



LOGS DIRECT EDUCATION PACK

Welcome to the Logs Direct education pack – a pack brought to primary schools across the country by our very own mascot – ‘Burnie’.

Burnie is a clever little firelighter whose aim is to have children fall in love with trees, wood and the environment. To do this, he tries to teach children about how to burn wood without causing nasty emissions that pollute the environment.

Burnie also endeavours to make sure that children have fun with what they learn, so that they can go home and tell their parents all about it. His young ambassadors can do a lot to teach adults how to use wood correctly.

Please make use of this education pack to help your children assist air quality and the environment, as well as keeping Britain warm and welcoming.

Exercise 1 - Seeing the Wood for the Trees: The Oxygen and Carbon Cycles

Oxygen: What do we know about it?

- Oxygen is the most common element in the human body, making up 65% of it
- Oxygen in the body is mostly in a *liquid* form – within water (H^2O)
- 30% of the Earth is made up of oxygen
- The atmosphere is 20% oxygen
- We constantly use up oxygen and need it to breathe
- Plants and trees – and plants in the ocean - are the main creators of oxygen in our atmosphere - plants use sunlight and carbon dioxide to produce *energy* and release oxygen. Humans and animals breathe in oxygen and breathe out carbon dioxide (CO^2)
- When things die, they *decompose*. This uses up oxygen and releases carbon dioxide instead.
- When things go rusty, they also use up oxygen, in a process called *oxidisation*.
- When things burn, they also use up oxygen and replace it with carbon dioxide.

Carbon: What do we know about it?

- Nature continually provides us with carbon ‘sinks’ that take carbon out of the atmosphere. Trees are carbon sinks.
- Plants and trees absorb carbon dioxide (CO^2), sunlight and water and convert these into oxygen and sugar.
- In rainforests, where there are very many plants and trees, a lot of carbon is taken out of the atmosphere

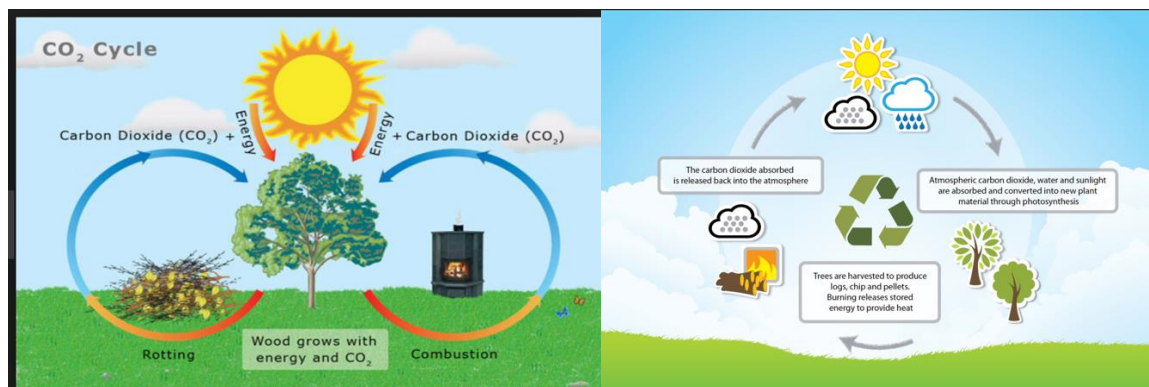
- The sea also removes carbon from the atmosphere. Sea water reacts with CO_2 in the air and creates carbonic acid. Some of the creatures living in the sea use this to make their protective shells.
- Carbon keeps the Earth warm.

Wood and the Oxygen and Carbon Cycle

Wood is a *renewable* fuel source, as trees are continually growing. It is also known as being *carbon-neutral*. As we just learned, trees absorb a significant amount of carbon dioxide (CO_2) during their lifetime, taking excess carbon dioxide out of the atmosphere. This is just one reason to love them.

You now know that humans breathe in oxygen and breath out carbon dioxide, with the carbon coming from the food that we eat and excess oxygen. This breathing process is called *respiration*. As we just said, trees can take carbon dioxide in for us and turn it into oxygen and sugar, using sunlight. This is through a process known as *photosynthesis*, which gives the plant or tree energy and helps them grow.

