



Education and Culture DG

Lifelong Learning Programme



COMENIUS MULTILATERAL PROJECT

G.R.E.E.N

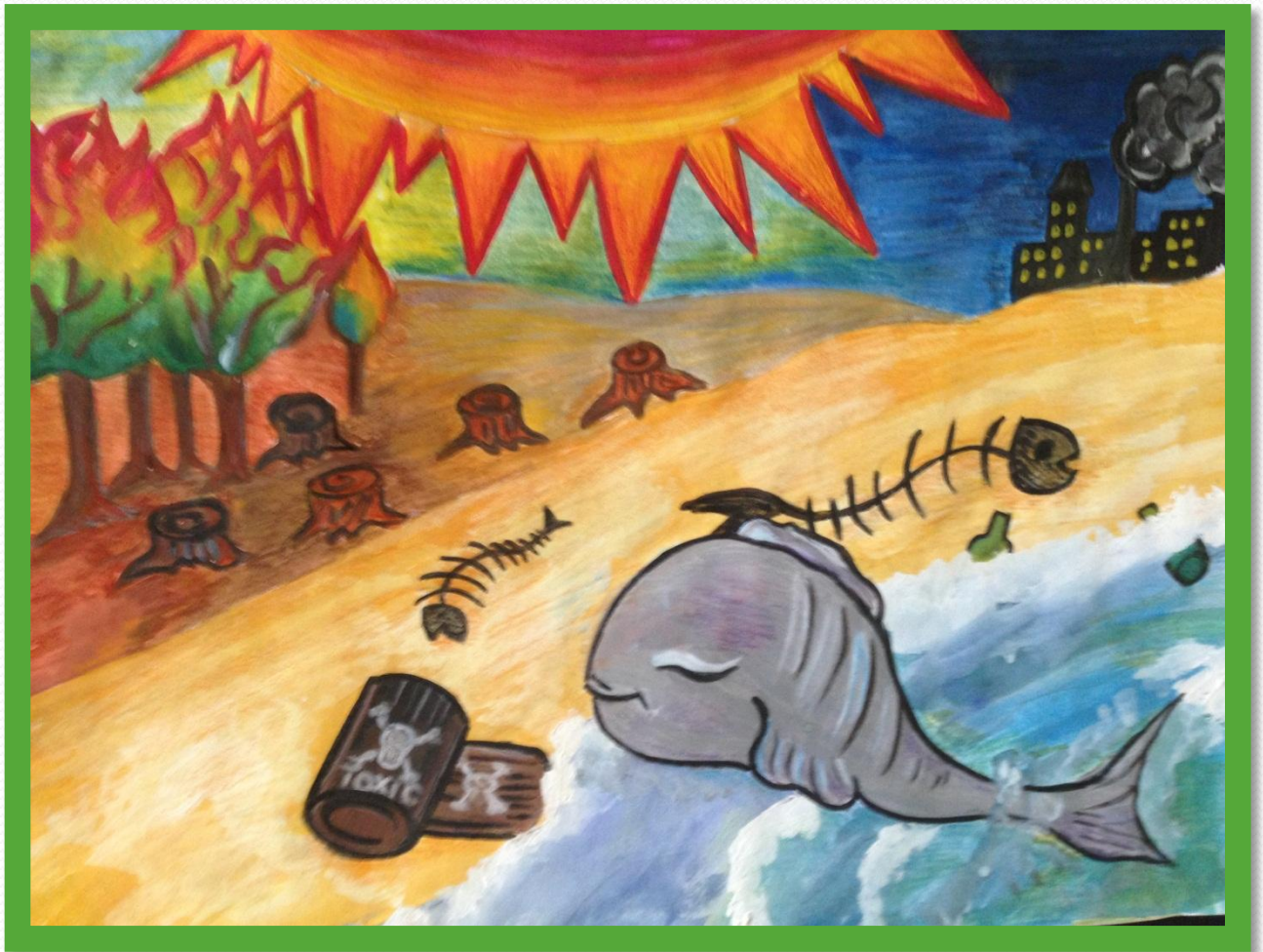
Go Re-Educate Earth Now!

POLLUTION

“OCTAVIAN GOGA” NATIONAL HIGH SCHOOL
Sibiu, Romania
March, 2013

G.R.E.E.N

Go Re-Educate Earth Now!



ROMANIA
March, 2013



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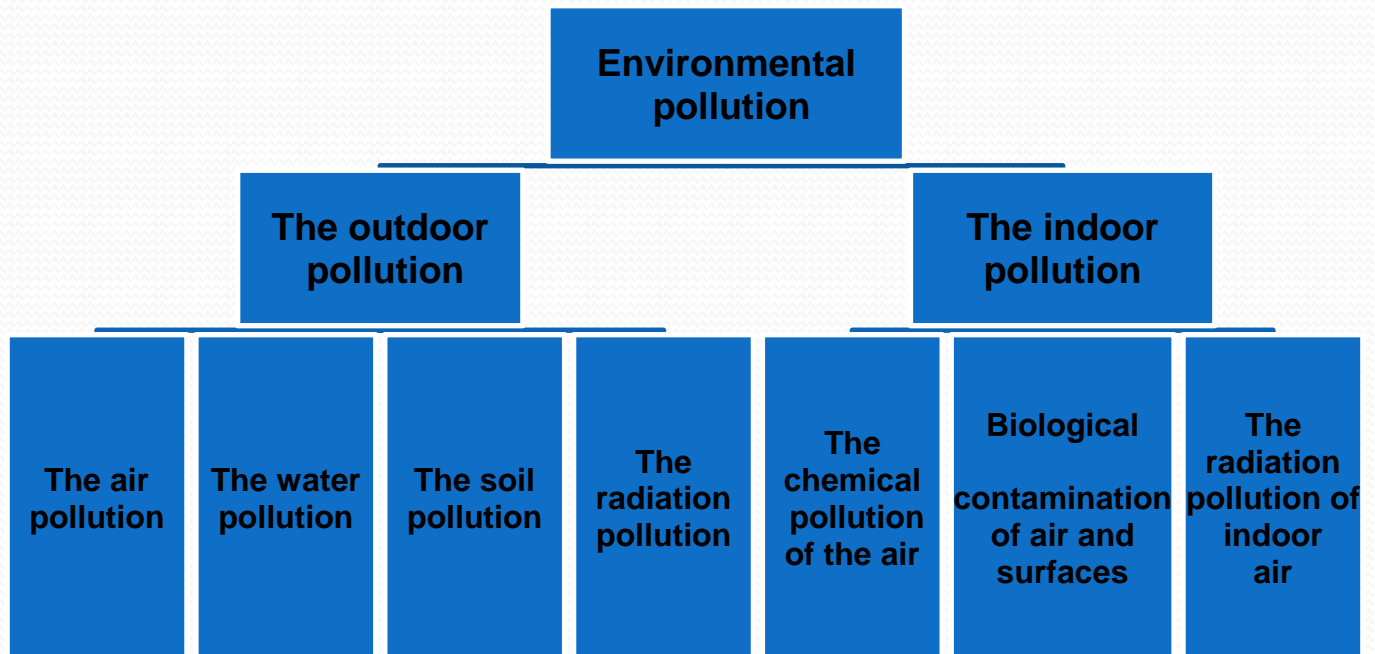
Dobrotă Dan

Epure Andrei

What is pollution?

