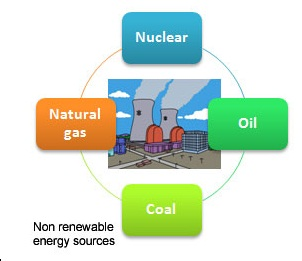
**Environmental Science**

**Chapter 17:**

**Nonrenewable Energy**

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***Class Website:*** http://aofscience.weebly.com

***Mr. Gutierrez’s email:*** gutierrezbr@elizabeth.k12.nj.us

|  |  |  |  |
| --- | --- | --- | --- |
| **Packet** | | **Followed All Classroom Policies** | |
| /80 | Completed Class Notes | / | Monday |
| /20 | Writing Name on Every Page | / | Tuesday |
|  | | / | Wednesday |
| / | Thursday |
| / | Friday |
| /100 | Total Points | / | Total Points |

Name of Environmental Scientist (Your Name):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_\_\_\_

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| **2. Fossil Fuel** | **8 - 10** | **522 - 528** |
| **3. Nuclear Energy** | **11- 14** | **536 - 541** |

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT define energy and differentiate between kinetic and potential energy . energy.** |
|  |

**ENERGY**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Energy, which is the ability to do work, can be classified as either kinetic or potential.**   |  |  | | --- | --- | | **KINETIC** | **POTENTIAL** | | **Kinetic energy is due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Potential energy is due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **(stored energy)** | | **Ex:** | **Ex:** | |

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT describe the different forms of energy.** |
|  |

**FORMS OF ENERGY**

**Forms of energy include mechanical energy, electrical energy, thermal energy, electromagnetic energy, chemical energy, and nuclear energy.**

* Energy is the ability to do work or cause a change

|  |  |
| --- | --- |
| *Form of Energy* | *Description* |
| **1. Mechanical** | Associated with the \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ of an object; can be kinetic or potential. Usually involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    Ex: |
| **2. Electrical** | Associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; can be kinetic  or potential    Ex: |
| **3. Thermal** | Kinetic energy of atoms and molecules— the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** atoms and molecules move in an object, the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**it  becomes    Ex: |
| **4. Electromagnetic** | Kinetic energy that travels **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    Ex: |
| **5. Chemical** | Potential energy stored in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    Ex: |
| **6. Nuclear** | Potential energy stored by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that hold \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  images.jpg |

**ENERGY CONVERSION**

* **Energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; it can only be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, from one form to another.**
* Combustion is the process by which a fuel burns because it combines rapidly with oxygen. It converts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. You feel the thermal energy as heat and see the electromagnetic energy as light.

**RENEWABLE VS. NONRENEWABLE**

|  |  |
| --- | --- |
| ***RENEWABLE SOURCE*** | ***NONRENEWABLE SOURCE*** |
| Nearly **­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**in a relatively **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;**  Includes:  **sunlight**, wind, flowing water, heat from Earth | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in a reasonable time;  Includes: fossil fuels and nuclear energy |

**ENERGY: Summary of Key Concepts**

key Energy, which is the ability to do work, can be classified as either kinetic or potential.

key Forms of energy include mechanical energy, electrical energy, thermal energy,  
electromagnetic energy, chemical energy, and nuclear energy.

key Human society uses renewable and nonrenewable energy resources in industry,  
transportation, commerce, and residences.

