Министерство науки и высшего образования Российской Федерации

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
РОССИЙСКИЙ ГОСУДАРСТВЕННЫЙ ГИДРОМЕТЕОРОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ

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# Ecology – Zoom in

Санкт-Петербург
РГГМУ
2021

УДК [811.111'373:502.5]
(075.8) ББК 81.432.1я73

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Ecology – Zoom in : учебное пособие / О.Е. Потапова. – Санкт-Петербург : РГГМУ, 2021. – 64 с.

Целью данного учебного пособия является не только расширение словарного запаса в области экологии, но и развитие навыков обработки русскоязычных и англоязычных текстов, развитие навыков ведения дискуссии по различным вопросам и темам, связанным с проблемой защиты окружающей среды, развитие навыков устного и письменного перевода.
Учебное пособие предназначено для студентов старших курсов, обучающихся по направлению 45.03.01 "Филология", профиль: "Зарубежная филология" (бакалавриат).

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## Введение

Сегодня вопросы экологии и окружающей среды занимают важное место в нашей жизни. Экологические проблемы, с которыми сталкивается современное общество, требуют наличия определенных знаний, умений и навыков от специалистов в разных областях.

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Комплекс упражнений и заданий, представленный в данном учебном пособии, направлен на развитие навыка осуществления межкультурного диалога в общей и профессиональной сферах общения, осуществления перевода с соблюдением норм лексической эквивалентности, соблюдением грамматических, синтаксических норм. Разнообразные лексические и коммуникативные упражнения помогут развить речевые навыки, способность формировать высказывания различных типов,  – то есть сформировать коммуникативную компетенцию на основе лингвистического, прагматического и социокультурного компонентов.

Данное учебное пособие предназначено для студентов старших курсов, обучающихся по направлению 45.03.01 "Филология", профиль: "Зарубежная филология" (бакалавриат), а также может быть использовано на занятиях со студентами магистратуры, обучающихся по специальности 45.04.01 «Теория и практика перевода в профессиональной коммуникации» при освоении дисциплины «Практический курс перевода в сфере профессиональной коммуникации».

## Ecology Today

Everything that surrounds or affects all organisms during their lifetime is collectively referred to as the environment. It comprises both living (biotic) and nonliving (abiotic) components.

Human civilisation and globalisation are the dominant culprits of constant change in the global environment. Various processes that can be said to contribute to the global environmental problems include pollution, global warming, ozone depletion, acid rain, depletion of natural resources, overpopulation, waste disposal, deforestation and loss of biodiversity.

These processes are the result of the use of natural resources in unsustainable manner. They have highly negative impact on our environment. One of the major impacts is the release of large quantities of carbon dioxide and other greenhouse gases in atmosphere as the result of burning of fossil fuels by industries and automobiles.

The rapidly growing demographic structure and globalisation are leading to a number of environmental issues owing to the uncontrolled deforestation, urbanisation, industrialisation and loss of useful agriculture land. The global environmental health impact remains profoundly perturbing. Poor hygiene conditions and sanitation, water and air pollution and global climate change accounts for nearly a tenth of deaths and disease burden worldwide.

The result is the worldwide pollution problem, temperature fluctuation of our planet, ozone hole and possible change in Earth's climate. Loss of forests, damage to water bodies (lakes and ponds) and their ecosystems by acid rain, over-exploitation of natural resources, massive extinction of species due to habitat destruction and other well-known causes worldwide are connected with environmental issues globally.

Due to above-mentioned environmental issues, our planet is facing severe environmental crisis. Current environmental problems lead to disasters and tragedies now, will also be the reason of casualties in future and require urgent attention from the responsible authorities/nations to frame appropriate laws to overcome these issues and also by making people aware to use natural resources in sustainable manner.

# Useful Words and Phrases

**Global warming** - the rise of average earth temperatures due to human actions. Such climate change triggers some serious negative consequences.
Example: *World leaders launched an initiative to accelerate work on global warming global warming also has the potential to change rainfall and snow patterns increased* ***droughts*** *and severe storms.*
**Droughts** – a state or condition when human demands for water exceed its natural availability.
**Melting glaciers.**
Example: *The increase in mean temperatures has led to melting of most of the world's glaciers.*
What drives the increase in temperature greenhouse gases are a widely discussed source. Some greenhouse gases occur naturally but human activity leads to release off enormous extra amounts of greenhouse gases.
Example: *population growth deforestation and factory farming are creating excess greenhouse gases in the atmosphere and contributing to global warming.*
**Deforestation** is the clearing of trees without the intent of replanting them.
Example: *one of the consequences of* ***deforestation*** *is loss of* ***biodiversity****.*
**Biodiversity** is the variety of all living things on earth which include plants animals and microorganisms.
Example: *many species within a forest* ***ecosystem*** *are endemic to that* ***habitat*** *when their habitat is lost it could lead to their* ***extinction***

**Extinction** - certain species no longer exist on the planet
**Habitat** - the natural environment of a plant animal or another organism
**Ecosystem** - any community of living and not living things that work together.
Endangered species are those considered to be at risk of extinction.
Example: *there are over 1300 species in the United States that are listed as threatened or endangered.*
**The ozone layer** is a belt of naturally

occurring ozone gas that sits above the earth and serves as a shield from the harmful ultraviolet radiation.

Example: *unlike pollution which has many types and causes **the ozone layer depletion** has been pinned down to one major human activity.*

**Carbon footprint** it is the amount of greenhouse gases emitted by something during a given period of time.

Example: *a **carbon footprint** can be measured for an individual or an organization and is typically given in tons of CO2.*

**Hazardous waste**

Example: *It's essential that **hazardous waste** is handled, stored, transported and disposed of properly. No one should touch hazardous waste.*

**Contamination** is the presence of unwanted or foreign substances. Contamination may be natural whilst pollution is produced by the influence or activities of people.

Example: ***contamination** of the fields could happen through overuse or misuse of **pesticides**.*

**Pesticides** are chemicals that kill or manage pests (you may know those small Colorado potato beetles). Pesticides can help to get rid of them.

**Landfill** is an area of land that is used to dispose of waste.

Example: *The purpose of the **landfill** is to bury the waste in a way that it will be isolated from groundwater kept dry and out of contact with air. Each country has a policy for landfills.*

**Renewable energy sources**

Example: *Wind solar and other forms of **renewable energy** could be the fastest growing power sources over the next few decades.*

**Tidal energy** is a power produced by the surge of ocean waters during the rise and fall of tides.

Example: *Engineers around the world are working to improve the technology of **tidal energy** generators to increase the amount of energy they produce and decrease their impact on the environment.*

**Wind turbines**. The turbines are an affordable, efficient and abundant source of electricity.

**Solar panels.** Some companies have embraced solar panels to improve their environmental profiles and at their operational costs.

**Fossil fuels** are sources of energy in the form of remains of dead plants and animals. They developed over millions of years and are now available as coal, oil and natural gas.

Example: S*ome **fossil fuels** such as coal are abundant and cheap, others like oil have a variable cost depending on geographic location***.**

**Exercise 1. Fill in the gaps with the words from the left-hand column**

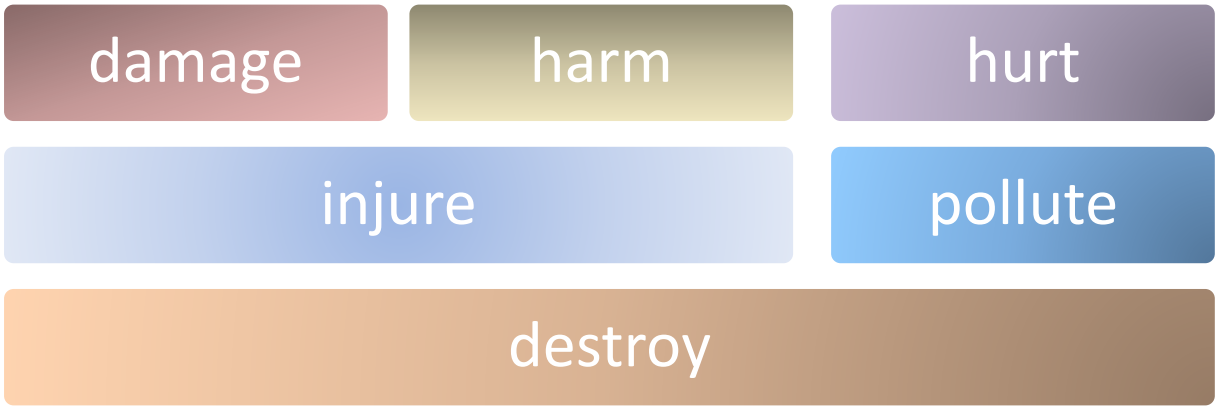
| | |
|---|---|
| 1. Some natural resources, such as natural gas and fossil fuel, cannot be _____.<br>2. Wind and wave power are _____energy sources<br>3. A large international meeting was held with the aim of promoting sustainable _____ in all countries.<br>4. Erupting _____ discharge massive quantities of dust into the stratosphere.<br>5. Biodegradable packaging helps to limit the amount of harmful chemicals released into the_____ .<br>6. The aim of the new National Biological Survey is to _____ species habitat and biodiversity.<br>7. The Mediterranean _____ is good for growing citrus fruits and grapes.<br>8. Deforestation is _____ large areas of tropical rain forest.<br>9. This year (a) severe drought has _____ the crops.<br>10. The energy _____ by the windmill drives all the drainage pumps.<br>11. Certain chemicals have been banned because of their damaging _____ on the environment. | a) *atmosphere*<br>*b) replaced*<br>*c) destroying*<br>*d) generated*<br>*e) climate*<br>*f) renewable*<br>*g) volcanoes*<br>*h) effect*<br>*i) protect*<br>*j) development*<br>k) *ruined* |

**Exercise 2. Fill in the gaps with the words from the table**

| |
|---|
| waste, pollution, protect, factory, exhaust fumes, toxic waste, emissions, deforestation, pesticides, crops, recycled, emissions, damage, environmentalists |

1. Tropical rainforests have always helped to keep the environment in balance but recent …… means they no longer absorb as much carbon dioxide as they used to.
2. …….. from cars and other vehicles cause a great deal of damage to the environment.
3. During the last hundred years we have done great……..to the environment.
4. There's a large chemical……..in our town which has polluted the river twice in the last year.
5. The Government is very worried about the ……..of our rivers and beaches.
6. A lot of household……..like bottles and newspapers can be……..and used again.
7. ……are furious with the American Government for delaying measures which will reduce greenhouse gas……
8. There are lots of things we can all do to ……..the environment.
9. The Government is introducing strict new rules on the dumping of ……. by industry.
10. Farmers contribute to environmental damage by spraying …….. with ……. which stay in the soil for years.
11. …….. from factories in northern Germany affect the environment in large parts of Scandinavia.

**Exercise 3. Which verbs cannot go with the word "environment"? Why?**




**Exercise 4. Form the collocations and explain their meaning**

| | |
|---|---|
| 1. global | a. rain |
| 2. greenhouse | b. warming |
| 3. ozone | c. effect |
| 4. acid | d. layer |

**Exercise 5. Comment on each component of the 3 R's concept:**


# Discussion 1

**Discuss the following questions.**

1. Do you worry about the environment?
2. What stories have you read or heard recently about the environment?
3. What are the biggest problems facing our environment?
4. What danger does your country pose to the global environment?
5. Do you think our government cares more about its economy or the environment?
6. Which countries are leaders in caring about the environment?
7. What do you know about the history of how our environment came to be under threat?
8. Would you give money to or actively campaign for environmental causes?
9. What do you think of environmental groups like Greenpeace?
10. What is the quality of the environment in your country?
11. What kind of environmental policies does our country have/need?