Burning fossil fuels, like wood from trees and coal from the earth, creates carbon dioxide. The carbon dioxide that is released when wood is burnt, goes back into the air, to be absorbed again by trees. Trees take in the carbon dioxide and breathe out oxygen. It's a cool relationship between humans and wood, isn't it!



You cannot see carbon dioxide most of the time as it is a colourless and invisible gas. In total, it accounts for less than 1% of the Earth's atmosphere, but that is increasing due to human activity. It can also be a solid and take the form of dry ice. Can you think of anywhere that you might find carbon dioxide in your school? A clue is that it can put out particular types of fire very efficiently.

The carbon dioxide and oxygen cycle is vital for life on earth. Carbon is needed in the atmosphere, because it is the central element for all living organisms. It provides heat and warmth. Without it, we would all freeze!

Activities

1. Photosynthesis

Find out about photosynthesis and what these things are: *chlorophyll, xylem vessels, stomata, phloem vessels*

2. The Respiratory system

Find out about the human respiratory system and the *lungs, airways, blood vessels and muscles*. Try to answer these questions:

- How can you increase your lung capacity and send oxygen around your body faster?
- In what ways are your left and right lungs different?
- How much water do we lose per day, simply by breathing?
- Why do we yawn?
- What part of your body protects your lungs?

3. Sea Creatures

What types of sea creature have shells? How do they use these shells?

Exercise 2: Combustion

Combustion is a chemical process in which oxygen combines with a *flammable* substance that can provide heat and light, plus a source of ignition. Combustion is the same as *burning* something. *Flammable* means that a substance is capable of being set on fire. Wood is one flammable material. What others can you think of? How about paper, cloth or coal?

For a fire to stay lit, it has to keep being fed with oxygen. If it has no oxygen, it will go out.

When the combustion process takes place, the fire will produce carbon dioxide and water.

Demonstration:

Why not show your class how the combustion process works by lighting a candle and then putting a jar over the top of it. This will allow them to see how the candle goes out once all the Oxygen inside the jar is used up. After this has happened, if you put your finger inside the jar, you will feel the water that has been generated during the combustion process.

The *combustion* process above describes *complete combustion*. This is where the maximum amount of energy is generated by the fuel being burnt. Usually, this process generates a blue flame in the fire.

However, it is also possible to have *incomplete combustion*. This occurs when not enough oxygen is available. Here, instead of producing just carbon dioxide and water, the fire produces carbon monoxide, water and carbon. *Carbon monoxide* is a poisonous gas, which can kill us. Incomplete combustion can also produce pure carbon (i.e. soot) which is dirty and messy. Incomplete combustion is usually accompanied by an orange flame and a lot of *smoke*. There is far less *energy* produced during *incomplete combustion*.

Incomplete combustion also takes place when the wood that is being burnt is wet. The water in the wood turns to *steam* and the fire burns at a much lower temperature, which means it needs a lot more wood, to try to keep it going. The steam can rise up the chimney as *vapour* and then *condense*. This means that *acidic tar*, carried with the vapour, can stick to the inside of the chimney. This is dangerous, as it is very *flammable* and can easily lead to a chimney fire. Firefighters put out many chimney fires each year.

The smoke from wet wood also leads to lots of smoke, which carries harmful *pollutants*. These are a health danger when breathed in and can cause lung and breathing issues.

For this reason, people with a fire or stove should only burn *dry wood*. This *dry wood* is now called *Woodsure Ready to Burn* wood and people buying wood should look for a *Woodsure Ready to Burn logo*, or make sure their wood has been dried for around 2 years. They should **never** use wood that they, a neighbour, or someone selling the wood has just taken from a tree that they have chopped down.



If you think of a log being 100% wood, only 20% of that should be water (or even less), if it is to be used in a fire properly and not cause pollutants.

A wet log – freshly cut from a tree trunk – is actually 80 or 90% water. That can be the same as a pint of water!