**Summary/Personal Notes**

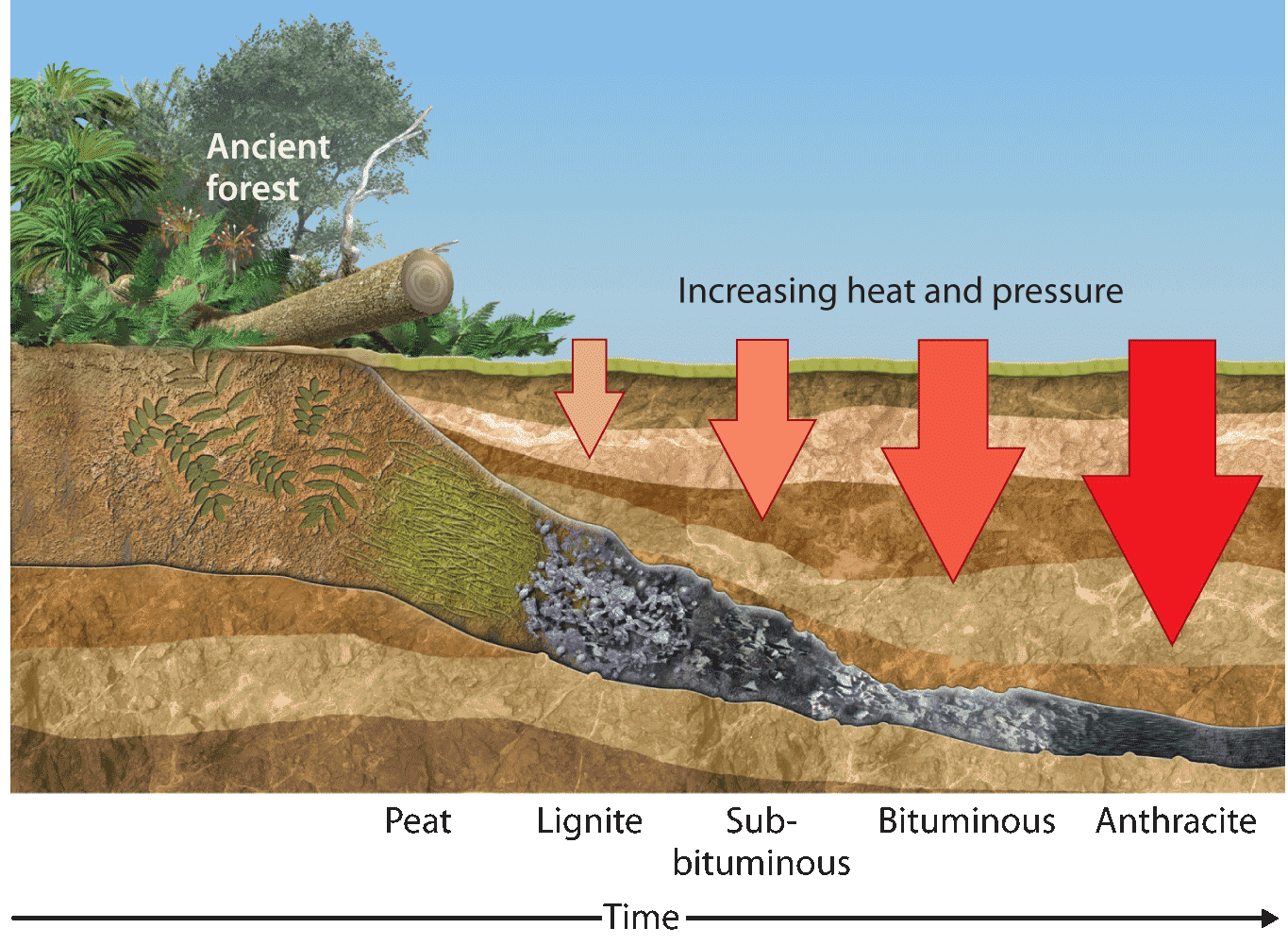
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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT describe how fossil fuels form.** |
|  |

