Name _____TEACHER KEY_____ Period _____ Date _____

Chapter 17.2 Environmental Science – Nuclear Energy Chart

Directions: Fill in the information from the classroom or online chart.

Environmental Science Standard and element:

SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources.

a.) Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.

STUDENT CHECKLIST

1.) Put the chart in your Science Notebook behind the Chapter 17 Word Study after it has been checked. ____yes ____no

2.) The CHART was accurate and complete with no abbreviated information. ____yes ____no

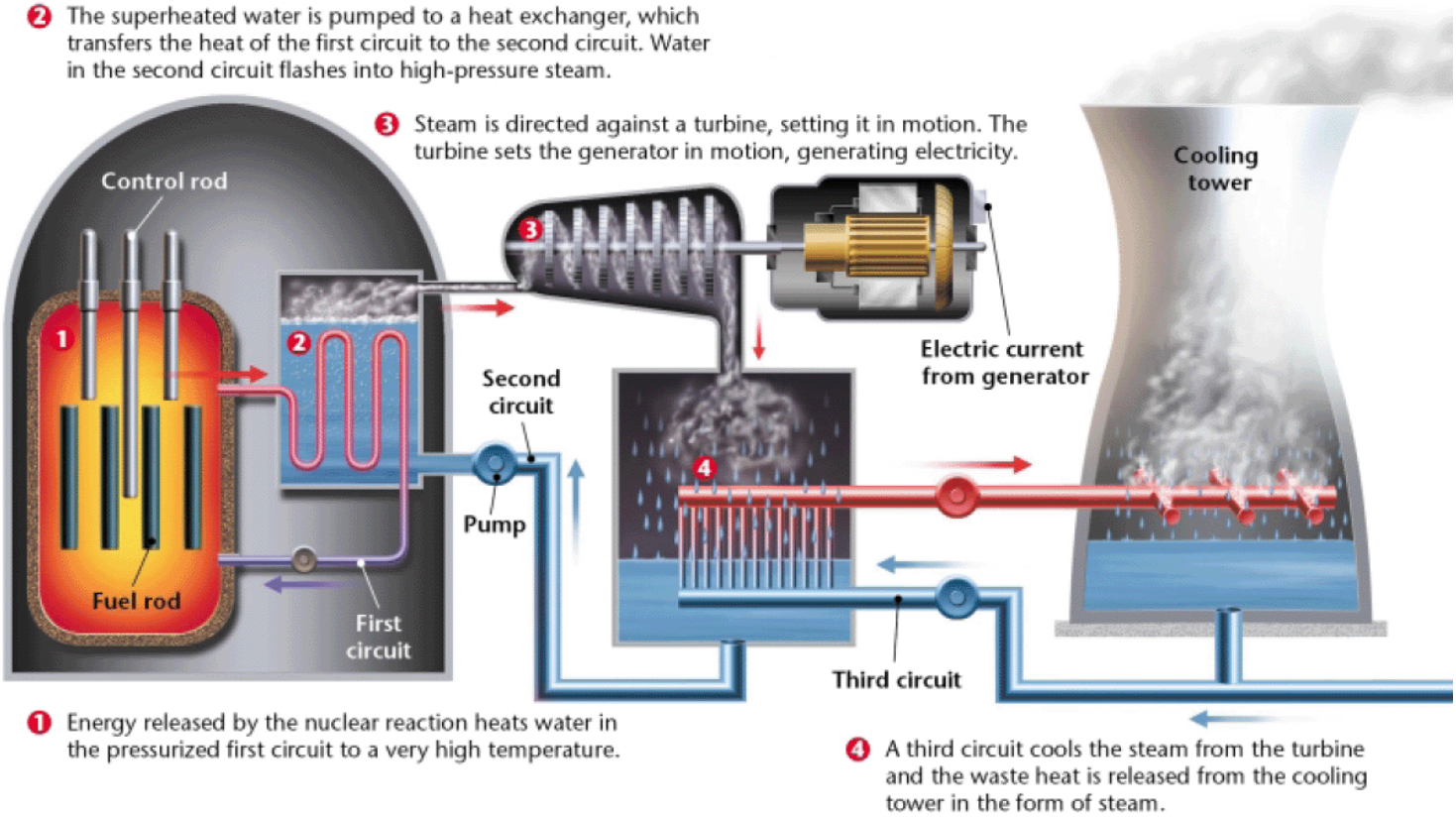
3.) The Information was written neatly and large and dark enough to be easily seen. ____yes ____no

4.) All information was complete with no grammar or spelling errors. ____yes ____no

Nuclear power plants get their power from nuclear energy which is the energy within the nucleus of an atom. Atoms of the element uranium are used as the fuel. The nuclei of uranium atoms are bombarded with atomic particles called neutrons. These collisions cause the nuclei to split in a process called *nuclear fission.*

One possible energy source in the future is *nuclear fusion.* Nuclear fusion occurs when atoms combine or fuse together and release tremendous amounts of energy. All the stars, including our sun, currently use fusion. Fusion is potentially a safer energy source than nuclear fission because it creates less radioactive wastes. However, for fusion to occur, atomic nuclei must be heated to 100,000,000° Celsius or 180,000,000° Fahrenheit, large numbers of nuclei are needed, and they need to be contained in a container that will not melt.

HOW A NUCLEAR POWER PLANT WORKS



NUCLEAR ENERGY

Nuclear Power	**ADVANTAGES:** • **Very concentrated energy source so you don't need large amounts of material to generate massive amounts of electricity** • **Does not produce greenhouse gas emissions so less air pollution is generated** • **Countries without a lot of fossil fuels can generate a large amount of electricity using nuclear power.** **DISADVANTAGES:** • **Nonrenewable resource (the metal uranium is used)** • **Very costly to build nuclear power plants** • **Produces waste that must be stored and is dangerously radioactive for thousands of years** • **When nuclear power plants break down, because of natural disasters or because of human error, then the radioactive material destroys all life and pollutes the environment.** ○ ***The most serious nuclear incident in the U.S. occurred in 1979 when human error caused a shut down because radiation began leaking at Three Mile Island in Pennsylvania.*** ○ ***One of the most serious nuclear incidents in the world occurred in 1986 when safety protocols were ignored and a nuclear power plant in Chernobyl in the Ukraine exploded.*** ○ ***The Fukushima Daiichi nuclear disaster was the largest catastrophic failure of a nuclear power plant in the world. It happened on March 11, 2011 and resulted in a meltdown of three of the plant's six nuclear reactors. The failure occurred when the plant was hit by the tsunami triggered by an earthquake under the Pacific Ocean.***