Activities:

- 1) Carry out an experiment, showing how different materials burn, using goggles and tongs and burning materials over a tray of sand. Try burning materials such as polystyrene, crisp packets, sponge, wood, latex balloon, tissue paper and aluminium foil. Assess how fast things burn, what type of smoke they produce, whether the material drips and whether it smells. Highlight how materials with loosely packed particles burn quicker, because there is more space in between the particles for Oxygen. Emphasise how denser materials burn more slowly.
- 2) What do these words in italics mean – *flammable, smoke, steam, energy, vapour, acidic, condense, pollutants*
- 3) What is 20% as a fraction? If a log is 20% moisture, how much of it is dry? If a log is 90% wet, how much of it is dry? How much of it is dry, if you turn the percentage into a fraction?
- 4) Design a poster that will tell people how to burn the right wood and not the wrong wood and why they should do this.

Exercise 3: Learning about Trees

How much attention do you pay to the trees all around us? At Logs Direct, we sell two particular types of log to our customers, not just for burning but for beautiful home decoration too, as logs can look very attractive in a home and add a beautiful scent. Find out more about two types of wood we sell, sold to us by communities in the Baltic who we support and who have become our friends, over the course of many years.

Alder

The scientific name for Alder is *Alnus glutinosa*. The *deciduous* Alder tree can be found in the UK and across Europe and has a special quality. It has a good friend in the form of a *bacterium* that absorbs *Nitrogen* from the air and gives it to the Alder tree. The bacterium exists in the root area of the tree and is rewarded by the Alder, which gives the bacterium something in exchange for Nitrogen. This gift is that of sugars, which the Alder produces during *photosynthesis*. The Alder also enriches the soil around it with Nitrogen, helping other species to grow.

An Alder tree can live for around 60 years and can reach a height of about 20 metres. It has a dark *bark* often covered in *lichen*. Young twigs of this tree are often sticky to the touch. Older ones have a light-brown spotted stem that is more of a red colour at the top.

The Alder's leaves are shaped liked tennis racquets or eggs and measure between 3 and 9 cm. They are dark green and leathery, with *serrated* edges.

The tree produces *catkins* between February and April. These are both male – coloured yellow – and female (coloured green). There can be up to six male *catkins* and 8 female *catkins* on a stalk. Seeds are released from these *catkins* and scattered by the wind.

Alder trees are often found in wet areas – marshes and land by ponds, rivers, stream and wet woodlands. Alder wood is very hard-wearing in watery conditions. Much of the city of Venice is actually built on Alder timbers.

When cut, the pale wood of the Alder turns deep orange and looks like blood. For this reason, many people in the past were afraid of Alder and the Irish were superstitious about it, feeling it bad luck to pass an Alder tree, if on a journey. Travellers who were walking a long distance would try to cool their feet and prevent swelling, by placing a few Alder leaves in their shoes before setting off. North American Indians used it to treat poison oak injuries.

The green dye from its flowers was also used to colour clothes – including those of outlaws and folk heroes like *Robin Hood*. Fairies were also thought to use the dye for their clothes. In *Norse* legend, men were thought to have been made from Ash trees and women were thought to have been made from Alder.

Alder is a good wood to burn. It burns quickly and has a pleasant scent and will create a nice hot fire or campfire. Alder trees are also a good source of *charcoal*.

Silver Birch (*Betula pendula*)

This is a medium-sized, beautiful *deciduous* tree with a white *bark*, which can reach a height of 30 metres. Its bark peels off the tree like tissue paper and can often turn black at the base of the tree. Diamond-shaped features can often also be seen on it, whilst its *twigs* are smooth and have small dark *warts*. Its leaves are a light-green colour in spring and summer and turn yellow in autumn. They are also small and *triangular* in shape. Their edges have a tiny tooth-like appearance.

Like the Alder, *catkins* appear on this tree, these being coloured yellowy-brown for males and bright-green for the female ones. The female catkins turn dark crimson later in the year.

The Silver Birch attracts around 300 insect species, ladybirds and the caterpillars of many moths. Its trunk often contains holes that are perfect as homes for birds like woodpeckers.

This tree was often thought to represent purity and renewal. Bundles of birch twigs would be used to drive out the spirits of the old year and welcome in the new. Some of these *superstitions* still exist in places like Latvia.

Silver Birch is often used in home decoration, but also burns well, quickly producing lots of heat.