12. How important is the natural environment to you in your daily life?
13. Do you think international meetings on the environment are useful?
14. What do you think our grandkids will think of the way we treated the environment?
15. If the environment could speak, what would it tell us?
16. What is our duty as custodians of the environment?

**Text**

# 20 Major Current Environmental Problems

## 1. Pollution

There are 7 key types of pollution – air, water, soil, noise, radioactive, light and thermal and these are primary causes that affect our environment in many ways. All these types of pollution are interlinked and influence each other. Therefore we need to tackle all of them together.

Pollution of air, water and soil requires millions of years to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution.
While water pollution is caused by oil spill, acid rain, urban runoff, air pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that deprives soil from essential nutrients.

## 2. Soil Degradation

Globally, food security depends on the factor whether or not soils are in good condition to produce crops. According to UN estimates, about 12 million hectares of farmland a year get seriously degraded.

Soils get damaged due to many reasons. Such reasons include erosion, overgrazing, overexposure to pollutants, monoculture planting, soil compaction, land-use conversion and many more.
Nowadays, a wide range of techniques of soil

conservation and restoration exist, from no-till agriculture to crop rotation to water-retention through terrace-building.

### 3. Global Warming

Climate changes like global warming are the result of human practices like the emission of greenhouse gases. Global warming leads to rising temperatures of the oceans and the earth' surface causing natural disasters that include flooding, melting of polar ice caps, rise in sea levels and also unnatural patterns of precipitation such as flash floods, hurricanes, wildfires, drought, excessive snow or desertification.

### 4. Overpopulation

The population of the planet is reaching unsustainable levels as it faces a shortage of resources like water, fuel and food. Population explosion in less developed and developing countries is straining the already scarce resources.

Intensive agriculture practiced to produce food damages the environment through the use of chemical fertilizer, pesticides and insecticides. Overpopulation is also one of the crucial current environmental problems**.**

### 5. Natural Resource Depletion

Another crucial current environmental problem is the depletion of Natural resources. We, humans, use so many natural resources that it would need almost 1.5 Earths to cover all our needs.
This will further increase in the future due to massive industrialization in Asian countries like India and China. Increased use of natural resources leads to a number

of other environmental issues, such as industrialization, population growth and air pollution.

Over time, natural resource depletion will lead to an energy crisis. The chemicals emitted from many natural resources contribute to climate change. Fossil fuel consumption results in the emission of greenhouse gases, which is primarily responsible for global warming and climate change.

Globally, people are making efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy. As such, the cost of installing the infrastructure and maintaining these sources has plummeted in recent years.

**6. Generating Unsustainable Waste**

The huge production of waste due to our hyperconsumption is a major threat to the environment. As per the study, the average person produces 4.3 pounds of waste per day, and the US alone accounting for 220 million tons a year.
This hyperconsumption results in non-biodegradable trash in the form of plastic packaging, toxic e-waste, and harmful chemicals that leach into our waterways.
When this waste ends up in landfills, it generates enormous amounts of methane, which ranks as one of the worst greenhouse gases because of its high potential for global warming. It creates severe explosion hazards.

Since modern technology allows us to access digital environments, many things that you need can be fulfilled in the cloud. Consider your purchases carefully.

**7. Waste Disposal**

The overconsumption of resources and the creation of plastics are creating a global crisis of waste disposal. Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and less developed countries.

Nuclear waste disposal has tremendous health hazards associated with it. Plastic, fast food, packaging and cheap electronic wastes threaten the well-being of humans. Waste disposal is, therefore, one of the urgent current environmental problems**.**

## 8. Deforestation

Our forests are natural sinks of carbon dioxide and produce fresh oxygen, as well as helps in regulating temperature and rainfall. At present, forests cover 30% of the land, but every year tree cover is lost, amounting to the country of Panama due to the growing population demand for more food, shelter and cloth.

Deforestation simply means clearing of green cover and make that land available for residential, industrial or commercial purposes.

## 9. Polar Ice Caps

The issue of the melting of polar ice caps is a contentious one. Although NASA studies have shown that the amount of ice in Antarctica is increasing, however, this increase is only one-third of what is being lost in the Arctic.

There is enough evidence that shows sea levels are rising, and the melting of Arctic ice caps is a major contributor. Over time, the melting of polar ice caps could lead to extensive flooding, contamination of drinking water and major changes in ecosystems.

### 10. Loss of Biodiversity

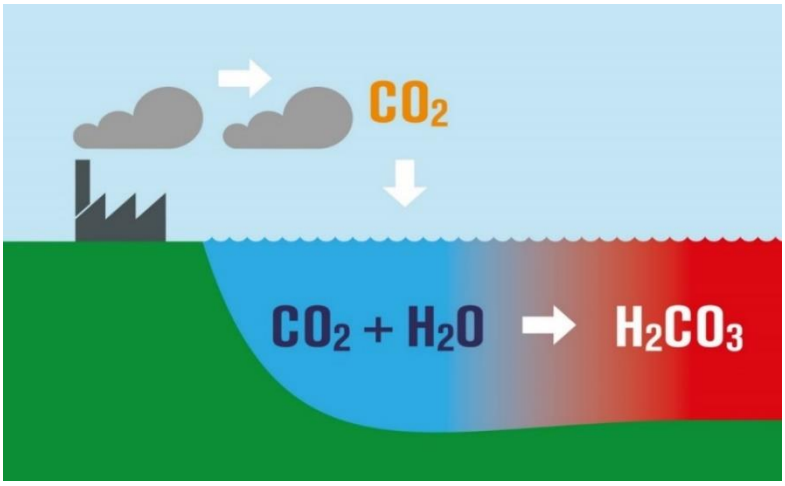
Human activity is leading to the extinction of species and habitats and loss of biodiversity. Ecosystems, which took millions of years to perfect, are in danger when any species population is decimating.

Balance of natural processes like pollination is crucial to the survival of the ecosystem, and human activity threatens the same. Another example is the destruction of coral reefs in the various oceans, which support the rich marine life.

### 11. Climate Change

Climate change is yet another environmental problem that has surfaced in the last couple of decades. It occurs due to the rise in global warming, which happens due to the increase in temperature of the atmosphere by burning fossil fuels and the release of harmful gases by industries.
Climate change has various harmful effects but not limited to the melting of polar ice, change in seasons, occurrence of new diseases, frequent occurrence of floods and change in overall weather scenario.

### 12.Ocean Acidification




It is a direct impact of excessive production of CO2. 25% of total atmospheric CO2 is produced by humans. The ocean acidity has increased by the last 250 years, but by 2100, it may shoot up by 150%. The main impact is on shellfish and plankton in the same way as human osteoporosis.

## 13. The Nitrogen Cycle

We often ignore the effects of the use of nitrogen by humans. Nitrogen is a crucial component of all life. Problems occur when the nitrogen cycle is not balanced.
A process through which it is converted or 'fixed' to a more usable form is called fixation. The fixation happens biologically and through lightning, or it can be done Industrially. People have learned to convert nitrogen gas to ammonia (NH3-) and fertilizers that are nitrogen-rich to supplement the amount of nitrogen fixed naturally.

It is estimated that agriculture may be responsible for about 50% of the nitrogen fixation on earth through the cultivation of nitrogen-fixing crops and the production of human-made fertilizers. When nitrogen is used more than plant demand, it can leach from soils into waterways and contributes to eutrophication.

Excess levels of nitrogen in water can hamper marine ecosystems, through overstimulation of plant and algae growth. This blocks the light from getting into deeper waters, thus damaging the rest of the marine population.

The problem can also occur during nitrification and denitrification. Nitrous oxide (N2O) can be formed when the chemical process is not completed. N2O is a potent greenhouse gas contributing to global warming.

## 14. Ozone Layer Depletion

The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful rays. The depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chlorine and Bromide found in Chloro-fluoro carbons (CFCs). Once these toxic gases reach the upper atmosphere, they create a hole in the ozone layer, the biggest of which is above the Antarctic.
CFCs are banned in many industries and consumer products. The ozone layer is valuable because it prevents harmful UV radiation from reaching the earth. This is one of the most important current environmental problems.

## 15. Acid Rain

Acid rain occurs due to the presence of certain pollutants in the atmosphere. Acid rain can be caused due to combustion of fossil fuels or erupting volcanoes or rotting vegetation which releases sulfur dioxide and nitrogen oxide into the atmosphere.
Acid rain is a known environmental problem that can have a serious effect on human health, wildlife and aquatic species.

## 16. Water Pollution

Clean drinking water is becoming a rare commodity. Water is becoming an economic and political issue as the human population fights for this resource.

One of the options suggested is using the process of desalinization. Industrial development is filling our rivers, seas and oceans with toxic pollutants, which are a major threat to human health.

## 17. Overfishing

Overfishing affects natural ecosystems severely and leads to an imbalance of ocean life. Around 63% of global fish stocks are estimated to be overfished. Overfishing caused fishing fleets to migrate to new waters that would further deplete the fish stocks.
Moreover, it has negative effects on coastal communities that rely on fishing to support their living.

## 18. Urban Sprawl

Urban sprawl refers to the migration of population from high-density urban areas to low-density rural areas, which results in the spreading of the city over more and more rural land.

Urban sprawl results in land degradation, increased traffic, environmental issues and health issues. The ever-growing demand for land displaces the natural environment consisting of flora and fauna, instead of being replaced.

## 19. Public Health Issues

The current environmental problems pose a lot of risk to the health of humans and animals. Dirty water is the biggest health risk in the world and poses a threat to the quality of life and public health.
Runoff to rivers carries with it toxins, chemicals and disease-carrying organisms. Pollutants cause respiratory diseases like Asthma and cardiac-vascular problems. High temperatures encourage the spread of infectious diseases like Dengue.

## 20. Genetic Engineering

Genetic modification of food using biotechnology is called genetic engineering. Genetic modification of food results in increased toxins and diseases as genes from an allergic plant can transfer to the target plant. Genetically modified crops can cause serious environmental problems as an engineered gene may prove toxic to wildlife.
Another drawback is that increased use of toxins to make insect resistant plants can cause resultant organisms to become resistant to antibiotics.

The need for change in our daily lives and the movements of our government is growing. Since so many different factors come into play, such as voting, governmental issues, the desire to stick to a routine, many people don't consider that what they do will affect future generations.
If humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. Although it's a fact that we cannot physically stop our ozone layer from thinning (and scientists are still having trouble figuring out what is causing it exactly), there are still so many things we can do to try and put a dent in what we already know.
By raising awareness in your local community and within your families about these issues, you can help contribute to a more environmentally conscious and friendly place for you and your future generations to live.

**Answer the following questions:**

1. What problems do you consider to be the most important?

2. How do these problems affect our lives?

3. How can these problems be overcome?

## Read and comment on the news:

### Peatlands project: 'We want to restore this fantastic landscape'

Areas of the south Wales valleys once referred to as the "Alps of Glamorgan" will be restored to boggy peatland.

The project aims to restore more than 540 hectares of historic landscape and habitat in Neath Port Talbot and Rhondda Cynon Taff, including peat bogs and pools, heathland, grassland and native woodland.

"We want to restore this fantastic landscape, that's been hidden by forestry for years... to what it was previously," ecologist Rebecca Sharp said.

As well as helping wildlife to thrive and reduce greenhouse gases, it is hoped the risk of wildfires will also reduce.

In 2018, South Wales Fire and Rescue Service was called to 1,956 wildfires.

