SUSTAINABILITY LAB
PESKY PLASTICS

INTRODUCTION/DISCUSSION

1. What is Plastic?

Let's get drastic on plastic! The UK is responsible for using 13 billion plastic bottles every year, and only half of them are recycled! Let's learn more about plastic, why it's hurting our planet, and what we can do to stop it!

- What do we use plastic for? *Get answers from the group – e.g. Bottles, shopping bags, straws, sandwich bags.* Okay, let's think about all those things that you've mentioned … are there alternatives to those things that we could use? *Get answers from the group – e.g. paper straws (like McDonalds), using bags for life at the supermarket, a reusable lunch box and bottle.*
- **Plastic is made from oil**… a non-renewable energy source that we will run out of one day!

How do we get oil? It's a very tough and long process:

- We drill deep below the ground (normally at sea these days) to find oil fields to extract oil from.
- That oil is separated into different parts depending on how thick and heavy (viscous) it is, and this decides what it will be used for (making electricity, planes, cars or making chemicals).

ACTIVITY

2.

Can have the children act out the behaviour of atoms, monomers and polymers here to help understanding what's happening.

- **Petroleum** is separated into tiny parts called **MONOMERS** – *add PVA Sol. and black paint to each groups cup (this is our petroleum).*
- Chemicals are then added to the monomers to join them together into long strings call **POLYMERS -** *using pipettes have each group add Sodium borate to the PVA Sol. and stir until the "slime"turns rubbery.*
- These polymers can be heated, cooled down, stretched and broken to create all sorts of different objects! Simultaneously using lots of water and fossil fuels to create it. But because of the chemicals added, they are now incredibly difficult to break down and will take thousands of years to decompose… let's take a look at that word…

DISCUSSION/ACTIVITY

GOOD OPPORTUNITY TO WORK IN VIRIDOR

3. Recycling & Decomposition

- The easiest change to make first is to **recycle.** Instead of throwing everything into one big bin, we can recycle certain items so they can be re-used or made into something new! Especially plastics and glass.
- **DID YOU KNOW?** For every ton of recycled glass, 315KG of carbon dioxide being released into the atmosphere is saved (that's 315 bags of sugar!). This would also reduce the amount of waste in landfills which affect our environment!
- The earths way of recycling is **DECOMPOSING.** We all know that the things we throw out eventually end up in a landfill with everyone else's rubbish from our neighbourhood.

I brought a model of a landfill with me so you can see how it works. <u>Show Landfill "worm farm" Model.</u>

STEP 1: As you discuss the parts of a landfill with the class point them out on the model. There is a liner on the bottom so that the garbage does not seep into the ground and harm the environment. Then the trash is piled on top and finally it is covered with dirt so that it does not smell. This is a bit of a problem though because for things to decompose, they need air, water and heat, which they do not get when they are covered with dirt. But, things like vegetable peels or apple cores can be put into composters and there, they slowly decompose and turn into dirt that can be used in gardens. H

STEP 2: Hold up the Leaf LAMINATE. How long do you think it would take this leaf to decompose? *Give pupils a couple of minutes to share their ideas with the group*.

STEP 3: Hold up Leaf LAMINATE and Dirt LAMINATE. For this leaf to fully decompose and turn into dirt like this it would take about 3 months. But, leaves are not the only things that get thrown away. I am going to give you some cards that have pictures of different items on them and other cards with times on them and your job is to work in teams to match a material with how long you think it will take for that item to decompose.

STEP 4: Put children into groups. Distribute the cards to the groups. Give the children some time to arrange the cards.

STEP 5: Review their ideas and emphasize the actual rates by consulting your **answer sheet.** Remember, things take time to decompose so it is important to try to reduce the amount of garbage that we throw away.

Decomposing is nature's way of recycling. It is the process through which dead plant matter is broken down and can be reused as food by living things like plants. Microbes, such as bacteria, moulds and yeasts, carry out the main part of the decay process.

