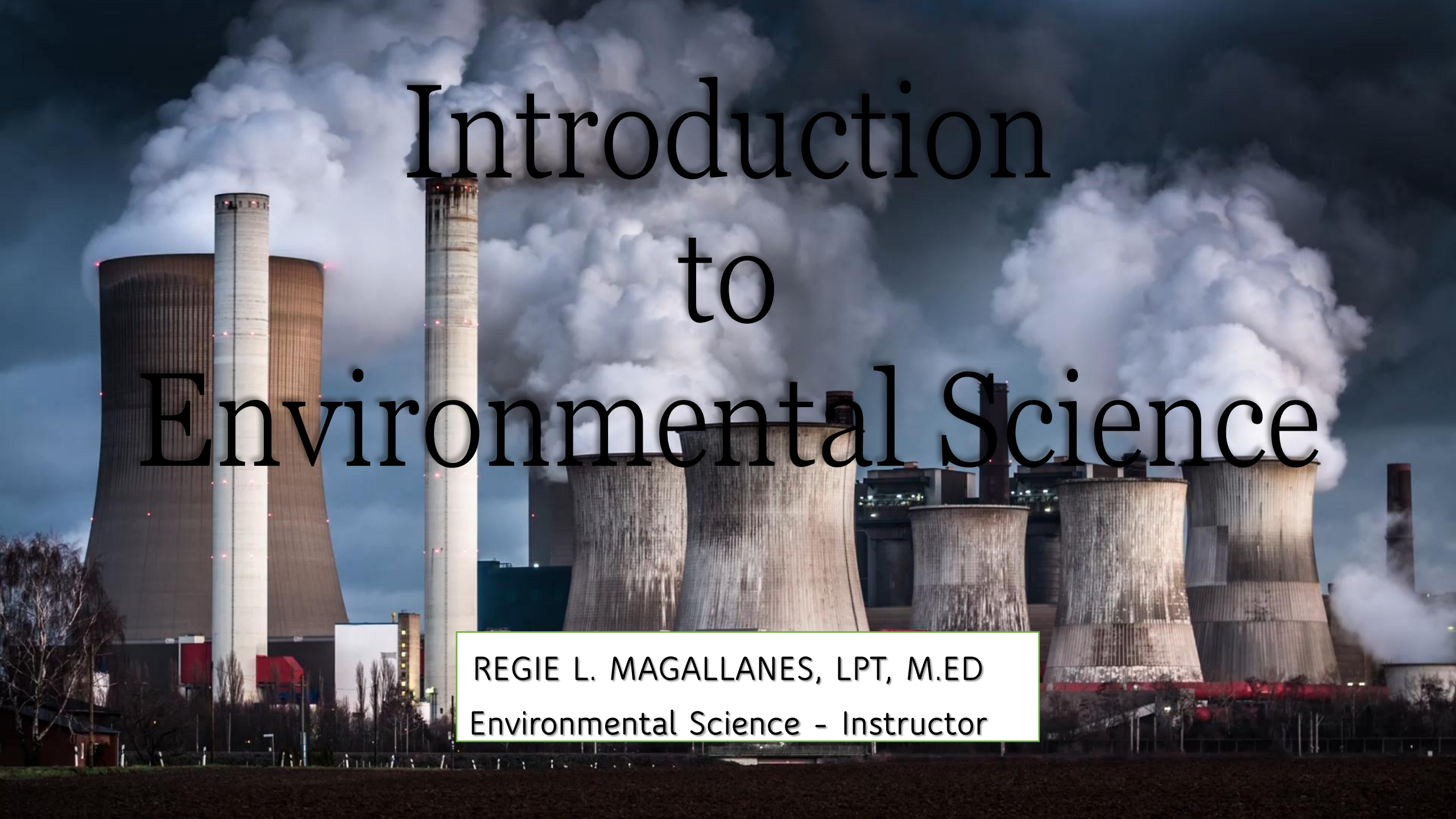

Introduction to Environmental Science

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The environment is everything around us.

Environmental Science is the study of the HUMAN IMPACT on the environment.

A major goal of Environmental Science is to understand and solve environmental problems.

HOWEVER, ENVIRONMENTAL PROBLEMS ARE USUALLY COMPLEX AND SOLUTIONS ARE NOT SIMPLE!

Environmental Science is an interdisciplinary science – it involves many other fields of study – including history, social sciences, and earth science.

One important foundation of Environmental Science is Ecology – the study of living things, nonliving things, the environment and their interactions.

HOW DOES ENVIRONMENTAL SCIENCE DIFFER FROM ECOLOGY?

Environmental science is concerned with the human impact on the environment.

Our Environment Through Time

As Society has changed its impact on the environment has changed.

Hunter-Gatherers

Small groups of people that migrated from place to place.

Obtained food by collecting plants, hunting or scavenging.

Hunter-Gatherers

Impact on the environment: Burned grasslands to maintain prairies FOR hunting, overhunting of some game animals, took plants from their native areas.

Hunter-Gatherers

For the most part Hunter-gatherers lived in Harmony with their environment.

Agricultural Revolution

was a time in human history when people practiced agriculture – this occurred all over the world.

Agricultural Revolution

AGRICULTURE is the growing of plants and breeding of animals for human use.