- Pollution is the contamination of the environment with materials that interfere with human health, quality of life or the natural ecosystems (living organisms and the environment in which they live)
- Even if sometimes the pollution of the environment is a result of natural causes, such as volcanic eruptions, most of the pollutants come from human activities





CLASSIFICATION OF POLLUTANTS

On the basis of existence in nature

- a) **Quantitative Pollutants**- The substances which are already present in the environment, but are termed as pollutants when their concentration (quantity) increases in the environment. eg. CO_2 is present in the environment in greater quantity than normal and is hence termed as a quantitative pollutant.
- b) **Qualitative pollutant**- The substances which are not normally present in the environment and are added by human beings and are pollutants by nature. Eg. insecticides, pesticides

On the basis of the form in which they persist

- a) **Primary Pollutants**- The substances which are directly emitted from the source and remain in that form are termed as primary pollutants eg, smoke, fumes, ash, dust, nitric oxide and sulphur dioxide
- b) **Secondary pollutants**- The substances which are formed by chemical reaction between the primary pollutants and constituents of the environment (i.e. those which are already present in the environment) eg. smog, ozone, sulphur trioxide, nitrogen dioxide.

On the basis of disposal

- a) **Bio-degradable pollutants**- the pollutants which are decomposed by natural processes eg. domestic (municipal) sewage.
- b) **Non bio-degradable pollutants**- The pollutants which don't decompose naturally or decompose slowly eg. DDT, aluminum cans.

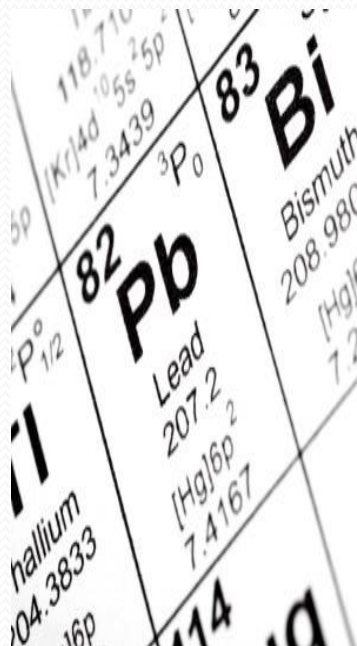
Physical pollutants:

- radioactive deposits
- water used in nuclear plants
- radioactive waste
- hot liquid from cooling of industrial installations or of the thermo and power stations



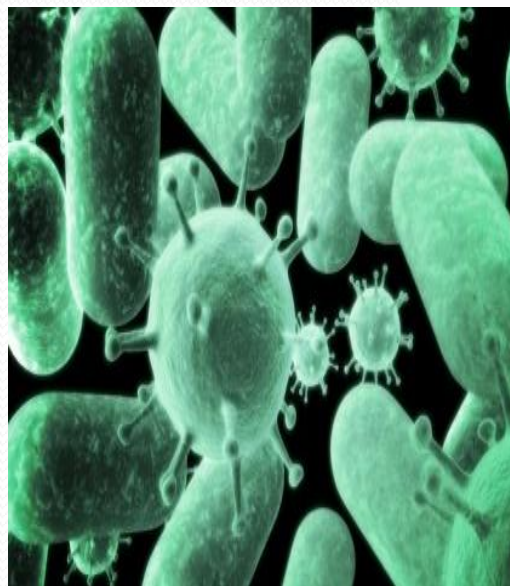
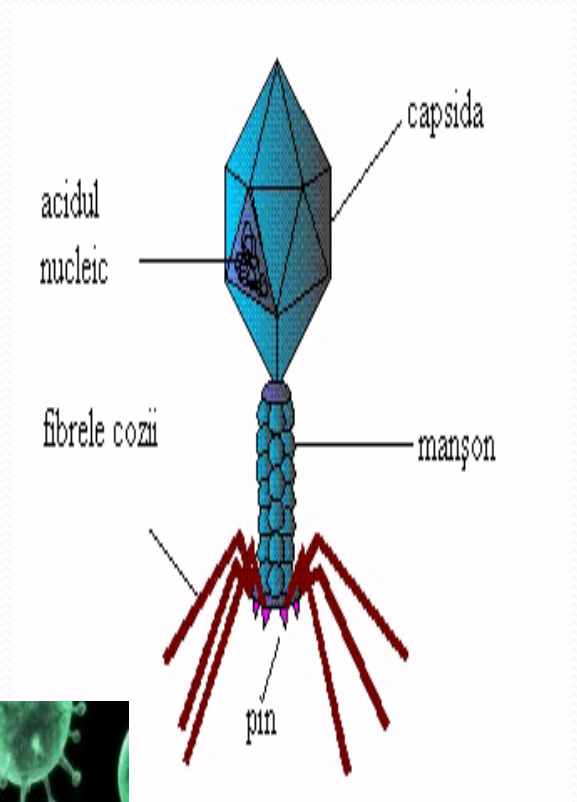
Chemical pollutants

- Mercury
- Nitrates
- Cadmium
- Lead
- Hydrocarbons
- Pesticides
- Insecticides
- Fungicides



Biological pollutants

- pathogenic micro-organisms
- fermenting organic substances



Earth Pollution

"The Earth has a skin, and the skin has diseases, one of these diseases is called man."

Friedrich

Wilhelm Nietzsche

Soil is a dynamic system performing functions vital for the survival of terrestrial ecosystems interacting with human activities. As an interface between earth, air and water, soil is a non-renewable source composed of mineral particles, organic matter, water, air and living organisms.