**FOSSIL FUELS**

**Fossil fuels form from the remains of organisms that lived millions of years.**

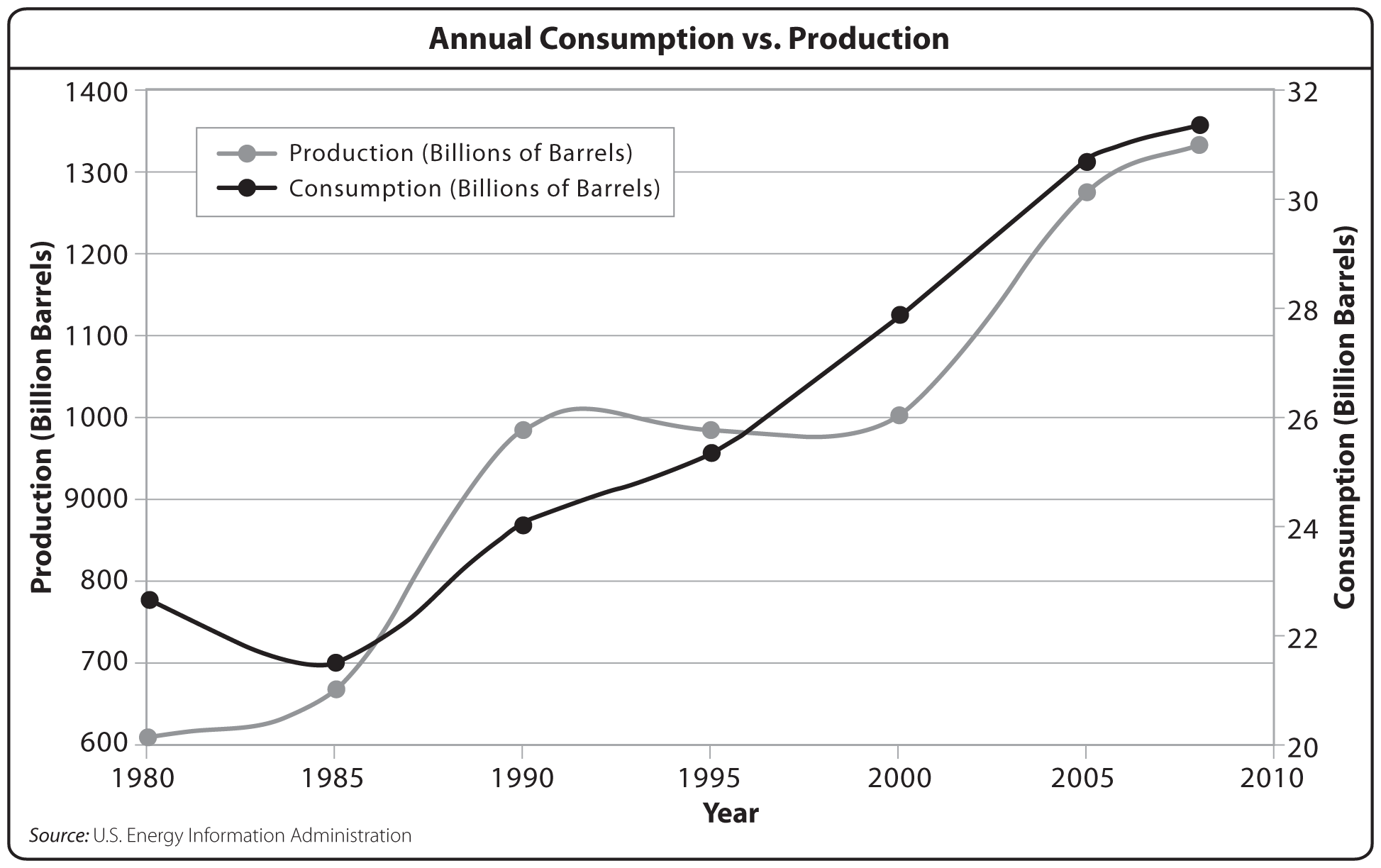
* Fossil fuels include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Formed from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over millions of years
* Different conditions produce different fossil fuels

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| --- | --- |
| 1. **Coal**   **imgres.jpg** | * Formed from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ subjected to high \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over millions of years * Provides \_\_\_\_\_\_\_\_\_\_\_\_ of the world’s energy * Relatively cheap, easy to process and transport |
| 1. **Oil/Petroleum**   **imgres.jpg** | * ­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fossil fuel made up mostly of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Formed from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organisms and found in underground \_\_\_\_\_\_\_\_\_\_\_ * Used in fuel for \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, planes, ships |
| 1. **Natural Gas** | * Natural gas consists of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mixed in with small amounts of other gases. * Often found \_\_\_\_\_\_\_\_\_\_\_\_\_ oil or coal  deposits * Much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than coal or oil and releases  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when combusted * Used for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, appliances (stoves, dryers), and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   imgres.jpg |