Effects of the Agricultural Revolution

Impact on the environment:

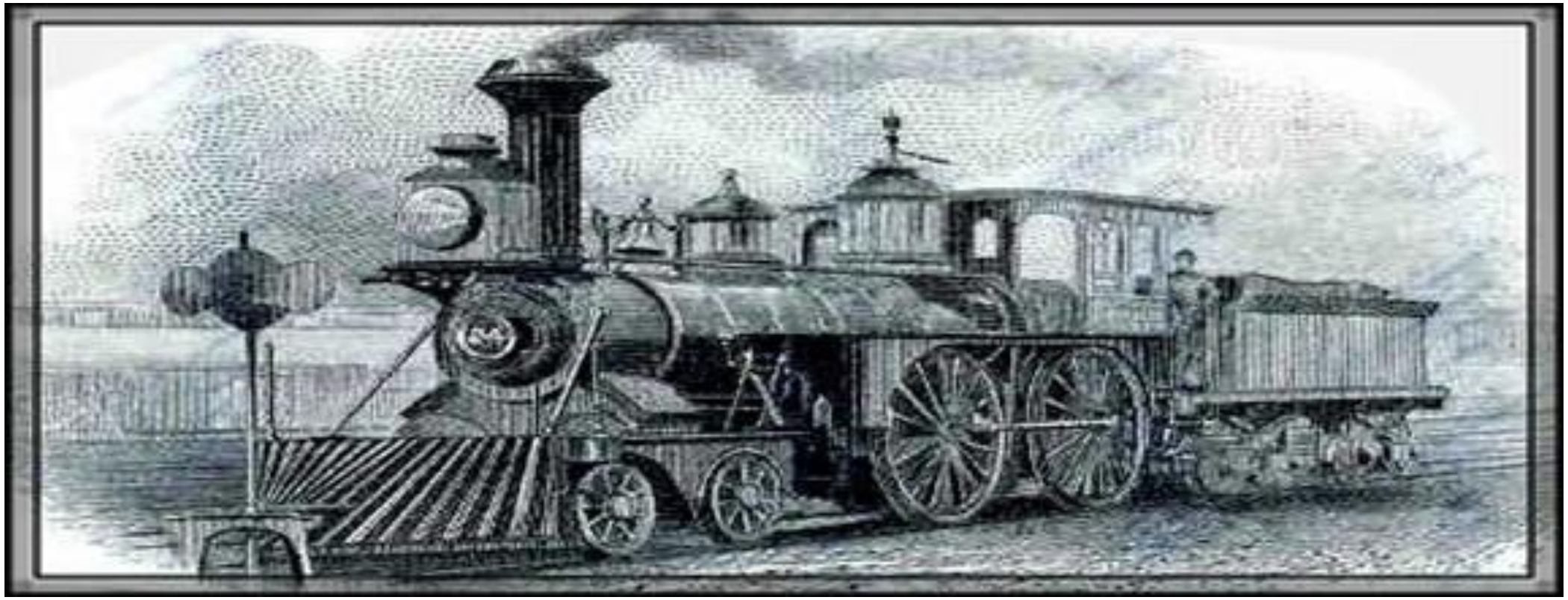
- More pressure on local environments.
- Habitats were destroyed for farmland.
- Changed species from their wild ancestors – plants and animals were domesticated.

Effects of the Agricultural Revolution

Impact on society:

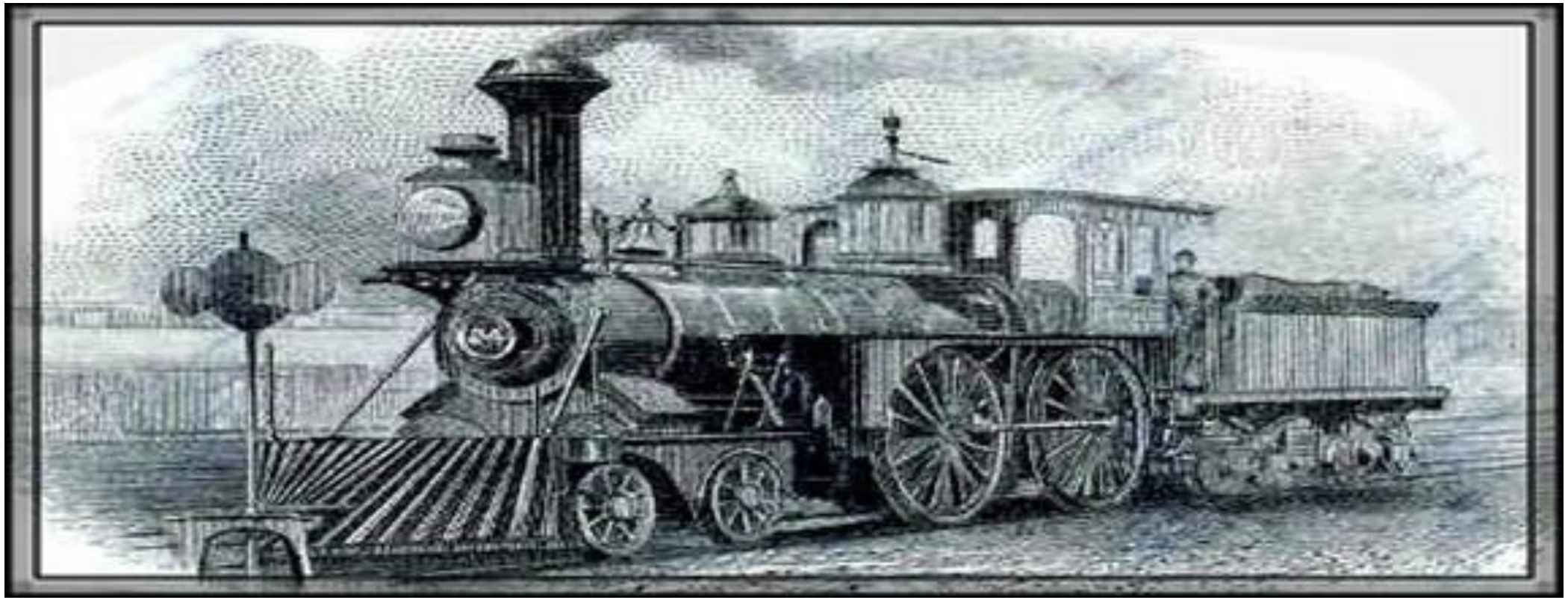
- Populations increased.
- People began to concentrate in small areas.

