

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

## Unit 9 Formative Assessment – Sustainability & Natural Resources

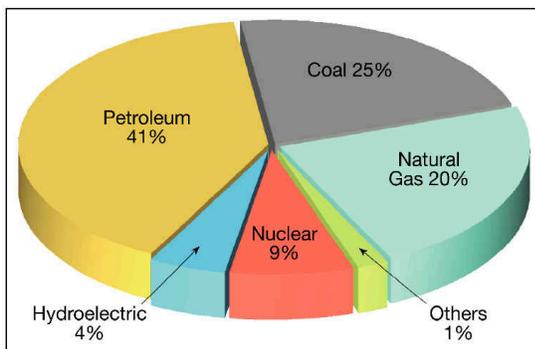
1. For each of the following types of energy, indicate if they are *renewable or non renewable*:

- |                 |           |               |           |
|-----------------|-----------|---------------|-----------|
| a. Solar        | <b>R</b>  | f. Tidal      | <b>R</b>  |
| b. Wind         | <b>R</b>  | g. Fission    | <b>NR</b> |
| c. Hydrothermal | <b>R</b>  | h. Fusion     | <b>R</b>  |
| d. Coal         | <b>NR</b> | i. Geothermal | <b>R</b>  |
| e. Petroleum    | <b>NR</b> | j. Oil        | <b>NR</b> |

2. **TRUE OR FALSE**: Nonrenewable resources can be replenished over months, years or decades.

**\*\* Replenished over thousands, millions of years, or if at all**

3. Using the pie chart below, determine what percent of the US energy comes from *petroleum, natural gas, nuclear* and *coal* **COMBINED**.



**\*\* 41% (petroleum) + 20% (natural gas) + 9% (nuclear) + 25% (coal) = 95%**

4. **TRUE OR FALSE**: In any energy generation process, the usefulness of the energy at the end of the process will be greater than the quality at the beginning. (*What does quality mean in this context?*)

**\*\* Lower**

**\*\* Quality refers to the EFFICIENCY of the energy produced**

5. **TRUE** OR FALSE: Extracting, processing, and using mined resources causes land disturbance and erosion.
6. TRUE OR **FALSE**: The world's dirtiest and most abundant fossil fuel is biomass.

**\*\* COAL**

7. Most oil in the United States is used for what activity?

**\*\* Automobile transportation**

8. Fill in the table to indicate the primary use of each of the following fuels:

Fuel	Primary Use	Benefit of fuel (if any)
Coal	<b>Generates Electricity and Heating</b>	<b>Abundant</b>
Natural Gas	<b>Heating</b>	<b>Air pollution is cleaner than for other fossil fuels</b>
Petroleum	<b>Automobile Transportation</b>	<b>Available; Reasonably cheap to process</b>
Propane	<b>Heating</b>	<b>Cheaper to produce than electricity</b>

9. If solar energy is so great, why don't we use more of it?

**\*\* Expensive equipment and installation costs**

**\*\* Aesthetics/space for solar panels**

**\*\* Not available at night time/cloudy days**

**\*\* Time consuming and training to set up**

10. Fill in the table on renewable energy (Word Hints: solar, fission, hydroelectric, wind, hydrothermal, tidal, plants and living matter, heat from the Earth, flowing rivers, uranium, green, clean, efficient, renewable, practical):

Type of Energy	Source	Benefit and Issue
<b>Wind</b>	<b>Unequal Heating from Sun</b>	<b>B: Non-polluting I: Noise pollution</b>
<b>Solar</b>	<b>Sun (Nuclear Fusion)</b>	<b>B: Unlimited I: Not available at night</b>
<b>Nuclear Energy</b>	<b>Nuclear Fission</b>	<b>B: Efficient I: Radioactive waste &amp; Can't be easily controlled</b>
<b>Hydroelectric</b>	<b>Flowing water -Rivers</b>	<b>B: Non-polluting I: Damages ecosystem (land); Expensive to start</b>
<b>Tidal</b>	<b>Big differences in the high tide and the low tide, location where the water from the tidal shift can be contained</b>	<b>B: Non-polluting I: Limited locations (coastal); Damages ecosystem</b>
<b>Geothermal</b>	<b>Circulating heated water &amp; steam within rock formations</b>	<b>B: Non-polluting I: Limited access to some locations</b>
<b>Biomass</b>	<b>Dead Plants and living matter</b>	<b>B: Practical I: Disturbs land; Water and air pollution</b>

11. **CIRCLE** the items that would be included in **BIOMASS**: oil from petroleum, methane from animal waste, corn ethanol, methane from food waste, gas made from coal.

