Sustainability Lab – 30min Show

The Renewable Road!

Introduction

Mad Science Golden rules

We have a big problem in the world at the moment – **Sustainability** – or the lack of! Does anyone know what this word means? How can we be more "sustainable"? It starts at home! Throughout today you'll be learning about the issues that we are facing, what scientists are doing to tackle them, and how **YOU** can help, starting at home …

Climate Change!

Climate change is a big topic that needs addressing by everyone! The global temperature is rising- that means earth is getting hotter! With all the fossil fuels we are using, the pollution we cause and the greenhouse gases we release, we are essentially wrapping the earth in a giant blanket … Let me show you …

DEMO *Select a volunteer from the audience to help you.* The volunteer is going to be the earth … imagine this is the earth. 100 years ago, the atmosphere would have been relatively neutral, just like now it would have a nice thin layer around it, a bit like the air in this room. Fast forward 50 years and that layer is getting thicker, a bit like wrapping the earth in a giant blanket (*wrap volunteer in a standard blanket.)* The earth is starting to feel warmer. Fast forward to today, with all the petrol we use, all the trees we cut down, that layer is getting thicker, a bit like a duvet (*wrap volunteer in a thick duvet)* The earth is getting even warmer! And if we keep adding layers it will become too warm

Carbon dioxide balloon and dry ice

So Greenhouse Gases are reason the world keeps getting hotter, gases like CO2. We all breathe CO2 out naturally, but we're in balance with trees that breathe it in. However we've stopped that balance in the past 200 years by burning stuff that releases it's own CO2.

Fill giant balloon with air ("CO2"): this is how much CO2 is released for every 5 miles your car drives, every 2 days you breathe, a tree breathes a month (assuming balloon is 1m3)

high lower with fossil fuels

At current rates we'll run out of known reserves in; coal 150+ years, oil and gas in approx. 50 years (same source). These are 2018/9 figures, maybe switch this to higher/lower of their CO2 impact?

Energy Efficient; Potential to Kinetic

Everything that we do requires energy, from walking to school, having a bath, eating or sitting and watching me! We call this Kinetic Energy, this is the energy that we use to do things. But to do anything we must first have **Potential Energy**, we have to charge ourselves**!** Where do we get this energy from? That's right, from eating food! Other things have to get their potential energy otherways; maybe they're elasticy (fire elastic band), or they get it from gravity (drop ball), or they can get it from using the right chemicals.

This Piezzo Popper uses Ethanol, one of the simples types of oil. The reason it's been so hard to stop using fossil fuels is that they contain an awful lot of Potential Energy, as we're about to see.

Did you notice what happened to the pot? That's right it flew away, that's because it gained Kinetic energy from the explosion.

Pumpaloon

But if we want to stop using fossil fuels then we need to find another source of potential energy that doesn't mae CO2. Can we use our own potential energy?

DEMO/ACTIVITY *Select 2 volunteers for the "pumpaloon race"* I hope you've both had a good breakfast, we're about to find out if you have! We are going to see if we can turn your potential energy into kinetic energy by seeing who can blow their inflatable up the quickest. *Do pumpaloon race between the 2 children and explain that our bodies use that energy to do tasks like this.*

Unfortunately not all energy is useful, even with everyone in the world pumping all day long, humans would never have enough energy to power the world!

Renewable Options : Solar Circuit

Luckily there are better sources of energy. Who's heard of Solar Panels? And where do they get their energy? That's right the sun! The sun gives away absoloutely loads of energy every day as light! This is what we call Renewable Energy - that means it won't run out or be used up - the sun will keep shining for billions of years.

Van de graff

what can you do that makes a difference - reuse recycle reduce

1. Plastics are not fantastic!

- Once you've eaten your food, what happens to the packaging it comes in? We put it in the bin! What happens to our clothes that are all sweaty once we've finished using your energy? They go in the wash! Not to mention all the cotton buds, wipes and carrier bags we use!
- **DEMO** Hold up the small polystyrene shape – Imagine this is the washing tablet for the dirty washing! What happens when you mix it with the hot water and your clothes? It does this – *place the "washing tablet" in a large clear box (the washing machine) and squirt acetone into the box – the tablet starts to dissolve. Then add a few clothing "fibres" (made of dental floss) and swirl it around! It's all mixing together!* Then the washing machine is drained … all that excess water, the plastic particles from the tablet and the fibres from our clothes go into the pipes and into the sea – *Pour the acetone solution into a beaker full of water and stir it.* Those particles are almost invisible in water … they sit in the sea and are eaten by fish … fisherman catch the fish to sell for our dinner … we eat our lovely fish and chips but we are also eating things we shouldn't be like plastic waste and clothes! Would you eat your own jumper? No! So, how can we stop this from happening, the answer is…