On Earth, land represents 38% of the total area, with the following distribution:



- agricultural land :
~30%



- forest :
30%



- desert :
36%

Causes of soil pollution

- ❖ Deposits of garbage, waste and inorganic residues
- ❖ Pesticides. Acidification. Pathogen contaminants
- ❖ The excavation work
- ❖ Radioactive materials and heavy metals
- ❖ Animal and human waste
- ❖ Floods
- ❖ The covering of soil with sediments produced by erosion
- ❖ Soil salinization



Effects of soil pollution in Romania

- ❑ Danger of desertification
- ❑ Affected regions: Oltenia, Banat

Soil condition in Romania

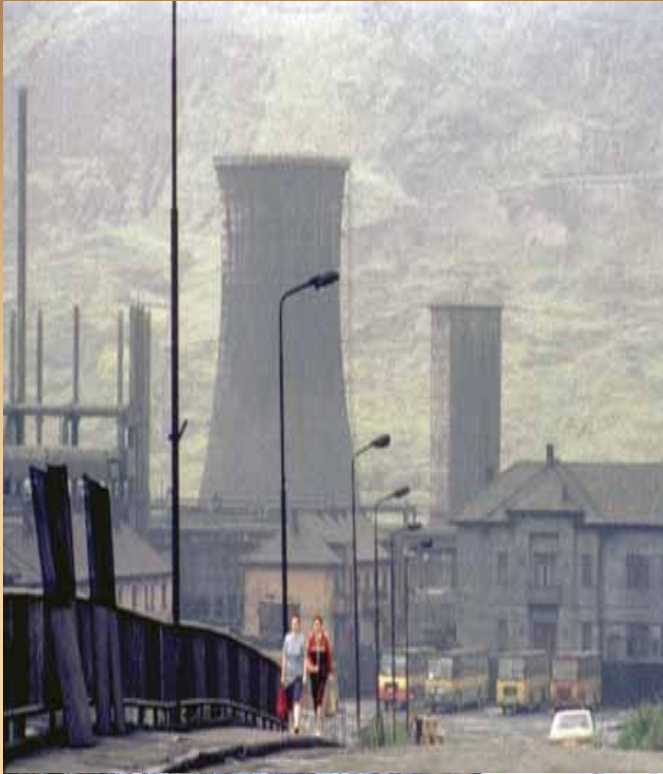
- ❑ 973 industrial warehouses, which occupy 11.086 acres of land
- ❑ Oil pollution and salt water from natural petroleum exploitation is present on about 50.000 acres
- ❑ Land slides cause soil loss up to 41,5 tons/acre/year



SOIL POLLUTION IN ROMANIA

The most important types of soil pollution officially investigated are:

- Soil pollution (degradation) by mining and quarry activities;
- Pollution caused by ponds, mining dumps, non-complying landfills;
- Pollution produced by inorganic residues and waste (minerals, inorganic material, metals, salts, acids, alkalis);
- Pollution caused by substances carried by the air – hydrocarbons, ammonia, sulphur dioxide, chlorides, fluorides, nitrogen oxides, lead compounds;
- Pollution caused by salted waters from petroleum extraction, petroleum pollution.



Soil Pollution in Sibiu area

- . The administrative area of Sibiu is 543,248 ha. Share the main land is agricultural land and vegetation forest.
- The data surveys have been undertaken on soil pollution in Copsa Mica, Medias from which we obtained a series of results showing the seriousness of the pollution by heavy metals and its effects on agricultural and forestry land and indirect effect on biological systems.
- The urban waste is a problem of present interest, taking seamed potential health and environmental hazard and that contain some recycled materials and energy recovery which aims to result saving natural resources and reducing material consumption and energy. Agricultural land occupying a small share, about 10%.
- Studies at Sibiu county level revealed a series of results showing that the phenomenon of heavy metal pollution is extended to a relatively large surface. Analytical results revealed the following:
 - ✓points most affected are those in the vicinity of the site, as you increase the distance from the point of generation, the pollutant emission load with heavy metals decreases .
 - ✓due to historical pollution, improving the soil quality requires a very long time, physical effort and great financial investments

Copșa Mică

According to several environmental studies, Copșa Mică is not only the most polluted city in Romania, but also the most polluted in Europe.

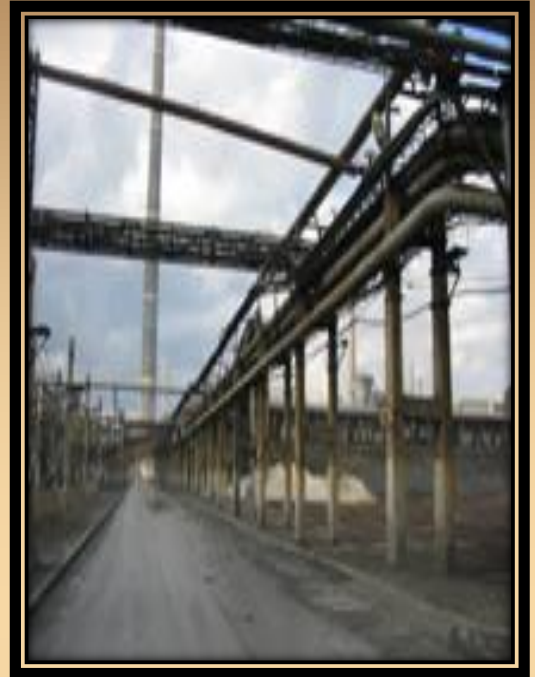
Copșa Mică is one of the sites with the highest degree of heavy metal pollution in Romania, the whole area being well known on national and international level for the ecological lack of balance due to the a non-ferrous smelter plant which uses ecological hazardous technologies: Sometra.

Copșa Mică was one of Europe's most polluted towns in the 1990s and remains the most polluted town in Romania to this day. Two factories Carbosin that produced carbon black and Sometra, a non-ferrous metallurgical smelter were behind this pollution. Carbosin shut down in 1993 but the smelter is still operational.



S.C. SOMETRA S.A

- SOMETRA SA is a private company and is specialized in the production of zinc and lead mining recovery from concentrate and other metals that are in focus, namely cadmium, bismunt, antimony, copper, gold and silver.



The plant currently occupies an area of over 36 hectares and together with slag dump, about 55 ha.

Effects on health

Potentially affected people: 5,189

Out of 2,972 people tested in the area, 1,570 showed symptoms of lead poisoning. Newborn children have twice the safe levels of lead in their bodies. Since 1983, 2,000 people have been hospitalized for lead poisoning. A few patients have been paralyzed because their brains were full of lead. 96% of children aged between two and 14 have chronic bronchitis and respiratory problems. The life expectancy in this town is nine years below the national average of 63 years.

There is widespread lung disease, the highest infant mortality rate in Europe, lead poisoning, reduced lung function, and neurobehavioral problems. The health risk from the smelter is considered so high by the government that the retirement age is 45, compared to 62 years nationally.

Attitude!

We don't abandon hope.

The MOVIE

at the International Film Festival "Document. Art



Copsa Mica- The Story of Hope

"We are in the most dreadful place on Earth!

A God-forgotten place, one of the most polluted...

At least this is what one would have said about

Copsa Mica. I will bring to your attention a changed city. A new perspective of what was once called the most polluted towns in Europe..." this is what Andem promises in the film.

What is more left to say about a city that seems to have told its story, especially when our sense of history has diminished? The modern eye only sees the remains of a disastrous industry and the ruins that marked Copsa Mica as a city with no chance. There are just a few notes that tell that Copsa Mica was a beautiful settlement just like any other 600 years ago.