**\*\* Methane from animal waste**

**\*\* Corn ethanol**

**\*\* Methane from food waste**

12. Classify these statements as **sustainable** or **non-sustainable** mentality:

- a. mode of human development in which resource use aims to meet human needs while preserving the environment **S**
- b. the earth has an unlimited supply of resources available for use by people-- If resources run out in one area, more can be found elsewhere or alternatively human ingenuity will find substitutes **NS**
- c. The earth has a limited supply of resources. **S**
- d. Humans do not need to conserve resources. **NS**
- e. Humans share the earth's resources with other living things. **S**
- f. Unlimited growth is sustainable. **NS**
- g. Humans are above nature. **NS**

13. Which of the following statements is true?

- a. Hydrogen fuel cells will become more expensive as development continues
- b. Hydrogen gas can be disturbed at the local gas station

**c. The use of hydrogen fuel cells releases little or no carbon dioxide**

- d. Hydrogen gas is easy to store at home

14. What are some consequences of deforestation?

**\*\* Increased soil erosion**

**\*\* Disrupts natural habitats**

**\*\* Loss of plant/animal biodiversity**

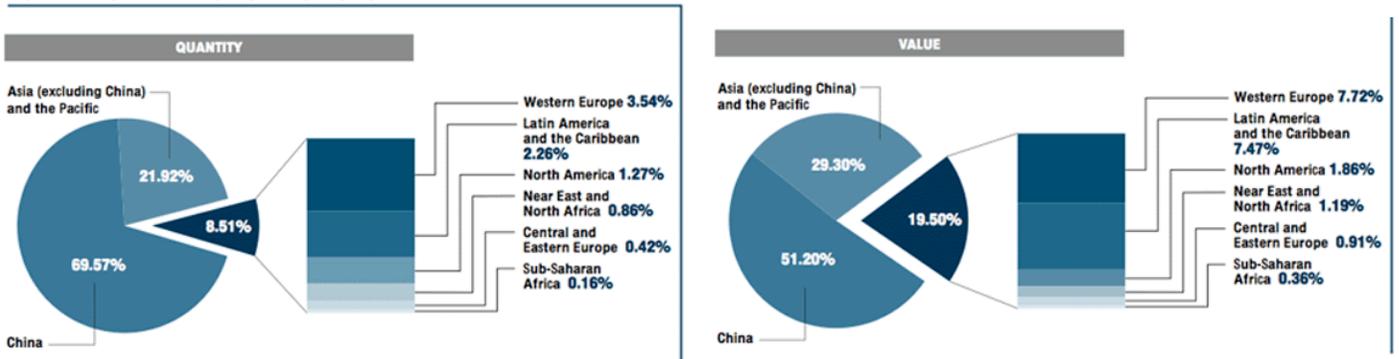
**\*\* Increased CO<sub>2</sub> emissions from machinery usage**

15. **TRUE** OR FALSE: People living in urban areas have a smaller carbon footprint due to public transportation and walking options.
16. **TRUE** OR FALSE: Urban areas have high rates of disease due to population density.
17. **TRUE** OR FALSE: Air pollution in urban areas is higher due to concentrated industrial and transportation density.
18. **TRUE OR FALSE**: Humans living in urban areas are more likely to travel by automobile.

## \*\* Public transportation

19. Using the chart below, determine which country has the **highest** quantity of aquaculture.

Aquaculture production by regional grouping in 2004



**\*\* CHINA → 69.57%**

20. Will this happen with deforestation: **Yes or No?**
- An increase in soil erosion → **YES**
  - Loss of CO<sub>2</sub> absorbing plants → **YES**
  - Increased stream clarity due to reduced erosion → **NO**
  - More habitat for monkeys → **NO**
21. Will this happen with aquaculture: **Yes or No?**
- A boom and bust operation that will make quick profits → **YES**
  - Lots of contaminated water → **YES**
  - Degraded genetic fish stock → **YES**
  - Wild species in danger from escaping domesticated species → **YES**
  - More food on the table at lower overall cost → **YES**

22. Sustainable agriculture relies heavily on \_\_\_\_\_.

a. Inorganic (what does this mean?) fertilizer to replenish soil nutrients

**b. Natural controls for pests and replenishing soil nutrients (*think manure*)**

c. Synthetic (man-made or natural) pesticide use for controlling pests

d. Inorganic fertilizer to replenish soil nutrients

23. The following are some of the types of energy available in North Carolina: *coal, natural gas, gasoline, oil, jet fuel, petroleum, nuclear electric, hydroelectric, biomass, etc.*

a. Pick one and describe its source (*where it comes from*).

