Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Energy Sources Websites**

**Part 2: Renewable Resources**

***Website #1:*** *Energy Kids*  [www.eia.gov/kids/](http://www.eia.gov/kids/) 🡪Click on **Energy Sources** and **Renewable**

* In 2014, \_\_\_\_\_\_% of total US energy consumption came from renewable sources
* \_\_\_\_\_\_\_ % of US electricity was generated from renewable sources

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| Why don't we use more renewable energy?  1.  2. |

*Click on* ***Biomass*** *from the sidebar*

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| **Biomass:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *Examples:* |
| How is the energy from biomass released?  1.  2. |
| What is **waste-to-energy?** |

* Americans throw away \_\_\_\_\_\_\_\_ pounds of trash a day.
* \_\_\_\_\_\_\_\_% is recycled, \_\_\_\_\_\_\_\_% is converted to energy, and \_\_\_\_\_\_\_\_% is discarded into landfills

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| What is **biogas?** How is it produced? |  |
| **Advantages of Biomass:** | | |
| **Disadvantages of Biomass:**  *Why is growing plants (like corn) for biofuel (like ethanol) controversial?* | | |

*Click on* ***Geothermal***

Geothermal energy is generated in the earth’s ­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

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| Three ways geothermal energy finds its way to the earth’s surface:  1.  2.  3. |  |

Most geothermal resources are found near \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

In the US, most of the geothermal resources are found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| Three types of geothermal energy systems:  1.  2.  3. |

Which country produces the most electricity from geothermal resources? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which state? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Summarize how these resources are converted to electricity. *Use the paragraph under “Geothermal Power Plants”. You do* ***not*** *need to know the three types of geothermal power plants.* |
| **Advantages of Geothermal:** |
| **Disadvantages of Geothermal:** |

*Click on* ***Hydropower***

**Hydropower:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Where do hydroelectric power plants need to located? (duh) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Two types of flowing water that contain mechanical energy:  1.  *example:*  2.  *example:* | How was hydropower used thousands of years ago? |
| Most hydropower in the US is used in these states: | Circle **True/False:** All dams in the U.S. produce electricity.  *🡪Most dams were constructed for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .* |

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| **Advantages of Hydropower:** |
| **Disadvantages of Hydropower:** |
| How do we reduce impacts of dams on anadromous fish populations, like salmon? *(Anadromous: spend part of their life cycle in freshwater rivers, part of it in the ocean)* |

**Tidal energy** is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than wind or solar energy.

* Economically, a tidal range of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is needed to produce tidal energy.
* How many tidal power plants are there in the US? \_\_\_\_\_\_\_\_\_\_\_\_

**Wave energy** has good potential but not much development yet. Places that are good possibilities for waver power plants include \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Click on* ***Solar***

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| Twoways solar energy is converted into electricity:  1.  2. | |
| Two main benefits of solar energy:  1.  2. | Two main limitations of solar energy:  1.  2. |

Where will you find the most usage of solar energy in the US? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How much of the world’s deserts would need to be covered with photovoltaics to supply all the world’s electricity? \_\_\_\_\_\_%

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| **How Photovoltaic Cells work**   * PV cells are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ material * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ photons provide energy to generate electricity * When enough sunlight is absorbed, \_\_\_\_\_\_\_\_\_\_\_\_\_ are released from the material’s atoms * The electrons flow towards the front of the cell and create an imbalance of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ potential, like the +/- of a battery * Electrical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ absorb the electrons, and are connected in an electrical \_\_\_\_\_\_\_\_\_. |  |

Efficiency right now of PV cells ranges from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Advantages of PV systems:  1.  2.  3. |
| What is **solar thermal power?** How is it different from using PV cells? |

* Solar heating systems may be **passive** or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.**
* Active systems use a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a fluid to collect and absorb solar radiation.
* Collectors may categorized as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

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| **Advantages of Solar Energy:** |
| **Disadvantages of Solar Energy:** |

*Click on* ***Wind***

**Wind energy** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

* Wind \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ use blades to collect wind’s kinetic energy
* Turbines are connected to a drive shaft that turns an electric \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Electricity generation from wind has increased from

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kWh (2000) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kWh (2014)

|  |  |
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| Why has this dramatic increase occurred?  1.  2. | |
| Good sites for wind turbines: | Two types of wind turbines:  1.  2. |
| What are turbines grouped together as wind power plants called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Explain the causes of the expansion of wind energy use, starting in the 1970s. | |
| **Advantages of Wind Energy:** | |
| **Disadvantages of Wind Energy:** | |

**Site 2:** [**http://www.wonderville.ca/asset/save-the-world**](http://www.wonderville.ca/asset/save-the-world) **Save the World Game.** Watch the intro animation and then click *Continue.* Watch the animation for **electricity generation.**

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| **Electricity Generation**   1. Water, steam or air turns the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and connects to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. Inside the generator is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ turns the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. The magnet turns over the coil, generating electricity in the copper wire, through the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5. Energy might be distributed through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or stored in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| Click **continue** and play the game. Which form of power is discussed at the completion of each of the regions? | **Norway** |  |
| **Canada** |  |
| **U.S.** |  |
| **France** |  |
|  | **India** |  |
| **Japan** |  |
| **New Zealand** |  |

**Site 3:** <http://climatekids.nasa.gov/power-up/>Climate Kids game. Use the **left/right** arrows to keep the solar panel in the sun, and the **up/down** arrows to keep the windmill in the wind. Try to power up all the houses in 2 minutes. What award did you win at the end? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Site 4:** <http://www.alliantenergykids.com/FunandGames/OnlineGames/KIDS_GAME_FLOW_OF_ENERGY>Alliant Energy Kids—Flow of Energy

Track the flow of energy for **Watching Television**.

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| 1. | 🡪2. | 🡪3. | 🡪4. | 🡪5. |

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| 11. | 🡪12. | 🡪13. | 🡪14. | 🡪15. |

Track the flow of energy for **Taking a Hot Shower**.

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