Industrial Revolution (1760 to 1850)



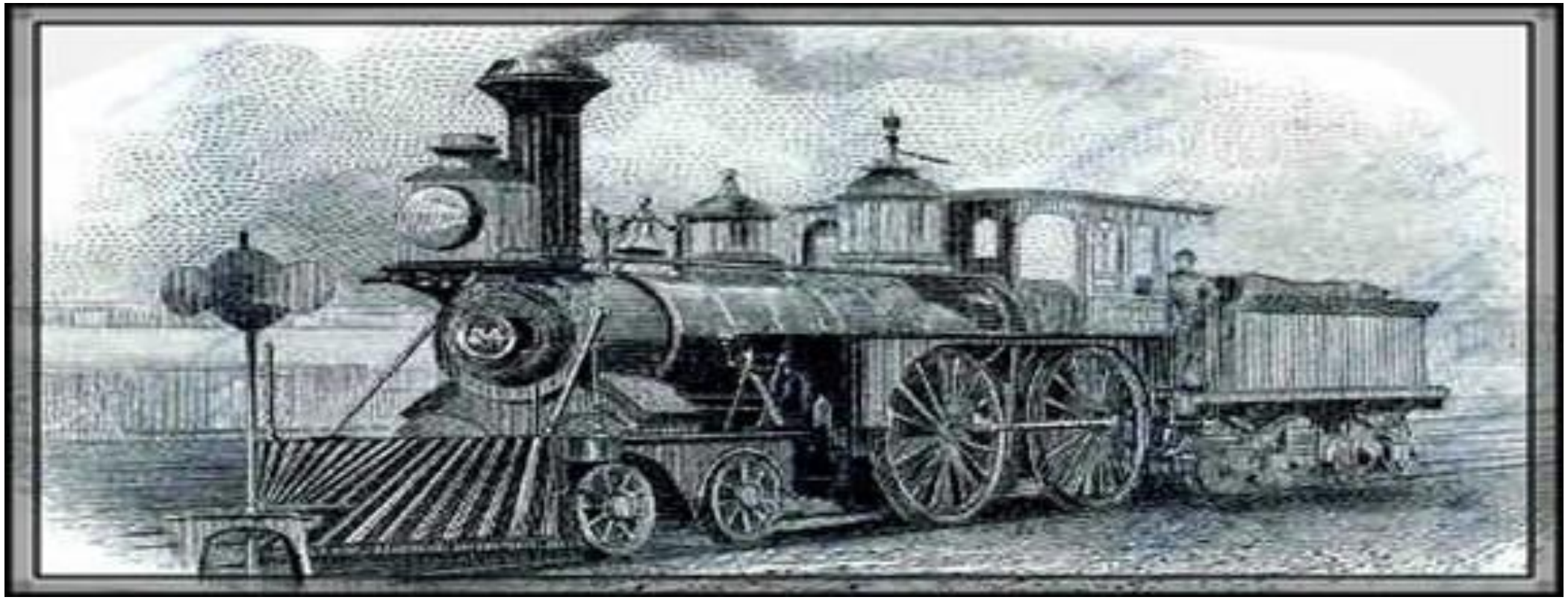
was a time when animals, humans and water were replaced as the major energy sources by fossil fuels - it was a shift in energy sources.

Industrial Revolution (1760 to 1850)



Industrialization – the development of industry on an extensive scale.