**\*\* COAL → Subsurface (Underground) Mining**

b. Describe how it can be used (*ex: electricity generation or transportation*).

**\*\* Electricity and power generation**

c. List two benefits and two issues with this energy.

**\*\* B: Very abundant in U.S.**

**\*\* B: Provides jobs → Mining**

**\*\* I: Very dirty → Air & water pollution**

**\*\* I: Generates ash → Solid waste**

24. Describe the trends in urban and rural population growth using the chart below:

a. What is happening?

**\*\* Began with Industrial Revolution in 18<sup>th</sup> Century and has been on the rise ever since**

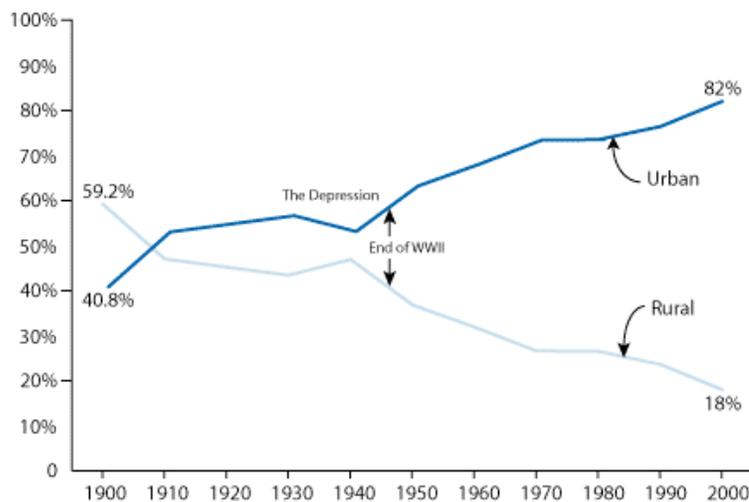
b. Why is it happening?

**\*\* Comfort and amenities that cities offer**

**\*\* Job opportunities that cities provide**

**\*\* Technical and medical advances**

c. What are some of the impacts on the environment due to the trend?



**\*\* Increased levels of pollution (*solid waste, air pollution, water pollution, noise pollution*)**

**\*\* Heavily populated (*high density in confined space*)**

**\*\* High cost of living**

**\*\* Economic disparity (*poor & rich*)**

**\*\* Increased crime rates**

**\*\* Increased disease transmission**

**\*\* Urban heat island effect (*higher temperature than surrounding area due to human activities*)**

25. Use the terms *restoration*, *mitigation*, *conservation* and *preservation* to complete the following:

- a. Ecosystem **restoration** is the return of a damaged ecological system to a stable, healthy, and sustainable state.
- b. **Conservation** is the protection, preservation, management, or restoration of wildlife and of natural resources such as forests, soil, and water.
- c. Environmental **mitigation** is complicated business. Essentially, it means that a developer that degrades or destroys a natural resource must restore ecological balance by doing something nice for the environment, preferably kind of nearby.
- d. Environmental **preservation** is the strict setting aside of natural resources to prevent the use or contact by humans or by human intervention.

26. Provide a **SPECIFIC** example of each of the following sustainable processes:

a. *Conservation*

**\*\* Habitat Conservation – Land management that seeks to protect and restore habitat areas for wild plants and animals, especially to prevent their extinction, fragmentation, or reduction in range.**

b. *Preservation*

**\*\* Habitat Preservation – Protecting habitats that wildlife need in order to survive and fulfill its niche (role) in the ecosystem. This runs parallel to protecting the future of humanity as we are also part of this ecosystem. We depend directly on natural habitats for essential, irreplaceable ecosystem services.**

c. *Restoration*

**\*\* Habitat Restoration – Removing all trash that have accumulated in natural habitats that have been placed there intentionally or unintentionally by human activities.**

d. *Mitigation*

**\*\* Climate Mitigation – Attempts to slow the process of global climate change by lowering the level of greenhouse gases in the atmosphere. Planting trees that absorb CO<sub>2</sub> from the air.**