## Mauritius oil spill: Japanese carrier ship splits apart as remaining fuel spreads into ocean waters

**The MV Wakashio, which has been stranded in the water since it struck a reef on 25 July, split in two on Saturday afternoon following warnings that the ship's condition was worsening, the Mauritius National Crisis Committee said.**

A plan to tow the ship back to shore has been implemented and the clean-up operation is ongoing, it added.

Photos posted on social media by the official clean-up effort show the ship in two pieces, with oil barriers put in place and a skimmer ship nearby to assist.

"Around 814 metric tonnes of oil liquid waste, 318 metric tonnes of solid waste sludge and contaminated debris, and 250 cubic metres of saturated artisan booms have been collected as at midday on 15 August." But environmental groups warned that the damage to coral reefs and once-pristine coastal areas could be irreversible.

Owner Nagashiki Shipping is investigating why the ship went off the course, as it was meant to stay at least 10 miles from the shore. The Mauritian government is seeking compensation from the company.

## Carbon-reducing seagrass to be planted off Pembrokeshire coast

**Acres of underwater seagrass will be restored off the coast in a bid to help wildlife and tackle climate change.**

Environmentalists believe the 4.9-acre (2 hectare) project at Dale Bay in Pembrokeshire will be the UK's biggest seagrass restoration.

Experts say seagrass acts as a "nursery for a wide variety of marine life" but 92% of the UK's seagrass meadows have disappeared over the last 100 years.

It is hoped the Welsh pilot could help large-scale UK seagrass restoration.

# Plan to future-proof the ecology of Thetford Forest

**Ideas to future-proof Thetford Forest in Norfolk for the next century are being worked on by the Forestry Commission.**

It recognizes the way we use our woodland is changing - moving away from timber and food production and towards recreational uses.

The plans also hope to safeguard against the effects of climate change and disease by planting new trees and bringing more diversity to the species already there.

"What we're trying to do is look at how we can manage our landscape to balance all of these benefits," said Eleanor Tew, a Cambridge University PhD student working alongside the Forestry Commission.

The long term aim of the project is to protect the environment "for generations to come", she added.

**Exercise 6. Fill in the gaps with the words from the left-hand column**

| | |
|---|---|
| 1. Imagine how much pollution you cause by _____ by car for two hours a day? | a) carbon-dioxide |
| 2. Burning fossil fuels in one country can cause _____ in other countries. | b) energy-efficient |
| 3. The more _____ we produce, the worse climate change will get. | c) habitats |
| 4. How much _____ does your family produce every day? | d) zero-emission |
| 5. Forests never recover fully after being _____. | e) pollutants |
| 6. Trees and plants absorb _____ and release oxygen into the air. | f) emit |
| 7. Travelling by air, driving a car or using coal-generated electricity will make your _____ bigger. | g) clear-cut |
| 8. Americans _____ more than their share of the earth's resources. | h) acid rain |
| 9. We moved our factory to a _____ because of cheap labour and weak environmental laws. | i) commuting |
| 10. Every year more animals are listed as _____. | j) consume |
| 11. Those _____ light bulbs are much cheaper these days. | k) carcinogens |
| 12. Fossil fuel companies have tried to damage the image of _____ and climate scientists. | l) endangered species |
| 13. Cars _____ harmful pollutants into the atmosphere. | m) domestic waste |
| 14. Rising sea levels, melting ice caps and coral reef bleaching are caused by _____. | n) hazardous waste |
| 15. Lots of animals will become extinct if their natural _____ are destroyed. | o) carbon footprint |
| 16. They increased their profits by dumping _____ into the ocean. | p) developing country |
| 17. The Environmental Protection Agency checks levels of _____. | q) greenhouse gases |
| 18. Cigarette smoke contains a number of _____. | r) reduce |
| 19. You can _____ your household waste by buying products with less packaging. | s) global warming |
| 20. _____ vehicles like electric cars are much cheaper now. | t) environmentalists |

**Exercise 7. Give the definitions to the following words and collocations**

climate change – acid rain – industrial waste – urbanization
biodegradable – environmentalist
environmental activists – natural disaster
hybrid cars – fertile or fertilizers
rainforest – chemicals – sustainable farming practices
adverse environmental effects
climate change – mitigation emissions
exhaust fumes – to conserve energy – toxic
to recycle

**Exercise 8. Fill in the gaps with the words from the table**

acid rain, ozone layer, recycling point, environmentally friendly,
renewable energy, bottle bank, public transport,
unleaded petrol, global warming, greenhouse effect

1. The gradual rise in the Earth's temperature is known as …… .
2. When heat gets trapped in the Earth's atmosphere, it is known as the …… .
3. Scientists have found holes in the …… , particularly over Antarctica.
4. Rain mixed with toxic chemicals from factories is known as …… .
5. Make sure your car runs on……and your home uses sources of …… .
6. Use……instead of taking your car.
7. Take glass, paper and plastic to a……and your empty bottles to a…… .
8. Buy……products whenever possible.

**Exercise 9. Fill in the gaps with the words from the table to complete the stories**

**STORY 1**

| floods, radiation, sea level, climate, deserts, ice caps, oceans, gases |
|---|

Scientists have shown that the temperature on Earth is increasing by 0.1° every ten years. That's one degree every century. The (1)…… that arc produced by factories and cars are allowing more (2)……..from the sun to reach Earth. In the future this will have very serious consequences for humanity.

As the Earth gets hotter, the Arcric and Antarctic (3)…….will slowly melt and the level of the (4)……..will rise. A recent report says that the (5)……. will rise by 70 metres over the next hundred years, causing (6)……..in many low-lying parts of the world.

There will be (7)……changes, too. Some areas will become wetter while others will become much drier. Some areas which today are green and fertile will eventually turn into (8)……..Tropical diseases like malaria will become common in areas where today they are unknown.

**STORY 2**

| natural habitats, in danger of extinction, long-term, natural resources,<br>way of life, indigenous people, destruction, future generations |
|---|

The (1)…….of the rainforest is very worrying. Thousands of acres of forest are being cut down every year and the (2)…….of many animals are being destroyed. As a result, many species are (3)……. .

This, in turn, threatens the traditional (4)…….of many of the (5)…….who live in some of the most remote areas of our planet. As with most environmental issues, we need to think more (6)…….and realise that everything we do has implications for (7)……. .

If we want to hand on our world to our children and grandchildren, we simply can't continue to misuse the world's (8)…….as we are at the moment.

**STORY 3**

| heavily polluted, cloud of pollution, uninhabitable, air quality |
|---|

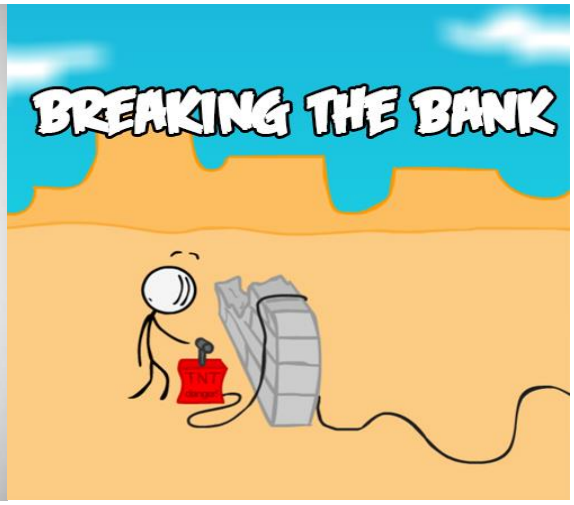
The (1)…….in many of the world's largest cities is so poor that we have seen an enormous increase in chest and lung illnesses such as asthma. These cities are (2)…….and some are permanently covered by a (3)……. . Unless we begin to take the problems more seriously and start to do something about them, many of our biggest cities, particularly in the developing world, will become (4)……. .

**Exercise 10. Form the collocations and explain their meaning.**

| | |
|---|---|
| 1. unleaded | a. friendly |
| 2. public | b. energy |
| 3. recycling | c. point |
| 4. environmentally | d. transport |
| 5. renewable | e. petrol |

# Working out: Idioms

**Can you guess what do these idioms mean?**





idiom: at loggerheads with someone

**Exercise 11. Match the definitions with the idioms.**

| | |
|---|---|
| a) on the other hand<br>b) as clean as a whistle<br>c) pitch-black<br>d) bury its head in the sand<br>e) to break the bank<br>f) to go up in smoke<br>g) burnt to a crisp<br>h) a clean bill of health<br>i) was put on the spot<br>j) a rude awakening<br>k) at loggerheads<br>l) a breath of fresh air<br>m) was put on the spot<br>n) to pay lip-service<br>o) a step in the right direction<br>p) a drop in the ocean<br>q) toes the line<br>r) to count the cost<br>s) to come under fire<br>t) to foot the bill | 1. to suffer the consequences of a reckless/foolish action<br>2. to be condemned/to be sharply criticised<br>3. a very small amount compared to what is necessary/needed<br>4. to pay for smth<br>5. however<br>6. to voice/express agreement on smth without actually supporting it<br>7. to end in nothing/to result in failure<br>8. to leave sb without moneys<br>9. to obey orders/rules<br>10. a positive action, especially towards a solution<br>11. to put sb in a difficult position, especially by a sudden question<br>12. to burn sth completely<br>13. to ignore trouble by pretending it doesn't exist<br>14. a statement that sth/sb is in satisfactory condition/health<br>15. in strong disagreement very clean a sudden understanding/ awareness of sth unpleasant<br>16. black/very dark<br>17. to make known sb/sth<br>18. refreshingly new and different |

**Exercise 12. Read the dialogue and filling the gaps with the idioms. Explain the meaning of the idioms.**

**go up in smoke – a drop in the ocean – toes the line**

**on the other hand – come under fire – pay lip-service**

**counting the cost – breaking the bank – foot the bill**

**a step in the right direction**

- Mr Bradley, you've recently **1) _____** over your comments on industrial pollution. What is your response to this criticism?
- I don't regret saying what I did at all. The main obstacle to reducing pollution is still cost, so of course we need to determine who is going to **2) _____.**

- Okay, Mr Bradley, but we should act before it's too late for our planet. We will be **3) _____** of this procrastination for a generation.

- I agree totally. **4) _____,** what is the good of 5) _____ in an effort to guarantee ourselves a future if it's only this **5** country that's willing to do it? I mean that would only be **6) _____.** To have the desired effect, every industrial nation in the world needs to contribute!

- So, what you're saying is that unless everyone else 7) _____**,** this government won't do anything to reduce pollution levels, right?

- I don't think you need to be quite so negative, but, yes, I believe it would be very foolish for us to spend millions of pounds on a plan which we know would **8) _____ .**

- Hmm... But surely we can do more than just **9) _____** to these schemes which must be carried out eventually! I mean, stricter regulation on cars for example; surely that would be **10) _____.** Oh, please, now that is another matter altogether...

**Exercise 13. Fill in the gaps with phrases from the list:**

| *went up in smoke, a step in the right direction, on the other hand, paid lip-service, drop in the ocean* |
|---|

1. My plans to have a quiet evening at home ..... when Geoffrey arrived with six of his friends.
2. Mayor Brooks lost favour with Carrstown residents as he only ….. to their anxieties.
3. You really upset Anne; it would certainly be ..... if you wrote and apologised to her.
4. This car is smoother to drive than that one. That one ……. Is a bargain.
5. The price of the mansion was a mere ..... compared to the multi-millionaire's staggering fortune.

