), sthetoscopes, stickers for brave patients 😉
3. Students improvise and act out a conversation between the doctor and the patient, focusing on the symptoms, diagnosis, and treatment options related to the environmental issues.

I.

Heat

Patient

Pretend you're a person who has been experiencing symptoms of heat-related illness, such as heat exhaustion or heatstroke. Tell the doctor about your symptoms (dizziness, nausea, headache, pain in the chest). Express your concerns about the increasing frequency and severity of heatwaves in your region and how they're affecting your health. Ask for advice on how to avoid heat-related risks, but explain that you do not like drinking water and ask what you could consume instead.

Doctor

You are a compassionate doctor. You ask the patient about as many details as possible. Offer to take his/her blood pressure. Offer practical advice on preventive measures (staying in shade, staying hydrated, etc.). Acknowledge the patient's concerns about heat-related illness and validate their experiences. Provide the patient with a medical certificate for absence at work.

II.

Respiratory Conditions due to Air Pollution

Patient

Imagine you're have been diagnosed with a respiratory condition caused by air pollution (asthma). Express your frustrations about the detrimental effects of air pollution on your respiratory health and quality of your life. Share your symptoms, such as coughing, wheezing, or difficulty breathing, and how they worsen during periods of high pollution.

Doctor

Provide the patient with a medical certificate for absence at work. Provide education about the sources and health effects of air pollution. Discuss practical steps to reduce exposure to air pollutants.

III. Water Contamination-related Illness

Patient

You have fallen ill due to a waterborne disease caused by contamination in your local water supply. Share details about your symptoms: rash, vomiting, stomachache. ensure the safety and purity of your drinking water and seek guidance on protecting yourself and your family from future waterborne illnesses. Discuss concerns about the environmental factors contributing to water contamination and potential solutions to address this public health issue.

Doctor

Show your compassion. Ask about symptoms and what the patient has eaten and drunk lately. Diagnose him/her with a water-borne disease, e.g. poisoning, bacterial infection. Decide on the further treatment. Discuss strategies for ensuring water safety, such as using water filters, boiling water before consumption, and staying informed about water quality reports.

IV. mental issues

Patient

You're an individual who has been experiencing anxiety and depression related to climate change. Express your feelings of overwhelm, fear, and helplessness about the worsening environmental crisis and its impact on your mental well-being. Discuss any concerns about the future and how climate change may affect your daily life, relationships. Ask for help and medicines.

Doctor

Collaborate with the patient to develop a personalized treatment plan that addresses their climate-related mental health concerns, including therapy, medication, and lifestyle modifications to enhance coping skills and promote emotional well-being. Acknowledge the patient's feelings of distress and anxiety about climate change.

V. malaria

Patient

you're experiencing symptoms such as fever, chills, headache, and muscle ache. Express your confusion and concern about these symptoms, especially since you've never traveled to Africa or other regions known for malaria. Describe the onset and progression of your symptoms, including any recent activities or exposures that may have contributed to your illness. nquire about the possibility of having malaria despite not traveling to endemic areas and seek clarification on the potential causes of your symptoms.

Doctor

Listen to the patient's description of symptoms and medical history, noting their concerns about malaria despite no travel history to Africa. Conduct a thorough physical examination and inquire about any recent activities or exposures that may have led to the patient's illness. Explain that while malaria is commonly associated with travel to endemic regions like Africa, it's possible to contract the disease through other means, such as blood transfusions or mosquito bites in non-endemic areas. Complain about the climate change. Explain how climate change may affect your health. Complain about all the changes in the world.

VI. Diarrhea

Patient:

Pretend you're a 30-year-old individual experiencing severe diarrhea, stomach cramps, nausea, and dehydration. Explain that these symptoms began shortly after drinking tap water in your local area, which you suspect might be contaminated. Express your concerns about the quality of your drinking water and its impact on your health. Inquire about the diagnosis, possible causes of water contamination, and immediate treatments to alleviate your symptoms. Ask for advice on how to ensure safe drinking water in the future and any steps you can take to protect yourself and your family from similar issues.