Industrial Revolution (1760 to 1850)



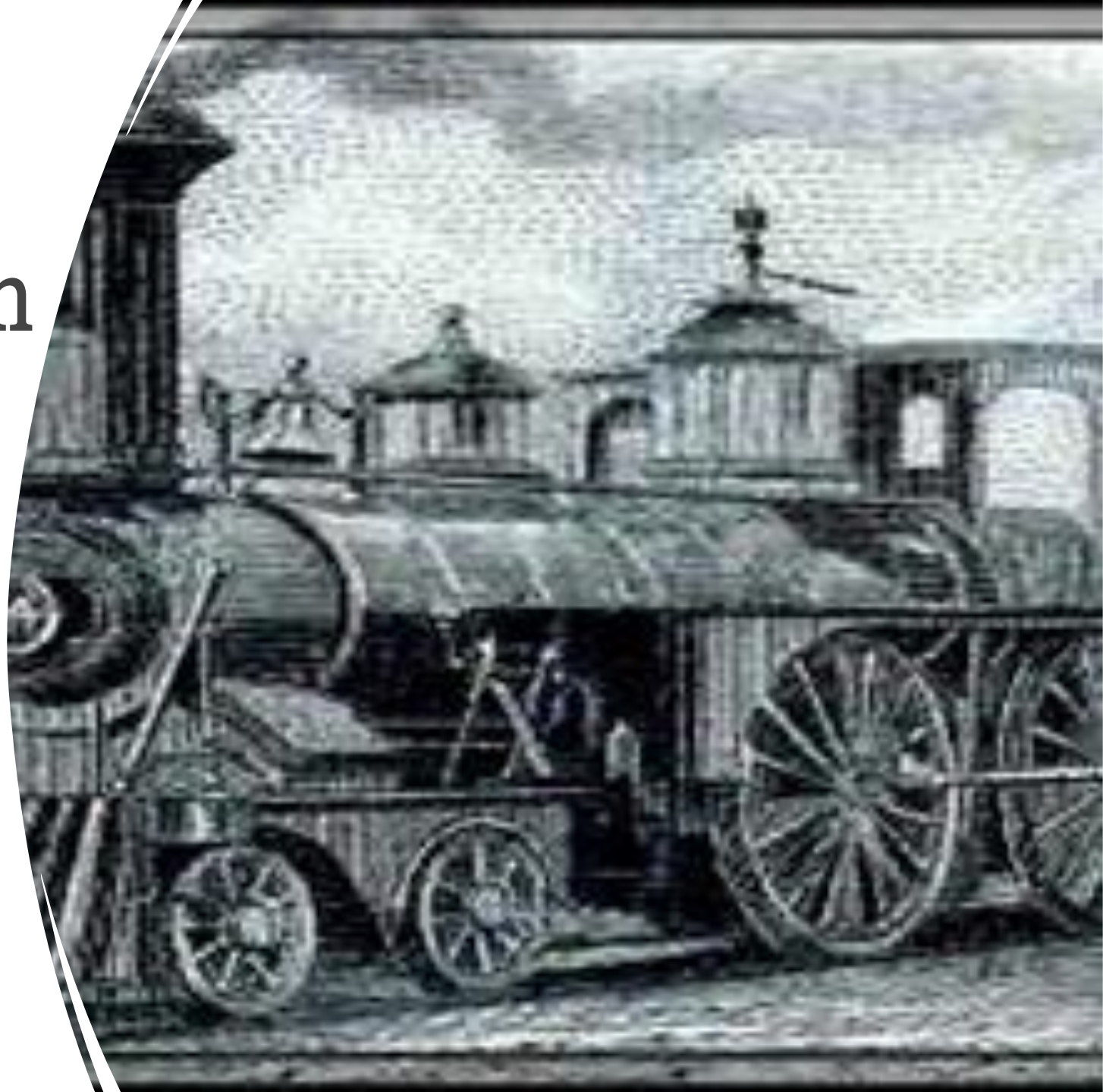
FOSSIL FUELS - include coal, oil, natural gas.

FOSSIL FUELS come from the remains of plants and animals.

Effects of the Industrial Revolution

Impact on the environment:

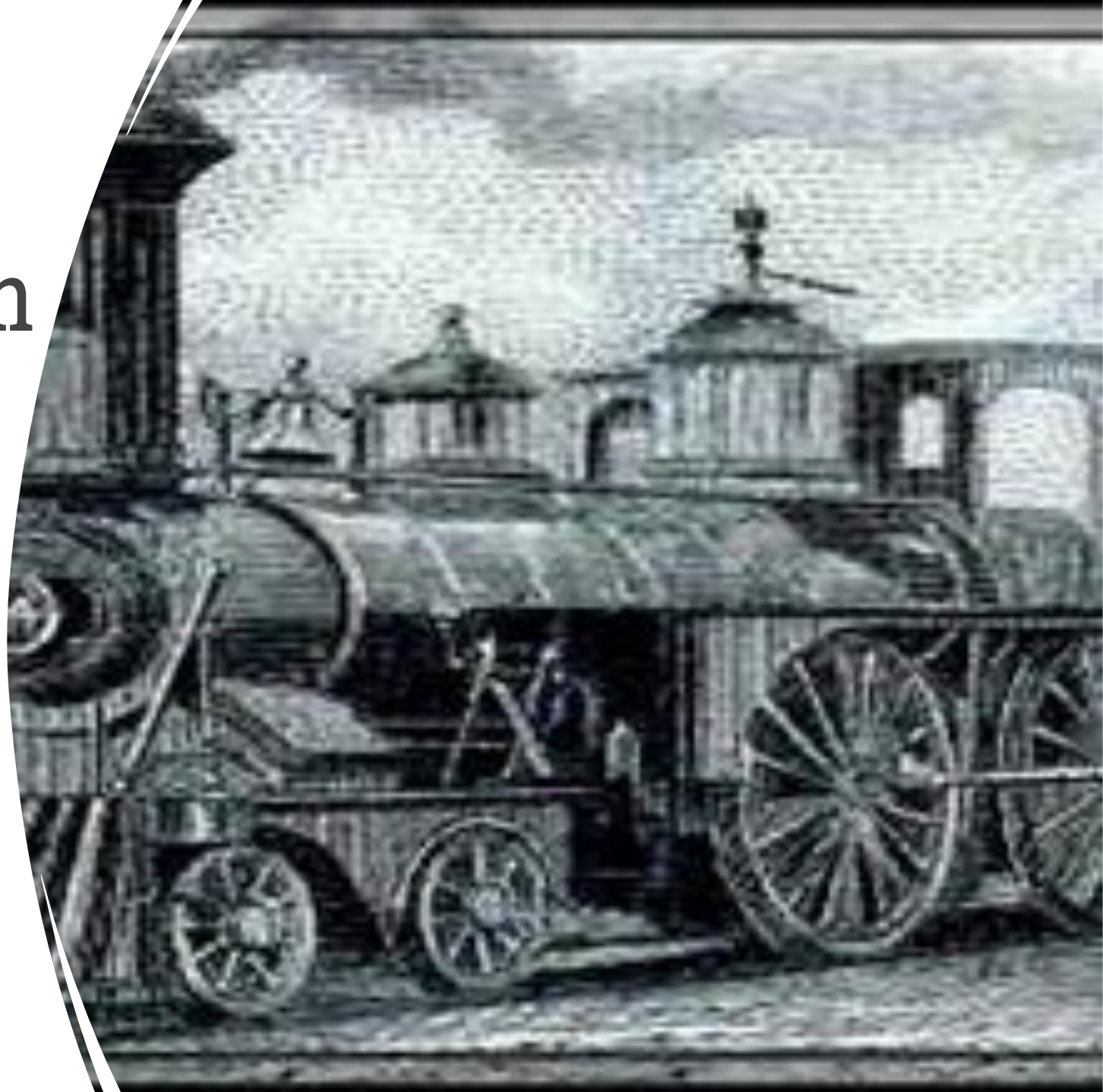
- Pollution first became a problem.
- More waste and trash to dispose of.
- Disease was a problem in many cities.



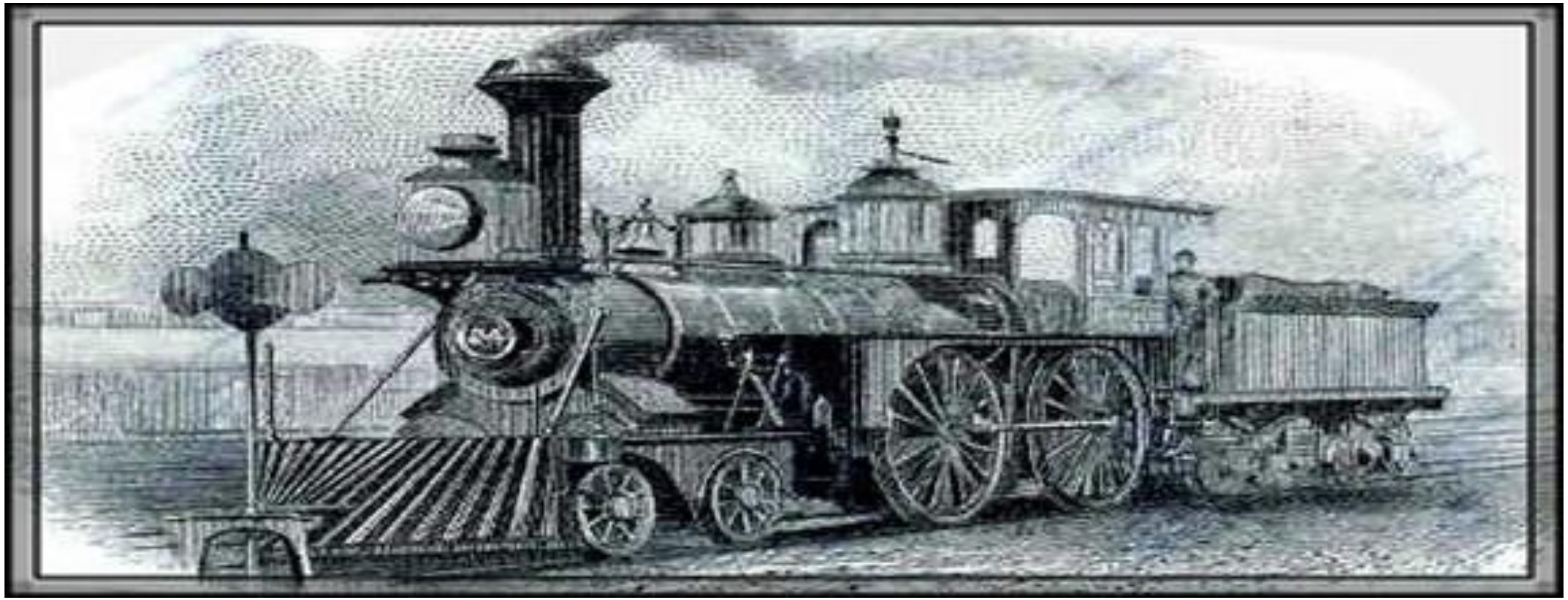
Effects of the Industrial Revolution

Impact on society:

- populations in urban areas grew.
- Life improved, sanitation, nutrition, medicine.
- Inventions – light bulb, telephone, computer.