The film was produced in 2008, in 9 months, with a low budget and had as main goal the rediscovery of Europe's darkest city.



Methods of combating soil pollution

- ✓ The development of an ecological agriculture
- ✓ Afforestation and restoration in agriculture
- ✓ The adoption of new technologies in agriculture
- ✓ The control of potentially polluting activities
- ✓ Reuse and Recycle
- ✓ More Biodegradable Products and Packaging
- ✓ Bringing in stiffer penalties for polluters will encourage both companies and individuals to act more responsibly.
- ✓ Environmentally Aware Management of Nature



Pollution: Deforestation

Deforestation, clearance or clearing is the removal of a forest or stand of trees where the land is thereafter converted to a non-forest use.

But this is often wrongly understood and forests are disappearing



Did you know that?

Deforestation cause water pollution because when there are no trees left to block the rain fall the rain falls directly on to the soil and washes it in to the rivers which take it on to the seas and Ocean. The soil contains chemicals that pollute the water.



Methods of combating deforestation

Trees are absolutely vital to life here on Earth!!!!

- Plant a tree.
- Go paperless.
- Recycle and buy recycled products.
- Look for Forest Stewardship Council (FSC) certification on wood and wood products.
- Eat vegetarian meals as often as possible.



What is air pollution?

- the presence of foreign substances that cause disorders in the natural balance, affecting human health and comfort
- Urban air pollution= SMOG

Causes

- **The main substances:**
 - sulphuric pollutants, absorbents, hydrocarbons, nitrogen compounds, mineral pollutants, radioactive substances, bacterial dust
- **Carbon dioxide** is the most spread - 60% come from vehicles that use gasoline or diesel fuel
- **Sulphur dioxide**-the most harmful substance in the air



Industrial pollution

- the main pollutant on a worldwide scale
- due to industrial development hardly biodegradable waste-detergents, pesticides, radioactive waste appeared
- industrial gases pollute the atmosphere with different toxic substances
- electricity-producing industry, metallurgical, chemical and building materials



AIR QUALITY IN SIBIU

- “The air quality check, performed by daily measurements carried out in three fixed points, showed Sibiu as an area with low pollution levels. The monthly and yearly averages for the monitored pollutants (SO₂, Nox, powders) do not exceed the
- admissible values. In Sibiu there are no major industrial air pollutants”.
(ACCORDING TO: LOCAL AGENDA 21 -Local Plan for Sustainable Development of Sibiu Municipality)

Air pollution and its effects

The main source of air pollution in Sibiu is the road traffic.

Direct influence of air pollution on human health is the body changes that occur in persons exposed as a result of their contact with various air pollutants.

We can say that in general the health of the population Sibiu is not adversely affected by environmental factor air condition.

In urban areas with high population density and high traffic levels in particulate matter and sediments somewhat influence people especially infant susceptibility to contracting infectious and allergic respiratory diseases.

Bad effects:

- big cities or dense urban agglomerations are the most affected
- vehicles with combustion engine represent a pollutant that is becoming more and more significant
- burning fuel gives off smoke, which disperses when released in the atmosphere



In Sibiu

Air is the environmental factor which is the fastest stand favoring transport of pollutants in the environment.

Air pollution is caused by air emissions from stationary sources and mobile sources (road traffic) mainly in large cities, as well as the long distance transport of pollutants.

- **Sibiu** is still facing pollution due to emissions from businesses, and traffic, more intense, especially transit traffic. This area is considered by institutions from this point of view one of the cities with an **average** degree of pollution in the country.
- **Mediaș** product is subject to human impact traffic and to the economic activities on the Industrial Platform in Medias.
- The major pollution sources in the county are **Sometra** and **Copsa Mică**. Due to its frequent concentrations of Pb, Cd and Zn, total alert threshold determined in various data collection points are directly influenced by these companies.



Air quality is measured with 4 automatic air monitoring stations in key areas Sibiu county.

- Station 1 - Sibiu EN-SB-1
- Station 2 - Sibiu EN-SB-2
- Station 3 - Copsa Mica EN-SB-3
- Station 4 - Medias EN-SB-4

Pollutants:

- Carbon dioxide
- Carbon Monoxide
- Heavy metals:
 - Lead
 - * Cadmium
 - * Nickel
 - * Arsenic
 - * Benzene



Burning leaves, plastic, garbage and old car tires- major problem in Romania and Sibiu rural zones

- Leaf burning leads to air pollution, health problems, and fire hazard. It releases carbon monoxide, hydrocarbons and particulate matter, which may lead to lung diseases, allergies and even death
- Most people in the rural areas use to “clean” their gardens by burning leaves and garbage, due to the fact that there are no proper solutions to discharge them
- Although in civilised countries it has been outlawed, in Romania it is a habit that nobody thinks to stop, especially in the villages far from the main cities





Photos by Sabina Rogos,
near Cîsnădie

HAVE YOU EVER THOUGHT ABOUT THIS?

Air Pollution: The smoke from fireworks consists mainly of fine toxic dusts (particulate matter) that can easily enter the lungs. This represents a real threat for people with asthma or multiple chemical sensitivity (MCS). Additionally, in this time where the issues of climate change and global warming are being presented with a sense of urgency, we need to be concerned about the greenhouse gases fireworks produce, which include Carbon dioxide (CO₂) and ozone.



Water Pollution: Fireworks fallout can contaminate water supplies and residue on the ground can be carried away by rain and end up in our lakes, rivers, or oceans. Some fishermen have noticed and reported to environmental authorities that firework residues can hurt fish and other water-life because some may contain toxic compounds such as antimony sulfide



Noise Pollution: Fireworks can be loud and the vibrations can travel far. In the middle of the night fireworks often disturb people trying to sleep. Fireworks can exceed 140 decibels and noise at 85 decibels or above can damage hearing.

- ***So, we could name this kind of thing as "complex pollutant" and try to make people aware of its negative effects!***



INDOOR POLLUTION

the enemy in our own house

- Fine particles of matter produced by the burners, called particulates, appear to trigger heart attacks, strokes, and fatal respiratory problems
- These emissions can affect the air quality both indoor and outdoor.
- In rural areas of Romania, around 80% of the households detain wooden-burning stoves, most of the people being not aware of the danger smoke and ashes can turn into



Methods of combating air pollution

- non-polluting technologies
- The use of less polluting means of transport
- Massive educational campaigns and ecological projects
- recovery and use of waste substances;
- Tree-planting campaigns
- Volunteering projects
- State involvement: laws, financial support, monitoring
- Environmental NGOs





Did you know that?