**Exercise 14. Read the following extract from a news report and fill in the gaps with phrases from the list:**

| |
|---|
| *break the bank, to toe the line, counting the cost, foot the bill, came underfire* |

The writing is on the wall for the Smith Group who have been given two years **1) .....** and adopt cleaner methods of production in their factories. Smith 's owners, who **2) .....** last year when it was discovered that they were releasing tons of toxic waste into the North Sea, have said that such changes will **3) .....** It seems that the Smith Group will soon be 4) …… of their past failure to observe regulations unless they find someone willing to help them to 5) ……..

**Exercise 15. Fill in the missing verbs to complete the idioms. Explain their meaning. Make the sentences of your own using these idioms.**

1. To _____ under fire
2. To _____ the bill
3. To _____ the bank
4. To _____ the line
5. To _____ the cost
6. To _____ lip-service
7. To _____ sb on the spot
8. To _____ smth to a crisp
9. To _____ smth to light
10. To _____ up in smoke

**Exercise 16. Read the extract from a newspaper and filling the gaps with the idioms. Explain the meaning of the idioms.**

| **burnt to a crisp – a clean bill of health - was put on the spot – a rude awakening – at loggerheads – a breath of fresh air – was put on the spot – as clean as a whistle – pitch-black – bury its head in the sand** |
|---|

The new Environment Minister Dave Moore is proving himself to be **1)** _____in the department whose policies have proved stale and unconvincing up to now. Yesterday, he **2)** _____by the environmental group "Healthy Planet" when he was challenged to respond to "Healthy Planet"'s latest report which has **3)** _____ the extent of the pollution in the River Medway.

The previous Minister, James Phillips, commissioned the Environmental Ministry to produce a special report on the River Medway last month. Based on the evidence in the report, he gave both the river and the large CJH Pharmaceuticals factory, which is situated on the river, **4)** _____**.** James Phillips reported that the environment around the factory is now **5)** _____ and the water in the river is "safe enough to drink".

"Healthy Planet"'s report must have come as **6)** _____ to James Phillips since it shows that pollution in and around the river is still far above the levels permitted by law. The report refers to plantations of small trees around the CJH factory **7)** _____ by sulphur emission, and **8)** _____ sediment at the bottom of the river which is the product of industrial waste. The report also notes that the previous minister is now a director of CJH Pharmaceuticals.

Mr Phillips announced that the Ministry would no longer **9)** _____ and pretend there was no problem with the River Medway and that he personally would lead a new enquiry into pollution there. He invited "Healthy Planet" to take part. He said there was nothing to be gained by having his Ministry and environmental groups constantly **10)** _____ with each other, and concluded by saying that everyone wants a cleaner and safer environment in which to live.

**Exercise 17. Fill in the gaps with phrases from the list:**

| *clean bill of health, brought to light, put on the spot, rude awakening, burying their heads in the sand* |
|---|

1. Joseph was _____ when his mother demanded an explanation for his low school marks.
2. Environmental groups concerned about the issue have accused the Government of_____.
3. After all his aches and pains, he was relieved to be given a _____.
4. We had rather a _____ to the cost of phone calls when we had our first bill.
5. Residents were appalled when Cubbley Council's mismanagement of local funds was _____.

# Discussion 2

**Discuss the following questions.**

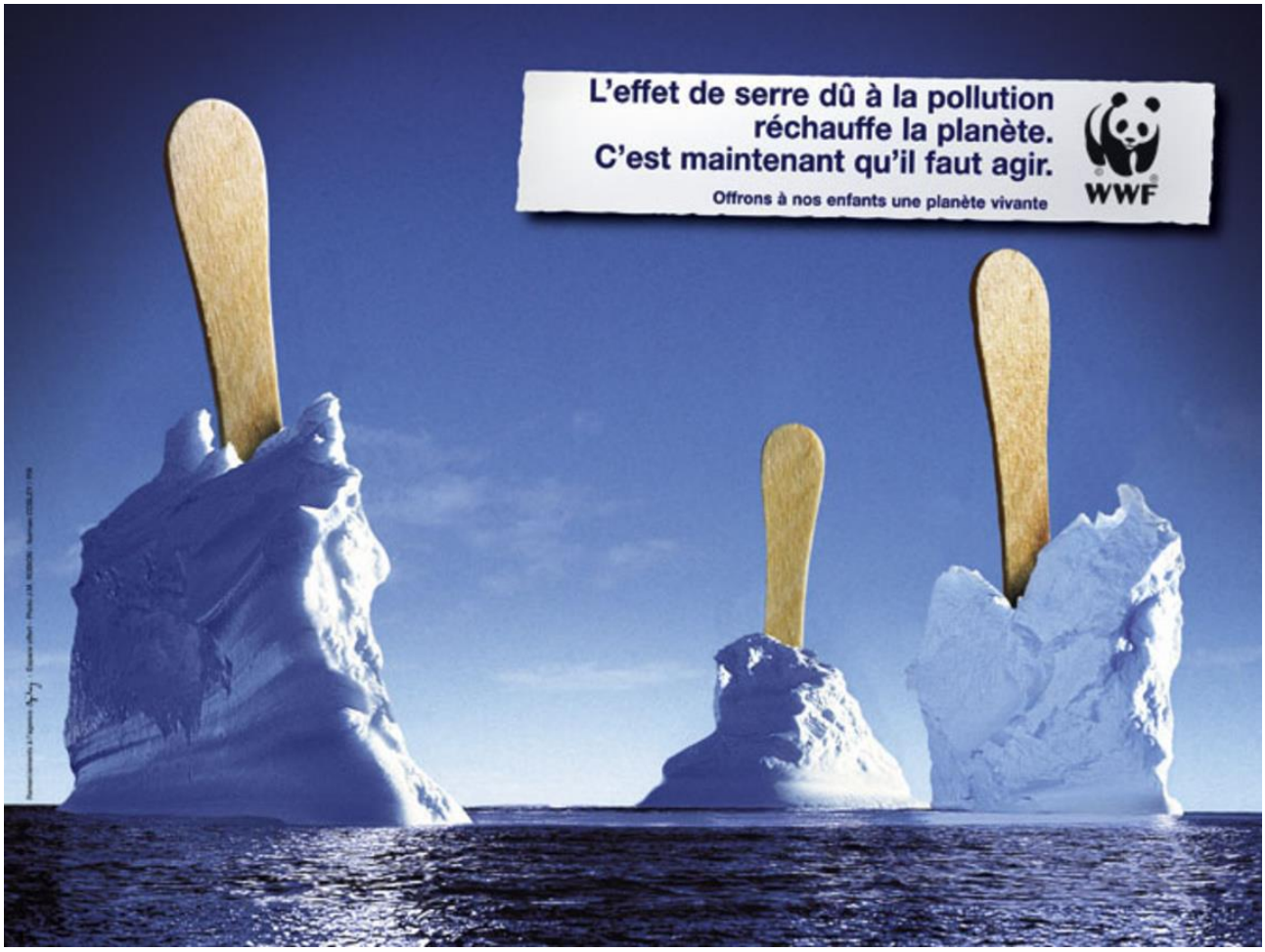
1. What do you think when you hear the words ‘environmental problem’?
2. Do you add to the environment's problems in your daily life?
3. What can you do every day to help the environment?
4. Will the problems get worse or will they slowly disappear?
5. What is the biggest environmental problem? Why do you think so?
6. Which do you think is worse, litter in the countryside or coral bleaching?
7. How eco-friendly is your country?
8. What causes climate change and how can we reverse it?
9. What problems do you know of about water?
10. Will we (humans) kill the Earth one day?
11. Why is an environmental problem a problem?
12. What makes environmental problems?
13. Do you think animals are angry with humans for destroying the Earth?
14. Which do you think is worse, desertification or noise pollution?
15. How would you explain to someone who doesn't know what global warming is?
16. How would you feel if all the pandas died and became extinct?
17. Who is most responsible for creating environmental problems?
18. Is it better if we all went back to nature (left the cities and moved to the countryside)?
19. Is it possible for everyone to change their lifestyle to help the Earth?
20. Shopping increases environmental problems. Should we stop shopping?

# POWERFUL SOCIAL ADS THAT MAKE YOU THINK…





why fight a losing battle when you can simply just walk or look the other way around?
http://pepey.deviantart.com


L'effet de serre dû à la pollution réchauffe la planète.
C'est maintenant qu'il faut agir.
Offrons à nos enfants une planète vivante
WWF




Answer the following questions:

1. What do you see in this ad?
2. What is the purpose of this ad?
3. How do you know?
4. Is it easy to understand?
5. Is this ad effective?
6. Why do you think so?

# Writing an Opinion Essay

### The structure of the essay

INTRODUCTION: Describe the problem and express your opinion.

CONTENT: Give at least three reasons for your opinion

CONCLUSION: Restate your opinion and briefly summarize the reasons.

### Linking words

| **Linkers Of Addition** | **Linkers Of Result** |
|---|---|
| What's More<br>Furthermore<br>Moreover<br>In Addition<br>Plus<br>Also | Consequently<br>As a result<br>Therefore<br>Thus<br>Because of this<br>Due to this<br>Not only that<br>For this reason<br>Hence |
| **Highlighting & Emphasizing:** | **Presenting Contrast:** |
| Especially<br>Clearly<br>Obviously<br>Specifically<br>Of course<br>In particular | Despite<br>In spite of<br>By contrast<br>Alternatively<br>Another opinion could be<br>On the other hand<br>Still<br>However<br>Although<br>Even though<br>But |
| **Presenting Comparison:** | **Linking Words for Conclusion:** |
| In comparison<br>Admittedly<br>Similarly<br>Likewise<br>In the same way | To sum up<br>In conclusion<br>To conclude<br>To draw the conclusion |

**Exercise 18. Fill in the gaps with the appropriate word.**

**1. The Government should encourage people to save water. Do you agree?**

People all over the world don't appreciate the importance of water. _____ millions of litres are wasted every year. In my opinion, Government campaigns would help to reduce unnecessary water consumption.

Water is a very important resource for various reasons. _____, we need to drink clean water to survive. _____we need it to keep clean. _____, without water we cannot grow crops or raise animals for food. The government should do more to make people realise this.

The human population is growing and the climate is changing. _____ there may not be enough water or everyone in the future. We should encourage people to change wasteful habits now before it is too late. _____ water treatment processes cost a lot and use a large amount of electricity. _____reduced water consumption would save energy and cut greenhouse gas emissions.

_____, I think that the government should encourage people to save water. It would help to conserve this important resource for the future. _____, it would reduce the money and energy that is spent on water treatment each year.

**2. More forests should be protected. Do you agree?**

At the moment a few forests worldwide are protected but more could be done. I believe that it is important that we protect the remaining forests for the following reasons.

Extensive deforestation has destroyed a number of habitats. _____many species of animal that live in these forests are in danger of extinction. It would be sad to see these animals disappear completely. _____ each animal has an important role to play in the ecosystem. For example, foxes keep rabbit populations in check.

_____through photosynthesis trees provide us with oxygen and help to filter gases like carbon dioxide which are harmful to humans. _____they help us to reduce pollution and combat global warming.

_____, deforestation destroys the natural beauty of area. _____, it may cause landslides.

_____ I think that there should be more protected forests all over the world. _____, we should educate our children about the importance of

conservation. _____, future generations might be able to enjoy the same biodiversity that exists today.

**3. Schools should educate students about the environment. Do you agree?**

Young people don't appreciate the importance of protecting the environment, they don't think about the harmful effects of their behaviour. I believe that education in schools may help change attitudes and behaviours.

_____, education could encourage recycling. Compared to other countries we only recycle a small percentage of our waste. Consequently, a lot of energy, resources and money are wasted needlessly.