Industrial Revolution (1760 to 1850)



Much of Environmental Science is concerned with the problems associated with the Industrial Revolution.

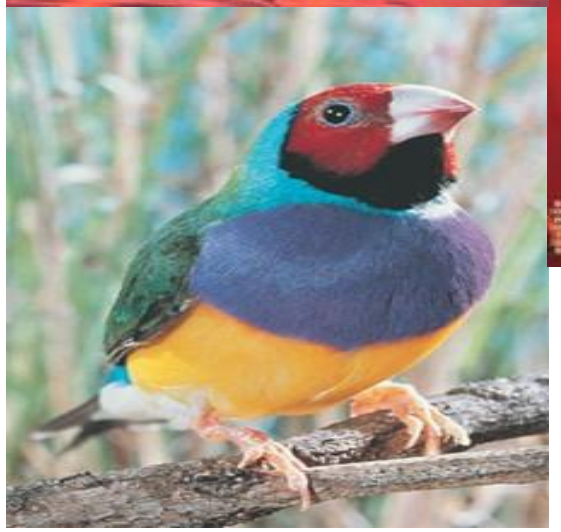
Spaceship Earth

- Earth (is like a spaceship) – it is unable to dispose of wastes or take on new supplies.
  - Energy from the sun enters and heat leaves, but In regard to matter Earth is a CLOSED SYSTEM – it does not "take on" or "get rid of" matter.

Resource Depletion Pollution Loss of Biodiversity

3 Main categories of environmental problems:

1. Resource Depletion.
2. Pollution
3. Loss of Biodiversity



Resources

Natural resource is any natural material used by humans such as wood, water, soil, air, plants, and 4animals.

3 types of Resource

1. Perpetual Resource – will continue forever like sun and wind.
2. Renewable Resource – can be replaced relatively quickly by natural processes.
3. Nonrenewable Resource – form at a slower rate than the rate it is consumed – fossil fuels (coal, oil, natural gas).

Resources Depletion

A resource is depleted…when a large fraction of it has been used up.

Pollution

Any undesired change in the air, water, soil that adversely affects the health and survival of humans and other organisms.

2 main types of pollutants

1. **BIODEGRADABLE** – ORGANIC MATERIAL that can be broken down by natural processes.

Examples – food waste, sewage, leaves, newspaper, cotton, and clothing.

2. **NON(BIO)DEGRADABLE** – INORGANIC MATERIAL that cannot be broken down by natural processes.

Examples – mercury, lead, most plastics, glass, and synthetic clothing.

Loss of Biodiversity


Quagga, extinct c. 1883, South Africa


Tasmanian tiger, extinct c Tasmania

Biodiversity refers to the number and variety of species that live in an area.

Extinction is a natural process , whereby all members of a species die.

Mass extinction - large-scale extinction.

Threatened and Endangered Species

polar bears were recently classified as “endangered”

Threatened species – likely to become endangered.

Endangered species – in danger of extinction.

“The Tragedy of the Commons” – an essay by Garrett Hardin

Garrett used the example of the “commons” in his essay.

Commons = land that belonged to all.

- Everyone could use the “commons”
- Individuals could grave as many animals as they wanted on the “commons” – What happened?
- The “commons” were eventually replaced by personal property – Why?

“The Tragedy of the Commons”

Hardin – argued that main difficulty in solving environmental problems is the conflict between short-term interests of individuals and the long-term welfare of society.

THE POINT OF THE ESSAY: Someone or some group has to take responsibility for maintaining a resource or the resource will be depleted or destroy.

If no one takes responsibility for cleaning up a beach, how will it look?

Economics and the Environment

Social pressures influence how we use resources so do economic pressures.

Economics and the Environment

Law of Supply and Demand – the greater the demand for a limited supply of something, the more that thing is worth.

Economics and the Environment

Cost-benefit Analysis – balances the cost of the action against the benefits one expects from it.

Economics and the Environment

POLLUTION CONTROL

How much will it cost to clean it up? Is it worth it?