- The wooden furniture emits toxic substances that can
- cause cancer? This toxic substances may affect the
- respiratory system, can cause sneezing, fatigue, skin eruptions and severe allergic reactions.
- Advice: Rise the level of airing in special after bringing new pieces of furniture in the house.
- The air in our own houses can be more polluted than the air outside and people spend almost 90% of their time indoors, at home or in the office?
- Nowadays, electro smog has become one of the most important source of pollution in our homes?
- Paints and dissolvent's which are based on latex are better than those that are based on oils, because they emit less toxic substances. The dissolvent's and the colored sprays may contain carcinogenic substances.
- Advice: When applying the paint, widely open the doors and windows, turn on the air conditioning and wear a mask for reducing the risk of getting in contact with the substances. Pregnant women should avoid as much as possible being in a room in which it is painting.

Air pollution. Ways You Can Help

- Combating air pollution does not always involve flashy new technologies, but also the small things that reduce energy use or stop pollution at its source.
- Use public transportation such as buses and trains.
- Carpooling decreases the number of cars on the road as well.
- Turn off lights and unused appliances. This reduces the need for more coal or other nonrenewable sources of energy to be burned.
- Plant a tree. Reforestation reduces the amount of carbon dioxide in the air since plants use it in photosynthesis.
- Don't burn wood. Fire places are the #1 cause of urban pollutants. Instead, use a gas powered fire place which gives off less emissions.
- If you are looking into a new car buy a hybrid, they reduce emissions.
- Get an electric mower. Using a gas mower for one hour produces the same pollution as a car driving 140 miles.
- Turn your heater system down a couple of degrees in the winter and your air conditioner up a couple in the summer.
- Add insulation to your home to increase the efficiency of your heating/air conditioning systems.
- Buy efficient appliances such light bulbs, washer-dryers, and dishwashers.

Water pollution



Water quality degrades as a result of physical, chemical and bacteriological changes

Causes of water pollution

- Accidental leakage of waste from factories and deliberate discharges of pollutants
- Spills of petroleum products
- Pesticides and weedkillers managed in agricultural work which moves through soil to groundwater
- Discharges from slaughterhouses
- Household waste and residues
- Deposition of atmospheric pollutants, acid rain
- Salt sprinkled on roads in winter, which is carried through the ground by rain water and melted snow



Effects of water pollution

- Chemical pollution of aquatic ecosystem
- Contamination of vegetables and fruit
- Destruction of the microbial flora



Surface water

- The most affected environmental impact factor in some cases, is the groundwater.
 - According to statistics, in Romania 35.70% of surface water is classified as Category I - drinking water, 46.30% class II-polluted water and 18.05% class III water is degraded, unusable .
- two underground sources: Steaza and springs Paltinis
- Two sources of surface: dam catchment: River mouth and Sadu



Water pollution and its effects



- Water affects human health both in quantity and in quality.
- Lack of sufficient water often leads to intermittent its distribution, which entails creating negative phase network, accompanied by a pipe penetration in outside dirt, water contamination and encourage the spread of epidemic diseases.

WATER POLLUTION IN ROMANIA

Sources of pollution for rural area

(ACCORDING TO THE MINISTRY OF ENVIRONMENT and SUSTAINABLE DEVELOPMENT):

- discharges of waste water from the human settlements and the livestock sector
- agricultural activities (pollutants difficult for identification)
- contamination with nitrates (pollution has a cumulative character), with phosphates, chemicals used for soil fertilization.

CONCLUSIONS OF THE STUDIES

- Current situation of water services and infrastructure has a negative impact on quality of life in rural areas and on economic development of these areas.
- Development and improvement of rural infrastructure are needed (basic physical infrastructure – especially streets/rural roads, water supply and sewage/waste water treatment, energy and gas/heating supply)

FACTS

- 33% of rural inhabitants (3.4 million inhabitants) – access to the public water networks
- 70% of the rural households get their water from wells
- Only few people clean their wells on regular basis, with chlorine, and follow the rules of a proper maintenance
- In most of the households there are no septical tanks or domestic waste drainage(because only 33% of the inhabitants of the villages are connected to the current water supply systems (compared to 87% in EU-15) and only 10 % to modern sewerage systems)
- The most common infestation is with nitrates, sometimes the rate of infestation rises up to 8 times higher than the legal limits, not only in the groundwater, but also in the surfacewater



Polluted water



Water pollution. Ways You Can Help

Conserve Soil

When you take steps to conserve soil, you are also conserving water and water life.

Dispose of Toxic Chemicals Properly

Proper disposal keeps these substances out of storm drains, water ways and septic tanks.

Keep Machinery in Good Working Order

Clean up the residue and dispose of the used oils properly.

Clean Up Beaches and Waterways

Do your part by taking your own trash, other wastes and any you see to a nearby disposal facility.

Avoid Plastics When Possible

Keep this problem from getting worse by changing to reusable grocery bags whenever possible.

Get Active and Get Involved

Is there a company near your home that releases heat, coolants or chemicals into a nearby waterway?

Do you know of a large area of land where soil erosion has been spotted?

Have you noticed an oil leak or spill?

You can get involved.

Contact local authorities or write letters to the heads of companies.

Spreading an awareness of problems is a big first step toward combating them.

You Can Make a Difference!!!

**Noise
pollution**

**Lighting
pollution**

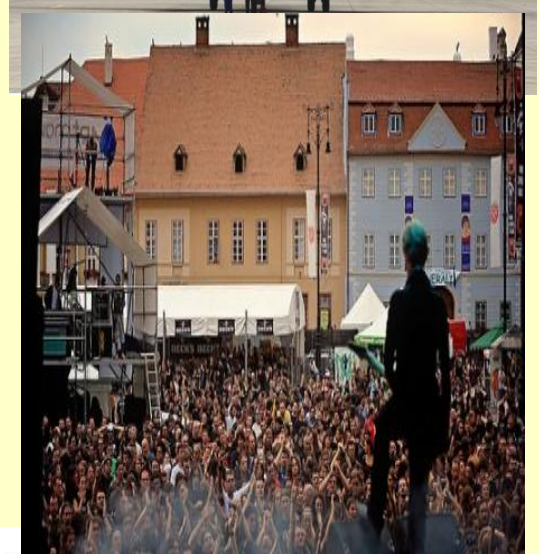


Noise pollution

is excessive or displeasing noise that may disrupt the activity or balance of human or animal life.

Outdoor noise is summarized by the word environmental noise: airport noise, concert noise etc. Poor urban planning may give rise to noise pollution, since side-by-side industrial and residential buildings can result in noise pollution in the residential areas.

Indoor noise is caused by machines, building activities, music performances and especially in some workplaces.



NOISE POLLUTION IN SIBIU

- Transportation is the main cause of noise pollution in Sibiu, due to increasing urban and transit traffic. The city inhabitants are exposed to the noise generated by land and aerial traffic. During the programme of monitoring the noise pollution, systematic measurements have been carried out at different hours and periods of the year in areas with the most intense traffic. In all six monitored crossings the limits of A. A. C. were exceeded.
- Other noise pollution sources, identified during 2002, include the small enterprises that work within residential areas and the refreshment units.