<u>ACTIVITY</u>

4. Tangled Turtles

- We know that rubbish can be a problem when it is placed in landfills, but what about when it is thrown onto the street, or left on the beach or in the park? What other problems can it cause? *Give the students a couple of minutes to share their ideas with the group.*
- **It can also cause many problems for animals because these pieces of rubbish end up in their homes.**
- We are going to try an experiment now to help us understand the damage that can be done to animals because of rubbish.
- *Give each child a rubber band*. *Show children how to take the rubber band and put one end around your little finger. Stretch the rubber band across the back of your hand and hook the other end around your thumb. Now try to remove the rubber band from your hand without using your other hand.* It is really hard to get it off without using your other hand, and this is an excellent example of what can happen to animals because of pollution. One of the biggest problems for animals, especially those that live in the sea, are the plastic rings that are used to hold cans together.
- **Show Plastic Rings.** These rings can get caught around seals, fish and other sea animals and they cannot remove them. *Put the plastic ring or an elastic band around the balloon and inflate it. Look at the shape of*

the balloon as it inflates. This is what happens to a turtle as it grows. It's body doesn't grow as it should which affects it's organs and can endanger it's life.

- **Thrown away plastic items are particularly harmful to sea creatures that can become terribly tangled by these items and cannot remove them. Turtles can mistake floating plastic bags for jellyfish and cause great damage to their digestive tracks.**

ACTIVITY

5. Super Sorters

- How easy is to tell the difference between biodegradable and non-biodegradable objects?
- Would you know what could be recycled and what couldn't? Let's put it to the test, I want you to think about these descriptions during this activity:

BIODEGRADABLE: A substance or object capable of being decomposed by bacteria or other living organisms and thereby avoiding pollution.
MAN MADE: made or caused by human beings (as opposed to occurring or being made naturally).
RECYCLABLE: Something that is suitable to be recycled and used to make something else.

- Now, can you sort them into these categories? **Recyclable, Man Mad, Natural**
- Can you now separate them into **Biodegradable** and **Non-Biodegradable?** Think about our discussion earlier about how long it takes certain things to break down.

DISCUSSION/ACTIVITY – CHECK WITH CLASS TEACHER FOR ALLERGIES

6. Feeding Frenzy!

- Let's explore how difficult it is for animals trying to survive in and amongst plastic pollution. If OUR food was littered with plastic and waste, it would be very difficult for us to eat only the things we were supposed to eat, wouldn't it?
- *Give out the "Feeding Mixture" boxes which include bird seed, popcorn maize, rice, plastic beads, shredded plastic bags and small pieces of plastic straw.*
- Imagine a bird flying over the beach and it swoops down to get a beak full of food. I want you, using your thumb and 1 finger, to swoop across the plastic box and pick up a beak full of food and place it on the plate next to it. Then you are going to have a look and sort the **edible** from the non-**edible** pieces.
- How much of your beak full is actually food, and how much is rubbish or waste? Can you work out a percentage?
- I want you to swoop in again 4 more times (to make a total of 5) every time you "swoop", sort the **edible** from the **non-edible** then swoop again. After 5, look at how much non-edible items you have, how do you think this would affect an actual bird trying to eat? Or a fish swimming and taking a mouth full of what they think is food. If we ate a mouthful of plastic, we'd feel very sick and it would damage our insides. And this is exactly what is happening to the birds and wildlife. This is why recycling and reduction of plastic use is so important!

DISCUSSION/ACTIVITY

7. Micro Plastics

- **What is a micro plastic?** Micro plastics are very small pieces of plastic that pollute the environment. Micro plastics are not a specific kind of plastic, but rather any type of plastic fragment that is less than 5mm in length according to the U.S. National Oceanic and Atmospheric Administration. This can be fragments from wet wipes and make up wipes, the plastic coating on washing machine tablets, pieces of thread from our

clothes. From our washing machines, down the sink, micro plastics end up in the sea and are eaten by wildlife!

- How strong are micro plastics? Let's take a look! Here I have 2 **Tornado Tubes**, which work the same way as a toilet. When we spin the bottles, it replicates the swirling motion of a toilet that is flushing! In one tube, we have toilet paper (Which SHOULD go down the toilet) and in the other we have wet wipes (Which SHOULD NOT go down the toilet).
- *Select 2 volunteers to do the tornado tube race.* Wet wipes are so strong they can literally block the pipes, but also, the micro plastics break off of the wipes and end up it the water stream which flows to the sea!
- Now, let's take those wipes and see how strong they really are! **Wet wipes can take up to 100 years to fully break down!** Here I have made a rope out of old baby wipes; these wipes are strong enough to pull a human! *Select a volunteer and put them on the scooter board and (safely!) pull them around the classroom. If possible, do the same with the teacher to prove the strength!*

WHAT CAN WE DO?

- **Replace plastic straws with paper straws**
- **Use "bags for life" instead of plastic carrier bags**
- **Recycle as much as you can**
- **Do not put wet wipes down the toilet and reduce the amount of wet wipes that you use.**