Economics and the Environment

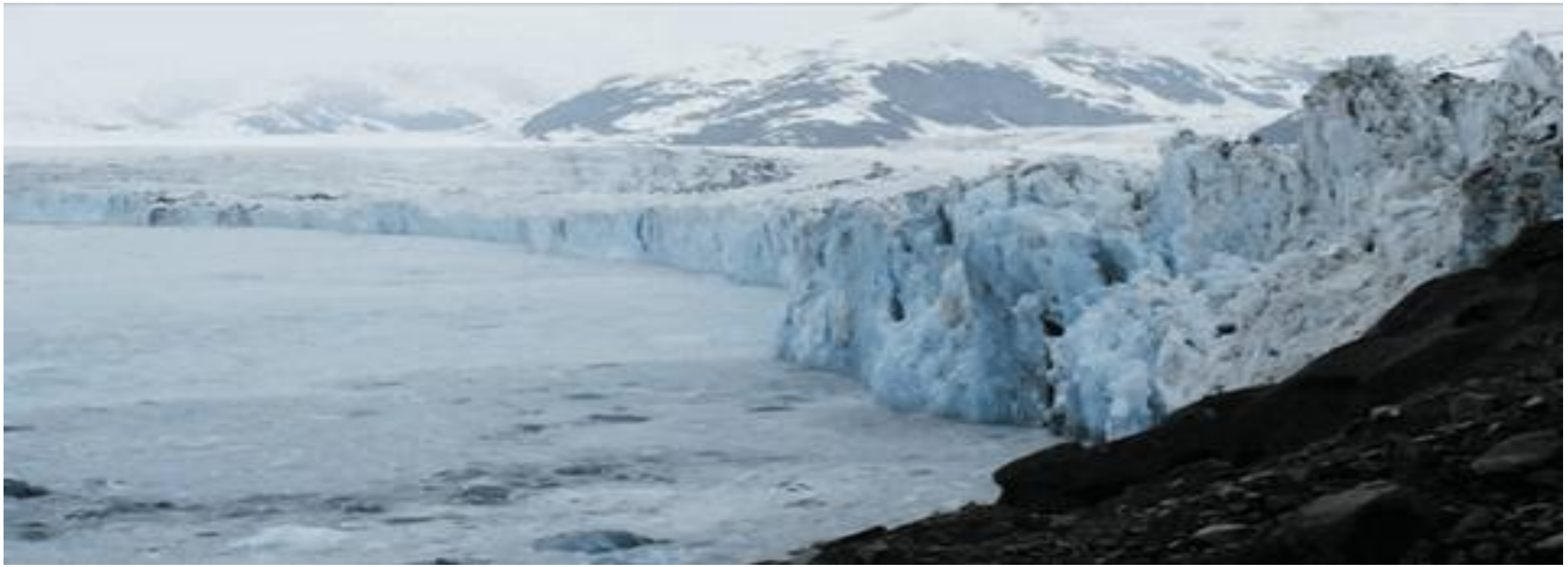
Risk Assessment – how does the public perceive the risk of the environmental problem. If we think there is no risk or danger involved then why should we change?

If we don't think global warming is real then why should we worry?If we don't think fossil fuels cause a problem then why should we worry?...

Economics and the Environment

If we don’t think global warming is real then why should we worry?

Economics and the Environment



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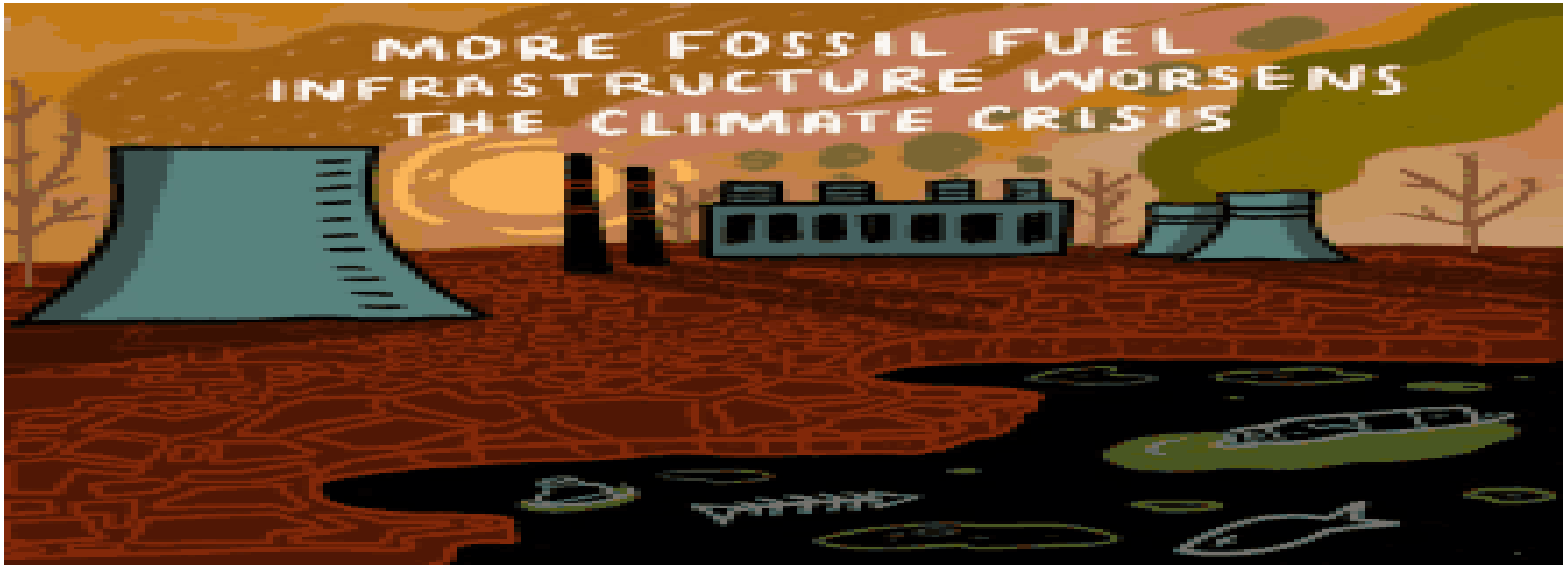
Economics and the Environment



If we don't think fossil fuels cause a problem, then why should we worry?