Lighting pollution

Light pollution
reduces the number
of visible stars

Excessive
lighting causes
the astronomical
and ecological
light pollution

Lights on tall
structures pose a
threat of collision
for birds

Covered lamps
can reduce light
pollution, but they
are still causing
ecological
photolight



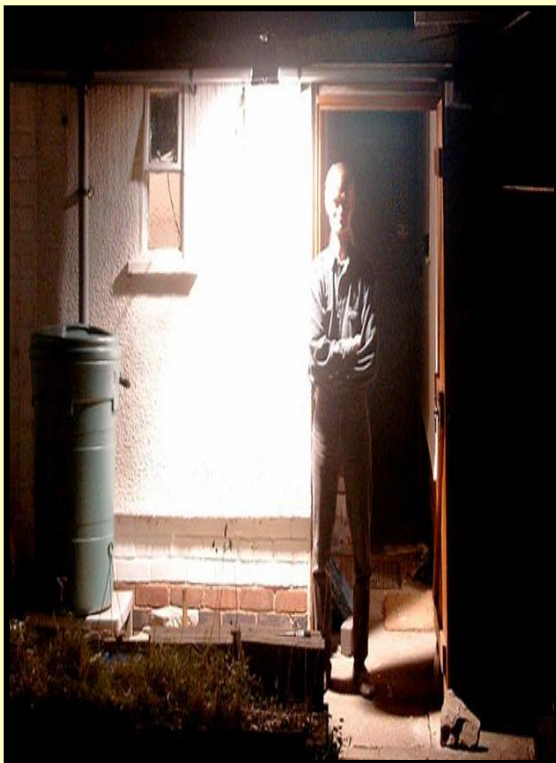
Sibiu at night





The consequences of light pollution

- huge unnecessary energy costs
- destruction of ecosystems based on day-night sequence
- health problems caused to people
- reduction of the activity of the astronomical observatories



The impact of light pollution on humans

- Life has adapted to the day-night sequence
- The illumination at night affects humans
- The misuse of light has adverse effects on health

Did you know that?



- 💡 Compact broken fluorescent light bulbs emit small amounts of mercury in the air, which is a very toxic substance. The carpets cannot be totally cleaned and the vacuum cleaner shouldn't be used in order to remove this substance.
- 💡 Advice: Do not use compact light bulbs that can get broken easily. If you broke such a bulb, turn off the air conditioning, leave the room for 15 minutes and only then start the cleaning process.



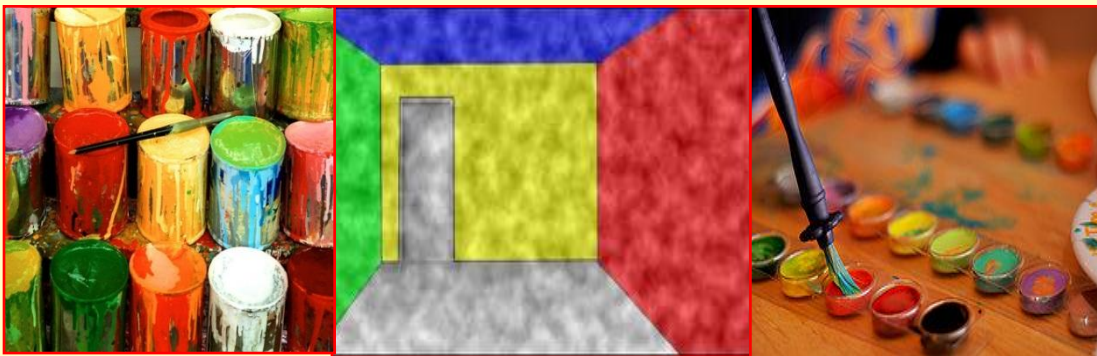
BADLY AIMED 500W HALOGEN FLOODLIGHT



WELL AIMED 100W FLOODLIGHT

Did you know that?

- The electronics and other plastic appliances are made of toxic chemicals which can cause hormonal affections, infertility and psyhical disorders.
- Advice: Ventilate the room untill you get rid of the specific smell. You should clean the nearby space of the computers, printers and TVs regularly.





POLLUTION EFFECTS



Ecosystem damage



Greenhouse Effect

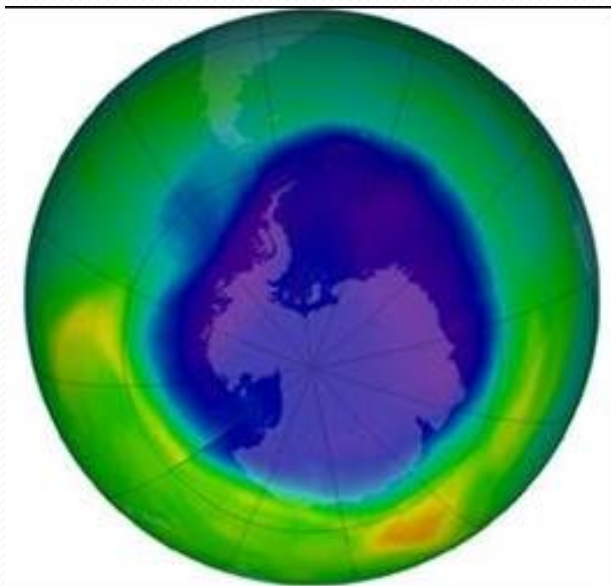
- occurs because the heat is trapped at the Earth surface.
- in our century average global temperatures will increase by half a degree



- scientists expect that by the end of the next century, temperatures will increase by 1,5-4,5 degrees
can produce extreme natural phenomena

Holes in the ozone layer

- The ozone layer retains the ultraviolet rays from sun;
- Large quantities of ultraviolet radiations lead to adverse biological effects: increase in cancer cases, inhibition of cereal crops
- Chemicals released by humans destroy ozone molecules;



Acid rain

- Sulphur dioxide or nitrogen oxides mix in the atmosphere with water steam
- Destroys plants and animals and pollutes water
- Extensive forest areas have disappeared as a result of acid rain
- Reaching out in the lakes or rivers, it kills the smallest organisms



