



Encouragement Award

Science Writing Year 7-8

Ruby Marsh

Glenunga International High
School



Oliphant Science: Global Warming is still so important - what is new in the field?

Global warming is a current issue happening right now. It is melting ice caps, raising temperatures, creating more natural disasters, and drying the earth. People around the world have been trying to solve these problems by creating innovative solutions. For example, Newlight Technologies, who have created plastic out of methane gases and the scientists trying to stop ice melting using water cannons. So what is global warming anyway?

According to the Oxford Dictionary, global warming is “*a gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, CFCs, and other pollutants*”. However, that is the definition of **enhanced** global warming. Global warming is actually a natural effect that happens constantly, known as the greenhouse effect. When sunlight hits the earth, it then bounces back into space, but the atmosphere stops some of it from going out which makes it continue bouncing from the atmosphere and earth. This makes the Earth warmer. Without the greenhouse effect, Earth would be -18 degrees on average and there would be barely any liquid water, it would be ice.

The enhanced global warming is what we're really worried about, when the greenhouse effect happens too much and then the temperature rises, and the world heats up. We know that we are the reason for the enhanced greenhouse effect. Therefore we have to solve this problem ourselves, which is why these solutions are being offered by different people to fix it.

AirCarbon

In 2003, two inventors had started to create what would become known as AirCarbon¹. Ten years later, it was finally invented, a carbon-negative plastic that was cheaper than petroleum-based plastics. It is created by taking methane out of the air and using special processes to convert it into a polymer. At the moment, there aren't many factories that produce AirCarbon so this is why it isn't well known and used.

Water and Snow Cannons

This innovation sounds interesting, and perhaps even fun. But really water cannons could slow ice from melting. This is because what stops ice from melting fast is a layer of permafrost. So by placing water on ice in a cold place like Antarctica where ice is melting, you can replace the permafrost. The water freezes on top of the ice and prevents the ice from melting as fast. This can stop ice from melting and the sea levels won't rise. You can also do the exact same with snow. To make these cannons work really well, you need to have lots of gigantic cannons which consistently shoot water and snow over ice. The water and snow can be taken from the ocean, which will also lessen sea level rise.

Bitublocks

There is a lot of rubbish on our planet and when it decomposes, it creates greenhouse gases. But someone managed to create a strong building material out of rubbish, meaning that we can make homes, roads, paths and a lot of infrastructure with it. That is BituBlocks. Made of compressed rubbish which is six times stronger than the concrete used now², BituBlocks gives the opportunity to use our rubbish instead of wasting it. They are also great because concrete takes a lot of carbon dioxide to produce. In fact, about 8% of carbon emissions⁴ come from the production of concrete, so by replacing concrete with BituBlocks, we can create less emissions.

Iron and Deep Sea Nutrients in the Oceans

What could iron possibly do to stop global warming? Well, if you add iron to the world's oceans, which are iron-deficient, you can allow more plankton to live. Plankton take carbon dioxide in, so when they die, the carbon dioxide that they took in goes with them to the bottom of the ocean. This leaves less carbon in our air to suffocate our planet. This process of geo-engineering takes in carbon dioxide and takes it out of the atmosphere for centuries. One experiment led by Smetacek and his team¹³ showed how this works. By adding 7 tonnes of iron-sulphate into Antarctic waters, which have very little minerals, soon huge blooms of phytoplankton formed. For three weeks the phytoplankton took in carbon dioxide before dying and sinking down. This left us with slightly less carbon dioxide, but if we did this on a large-scale, then there would be a huge difference.

Another similar idea is trying to grow algae, which takes in carbon dioxide, on the world's oceans. Doing this would mean we need more nutrients for the algae to grow better. Scientists think that by moving water from the deep parts of the sea where there are a lot of nutrients compared to the top, algae would have the nutrients that they need to grow. However, this might not be too good because algae blooms can be toxic for sea life¹⁴ but when the algae bloom is in open oceans, it is a lot better for the ocean. The algae produces more nutrients for the ocean, because smaller

organisms such as krill can feed, leading to the krill population to be higher and the krill's predators to have more food as well.

Real and Fake Trees

We know that trees can take in a lot of carbon dioxide each day, and that carbon dioxide is one of the main gases that is creating global warming. So the answer is simple: plant more trees to get rid of the carbon dioxide. Yet we can't plant them fast enough so we could try using fake trees as well. Fake trees, like Klaus Lackner's tree³ which has many leaves that can soak up carbon dioxide better than any ordinary tree could. Using some "leaves" with sodium carbonate resin, according to calculations, Lackner's artificial tree could absorb 1 tonne of carbon dioxide every day. If we had 100 million of those trees, they could take in all of the carbon dioxide in our atmosphere, however, with regular trees, we would need a trillion trees.

Hydrogen Vehicles

In Australia, the majority of vehicles are run on petrol or diesel. These fuels aren't good because they release CO₂ into the air. In fact, each car which runs on petrol produces about 4.6 tonnes of carbon dioxide every year and for every litre of petrol, 2.334 kilograms of carbon dioxide is produced⁷. Since there are approximately 1.4 billion cars on the road, this means that every year, around 6.44 billion tons of carbon dioxide is produced⁵. To replace these cars, hydrogen is looking like a new option available because they don't produce any CO₂. Their only waste is water. How is the car powered though? Using hydrogen and exposing it to oxygen creates heat, water and electrical energy. The electrical energy is taken and used in the vehicle like an electric car.

Glow In The Dark Roads

We use a lot of electricity so we can see in the streets at night. A lot of it is created from non-renewable energy. Did you know that 2.3 million streetlights are powered by electricity in Australia¹⁰? In fact, from using these each year, it costs over 125 million dollars. Street-lighting also creates 30-60% of our total emissions. Some scientists have created a solution for this, making glow in the dark roads and paths. By changing the structure of the cement and taking out the small crystal particles that form in cement making, it can let the cement take in solar energy and release light at night. The light created from the cement lasts for around 12 hours, even when the sun is hidden by clouds. The material could also last for a long time and wouldn't need to be repeatedly replaced. The manufacturing is also good, because creating it doesn't emit greenhouse gases, just water vapour.

All of these innovations are brand new and still need to be improved to make them more available and efficient, but they are some of the ideas we might be looking at in the future. They all take away or stop creating more greenhouse gases. If we use these inventions, we can greatly reduce our emissions so global warming will be less of an issue for us. After all, it is the only planet that we have, so we must take care of it and ensure its and our survival.

1384 words

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