Risk Assessment – example - tattoos

Areas of concern include tattoo removal, allergic reactions, keloid formation, infections, variety of pigments and diluting agents being used.

- More than 50 different pigments and shades are in use
- Many pigments used in tattoo inks are not approved for skin contact at all - some are industrial grade colors that are suitable for printers' ink or automobile paint.
- NEVERTHELESS, MANY INDIVIDUALS CHOOSE TOUNDERGO TATTOOING IN ITS VARIOUS FORMS.
- CONSUMERS SHOULD DO A RISK ASSESSMENTIN ORDER TO MAKE AN INFORMED DECISION.

DEVELOPED COUNTRIES

- Highly industrialized.
- High incomes.
- High standards of living.
- Slower population growth.
- Good medical care.

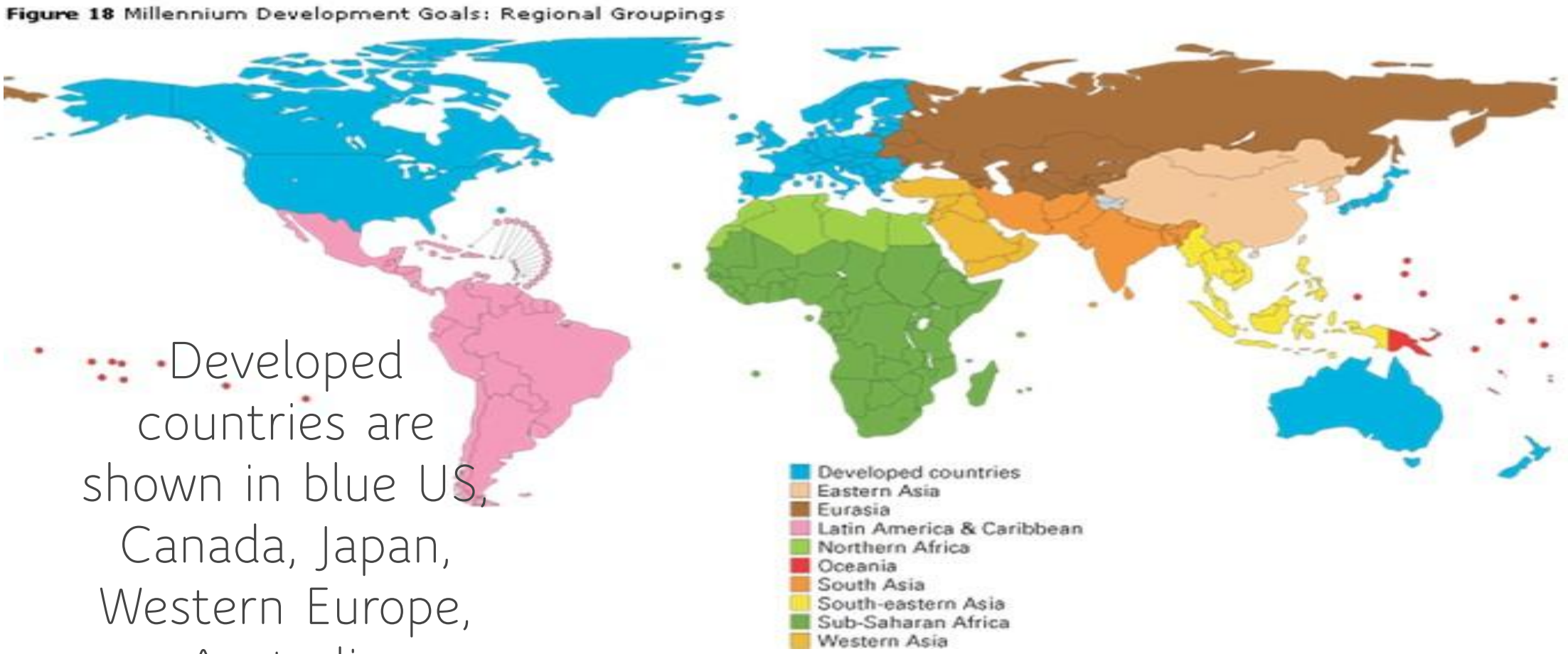
These have different consumption patterns and affect the environment in different ways

DEVELOPING COUNTRIES

- Less industrialized.
- Average income is low.
- Standard of living is low.
- Agriculture based economies.
- Faster population growth.
- Poorer medical care.

These have different consumption patterns and affect the environment in different ways

DEVELOPED COUNTRIES Vs. DEVELOPING COUNTRIES



- Developed countries are shown in blue US, Canada, Japan, Western Europe, Australia

Population and Consumption

Most environmental problems can be traced back to 2 root causes.

POPULATION PRESSURES and CONSUMPTION TRENDS

Developed nations (like the United states)use about75% of the earth's resources but make up only about 25% of the earth's population.

Ecological Footprints

The productive area of the Earth needed to support one person in a particular country.

ECO. FTPRNT……US it is about 30 acres

(each individual requires about 30 acres to meethis/her needs for food, goods and services)

ECO. FTPRT…… India it is about 2.5 acres

– so, what does this mean?

Why are these ecological footprints so different?

Sustainable World – a world in which humans can continue to exist indefinitely with a high standard of living and health.

Thank you for today!