Smog

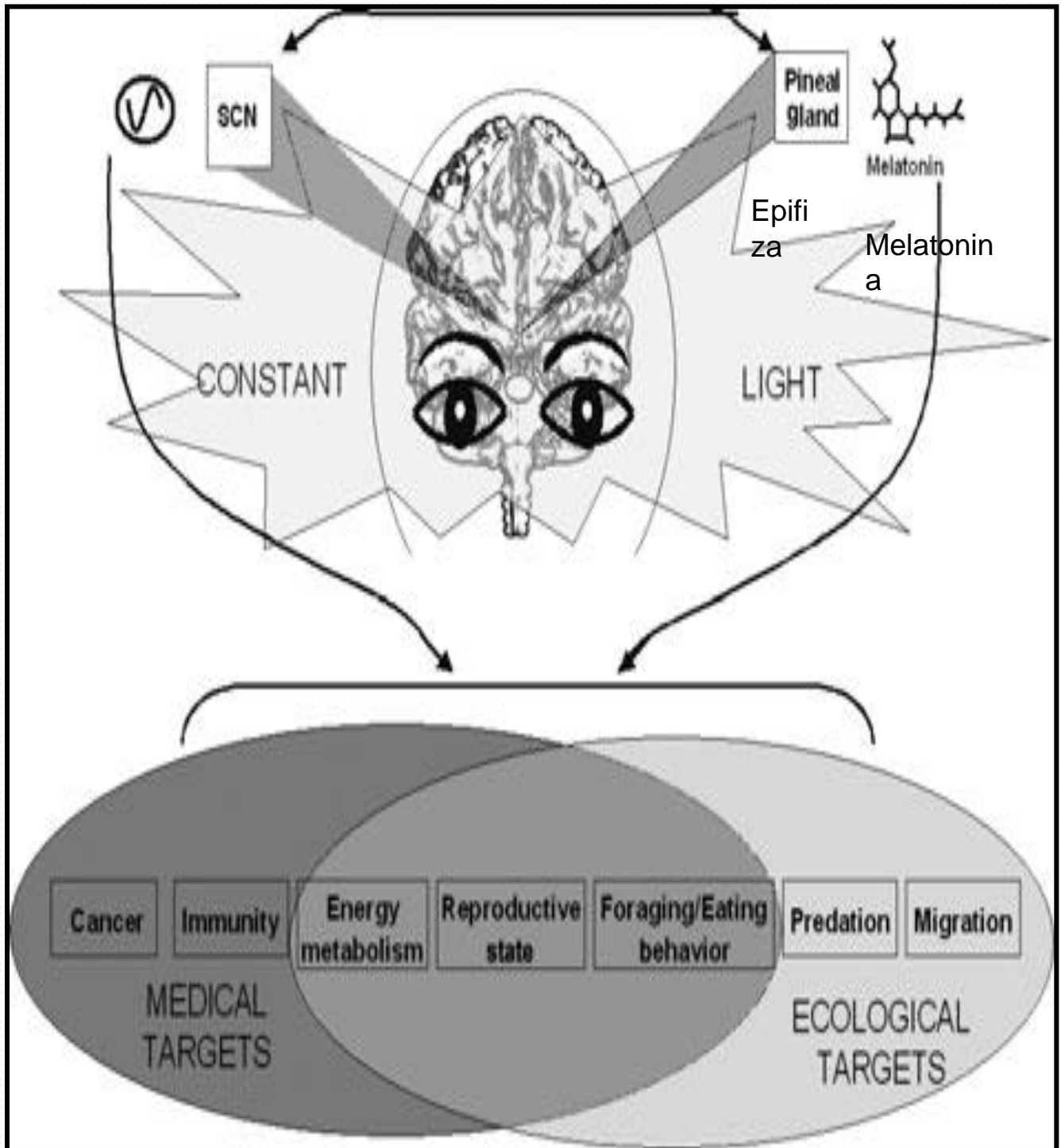


- A mixture of solid or liquid fog and smoke particles formed when moisture is increased
- It reduces natural visibility and often irritates the eyes and respiratory tract



- Causes thousands of deaths annually
- Photochemical smog - toxic yellow-coloured mist

The effects on human health



Solutions for security problems

- Reducing the dazzling brightness
- The reduction of light directed upwards
- Reducing energy consumption and costs



The impact on the enviroment

- Light pollution:
 - leads to confusing the birds
 - can change prey-predator relations
 - may influence the animal psychology



- migrating birds are also confused by the light at night
- the hatching of turtles occurs in the dark and because of the light they are in great danger

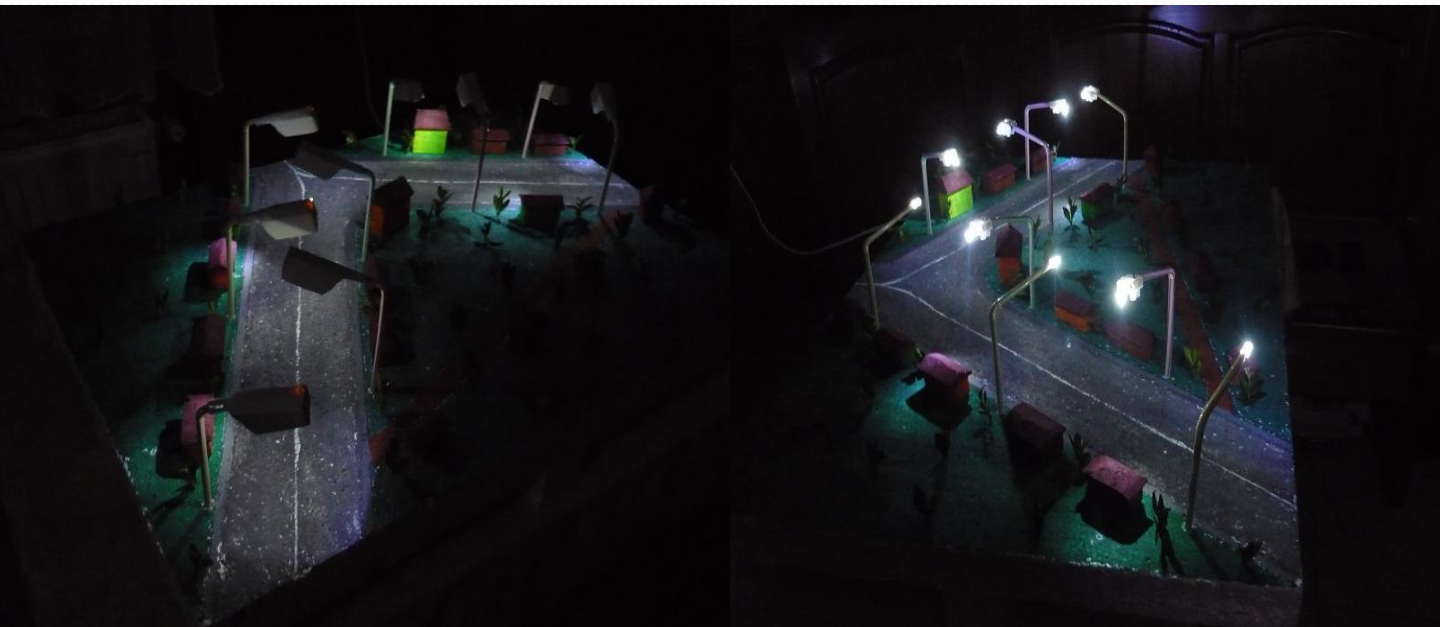
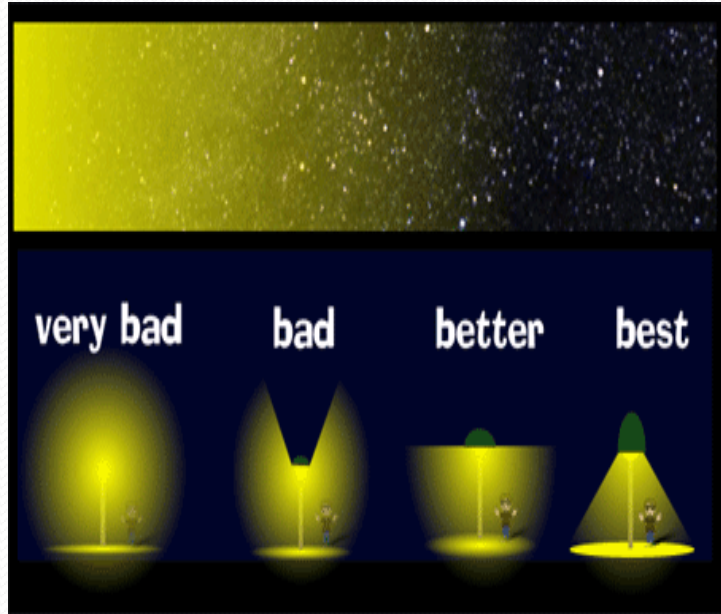
Effect on astronomy