_____, schools can raise awareness of the importance of water as a resource. At the moment water is seen as a cheap and unlimited resource. _____, people waste water on unnecessary things like golf courses and private swimming pools. _____, people could be made aware of the consequences of dropping litter. Many people drop litter at the beach and in the countryside. _____, our seas and fields are full of rubbish.

_____, I believe that education can help young people realise how they harm the environment and the consequences of this. _____, their attitudes might change and environmentally harmful activities may become less acceptable.

**Write your essays on the topics below:**

1. Have humans created the problem of climate change?
2. Should the penalties for littering be more severe?
3. What consequences does deforestation have on the environment?
4. How is the environment being destroyed by fossil fuels, coal, oil, natural gas, and nuclear power?
5. How can water, air, and soil pollution be controlled - what control measure is available?
6. Should every household make more effort to recycle their waste?
7. Sustainable methods for managing and using water resources.
8. How biodiversity is put at risk in the modern world.
9. Humans do not own the Earth and, therefore, we do not have the right to harm it to the extent we are doing.
10. How and to what extent is marine line impacted by oil spillages?

# Additional texts

## The Arctic Is Shifting to a New Climate Because of Global Warming

By Henry Fountain

Open water and rain, rather than ice and snow, are becoming typical of the region, a new study has found.

The effects of global warming in the Arctic are so severe that the region is shifting to a different climate, one characterized less by ice and snow and more by open water and rain, scientists said Monday.

Already, they said, sea ice in the Arctic has declined so much that even an extremely cold year would not result in as much ice as was typical decades ago. Two other characteristics of the region's climate, seasonal air temperatures and the number of days of rain instead of snow, are shifting in the same way, the researchers said.

The Arctic is among the parts of the world most influenced by climate change, with sharply rising temperatures, thawing permafrost and other effects in addition to shrinking sea ice. The study, by Laura Landrum and Marika M. Holland of the National Center for Atmospheric Research in Boulder, Colo., is an effort to put what is occurring in the region in context.

"Everybody knows the Arctic is changing," said Dr. Landrum, a climate scientist and the lead author of the study, published in the journal Nature Climate Change. "We really wanted to quantify if this is a new climate."

In other words, she said, "has the Arctic changed so much and so fast that the new climate cannot be predicted from the recent past?"

Using years of observational data from the region and computer models, the researchers found that sea ice is already in a new climate, in effect: The extent of ice in recent years is consistently less than what would be expected in even the worst year for ice in the mid-20th century.

Arctic sea ice has declined by about 12 percent per decade since satellite measurements began in the late 1970s, and the 13 lowest sea-ice years have all occurred since 2007. This year is expected to be a record or near-record low for ice

extent, which will be determined by the end of this month as the summer melt period ends.

For fall and winter air temperatures and rain vs. snow days, the simulations found that the transition to a new climate is occurring more slowly, with the shift expected to be complete by the middle of the century.
Overall, Dr. Landrum said, “We are beginning to get to the point where we can no longer know what to expect.”

Jennifer Kay, a climate scientist at the University of Colorado who was not involved in the research, said the new study builds on previous ones that had looked at fewer climate elements.

“It’s nice to see all those variables discussed,” Dr. Kay said. And determining the timing of the various shifts is an interesting contribution.

But scientists have known for a long time that fundamental changes were occurring in the region. “We know what used to be,” Dr. Kay said. “We call it the ‘new Arctic’ because it’s not the same.”

Dr. Landrum said that Arctic communities are already suffering from the changes. Eroding coastlines are forcing some Alaska Native villages to consider relocating. Other changes are affecting the food supply. Warmer storms that bring rain on existing snow, for example, can lead to starvation of the animals Indigenous groups rely on.

“Arctic climate change is not in the future for them,” she said. “It’s now.”

Dr. Landrum said the climate models used in the study simulated the future in a world where planet-warming emissions of greenhouse gases remained high. That provides some fodder for optimism, she said.

“We still have an opportunity to change how rapidly the Arctic evolves,” she said, “if we end up changing our emissions.”

“You can’t just give up. If you work hard and make some changes there’s a possibility you’d have some dramatic effects.”

Another study released Monday suggested that two Antarctic glaciers that have long been of concern to scientists over their potential to contribute to sea level rise may be in worse shape than previously thought.

The Thwaites and Pine Island glaciers are rivers of ice, slowly moving ice from the West Antarctic Ice Sheet in the continent’s interior to the ocean, where it melts and adds to sea level rise. In recent decades the two glaciers’ movement has accelerated,

leading to more ice loss from the interior, largely because of melting by warm water underneath the glaciers.

Even with the acceleration, however, complete melting of this part of the West Antarctic sheet could take centuries.The new study, published in Proceedings of the National Academy of Sciences, analyzed satellite imagery and found cracks and other signs of stress damage to the glaciers' ice shelves, the leading edges that float on the water. This evidence of damage, the paper's authors wrote, is the first sign of structural weakening of the ice shelves, a process that can end in the shelves' disintegration and even faster glacial flow of ice to the ocean. The authors said that incorporating these damage processes into models of ice-sheet dynamics is critical for more accurate assessments of potential sea-level rise.

## Why wildfire smoke may be harming your health

By Allison Hirschlag

*Smoke from burning forests and peat can linger in the atmosphere for weeks, travelling thousands of miles and harming the health of populations living far away.*

From far above, they almost look beautiful. Golden yellow tendrils etched across the dark forest landscape below. But in daylight, at close range, the devastation wrought by the fires in the Krasnoyarsk region of Siberia is harrowing.

A wall of blistering flames engulfs the vegetation. Behind it, charred trees stand like blackened toothpicks while columns of smoke choke the air, rising high up into the

atmosphere. Since the start of 2020, Russia has seen an estimated **19 million hectares** (73,359 square miles) consumed by wildfires, according to Greenpeace International's analysis of satellite images. Nasa has warned that **abnormally warm temperatures in eastern Siberia** – particularly in the Sakha Republic, more than 1,250 miles (2,000km) away from Krasnoyarsk – have led to more intense and widespread fires than normal.

The destruction this leads to is undeniable. Swathes of forest and peatland are destroyed. Countless animals caught up in the flames and smoke perish. And when the flames reach areas inhabited by people, they can claim many lives and homes of those unlucky enough to be caught in their path.

In the first few months of 2020, Australia grappled with the **worst wildfire season** in its history. It **claimed the lives of 33 people**, destroyed thousands of homes and saw **18 million hectares (69,500 square miles) burned**. **Three billion animals** were killed or displaced. And this August, **thousands of lightning strikes triggered hundreds of fires across California**, leading to a state of emergency being declared as the flames threatened densly populated residential areas. Beset by a prolonged drought, the state experienced **its most destructive** and **deadliest fires** in recorded history during 2017 and 2018.

These impacts on the ground can be hard to bear, but wildfires can have another far-reaching effect on our lives.

Rising up to **14 miles (23km) into the air, well into the stratosphere**, plumes of smoke from large wildfires can spread all over the globe thanks to currents of air. Smoke from this summer's Siberian wildfires has been choking nearby cities for months now and has spread across the **Pacific Ocean to reach Alaska**. The smoke has even been reducing air quality by creating **hazes in cities as far away Seattle**.

Story continues below

The Arctic wildfires in Siberia this summer have **set a record**: for releasing more pollution into the air in a single month than any other in 18 years of record keeping, according to the European Centre for Medium-Range Weather Forecasts.

It is in part down to what's burning – resin-rich boreal forest, peat buried in bogs and **melting tundra permafrost all release** high concentrations of carbon dioxide into the atmosphere along with methane and **toxic contaminants such as mercury**. But it's also because the fires are more widespread – a byproduct of **record-breaking** heat waves that gripped the Arctic in early summer. This helped thaw parts of the tundra, making it much more susceptible to burning.

Carried with the gases released by wildfires, however, are also tiny, lightweight particles of soot. Such "particulate matter" (PM) is a common component in air pollution in cities, where it can be released from vehicle exhausts and heavy industry.

But smoke from wildfires can lead to dramatic spikes in the amount of particulate matter in the air compared with average air pollution.
*Wildfire causes episodes of the worst air quality that most people living in high income countries are ever going to see – Sarah Henderson*

For example, during wildfire season in Canada, cities in British Columbia have seen particulate levels that are **20 times higher** than would be expected on an average day.

"Wildfire causes episodes of the worst air quality that most people living in high income countries are ever going to see," says Sarah Henderson, senior scientist in environmental health services at the British Columbia Center for Disease Control. The small size and **large amount** of particulate matter has a lot to do with this.

Wildfires tend to produce large quantities of finer particulates known as PM2.5 and even finer nanoparticles, which are known to be particularly harmful to human health. This is largely because the tiny particles – which are more 30 times smaller than the width of a human hair and so too small to see – can **penetrate the lung membranes** when breathed in, damaging the respiratory system and **passing into the blood stream**.
In the short-term, that can lead to coughing, shortness of breath and exacerbate asthma attacks. During the bushfires at the end of 2019 in Australia, hospital admissions due to breathing problems **increased by 34% in the state of New South Wales**.

One study estimated that between 2004 and 2009, around 46 million people in the western US were exposed to at least one wave of smoke from wildfires. On days where smoke had caused high PM2.5 levels, there was a **7.2% increase in hospital admissions** due to respiratory illnesses. Increases in PM2.5 have also been found to be **accompanied by a spike in cases of cardiac arrest**.

The potential long-term effects, however, are just as worrying.
Particulate matter has been linked to a range of long-term problems, including increased inflammation, and a greater risk of **heart disease and stroke**.

But wildfire smoke carries an added danger compared with other particulate pollution. It is filled with reactive chemical compounds that can be carcinogenic, and that can also lead to premature births. These compounds can also stress the body's respiratory tract, leaving it **more vulnerable** to deadly respiratory pathogens such as Covid-19. One study found that particulate matter from wildfire smoke was especially harmful to a type of immune cell called macrophages in the lungs. It showed that wildfire particulates were **four times more toxic to these immune cells** than particulate matter from other air pollution. *(Read more about **the link between air pollution and respiratory disease**)*

Henderson, who's currently conducting two studies on the long-term health effects of wildfire smoke, says people with pre-existing respiratory conditions are often the

most impacted by the smoke. Her work suggests that some may never completely recover after experiencing just one severe wildfire season. Newborn babies, however, may face the most life-altering impacts, because their lungs are still developing and therefore highly vulnerable to smoke toxicity.

Perhaps most alarming is that the toxicity of these smoke particles also appears to increase the further they get from the site of a fire. As they are carried in the wind, the particles undergo chemical reactions in the air that cause them to "age" in a process known as oxidation. This converts the particles into highly reactive compounds that have an even greater capacity to damage cells and tissue than when they were first produced.

A recent study conducted in Greece showed that this process can lead to the toxicity of smoke compounds **doubling in the hours after they are first emitted** from a fire and that they have the potential to become up to four times as toxic over the following days.

*Wildfire smoke can hang in the atmosphere for days, weeks or even months depending on how long the fires burn*

"Even if someone is far away from a fire source, they may still experience adverse health outcomes from the inhalation of highly diluted and oxidised smoke," says Athanasios Nenes, an atmospheric chemist at the Swiss Federal Institute of Technology Lausanne and the Institute of Chemical Engineering Sciences in Patras, Greece, who led the study. "We have seen that the oxidative potential of wildfire smoke can be up to four times higher when smoke has been atmospherically processed."

Wildfire smoke can hang in the atmosphere for days, weeks or **even months** depending on how long the fires burn. One reason it's able to do that is because the superheated smoke and ash rising into the air can trigger **pyrocumulonimbus** events, or fire-induced thunderstorms.