**FOSSIL FUEL SUPPLY**

* Consumption is still rising, but new fossil fuels do not form on a human timescale.
* New oil sources—oil sands, oil shale, methane hydrates— are expensive, energy-intensive, and can be hazardous to obtain.
* Coal sources are still relatively abundant, but are finite (limited)



**FOSSIL FUELS: Summary of Key Concepts**

key Fossil fuels formed from the remains of organisms that lived millions of years ago.

key Coal, which is used mainly to generate electricity, is obtained by mining.

key Petroleum, which is obtained by drilling, is a major source of energy and is used to  
make a variety of products.

key Natural gas yields a large amount of energy and is less polluting than other fossil fuels.

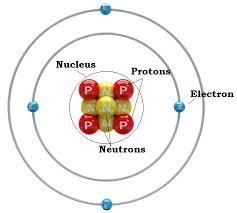
key The supply of fossil fuels is limited.

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT differentiate between nuclear fusion with nuclear fission**. |

**NUCLEAR ENERGY**

**** **The process of nuclear fission releases energy.**

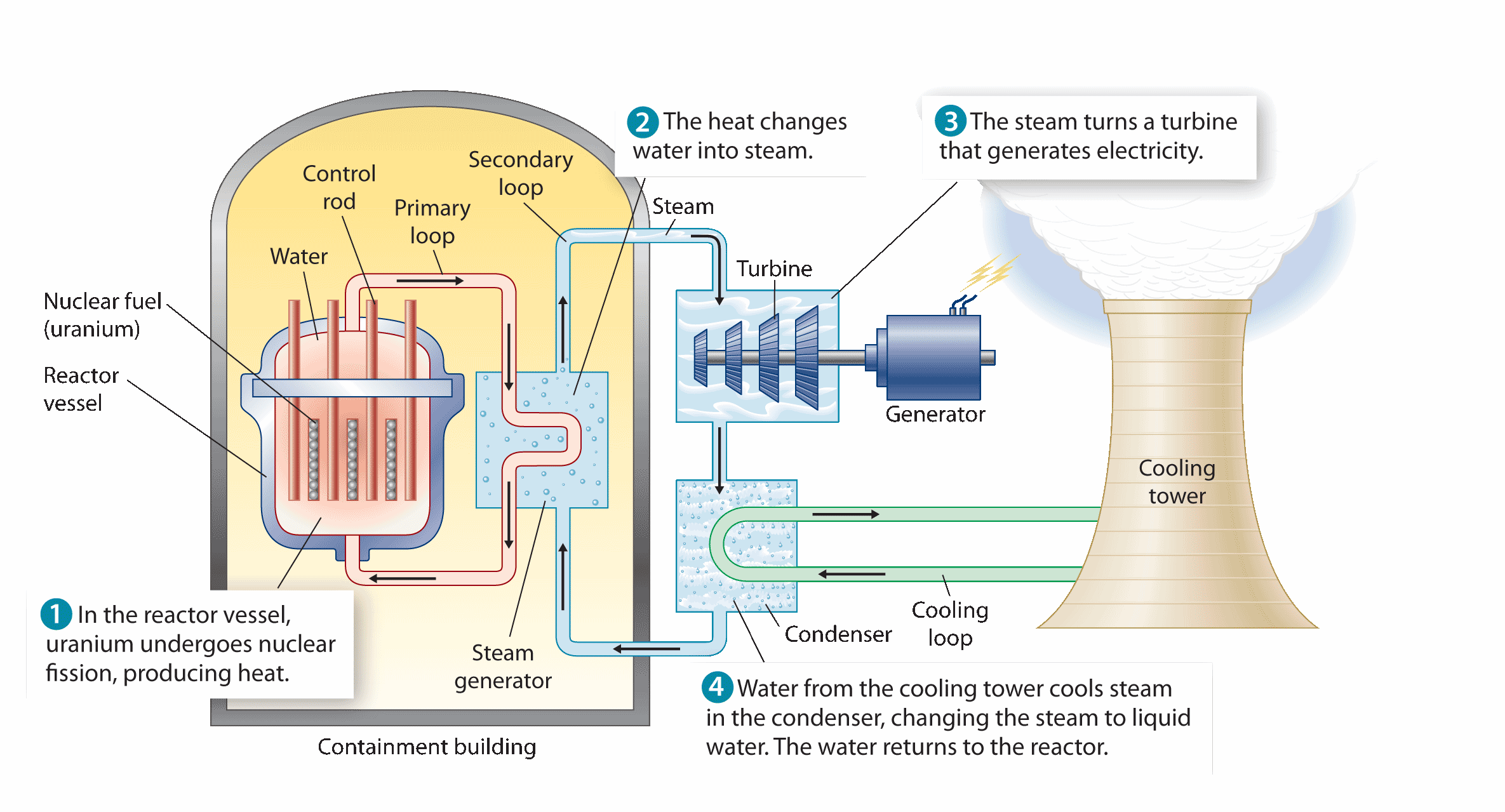
**The Atom**

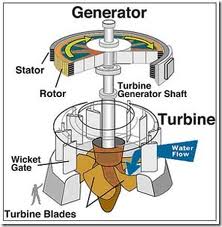


|  |  |
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| NUCLEAR **FISSION**   * \_\_\_\_\_\_\_\_\_\_\_\_\_ an atomic nucleus into\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Releases neutrons and large \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If enough unstable nuclei are present, a **nuclear chain reaction** can occur.   0133724751a121 | |
| PROS | CONS |
| * \_\_\_\_\_\_\_\_\_\_\_\_alternative energy source * Creates lots of energy * Used for nuclear bombs | * Used for nuclear bombs * Can cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Reactor accidents are dangerous * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Uranium and Plutonium) |

|  |  |
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| NUCLEAR **FUSION**   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atomic nuclei to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Releases much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than fission * Currently impractical because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but scientists continue exploring fusion for our future energy needs   0133724751a123 | |
| PROS | CONS |