Sky glow reduces the contrast of the sky itself, making it much harder to see the stars or galaxies



Solutions for reducing light pollution

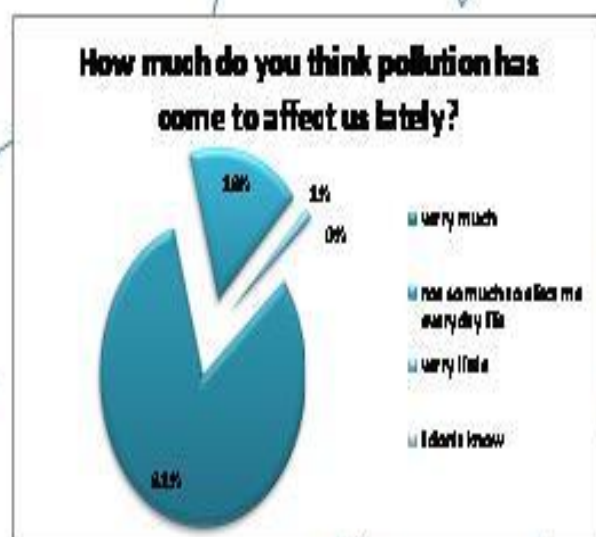
- Limiting lighting towards the sky
- Using ecological lamps
- These must be directed down and not in the other directions



- Reducing unnecessary illumination
- Choosing and correctly screwing the bulbs

1. How much do you think pollution has come to affect us lately?

128	very much
28	not so much as to affect my everyday life
2	very little
0	I don't know



17. Do you think that the educational activities organised through extracurricular activities such as Comenius projects can raise awareness towards pollution and its effects?

82

yes

5

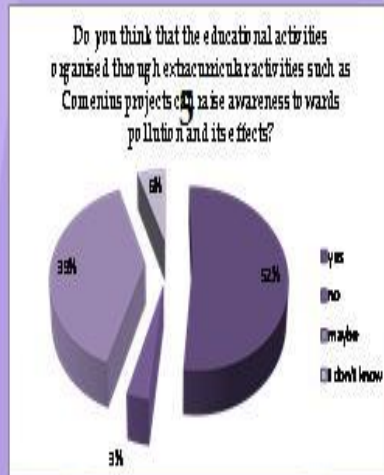
no

62

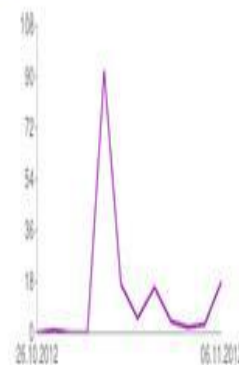
maybe

9

I don't know



Günlük yanıt sayısı



2. Which type of pollution do you think is the most dangerous?

105

air pollution

44

water pollution

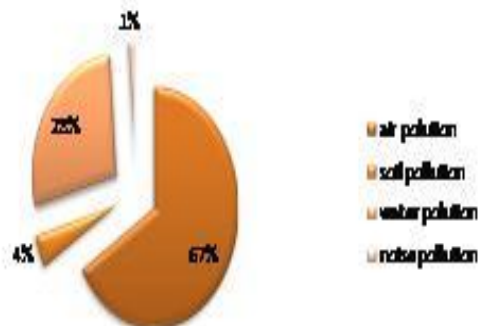
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soil pollution

2

noise pollution

Which type of pollution do you think is the most dangerous?



3. Do you consider pollution to be
the most serious global issue?

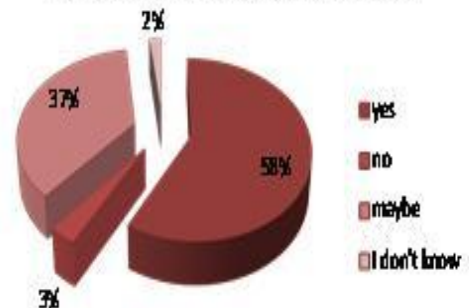
92 yes

5 no

58 maybe

3 I don't know

Do you consider pollution to be
the most serious global issue?



17. Do you think that the educational activities organised through extracurricular activities such as Comenius projects can raise awareness towards pollution and its effects?

82

yes

5

no

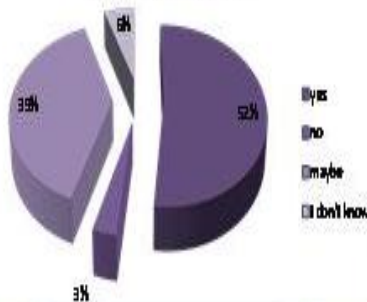
62

maybe

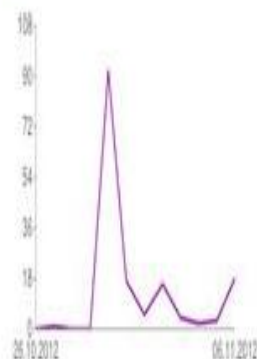
9

I don't know

Do you think that the educational activities organised through extracurricular activities such as Comenius projects can raise awareness towards pollution and its effects?



Günlük yanıt sayısı



OPRITI
POLUAREA!!!



Let's make a step towards a cleaner environment!





Education and Culture DG

Lifelong Learning Programme

*Comenius Project **GREEN***
Go Re-Educate Earth Now
2012-2014