These thunderstorms form at least 10 miles (16 km) above the ground in the stratosphere. Here they are moved by the winds and weather in the jetstream, allowing smoke particles to "stay in the stratosphere for weeks, because it's a very stable layer," says Mike Flannigan, director of the Canadian Partnership for Wildland Fire Science at the University of Alberta.

This also allows wildfire smoke to travel huge distances. Large wildfires can send smoke billowing across whole continents and even oceans. In 2019, smoke from forest fires in Alberta, Canada, was tracked spreading across the Atlantic and into Europe. Smoke from the recent Australian fires was **carried by pyrocumulonimbus events over New Zealand**, where it impacted air quality and visibly darkened snow on mountains. The smoke even made it to South America.

Experts like Henderson and Nenes fear this spread of wildfire smoke may be exacerbating the harmful health effects of existing air pollution in busy, overpopulated cities. Globally wildfire smoke has been **estimated to cause over 339,000 premature deaths** a year – far more than those who lose their lives directly in these blazes. It could also be shortening life expectancies for populations that experience fire seasons regularly, Henderson warns.

"It really has an impact if you live under poor air quality conditions," says Henderson. "If that translates to these populations that are living for four months at a time in these really smoky conditions, you know that's going to have an impact on their life expectancy."

Wearing masks such as the N95 respirator can help people to protect themselves when they venture outside during wildfire smoke events. Investing in air purifiers with HEPA filters can also help reduce fine particles indoors too, says Henderson.

"If we can keep the indoor air as smoke-free as possible, it will go a long way to protecting people from these exposures," she says.

But the longer-term impact of wildfires is not just on human health, but the health of the planet as a whole. Burning forests and peat release huge amounts of carbon dioxide and other greenhouse gases into the atmosphere.

"Peat fires are important because it's legacy carbon," says Flannigan. "It's been built up over thousands of years. And it can be emitted to the atmosphere in a matter of hours or days." One study estimated that during the 2015 fire season in Indonesia, biomass fires that included a significant amount of peat **released the equivalent of 1.5 billion tonnes of carbon dioxide** into the atmosphere while fires in 1997 released so much carbon it was **equivalent to 13-40% of all emissions from fossil fuels** that year.

*As climate change causes these Arctic territories to warm, the risk of more carbon-spewing peat fires will only increase*

According to Flannigan, the soil in Russia, Alaska and Canada contains 30 times the amount of peat found in Indonesia's soil. As climate change causes these Arctic territories to warm **twice** as fast as the rest of the planet, the risk of more carbon-spewing peat fires will only increase.

If that wasn't enough, these areas are regularly experiencing so-called **Zombie fires**, which are slow-burn peat fires that can smoulder just under the ground for months and even years, only to roar back to life when temperatures climb, as **happened in Siberia this year**.

With climate change bringing warmer, dryer summer conditions, it could lead to a vicious cycle of fire.

“The warmer we get, the more fire we get,” says Flannigan. “The more fire we get, the more greenhouse gas emissions we get, which feeds the warming and this keeps on going until something changes.”

Nasa researchers **discovered** another effect wildfire smoke may be having on the climate. They found the Earth is surrounded by a haze of old smoke hanging in the troposphere over places like Antarctica. It accounts for roughly one-fifth of the aerosols from global fires.

“On a global scale, these smoke particles cool the Earth, but only slightly,” says Gregory Schill, a research associate at the National Oceanic and Atmospheric Administration’s Chemical Sciences Laboratory where the study was conducted. “On a regional scale, however, and in climate-sensitive places like the Arctic, these particles can cause a regional warming effect.”

One reason for this is that black and brown carbon in smoke absorbs heat, causing the air temperature to rise and warm the area below. In areas like the Arctic, this could only exacerbate the problem, creating the conditions that would make wildfires even more likely.

In a world already struggling against wildfires, it is a worrying prediction.

## How do you fix healthcare's medical waste problem?

By Hope Ngo

*Coronavirus has made medical waste more visible than ever, but the environmental footprint of healthcare goes much further – and reducing it could save lives.*

When surgeon Claire Teves* (not her real name) landed in Singapore from the Philippines for a six-month fellowship, she knew it would take some time to adjust. Teves had come from a hospital serving the needs of a poorer developing society, to work in a cutting-edge medical facility in a much wealthier one. She was braced to overcome a knowledge gap at this world-class facility, and face different day-to-day medical challenges. But when she arrived, she faced a very different culture shock: how the new hospital used plastics.

In the operating theatre, devices such as plastic retractors – which are used to hold surgical cuts open – were used once per patient and then thrown away at the end of the procedure to be disposed of as medical waste. In her hospital in the Philippines, the same device would be painstakingly sterilised and reused until it was worn out and beyond repair.

Seeing these life-saving items being thrown away when they were so sought-after in the Philippines, Teves decided to do something about it. “When I saw the waste, I

thought to save whatever single-use equipment I could get my hands on, so I could recycle them and bring them back," she says. It was a decision that would have ruffled some feathers at the Singapore hospital if it wasn't carried out with discretion and the help of friendly staff. In the end she managed to fill a large suitcase with "single use" plastic surgical devices that would otherwise have gone to waste.

Addressing the environmental impact of healthcare, from plastics to fossil fuel reliance, can quickly become a charged debate. After all, when it comes to saving lives, the patient in front of a doctor is always the first concern. "It's very good in theory to talk about healthcare and its environmental footprint, which is not insignificant," says Hong Kong-based cardiologist Ryan Ko. "But it's another thing altogether when you're on the front lines of healthcare. As doctors, we are required to make patients' immediate needs and requirements a priority, and that needs to come first."

*Fossil fuel combustion is a major contributor to air pollution-related deaths, which kill more than four million people around the world every year – Gary Cohen*

Even Teves agrees – her motivation in saving devices was to provide equipment for patients in the Philippines. "Addressing sustainability is not really on our priority list; everything we do is about helping our patients," she says.

Others point out that in the broader sense, sustainability is also about helping patients – or rather, preventing people having to go to hospital in the first place.

Take the healthcare industry's carbon emissions – if healthcare were a country, it would be the fifth-largest emitter of greenhouse gases on the planet, according to the non-profit organisation Health Care Without Harm. That's a carbon footprint the same as the emissions of 514 coal-fired power plants, **equivalent to 4.4% of global net emissions**. More than half of that was a result of energy use: electricity, gas, steam, air conditioning and operational emissions.

"Fossil fuel combustion is a major contributor to air pollution-related deaths, which kill more than four million people around the world every year. More than tuberculosis, more than malaria, and more than Aids combined," says Gary Cohen, president and co-founder of Health Care Without Harm.

## Cost of waste

One of the problems is those on the frontline often see providing necessary healthcare and being environmentally friendly as an either/or choice. "It's difficult to think about sustainability when we have to weigh that up against the safety of a patient," says Ko.

*In people's minds now, both single-use protective equipment and single-use medical equipment are understood as safer. But that is not necessarily true – Tony Capon*

But what if doctors worked in a healthcare system where they didn't have to make a choice between the two?

Sometimes the shift is as simple as challenging assumptions. Take single-use plastics; healthcare workers on the front line emphasise that there is a legitimate need for single-use plastics, primarily to prevent infectious diseases from taking hold and spreading – and **Covid-19 is a perfect example** of this need. While no one would argue that **safely disposing of hazardous used PPE is essential** when it comes to infectious diseases like Covid-19, **only 15% of healthcare waste is actually classed as "hazardous"** – which covers waste that could be a source of infection, or is radioactive or toxic.
The other 85% of medical waste is not much different from the waste we generate at home, or at work. This waste might cover used food containers, packaging materials or gloves worn to inspect a non-infectious patient. It's this non-hazardous 85% where the reductions could come.

"In people's minds now, both single-use protective equipment and single-use medical equipment are understood as safer. But that is not necessarily true," says Tony Capon, director of the Monash Sustainable Development Institute. "When I was beginning my medical career, it was standard practice for things to be cleaned and autoclaved. Medical equipment was routinely cleaned up, sterilised and reused."
*Coronavirus could well become a catalyst, because people may realise that by degrading our environment, we could find that we are getting more and more of these types of diseases – Sonia Roschnik*

Then there is the question of cost. **Single-use disposables are perceived to cost less upfront**, than supplies which need to be maintained carefully to prevent infection and early wear and tear. But in the longer term, **there is a high cost to constantly replacing devices**. **Neurosurgeons at one Canadian hospital, for example, cut their costs by CA$750,000 ($570,000/£430,000) by reducing use of disposables by 30%**.
Plastic gloves are a good example. Sonia Roschnik, the former director of the Sustainable Development Unit for England's National Health Service, recalls a time when **nurses at London's Great Ormond Street hospital realised that healthcare professionals were choosing to use non-surgical gloves instead of washing their hands**, when performing tasks such as moving beds or bathing babies. When nurses started to remind staff that the gloves weren't intended for these purposes, glove usage went down, says Roschnik. The hospital was able to cut its use of plastic gloves, saving 21 tonnes of plastic and £90,000 ($120,000) as a result.

Roschnik, who is now international climate policy director at Health Care Without Harm, adds that the industry "could also go some way into cleaning up if it reutilises certain items, and if there is a concerted effort to segregate waste more efficiently, because not all of the rubbish needs to go into a high-infectious work stream".

There is certainly a way to go. In 2018, **a survey conducted across four Mayo Clinic locations across the United States** found that single-use plastics made up at least 20% of medical waste generated in US hospitals; 57% of those surveyed didn't know which items in operating theatres could be recycled, 39% said they either sometimes or never recycled, and that 48% had "a lack of knowledge" about recycling.

The widespread lack of an efficient medical recycling system represents a part of the bigger problem with the industry as a whole. In a commentary on healthcare's role in the global climate crisis, Yale School of Medicine associate professor of anaesthesiology Jodi Sherman called environmental sustainability an "unappreciated dimension of health quality care". She and her co-authors also pointed out that **traditional assessments in the successes or failures in the healthcare system as a whole have yet to factor in the cost of pollution** both up and downstream of the industry's supply chain, from resource extraction to disposal management.
With medical waste currently more visible than ever, **researchers are calling for healthcare's waste and environmental footprint to be brought up the agenda**. "Coronavirus could well become a catalyst, because people may realise that **by degrading our environment, we could find that we are getting more and more of these types of diseases**," says Roschnik. "Do we as a people want to live this way? Or do we say: if we want to be healthy, our planet needs to be healthy – and it's incumbent on all of us to do something about it."

**Climate health**

Cutting greenhouse gas emissions is perhaps the most direct way that healthcare facilities can align pro-environmental behaviour and human health benefits. Aside from the **disease and deaths caused worldwide by increased extreme weather, heatwaves and sea level rise**, cutting emissions often comes with cost savings that can be channelled back into healthcare.

In the US, Boston Medical Center, for example, is using solar energy to meet its energy needs by buying its electricity from solar farms, saving $25m (£19m) as a result. The Cleveland Clinic, which invested in 15 internationally certified energy-efficient buildings, saw its energy consumption decrease by 19% as a result, which translates into $50m in (£38m) savings. Energy efficiency measures also slashed consumption at Canada's McGill University Health Centre, which resulted in **savings of up to C$2m ($1.5m; £1.1m) a year**, and the hospital's electronic waste recycling program processed 52 tonnes of electronic devices over the span of a decade.

