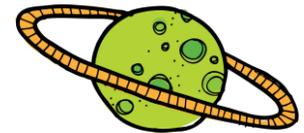




Our Carbon Universe

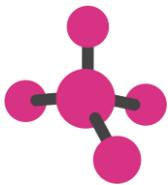


Sweet Atoms



Ever wonder what things are made of? It's true that candy is made from sugar, and that sugar comes from sugar cane, but what is sugar cane made of? At the very tiniest level, everything is made of **atoms**! Atoms are the basic building blocks of **matter** or stuff.

What is an Element?



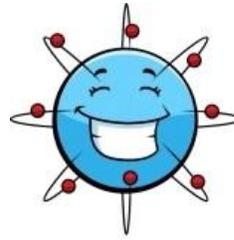
An **element** is a substance that is made entirely from one type of atom. Scientists have identified 118 different elements like gold, silver, hydrogen, helium, and oxygen. These elements come together in many different ways – and these combinations create everything in our universe!

Pencils and Diamonds



One of the most plentiful elements in our universe is carbon. **Carbon** is a key ingredient for most of life on Earth. That's because carbon atoms can be arranged in different ways, and they can attach to, or **bond** easily with other elements. These combinations can create many different things. Interestingly enough, there are only two things in this world that are made from just pure carbon atoms – graphite and diamonds! **Graphite** is a natural mineral that is so soft it can be used as pencil lead, and diamonds – which are naturally formed through intense pressure underground – are the hardest material naturally found on our planet!

The Importance of Carbon



Carbon is everywhere in our universe in so many forms. It's a powerful element that helps create stars, oceans, and even people. Without carbon, today's world would not exist! Carbon is a key component of coal, gasoline and oil. These are called **fossil fuels** and are made from the remains of ancient plants and animals that were on Earth millions of years ago and are now buried deep underground. Since carbon was an ingredient in these ancient plants and animals, it is still an ingredient in fossil fuels today. During the last 150 years, human beings have burned fossil fuels as a source of energy – used to heat our homes, drive our cars and run our factories.

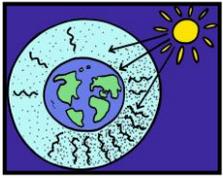
Burning Away the Balance



While burning fossil fuels has made it easier to get energy, it has also created problems. When coal, oil and gasoline are burned, the carbon that has been deep underground for millions of years gets put into the air or **atmosphere**. There it mixes with oxygen and becomes **carbon dioxide**. Carbon dioxide is a type of **greenhouse gas**. This is a naturally occurring gas that traps heat from the sun, and makes our planet warm enough for us to live on it. Without greenhouse gases like carbon dioxide, our planet would be covered with ice! However, we are now putting *too* much carbon dioxide into the atmosphere, which is trapping *too* much heat from the sun, which is *not* such a good thing. We are releasing extra carbon into the atmosphere that is

normally buried deep underground. This means that the natural balance of carbon on our planet is being damaged.

Climate Change



When too many greenhouse gases trap too much heat from the sun, it makes the average temperature of the planet warmer than normal.

In turn, this has an effect on our global **climate**. That means average weather patterns over a long period of time will change in serious ways. Almost every scientist on Earth agrees that our climate is already changing because there is too much carbon dioxide in the atmosphere along with other greenhouse gases like **methane**.

Superheroes to the Rescue!



While climate change can be scary, there is hope! Human beings have so much power to help our planet. Just like super heroes, we can take actions that save the day. In addition to burning less fossil fuels, one powerful thing we can do to **restore**, or bring back, natural balance is to remove carbon from the air and put it back into the earth. The earth naturally holds lots of carbon in its soil and can also absorb it. We can return the carbon to the earth by covering our soil with compost!

Compost Magic



Whenever we put our leftover food scraps into San Francisco's green bin, the scraps are taken away and put into a pile where they can **decompose** or break down into a dirt-like material called **compost**. Compost is a natural **fertilizer** that provides important nutrients to plants. When we spread compost onto farmland, gardens or rangeland, we are helping plants like grasses, fruit trees, and

vegetables grow big, strong and healthy. In turn, these plants remove carbon from our atmosphere. Let's find out how...

Zillions of Organisms



Healthy plants need healthy soil and healthy soil is filled with life! Zillions of very tiny living things, or **organisms**, live in the soil. Each time we put a small layer of compost on top of the soil, we feed all the organisms that live in the soil, and in turn they help plants grow!

Absorbing Carbon



So, how do plants remove carbon? Well, plants also use sunlight, or energy from the sun, to grow. This is called **photosynthesis**. During the process of photosynthesis, plants absorb carbon dioxide out of the air, and absorb water with their roots. In turn, plants create the energy and nutrients they need to grow. As they grow, plants put their roots deep into the ground. These roots return the carbon dioxide they absorbed from the air, back to the soil in the form of carbon. The soil is so thirsty for carbon, it soaks it up like a sponge!

Bringing Back Balance



For many years, soil around the world has lost a lot of its natural carbon supply. There are several reasons for this including the use of **pesticides**, or poisonous chemicals used to kill insects, which also kill many organisms in the soil. Our global soil is now hungry for nutrients and carbon. By spreading compost to grow more plants and help remove all that extra carbon from the air, we can help our planet stay balanced and cool. We can be superheroes who harness the power of compost to come to our planet's rescue!