Unit 8: Energy Production and Climate Change - Study Guide

Presentation #1: Renewable and Nonrenewable Energies and Renew a Bean Lab

Vocabulary:

1. Energy - **the ability to cause change in matter; the ability to do work**

2. Renewable Energy - **energy from natural resources that are continuously replenished and will not run out**

3. Non-Renewable Energy - **energy from limited sources that will eventually run out**

Questions:

4. Fill in the following table about renewable and. non-newable energy.

	Renewable Energy	Non-Renewable Energy
Main Characteristics	• **They are clean (little to no pollution)** • **They are almost inexhaustible resources (replenished quickly)** • **Sustainable** • **Come from natural sources**	• **Generates pollution** • **They are limited (can run out)** • **Often imported in (increased dependence on others)**
Pros	• **Little pollution** • **Sustainable/Don't run out** • **Safer for people's health** • **Promote technological development and job creation**	• **Cheaper than renewable (at least at first)** • **Able to make lots of energy fast**
Cons	• **Typically expensive to set up** • **Depends on weather and location resource availability (can't be anywhere you want)**	• **Pollution → Climate change** ○ **Bad for health** • **Will run out** • **Environmental degradation**
Types	• **Solar** • **Hydraulic** • **Wind** • **Sea** • **Geothermic** • **Biomass**	• **Oil/Petroleum** • **Natural Gas** • **Coal** • **Nuclear Energy**
Environmental Impacts	• **Low → but still some as it takes up land space**	• **High → pollution, climate change, habitat destruction**

5. Describe each of the types of renewable and non-renewable energy.

Renewable

Solar Energy - Energy from the sun that is captured using solar panels and converted into electricity or heat.

Hydraulic (Hydroelectric) Energy - Energy produced by moving water (such as rivers or dams) that spins turbines to generate electricity.

Wind Energy - Energy created by moving air that turns wind turbines to produce electricity.

Sea Energy (Ocean Energy) - Energy generated from the movement of ocean water, including waves, tides, and currents.

Geothermic (Geothermal) Energy - Energy from heat inside the Earth that can be used for heating or generating electricity.

Biomass - Energy produced from organic materials such as plants, wood, and animal waste, often by burning or converting them into fuel.

Non-Renewable

Oil/Petroleum - A liquid fossil fuel formed from ancient marine organisms, used to make gasoline, diesel, and other fuels for transportation and industry.

Natural Gas - A gaseous fossil fuel (mostly methane) used for heating, cooking, and generating electricity; it burns cleaner than coal and oil.

Coal - A solid fossil fuel formed from ancient plant material, commonly used to produce electricity in power plants.

Nuclear Energy - Energy produced by splitting atoms (usually uranium) in a process called nuclear fission, generating large amounts of heat to produce electricity.

History of Energy Use Article and **History of Energy Use Article**

Vocabulary:

6. Energy Demand - **the total amount of energy used by a society**

7. Industrialization - **the shift from manual labor to machine-based production, increasing energy use**

8. Fossil Fuels - **energy resources (coal, oil, natural gas) formed from ancient organic matter**

9. Energy Independence - **when a country produces its own energy instead of relying on imports**

Questions:

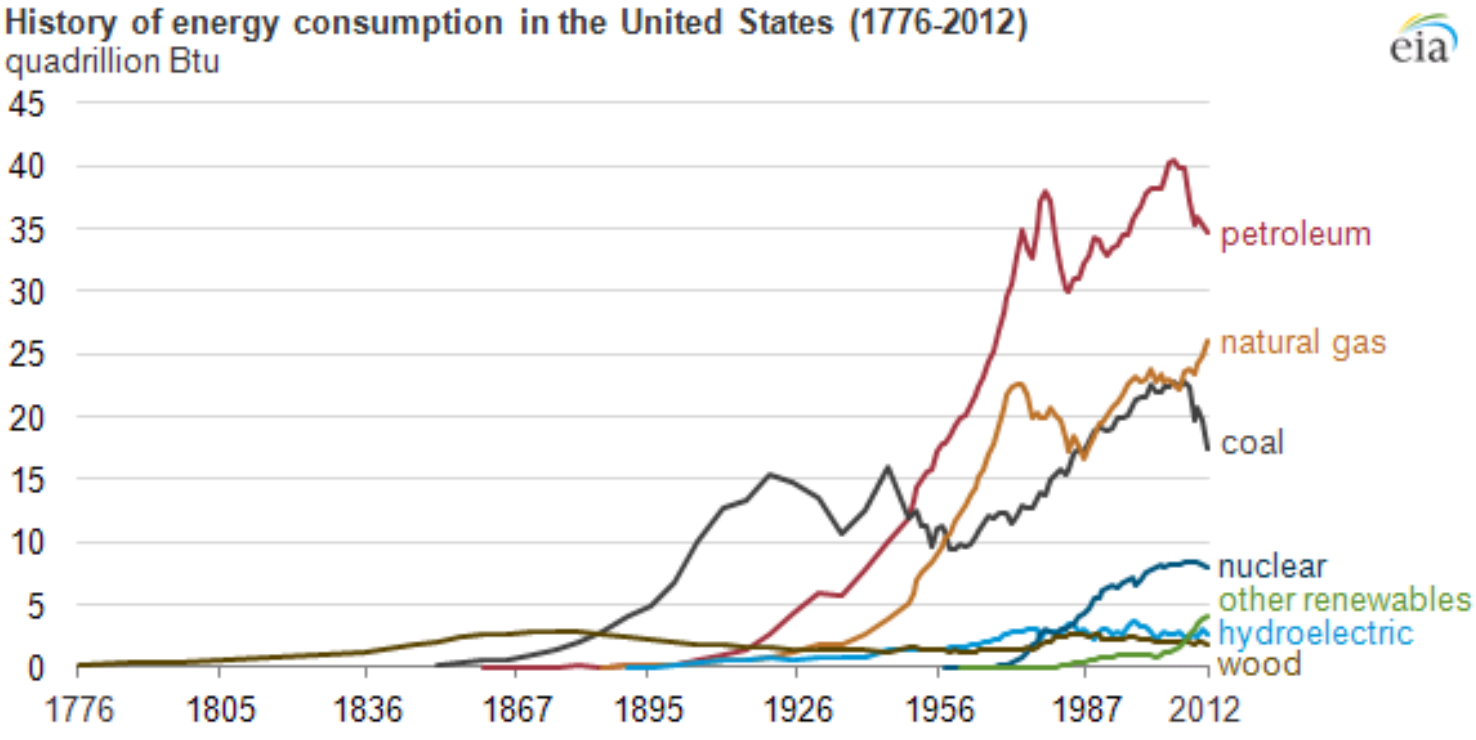
10. Describe the general timeline about how energy use has changed over time?
    a. 1700s: **Wood and renewable sources dominate (animal, water, wind were other sources used as well). Wood was easy to obtain, transport, and could be used on demand.**

    b. 1800s: **Coal becomes dominant due to industrialization (coal produces more heat, is more efficient, and easier to transport than wood)**

    c. 1900s: **Oil and natural gas rose and surpassed coal as drilling technology advanced. (Oil and natural gas were cleaner, easier to transport, store, and handle). Demand continues to increase for fossil fuels during this century.**

    d. Mid-1900s: **Nuclear energy introduced. Growth slows due to accidents and concerns over waste**

    e. Late 1900s-Today: **Renewables grow, especially wind and solar. Growth continues as technological advances reduces cost and increases efficiency.**



Climate Change Doodle Notes and Can We Cool the Planet Documentary

Vocabulary:

11. Climate Change - **a long-term change in Earth's average temperature and weather patterns**

Questions:

12. What are the main causes of climate change?

    Increased activities that release greenhouse gases (burning fossil fuels, industrial activities, agriculture)

    Activities that decrease the absorption of greenhouse gasses (deforestation and habitat loss)

13. Describe the effects of climate change?
    - **Invasive species are able to colonize new areas as the climate begins to suit them**
    - **Extinction of species that can't handle the changes**
    - **Increase forest fires, drought, heatwaves, and severe weather like hurricanes**
    - **Death of coral reefs**
    - **Food and water shortages**
    - **Melting ice caps**