Student Worksheet

We can make our dreams reality

UNIT C

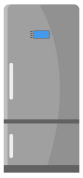
Name _____

Age _____ Date _____

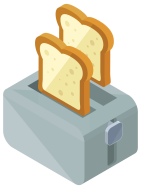
Class _____ Teacher _____

Activity C1

#C1.1. | Look at the list below. Which household appliances do you use at home?

☐ 
200 W
FREEZER

☐ 
117 W
VIDEO GAME CONSOLE

☐ 
1150 W
TOASTER

☐ 
1050 W
MICROWAVE

☐ 
163 W
TV

☐ 
140 W
DESKTOP COMPUTER

☐ 
1275 W
DISHWASHER

☐ 
3000 W
KETTLE

☐ 
2100 W
WASHING MACHINE

☐ 
2000 W
HAIRDRYER

☐ 
65 W
PORTABLE SPEAKER (BLUETOOTH/ WI-FI)

☐ 
5 W
MOBILE PHONE

How many 100 W light bulbs would you need to power your house?

Activity C2

#C2.1. | GREEN ENERGY: ALTERNATIVES!

There are alternative energy sources which are considered "clean" because they emit low levels of CO_2 gas. Some of them are considered **renewable** because they are obtained from natural sources or processes that are constantly replenished.

Examples of renewable energies are: solar energy (which uses sunlight), wind energy, hydroelectric energy (which uses water currents), geothermal energy (which uses the heat within the Earth), and biomass energy (which uses organic matter like plants). The sources of energy used in a certain place depend on the environmental and technological conditions of that region of the planet.

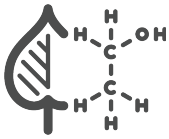
Another source of energy is **Nuclear Energy,** produced in nuclear reactors. Nuclear energy uses the energy of the atom's nucleus. **Atoms** are the units that compose everything in the universe made of **matter**, such as our bodies, the water and even the air. The nucleus is the center of an atom.

Nowadays, nuclear reactors generate energy from **fission reactions** (when the **nuclei** of atoms are split, releasing a large amount of energy). But this process creates long-lived **radioactive waste**, which is harmful and needs to be properly stored. Therefore, the scientific community is studying an alternative form of producing nuclear energy without long-lived nuclear waste. This new type of large-scale, sustainable, and carbon-free form of energy is generated from **fusion reactions.**

#C2.1. | What am I? Read each sentence and match the columns according to what type of energy source it is! Then, complete the blank space with the name of the alternative energy power represented in the images.

HYDROELETRIC ENERGY

"To turn me into electrical energy, it's necessary to use panels called solar cells. I can be found on home rooftops or on utility-scale farms"



"To use me, people build wind turbines. With my power, I move the turbine's blade, generating energy. Historical records show I've been used for more than 7,000 years!"

GEOTHERMAL ENERGY

"My source is collected behind dams on large rivers. To generate energy, I turn giant water turbines that convert my power into electrical power!"

"I was formed when remains of prehistoric plants and animals were buried by layers of soil rock. I can be either natural gas, petroleum (or oil), or coal."

"When you see a geyser, remember me - it's my energy that heats that water below Earth's crust! To produce electricity, power plants produce steam from my heat to turn turbines."

"I can be generated from wood, plants, and even sewage and garbage! To use my energy, my sources can be burned or be converted into biofuels."

FOSSIL FUELS

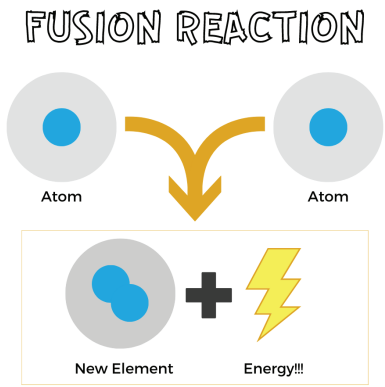
"Scientists use chemical elements to use my energy. My waste is kept in special containers for safe storage - that can last from a few months to many decades!"

#C2.3. | DREAMING ABOUT ENERGY: FUSION

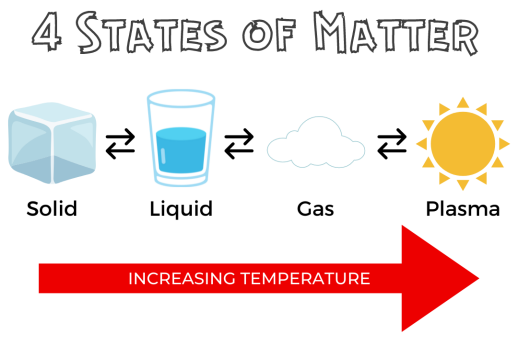
Fusion energy powers all the stars. The light we see and the warmth we feel from our solar system's star, the Sun, are the results of a nuclear fusion reaction. Nuclear energy is the most efficient energy in nature and keeps our universe alive.

In a **fusion reaction**, the nuclei of two atoms become united, releasing huge quantities of energy and producing a new **chemical element**.

However, there are still scientific and technological challenges to making use of nuclear fusion energy in a practical way on Earth.



"Fusion Reaction": fusion reactions, two light atoms are united, creating a new chemical element and releasing a lot of energy!



"4 states of matter": Plasma is the superheated form (state) a substance can be. Just as a liquid boils and changes into a gas when it is heated, plasma is formed when a gas is heated at very high temperatures."

For example, fusion reactions only happen at extremely high pressure and temperatures. The temperature needed is about 10 times over the temperature inside the core of the Sun, to obtain a **plasma** - providing the right environment for the fusion reactions happen. These conditions are very difficult to recreate is present in a laboratory additional research is necessary until fusion energy is ready for global use.

At the moment, nuclear fusion energy is still a dream. The possibility of developing a clean, sustainable and efficient energy source for future generations inspires many scientists around the world to continue studying it so that the dream of nuclear fusion energy can become a reality in the XXI century!

#C2.4. | Circle the right answer:

Which energy source produces most CO2?	**Solar**	or	**Fossil Fuels**
Which energy source produces radioactive waste?	**Nuclear**	or	**Fossil Fuels**
Which energy source is still being developed?	**Fusion**	or	**Fission**
What is the state of matter in the Sun?	**Plasma**	or	**Gas**

Learning

The most interesting thing I have learnt today is _____

_____

Glossary

Atoms: basic units of matter. The smallest particle of a chemical element.

Chemical Element: A species of atoms which has unique characteristics. Different chemical elements have different atomic characteristics.

Fission Reactions: the nucleus of an atom breaks up into two lighter nuclei. It can happen spontaneously or may be induced.

Fusion Energy: energy generated from fusion reactions.

Fusion Reaction: process by which two light atomic nuclei combine to form a single heavier one, while releasing massive amounts of energy.
It takes place in the fourth state of matter, the plasma.

Matter: anything that occupies space and has mass.

Non-renewable Energy: energy produced from sources that have limited supply and/or cannot be replenished in a short time.

Nuclear Energy: form of energy released from the nucleus.

Nuclei: the plural of nucleus.

Nucleus: the central part of an atom.

Plasma: the fourth state of matter.
The chemical elements present in the stars and hence our Sun are in the form of plasma.

Radioactive Waste: comes from nuclear electricity production, as well as other activities that created radioactive material. Radioactive waste is potentially dangerous to health and it must be properly stored to protect people and the envrionment.

Renewable Energy: energy produced from natural resources and/or that are constantly replenished.