Other hospitals are looking into their food supply chain as a way of making their operations more carbon friendly. The University of Washington Medical Center has begun using a more sustainable, efficient food procurement system to improve its carbon footprint, by working with a local farmers union to provide locally grown, organic food to both patients and paying customers. The University of California, San

Diego Health eliminates food waste either through composting or donating uneaten meals; their goal is to cut their food-related emissions by 25% by 2030.
Besides carbon dioxide, healthcare relies on several more potent greenhouse gases; operating theatres rely on the anaesthetic gases desflurane, sevoflurane and nitrous oxide, which are greenhouse gases. Only 5% of these gases actually enter a patient's system during surgery – the rest is vented out as medical waste. These halogenated gases have the global warming potential up to 2,000 times greater than carbon dioxide. Researchers have suggested **reducing emissions by using gas-capture technology that uses canisters to collect unused anaesthetics**.

"Hospital managements may have a lot of things that they have to put in place to make sustainability 'a thing', but in reality every healthcare professional should be thinking about it in the way you use products," says Roschnik. "How you do clinical practice in a sustainable way is going to require every healthcare professional to think about it."

As Teves' efforts in Singapore to save reusable medical devices from the incinerator show, sometimes providing the best care for patients and sustainability naturally align. And where they don't, it's a question of how to redesign the healthcare system so there isn't a choice between saving lives and the environment.

"What health means now is to address those factors that are making people sick in the first place, and not just treating sick people," says Health Care Without Harm's Cohen. "[We need to get] healthcare to address their climate footprint, to be the anchors of resilience for the communities that they serve, and to become advocates for environmental health and justice."

Given the health risks of **air pollution**, **climate change** and **plastic waste**, cleaning up healthcare could in fact turn out to be an opportunity to save many more lives.

# Все очень плохо: экологи оценили "здоровье" биосферы Земли

*https://www.popmech.ru/*

*Осенью 2020 года был опубликован очередной выпуск регулярного доклада "Живая планета", над которым в этот раз работали 134 автора из 25 стран мира. Ученые, специалисты по экологии и другие эксперты "Всемирного фонда дикой природы" (WWF) проанализировали данные о биоразнообразии всех уголков нашей планеты с 1970 по 2016 годы и поделились своими выводами.*

Биоразнообразие — один из качественных показателей сложности биосферы или отдельных ее зон, показывающий ее богатство и, косвенно, устойчивость к внешним факторам, а также потенциал к росту и развитию. Все природные

механизмы, влияющие на формирование биоразнообразия для ученых пока не ясны, но совершенно точно известно, что его снижение является крайне опасным. А ключевой фактор, снижающий биоразнообразие на Земле — деятельность человека.

В докладе (PDF) приводится огромное количество цифр, описывающих сложившуюся ситуацию. Подавляющее большинство из них — весьма депрессивны:

- 75% свободной ото льда земной поверхности претерпело значительные изменения, часть из которых — необратима. Чистых морей и океанов не осталось, они загрязнены по всей глубине и площади. Каждый пятый вид растений находится под угрозой исчезновения, среди пресноводных животных — каждый третий.
- За последние полвека численность популяций позвоночных (млекопитающие, птицы, рыбы, земноводные и пресмыкающиеся) снизилась на 68%. Оценка построена на изучении четырех тысяч видов и не включает в себя насекомых, бактерий и моллюсков, которые также важны для природы, но подсчитать их гораздо сложнее. Это все не означает, что животных на Земле стало на две третьих меньше, данный показатель демонстрирует динамику развития популяций. Общее количество позвоночных пока уменьшается не такими быстрыми темпами.

- На территории России снижение численности популяций позвоночных не такое большое — всего 24%, однако это не является заслугой местных экологов или ответственного отношения жителей страны к природе. Значительная часть нашей родины просто пока не тронута человеком, а на западе страны основные изменения произошли еще до начала XX века.
- Самое большое падение численности животных в популяциях (84%) наблюдается в пресноводных водоемах — реках и озерах.
- Сельское хозяйство, обеспечивающее человечество пропитанием, сильнее всего влияет на биосферу. Под него задействована треть всей площади Земли, из-за него погибло 80% исчезнувших лесов планеты, для его нужд используется 70% всей потребляемой пресной воды и оно же ответственно за 29% выбросов парниковых газов в мире.
- Применительно к региону, где расположена Россия (Европа и Центральная Азия), основными угрозами биоразнообразию являются: 57,9% — изменение мест обитания животных под нужды человека, 19,7% — эксплуатация биосферы человеком (охота, вылов рыбы, браконьерство), 10,9% — инвазивные виды и болезни, 7,5% — загрязнения, 4% — изменение климата.

- Экономический рост человечества за последние полвека был впечатляющим, но обошелся природе колоссальной ценой. Население увеличилось вдвое, экономика в 4 раза, объемы торговли в 10 раз, а средняя продолжительность жизни — на 15 лет. При этом современному человеку для обеспечения

привычной жизни необходимо на 56% больше ресурсов, чем природа способна восстановить. При этом россияне используют вдвое больше ресурсов, чем среднестатистический житель планеты.

- Россия входит в четверку стран-лидеров с наибольшими нетронутыми территориями, наряду с Канадой, Бразилией и Австралией. Одновременно с этим наша страна лидер и в другом рейтинге, только со знаком “минус” — за последние 20 лет наша родина быстрее всех теряет эти первозданные ландшафты, которые не встречались еще с деятельностью человека. Основной регион, где наиболее заметен данный процесс — Арктика.

Но специалисты WWF не просто констатируют мрачные факты и прогнозы, они предлагают и пути решения проблем. Среди прочего, как “Популярная механика” писала ранее, рассматривается вариант увеличения количества заповедников, что может сильно помочь в сохранении природы. Очень важным является пересмотр всей экономики в целом и отдельных ее отраслей в частности. По самым оптимистичным прогнозам, если принять все необходимые меры, к 2070 году удастся восстановить биоразнообразие на уровне 2010 года.

Изменение климата пока еще не так сильно влияет на животных в глобальном масштабе, гораздо меньше, чем прямая деятельность человека. Однако это все равно взаимосвязанные процессы, тем более, что локально потепление приводит к настоящим катастрофам. Как это произошло, например,

в Австралии, где пожары прошлой зимы унесли жизни более чем трех миллиардов особей позвоночных.

Отдельно экологи отмечают и влияние пандемии коронавирусной инфекции. Несмотря на всяческие сообщения о том, что “природа очищается” и различные виды животных “отвоевывают у человека свои территории”, на самом деле произошедший спад человеческой деятельности приведет к еще большему урону природе. Для восстановления экономики производства и предприятия уже начинают работать в усиленном режиме, а чтобы уменьшить их издержки во многих странах звучат предложения снизить экологические нормы.

# Экологическое состояние России на 2020 год

https://vtorexpo.ru

Проблемы экологии в России являются объектом пристального внимания со стороны государства и ученых. На территории одного из самых крупных в мире государств находится множество уникальных природных комплексов, имеющих большое значение не только для страны, но и для всей планеты. Экологической ситуации в России угрожают те же факторы, с которыми сталкиваются все государства, и связаны они с расширением цивилизованных пространств, использованием человеком ресурсов планеты, развитием промышленности и проблемами загрязнения.

**Основные экологические проблемы**

Экологические проблемы, наиболее актуальные для страны, можно разделить на следующие группы:

- загрязнение воздуха, почвы, воды промышленного характера;
- изменение природного ландшафта, вырубка лесных массивов;
- комплексное отрицательное влияние на окружающую среду, оказываемое крупными городами;
- большие объемы сжигаемого и складируемого мусора;
- последствия техногенных катастроф.

В отношении всех перечисленных факторов ведется постоянное наблюдение и надзор, разрабатываются меры по минимизации вреда для экологии. Но принимаемых мер не всегда достаточно для того, чтобы решить проблему полностью.

**Ситуация с загрязнением окружающей среды**


На территории России работает огромное количество промышленных предприятий, деятельность которых отрицательно сказывается на состоянии не только расположенных в их окрестностях территорий, но и может влиять на экологию целых регионов.

Вред окружающей среде способно нанести любое производство, но наиболее проблемными для экологической ситуации являются следующие отрасли:

- добыча ископаемых, нефти;

- энергетика;
- металлургия;
- производство пластика, других строительных материалов;
- военно-промышленные предприятия.

Их выбросы, отходы попадают в воздух и воду. Реки и ветер переносят вредные вещества на огромные расстояния. Выпадая вместе с осадками, они отравляют и почву. В результате разработки месторождений изменяется естественный ландшафт, образуются провалы, оползни. Все это оказывает негативное влияние не только на состояние атмосферы, но и на здоровье людей, проживающих на территориях, подвергшихся загрязнению. Почвы на территориях месторождений надолго становятся непригодными для сельского хозяйства, строительства жилья.

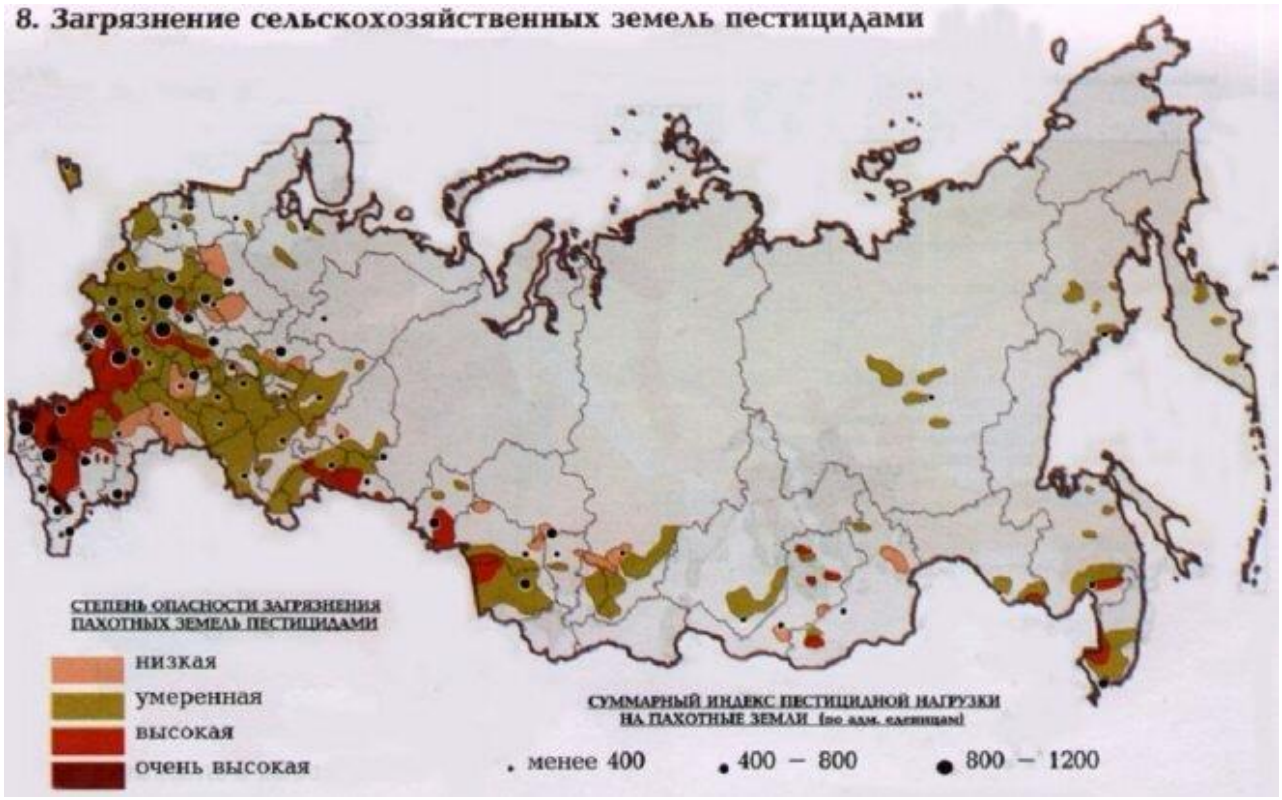
В больших городах ситуация усугубляется выбросами выхлопных газов и повышенными затратами электроэнергии. Это сказывается на состоянии озонового слоя планеты. Последние исследования показывают, что превышение нормы содержания выхлопных газов в воздухе наблюдается более чем в 40 городах России.


