Energy Unit Study Guide

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Nonrenewable Energy

**Key Terms**

* coal
* crude oil
* liquefied natural gas (LPG)
* liquefied petroleum gas (LPG)
* natural gas
* net energy
* nuclear fusion
* oil sand
* petrochemicals
* petroleum
* shale oil
* tar sand
1. How does today’s energy usage in the U.S. compare to the world?
2. Define net energy.
3. Why is a net energy ratio less than 1 bad?
4. Oil:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source: | How is it extracted and processed? | Location: Which countries have the largest supply? | How Long Will Current Supplies Last? | Advantages: | Disadvantages: |
| **Petroleum & Crude Oil** |  |  |  |  |  |

1. How are petrochemicals used?

1. Who is OPEC? List the contributing countries.
2. How much of the US energy comes from fossil fuels? \_\_\_\_\_\_\_\_\_ From oil? \_\_\_\_\_\_\_\_\_
3. How much of the world’s oil do we (US) use? \_\_\_\_\_\_\_ How much do we produce? \_\_\_\_\_\_\_
4. What is oil sand/tar sand and who has a lot of this?
5. What are the chief environmental issues associated with this type of oil production?
6. How is shale oil produced?
7. What is natural gas? Which gases make it up?
8. Natural gas:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source: | How is it extracted and processed? | Location: Which countries have the largest supply? | How Long Will Current Supplies Last? | Advantages: | Disadvantages: |
| **Natural Gas** |  |  |  |  |  |

1. What is coal and where does it come from?
2. What are the 3 largest coal burning countries in order?
3. List the types of coal from least to greatest energy (heat) content.
4. How is China’s coal consumption affecting the environment?
5. Coal:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source: | How is it extracted and processed? | Location: Which countries have the largest supply? | How Long Will Current Supplies Last? | Advantages: | Disadvantages: |
| **Coal** |  |  |  |  |  |

1. The parts of a nuclear reactor (explain each component’s role):
	1. Fuel rods:
	2. Fuel assemblies:
	3. Control rods:
	4. Coolant:
	5. Containment shell:
	6. Water-filled pools & Dry-casks:
2. List the steps of the nuclear fuel cycle:

1.

2.

3.

4.

5.

1. What countries are large nuclear power users?
2. Two major nuclear disasters (list place, year and what happened)

1.

2.

1. List 3 advantages and 3 disadvantages of nuclear power.

Energy Efficiency and Renewable Energy

Key Terms

* active solar heating system
* biofuels
* cogeneration
* combined heat and power systems (CHP)
* energy conservation
* energy efficiency
* geothermal energy
* passive solar heating system
* photovoltaic (PV) cells
* solar cells
1. How much energy in the U.S. is wasted?
2. How much energy could we potentially save if we improved our energy efficiency?
3. Explain how a cogeneration system works. How energy efficient is this system?
4. List inefficient energy sources and possible solutions for each.

|  |  |
| --- | --- |
| **Inefficient energy source** | **Possible solution(s)** |
| Incandescent light bulbs |  |
| Furnaces |  |
| Leaky buildings |  |
| Coal and nuclear power plants |  |
| Internal combustion engines in cars |  |

1. What is green architecture?
2. Explain how the Georgia Power building in Atlanta is “green.”
3. Describe 5 ways of making a building “green.”
	1.
	2.
	3.
	4.
	5.
4. Label ways to improve energy efficiency in a house or building:



1. Fill in the chart regarding renewable energy sources:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Description | Best Used For | Best Locations | Advantages | Disadvantages |
| Passive Solar |  |  |  |  |  |
| Active Solar |  |  |  |  |  |
|  | Description | Best used for | Best Location | Advantages | Disadvantages |
| Solar Thermal |  |  |  |  |  |
| Solar Cells (PV Cells) |  |  |  |  |  |
| Hydroelectric |  |  |  |  |  |
| Tidal Power |  |  |  |  |  |
| Wind |  |  |  |  |  |
|  | Description | Best used for | Best Location | Advantages | Disadvantages |
| Biofuels |  |  |  |  |  |
| Geothermal |  |  |  |  |  |
| Hydrogen Fuel Cells |  |  |  |  |  |