| * Creates even more energy * Lots of fuel supply (Hydrogen) * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * No risk of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | * Used for Hydrogen bombs (8x more powerful than atomic bombs) * Technology for clean energy hasn’t been developed yet * It will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT Describe how a nuclear power plant generates electricity.** |
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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: Explain the advantages and disadvantages of nuclear power.** |

**Benefits and Costs of   
Nuclear Power**

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| --- | --- |
| ***BENEFITS (Advantages)*** | ***COSTS (Disadvantages)*** |
|  |  |
|  |  |
| Under normal conditions, nuclear power plants are \_\_\_\_\_\_\_\_\_for workers than coal-burning power plants. | Nuclear waste must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| **NUCLEAR ENERGY: Summary of Key Concepts**  key The process of nuclear fission releases energy.  key In a nuclear power plant, nuclear fission is used to generate electricity.  key Nuclear power does not create air pollution, but its problems include risk of accidents and disposal of wastes.  key Nuclear fusion has advantages over fission, but the technology does not yet exist to use fusion to generate power. |
|  |

Make sure Mr. Gutierrez stamps/signs this by the end of the period. You CANNOT get the stamp/signature for a day later on. It is your responsibility to remind Mr. Gutierrez. You will NOT receive a stamp if you did not follow all classroom policies or actively work on the practice problems during the allotted class time.A stamp means you received all 10 points. No stamps means you’ve received zero points. If you completed some work, I may give you partial credit based on my discretion. ***If you are absent, write the date on the day you were absent and write the word “Absent.” DO NOT LOSE THIS SHEET!!!*** (If you lose this sheet, you will lose all of your participation points. NO EXCEPTIONS.)

|  |  |  |  |
| --- | --- | --- | --- |
| **Day of Week** | **Followed All Classroom Policies** (Respectful, on time, prepared, engaged…) | **Class work Participation** | **Homework** |
| *Monday* | /10 | /10 | /10 |
| *Tuesday* | /10 | /10 | /10 |
| *Wednesday* | /10 | /10 | /10 |
| *Thursday* | /10 | /10 | /10 |
| *Friday* | /10 | /10 | /10 |