Экологические проблемы связаны и с утилизацией мусора. Радиоактивное загрязнение почв в местах свалок имеет долгосрочный характер и даже после их ликвидации земля в этом месте на десятилетия непригодна для

использования. Это означает, что для жизнедеятельности человеку нужны все новые и новые участки.

**Вред, нанесенный почве**

Долгие годы в сельском хозяйстве использовались удобрения и средства для борьбы с вредителями, наносящие вред окружающей среде. Это также привело к сильному химическому отравлению почв, последствия которого еще не нейтрализованы.




В России к предприятиям промышленности и сельского хозяйства, производителям топлива в последние десятилетия предъявляются требования, вынуждающие их обеспечить качественную очистку отходов, экологическую безопасность производства. Но выполнение этих требований не всегда происходит в полном объеме.

Экономический кризис заставляет организации еще больше экономить на средствах по соблюдению экологических норм. В этом состоит серьезная экологическая проблема современной России – обеспечить выполнение законодательства в части охраны окружающей среды и разработать нормы, соответствующие текущей ситуации.

## Экология водных ресурсов, лесов

Леса и водоемы являются бесценным природным богатством, которые позволяют соблюдать природный баланс, очищают атмосферу от вредных веществ, вырабатывают необходимый для жизни кислород.

### Вырубка леса в России

Характерной тенденцией последних лет является постоянное сокращение лесных массивов в результате неконтролируемой вырубки, заготовки древесины. Это означает уничтожение заповедных зон, где обитают животные и птицы, уникальных видов растений, деревьев. Пополнение лесного фонда происходит гораздо более медленными темпами, чем его вырубка.

Помимо промышленного использования, лесам грозят расширение населенных пунктов, строительство транспортных магистралей. На многих территориях, представляющих собой уникальные природные комплексы, созданы заповедные зоны, которые запрещено использовать. Но этого мало для охраны окружающей среды и для решения экологической проблемы исчезновения лесов.

Не только в России, но и во всем мире остро стоит вопрос с состоянием водных ресурсов, особенно пресных водоемов. Реки и моря являются наиболее удобными для предприятий и городов способами избавления от отходов и сточных вод. Жесткие требования к их очистке перед сбросом стали предъявляться не так давно. За это время был нанесен непоправимый урон. По данным ученых, условно чистыми в стране являются чуть более 10% водоемов и рек.

### Последствия загрязнений

Загрязнение рек уничтожает сложившиеся экосистемы, приводит к гибели животных, рыб, растений. Для человека эта экологическая ситуация грозит обернуться ощутимым дефицитом пригодных для использования водных ресурсов. Уже сейчас в некоторых важных водоемах России содержание вредных веществ, пестицидов, тяжелых металлов гораздо выше допустимых норм, что делает использование воды из них для употребления в пищу опасным.

Все очистные мероприятия не могут обеспечить стопроцентное очищение сильно загрязненных вод. Признание водоемов и рек охраняемыми происходит

медленно и зачастую ситуация уже бывает критической к моменту, когда экологи добиваются запрета на сброс отходов.


**Решение экологических проблем**

Для решения проблем экологии в России используются различные комплексы мер. Пути решения экологических проблем в России:

- признание земель и водоемов охраняемыми зонами, защита их от загрязнения и использования;
- ограничение или запрет на использование некоторых видов природных ресурсов: животных, растений, рыб;
- ужесточение требований к утилизации химических отходов, очистке выбрасываемых газов, продуктов производства, сточных вод;
- переменное использование почв для сельского хозяйства с перерывами на восстановление отдельных участков, проведение мер по их очистке;
- контроль количества транспорта в городах и качества топлива.

Помимо государственного контроля, улучшение ситуации требует сознательного отношения к природным ресурсам со стороны всех граждан страны. Разумное расходование природных и энергетических ресурсов, правильная утилизация мусора, расчистка земель позволяют избежать усугубления состояния окружающей среды.

# Vocabulary

**Acid rain –** rain which contains large amounts of harmful chemicals as a result of burning substances such as coal and oil.

**Air quality –** The degree to which the air is free of pollution

**Animal sanctuary –** A place of safety for distressed animals

**Ban (v) -** to not allow something (eg. smoking, alcohol, plastic bags, protest marches, etc.)

**Be under threat (v) –** To be at risk

**Biodegradable –** able to decay naturally and harmlessly.

**Biodiversity –** the number and variety of plant and animal species that exist in a particular environmental area or in the world generally, or the problem of preserving and protecting this.

**Carbon dioxide –** the gas formed when carbon is burned, or when people or animals breathe out.

**Carbon monoxide –** the poisonous gas formed by the burning of carbon, especially in the form of car fuel.

**Carbon tax-** A tax on fossil fuels

**Carcinogen -** a substance that has been linked to causing one or more types of cancer

**clear-cut** (v) - to destroy a forest by cutting down all the trees

**Climate –** the general weather conditions usually found in a particular place.

**Climate change –** there has been a growing concern about climate change.

**Commute** (v) - to travel from home to work and back

**Conserving water –** To use water sparingly

**Consume (**v) - to use things like energy, fuel, materials, food, water, etc.

**Contaminate (v) –** to poison or pollute

**Deforestation –** the cutting down of trees in a large area; the destruction of forests by people.

**Desertification –** the process by which land changes into desert.

**Disposable products –** describes an item that is intended to be thrown away after use.

**Domestic waste** (also **household waste**) -rubbish or garbage from a house or apartment

**Drought –** a long period when there is little or no rain.

**Dump (**v) - to put waste in the wrong place (eg. put toxic waste into a river)

**Earthquake –** a sudden violent movement of the Earth's surface, sometimes causing great damage.

**Eco-community** or **ecovillage** - a community with environmentally-friendly buildings, clean technology and renewable energy like solar and wind

**Ecosystem** - the complex system of relationships between living things and their environment

**Emit** (v) - to release or project something (eg. light, sound, smoke, gas, radiation, etc.)

**Endangered species –** endangered birds/plants/species animals or plants which may soon not exist because there are very few now alive.

**Endangered species –** A species that is close to extinction

**Energy –** the power from something such as electricity or oil, which can do work, such as providing light and heat. There are different types of energy: solar, nuclear, hydroelectric...

**Energy conservation –** the process of conserving energy

**Energy efficient –** To use as much energy as is required with no wastage

**Energy-efficient** - able to use less energy (esp. of vehicles, appliances, buildings, etc.)

**Environment –** the air, water and land in or on which people, animals and plants live.

**Environmentalist** - a person who protects the natural world and educates others about environmental problems

**Environmentalists –** Someone who is concerned about the environment

**Estuary –** The large tidal area of one or more river

**Extinct** - no longer existing or lost forever (of an animal, bird or plant species)

**Extinction –** Many species of plants and animals are in danger of/threatened with extinction (= being destroyed so that they no longer exist)

**Fertilize** (v) - to add chemicals or organic material to soil so that plants grow better

**Flood –** a large amount of water covering an area that is usually dry.

**Food chain –** Living organisms in a hierarchy that depend on the one below for sustenance

**Fossil fuel –** Fuel such as coal or diesel, formed from organic material

**Fumes –** strong, unpleasant and sometimes dangerous gas or smoke.

**Global warming –** a gradual increase in world temperatures caused by polluting gases such as carbon dioxide which are collecting in the air around the Earth and preventing heat escaping into space.

**Green peace –** an organization that fights for the protection of the environment.

**Greenhouse effect –** an increase in the amount of carbon dioxide and other gases in the atmosphere which is believed to be the cause of a gradual warming of the surface of the Earth.

**Greenhouse gas** - a gas in the atmosphere that stops heat from escaping into space

**Grey water –** Fairly clean waste water from baths and showers

**Habitat** - the place in which a species normally lives

**Hazardous waste** - dangerous substances that need careful disposal (eg. toxic or nuclear waste)

**Heavy industry –** An area of factories which use heavy machinery

**Industrial effluent –** Liquid waste from factories

**Loss of habitat –** Loss of natural living areas

**Marine life –** Living creatures in the sea or ocean

**Mass extinction –** The largescale total loss of species

**Minimize** (v) - to reduce as much as possible

**Natural habitat –** The natural living space of a particular species

**Natural resources –** things such as minerals, forests, coal, etc. which exist in a place and can be used by people.

**Oil slick –** a layer of oil that is floating over a large area of the surface of the sea, usually because an accident has caused it to escape from a ship or container.

**Oil Spill –** Oil which has escaped into a body of water

**Ozone layer –** a layer of air high above the Earth, which contains a lot of ozone, and which prevents harmful ultraviolet light from the sun from reaching the Earth.

**Pesticide** - a chemical that's sprayed on crops to stop insects from destroying them

**Pollutant** - a substance or material that damages the natural environment

**Pollute** (v) - to release waste substances into the air, water and soil

**Pollution –** damage caused to water, air.... by harmful substances or waste.

**Pollution** - the contamination of the environment, esp. by industrial waste products and chemicals like pesticides

**Preserve** (v) - to keep something in its original state

**Protect** (v) - to keep from harm

**Protest** (v) - to show you disagree with something, esp. as part of a group of protesters

**Rapid deforestation** – The fast destruction of forests

**Recyclable materials –** Materials which can be re-used once reworked

**Recycle waste –** to collect and treat rubbish to produce useful materials which can be used again.

**Recycle** (v) - to make something new from materials that have been used before

**Reduce** (v) - to use less or make something smaller

**Reforestation** - the planting of trees and plants to help a damaged or destroyed forest recover

**Rely on** (v) - to depend on (or need) someone or something

**Renewable energy –** describes a form of energy that can be produced as quickly as it is used.

**Renewable** - can be used without running out, esp. of energy sources like solar and wind

**Renewables** - forms of energy that can be replaced naturally, such as hydro-electricity, solar energy and wind power

**Reuse** (v) - to use again

**Scarce resources –** A limited amount of materials such as water

**Self-sufficient** - able to function, or produce all that's needed, without outside help

**Smog** - thick dirty cloud at ground level caused by pollutants reacting to sunlight

**Spawn (v)** – release of eggs by fish or frogs.

**Spring migration –** The movement of animals from north to south or vice versa

**Sustainable development –** a development that is causing little or no damage to the environment and therefore able to continue for a long time.

**Throw away** (v) - to get rid of something you don't want

**Toxic** - deadly or poisonous (of waste, chemicals, pollutants, etc.)

**Toxin (toxic chemical)** - a poisonous substance that damages health or the environment

**Tsunami –** an extremely large wave caused by movement of the earth under the sea, often caused by an earthquake (= when the Earth shakes)

**Unleaded petrol –** describes a type of petrol or other substance that does not contain lead.

**Use up natural resources –** The degradation of natural resources because of human pressure

**Use up** (v) - to use something until there's none left

**Volcano –** a mountain with a large circular hole at the top through which lava (= hot liquid rock), gases, steam and dust are or have been forced out.

**Waste –** unwanted matter or material of any type, often that which is left after useful substances or parts have been removed.

**Waste** (v) - to use more than necessary, or to use inefficiently

**Wildlife** - animals, birds, insects, etc. living naturally in the wild

**Zero-emission** - releasing no greenhouse gases like carbon-dioxide or methane

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