

Earth Systems Science II--Trimester 2

Unit Theme:

“Conflict”

10th Grade Level

Faculty:

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Essential Questions:

What are the signs and symptoms that the natural world is under assault?

What are the three fundamental laws of all natural systems and how are we in conflict with them?

Unit Summary:

There is no doubt that we are in the midst of a great ‘transformation’ on earth. Living organisms are going extinct at an unprecedented rate. The climate is changing, more rapidly than it ever has, and life as we now know it on earth, will surely be different in the coming years. Much of this change is related to various types of *conflicts* that humans are experiencing between their current way of life and the natural systems of the earth. This trimester we will continue studying how natural systems work and why there appears to be a conflict between how they should work and how they are currently working. The “conflicted” systems we will be studying are: natural resource use, climate change, over population, toxic exposure and disease.

Suggested Time Allowance: 10 weeks

State Standards:

- 1.1, 1.2, 1.3, 4.1, 4.2, 4.3, 4.5 4.6, 7.1. 7.2,

Education for Sustainability Core Content Standards and Performance Indicators (Name of Standard, letter and number of Performance Indicator)

- C The Dynamics of Systems and Change: C1, C2, C3, C4, C6, C11, C14,
- F Natural Laws and Ecological Principles: F1, F4,

Investigation 1: Natural Resources

Guiding Questions:

What are the basic natural resources that humans currently need and use to live on this planet?

How are we endangering our access to those resources?

What role does ENERGY play in natural and human systems?

What is the scientific process of hydrofracking?
What are the possible impacts of hydrofracking on the natural world?

Learning Targets:

- I can identify the major natural resources that sustains life on earth.
- I can explain what hydrofracking is and the environmental impact it could have on this region.
- I can discuss the different forms of “energy” that humans currently use to live.

Investigation 2: Climate Change

Guiding Questions:

What IS the process of climate change? How does it work?

What influences how/why the climate is currently changing—natural and artificial factors?

Learning Targets:

- I can clearly explain the process of climate change and the impact it is having on the natural world.
- I can project the kind of adaptations life on earth will be forced to make as a result of climate change.
- I can explore the impacts climate change will specifically have on the Finger Lakes Region.

Investigation 3: Overpopulation

Guiding Questions:

How do populations of organisms usually regulate their numbers?

What happens to populations of organisms that become overpopulated?

Learning Targets:

- I can demonstrate the results of overpopulation of any organism.
- I can describe the consequence that over population has on the environment.
- I can debate the issue of regulating human population in the United State and the world.

Investigation 4: Toxic Exposure and Disease

Guiding Questions:

What are the main types of toxic exposure that are affecting the natural world and the human body?

How are toxic materials affecting life on this planet and the human body?

Learning Targets:

- I can investigate forms of cancer and identify proposed environmental causes of cancer in my community.
- I can describe the impact that toxic exposure has on a normal human system.
- I can identify the major systems of the human body and how they function.

Books:

Local Articles on Hydrofracking

Carson, Rachel. 1962. **Silent Spring**

Hartman, Thom. 1998. **The Last Hours of Ancient Sunlight**; *The Fate of the World and What We Can Do Before It's Too Late.*

Steingraber, Sandra. 1998. **Living Down Stream**; *A Scientist's Personal Investigation of Cancer and the Environment.*

Sussaman, Art, 2000. **Dr. Art's Guide to Planet Earth**, Chelsea Green Publishing, VT.

Wessels, Tom, 2006. **The Myth of Progress**. The Countryman Press, VT

Biology; The Living System. 2003. Glencoe/McGraw-Hill

Video/Film:

The Planet Earth Series

Flow

Frac Attack

The Story of Stuff

Peak Oil

The Inconvenient Truth

Glossary:

Natural Resource

Nonrenewable Resources

Renewable Resources

Hydrofracking

Population Density

Population Growth

Zero Population Growth

Producers

Consumers

Trophic Levels

Toxicology

Pesticide

Cancer

Human Body Systems: Respiratory, Digestive, Nervous, Muscular...

Green House Effect

Organism

Climate Change

Milakovitch Cycles

2nd Law of Thermodynamics

Entropy

Ecosystem
Energy
Food Chain
Food Web
Homeostasis
Negative Feedback
Positive Feedback

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"Yeah, the job's got great benefits, but mainly
I like the safe work environment."



Parent/Guardian Signature: _____

Student Signature: _____