Doctor:

Assume the role of a compassionate and knowledgeable physician experienced in treating waterborne illnesses. Listen attentively to the patient's description of symptoms and their concerns about water contamination. Provide an explanation of how water pollution can lead to gastrointestinal issues, including diarrhea, and discuss the common pathogens and contaminants involved. Conduct a thorough examination and recommend diagnostic tests, such as stool tests, to identify the specific cause of the illness. Discuss immediate treatment options to manage the symptoms, such as rehydration therapy, anti-diarrheal medications, and possibly antibiotics if a bacterial infection is confirmed. Offer practical advice on ensuring safe drinking water, such as boiling water, using water filters, and staying informed about local water quality reports. Reassure the patient about their recovery and emphasize the importance of follow-up care to monitor their health and prevent future episodes.

VII. Heart attack

Patient:

Pretend you are a 58-year-old individual who recently suffered a heart attack. Express your concerns about the increasingly extreme weather conditions, such as heatwaves and poor air quality, and how they might have contributed to your heart attack. Describe any symptoms you experienced prior to the heart attack, such as chest pain, shortness of breath, or fatigue, and mention any stressors related to the climate, like extreme heat or poor air quality. Ask for an explanation of how climate change can impact cardiovascular health and seek guidance on preventing future heart-related incidents. Inquire about lifestyle modifications, medications, and other measures you can take to protect your heart health in a changing climate.

Doctor:

Assume the role of a knowledgeable and empathetic cardiologist familiar with the impacts of climate change on cardiovascular health. Listen attentively to the patient's account of their heart attack and any environmental stressors they believe may have contributed to it. Explain how extreme weather conditions, such as heatwaves and air pollution, can exacerbate cardiovascular issues and increase the risk of heart attacks. Conduct a thorough review of the patient's medical history, lifestyle, and any pre-existing conditions to develop a comprehensive understanding of their heart health. Discuss immediate and long-term strategies for managing heart health, including medications, dietary changes, exercise recommendations, and stress management techniques. Offer practical advice on minimizing exposure to extreme weather and poor air quality, such as staying indoors during heatwaves, using air purifiers, and monitoring local air quality indexes. Reassure the patient about their recovery and emphasize the importance of regular follow-up appointments to monitor their cardiovascular health and adjust their treatment plan as needed.

VIII. An illegal immigrant with a broken leg, no insurance

Patient Instructions:

Pretend you are a 20-year-old individual who is an illegal immigrant and recently suffered a broken leg. Express your pain and discomfort, describing how the injury occurred (e.g., a fall or accident at work). Share your concerns about not having health insurance and being unable to afford medical treatment. Explain your fear of seeking medical help due to your immigration status and potential legal repercussions. Ask for information on the available treatment options, the costs involved, and any possible financial assistance or support programs. Inquire about the healing process, pain management, and what steps you need to take to recover fully.

Doctor Instructions:

Assume the role of a compassionate and non-judgmental physician dedicated to providing care regardless of the patient's immigration status. Listen attentively to the patient's account of their injury and their concerns about the lack of insurance and legal status. Reassure the patient that your primary focus is their health and well-being, and that their immigration status will not affect the medical care they receive. Conduct a thorough examination of the broken leg, including necessary imaging (e.g., X-rays) to assess the severity of the injury. Discuss the treatment plan, which may include setting the bone, applying a cast, and scheduling follow-up appointments. Provide information on pain management and the expected recovery timeline. Offer advice on financial assistance programs, community health services, and charity care options that can help cover the costs of treatment. Reassure the patient about their recovery and emphasize the importance of following the treatment plan to ensure proper healing.

### EVALUATE

1. What were some of the direct health impacts of the environmental problems discussed by you and your partners today?
2. Can you provide examples of how these direct impacts manifest in individuals or communities affected by environmental issues?
3. How do direct health impacts differ from indirect health impacts? Can you give examples to illustrate the distinction?
4. In what ways do indirect health impacts of environmental problems pose challenges for public health interventions and policymaking?