*Complete the following worksheet using the Electricity & Transmission Power Point.*

[Page #s in the PPT are indicated to the right of each question]

1. What is electricity? [p 2]

2. Electrons can build up a charge as in \_\_\_\_\_ electricity or they can flow in loops called \_\_\_\_\_. [pp 3-4]

3. When electrons flow in a continuous, single loop, this is an example of a \_\_\_\_\_ circuit. Give two examples of electrical devices that use this kind of circuit. [pp 4-6]

4. When electrons can flow in more than one loop, this is a \_\_\_\_\_ circuit. Give two examples of electrical devices that use this kind of circuit. [pp 7-9]

5. \_\_\_\_\_ circuits contain both a series circuit and two or more parallel circuits. \_\_\_\_\_ and \_\_\_\_\_ are connected in series with electrical appliances. [pp 10-13]

6. The quantity of electrons moving is called the \_\_\_\_\_ and it is measured in \_\_\_\_\_. [p 14]

7. Three basic components of electricity are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_. [p 16]

8. Materials that allow electrons to flow easily are called \_\_\_\_\_. Two examples of such materials are: \_\_\_\_\_ and \_\_\_\_\_. [p 17]

9. Materials that restrict the flow of electrons are called \_\_\_\_\_. Three examples of such materials are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_. [p 18]

10. Materials which allow the flow of electrons, but not easily are called \_\_\_\_\_. Electricity forced through these materials transforms some energy into \_\_\_\_\_ and \_\_\_\_\_. [pp 21-22]

11. \_\_\_\_\_ \_\_\_\_\_ is the process by which much of our useful electricity is generated. [p 23]

12. When a magnetic field moves across a conductor (e.g. wire) this causes a current to flow, and is called \_\_\_\_\_ \_\_\_\_\_. [p 25]

13. Two important uses of magnetic induction involve \_\_\_\_\_ and \_\_\_\_\_. [pp 25-26]

14. Boiling water produces steam which is used to turn a \_\_\_\_\_. [pp 29-31]

15. The shaft of the turbine is connected to an electromagnet which rotates and produces a current in the coils of wire. This system is called a \_\_\_\_\_. [p 32]

16. The current changes direction as the north pole of the magnet passes by the coils of wire and then the south pole of the magnet passes by the coils. This produces \_\_\_\_\_ current. [p 33]

17. How many times per second does the current alternate? \_\_\_\_\_\_ What kind of voltage do we find in our homes? \_\_\_\_\_ The rate at which the current alternates is measured in \_\_\_\_\_. [pp 33-34]

18. Name four major components of a Boiling Water Reactor used to produce electricity [p 36]:

a) b) c) d)

19. Electricity's potential to do work is measured in \_\_\_\_\_. Give two examples of electrical items that deal with volts or voltage. [p 41]

20. What kind of current \_\_\_\_\_ (*lower or higher*) is safer and costs less money to the power company? [p 44]

21. What device changes potential and current while keeping power the same? [p 45]

22. Transformers produce \_\_\_\_\_ (*alternating or direct*) current because they use the process of \_\_\_\_\_? [p 45]

23. How does the potential (voltage) coming out of a “Step-Up Transformer” compare to the potential going in? How does the current compare? Where are the “Step-Up Transformers” used (power plant or industry and homes)? [pp 49-51]

24. How does the potential (voltage) coming out of a “Step-Down Transformer” compare to the potential going in? Where are the “Step-Down Transformers” used (power plant or industry and homes)? [p 52]

25. What is a major reason for reducing the amperage (current) when transmitting electricity from the power plant to our homes? [p 53]

26. What role does the ground wire play in AC circuits? [p 54]

*Answers*

1. What is electricity? **The movement of electrons**

2. Electrons can build up a charge as in **Static** electricity or they can flow in loops called **circuits**

3. When electrons flow in a continuous, single loop, this is an example of a **series** circuit. Give two examples of electrical devices that use this kind of circuit.

**Christmas lights & flashlights**

4. When electrons can flow in more than one loop, this is a **parallel** circuit. Give two examples of electrical devices that use this kind of circuit.

**Microwave oven, toaster, washing machine**

5. **Combination** circuits contain both a series circuit and two or more parallel circuits. **Fuses** and **Circuit Breakers** are connected in series with electrical appliances.

6. The quantity of electrons moving is called the **current** and it is measured in **amps**

7. Three basic components of electricity are **conductors, resistors** and **insulators**

8. Materials that allow electrons to flow easily are called **conductors**. Two examples of such materials are: **copper** and **aluminum**.

9. Materials that restrict the flow of electrons are called **insulators**. Three examples of such materials are **glass**, **wood, air,** **plastic**.

10. Materials which allow the flow of electrons, but not easily are called **resistors**. Electricity forced through these materials transforms some energy into **heat** and **light**

11. **Magnetic** **induction** is the process by which much of our useful electricity is generated.

12. When a magnetic field moves across a conductor (e.g. wire) this causes a current to flow, and is called **induction**.

13. Two important uses of magnetic induction involve **motors** and **transformers** .

14. Boiling water produces steam which is used to turn a **turbine**.

15. The shaft of the turbine is connected to an electromagnet which rotates and produces a current in the coils of wire. This system is called a **generator**.

16. The current changes direction as the north pole of the magnet passes by the coils of wire and then the south pole of the magnet passes by the coils. This produces **alternating** current.

17. How many times per second does the current alternate? **60**  What kind of voltage do we find in our homes? **120 V**  The rate at which the current alternates is measured in **hertz**.

18. Name four major components of a Boiling Water Reactor used to produce electricity:

a) **boiler** b) **turbine** c) **condenser** d) **generator**

19. Electricity's potential to do work is measured in **volts**. Give two examples of electrical items that deal with volts or voltage.

**Batteries & outlets**

20. What kind of current (**lower**) is safer and costs less money to the power company?

21. What device changes potential and current while keeping power the same? [p 45]

**Transformer**

22. Transformers produce **(alternating)** current because they use the process of **induction**.

23. How does the potential (voltage) coming out of a “Step-Up Transformer” compare to the potential going in? How does the current compare? Where are the “Step-Up Transformers” used (power plant or industry and homes)?

**A Step-Up transformer produces high voltage and low current … they are used at the power plant before transmission to industry and our homes**

24. How does the potential (voltage) coming out of a “Step-Down Transformer” compare to the potential going in? Where are the “Step-Down Transformers” used (power plant or industry and homes)?

**A Step-Down transformer produces low voltage and higher current … they are used near industry and our homes after transmission from the power plant**

25. What is a major reason for reducing the amperage (current) when transmitting electricity from the power plant to our homes?

**To reduce transmission losses through the power lines**

26. What role does the ground wire play in AC circuits?

**Electricity will not flow until it is connected to the earth, “the ground”. Ground wires make this connection so electricity can flow in AC circuits**