Activities:

1. What do these words mean: *deciduous, bacterium, lichen, serrated, catkins, Norse, charcoal, twigs, warts, triangular*?
2. What can you find out about Venice?
3. Choose a creature and find out more about it: *ladybird, caterpillar, woodpecker*
4. Apart from triangles, what other types of shape can you think of?
5. Draw a tree and label these parts: *trunk, roots, branches, twigs, bark, leaves*
6. What superstitions do you know about?
7. Find out more about Robin Hood
8. Use charcoal to create some drawings of forests, trees, leaves or other things connected with trees
9. Write a story with this beginning: "The wind whistled through the branches of the Alder tree in a way that made the boy shiver ..."

Exercise 4: The Baltic

As there is very little hard, dense wood in Britain that can be used for burning, we have to look elsewhere. One of the regions in which we find *sustainable* wood supplies is that of the Baltic, but what do you know about this area? Here are some facts for you.

- The Baltic Sea is found in Northern Europe and is a sea of the Atlantic Ocean
- Countries that have a coastline on the Baltic are: Sweden, Finland, Denmark, Russia, Estonia, Latvia, Lithuania, Poland and Germany
- The Baltic Sea includes the Gulf of Bothnia, the Gulf of Finland, the Gulf of Riga and the Bay of Gdansk
- The Baltic is connected to the White Sea by the White Sea Canal and to the German Bight of the North Sea by the Kiel Canal
- The Baltic is 1600km (990 miles) long and on average 193km (120 miles) wide
- The maximum depth of the Baltic is 459 metres – 1506 feet
- The Baltic has completely frozen over on 20 different occasions since 1720. The last time was in 1987

- The Baltic was formed 10,000 years ago after the glaciers of the last Ice Age retreated
- The Baltic contains both seawater and freshwater. Fish living in its sea waters include cod, herring, hake, plaice, flounder and turbot. In its freshwaters, you will find perch, pike, whitefish and roach, amongst others
- In the Baltic, you can regularly see White-sided Dolphins, Bottlenose Dolphins, Beluga Whales and Orcas.
- On the south side of the Baltic especially, there is much Amber to be found
- In the Middle Ages, the Vikings traded all around the Baltic
- 50% of Estonia is covered by forest and the country has 1521 islands
- In Lithuania, Easter eggs are brought by Velyke – the Easter Granny
- Jeans were invented by a Latvian – Jakobs Jufess – but the person who lent him money, Levi Strauss, is the person with whom they are most associated
- Lithuania has its own perfume, made from natural essences and called ‘The Scent of Lithuania’
- The Latvian flag is white, with big red stripes. It was born in 1279, when the city of Cesis was under attack. The chief of those defending the city was killed by an arrow and his men took off their shirts and stained them with his blood, before fighting back. They won and then adopted the white and red flag as their emblem.

Activities

1. Choose a Baltic country and find out more about it. What is its capital? What is its flag? What do people there eat? What types of work do they tend to do? Describe the landscape and the main cities.
2. Design a flag for your school. What would you include?
3. Find out more about the Vikings. Who were they? How did they live? What kinds of boat did they travel in? Did they manage to conquer parts of England?
4. Find out more about one of these: Orcas, Beluga Whales, Bottlenose Dolphins
5. Write a letter to a pretend friend in a Baltic country, telling them all about your town, your life, the food you eat and what you do with your spare time
6. What do you know about canals? Are there any in Britain?

Baltic Maths

- The Baltic is 990 miles long. How many miles longer would it need to be, to measure 1017 miles in length?
- The Baltic froze in 1720 and 1987. How many years apart was this?
- If 50% of Estonia is covered by forest, how much is that as a fraction?
- If 50% of Estonia is covered by forest, what percentage is not?
- Estonia has 1521 islands and Lithuania has 25 main islands. How many more islands than Lithuania does Estonia have?
- The Latvian flag was created in 1279. How many years after that did the next new century begin?
- If Josh buys a pair of jeans for £22.48 and gives the shopkeeper £30, how much change does he get?
- If Josh buys a pair of jeans for £30, but they are on offer and 10% of this price will be taken off, how much does he pay?
- If you multiply the number of countries with a Baltic coastline by the number of Gulfs in the Baltic and then add the number of Bays to that figure, what is the final answer?
- If you subtract the number of times the Baltic has frozen over since 1720 from its average width in km, what is the answer?
- If you subtract the number of times the Baltic has frozen over since 1729 from its average width in miles, what is the answer?

Burnie's Wordsquare



Find the words that Burnie has hidden in the word square. The list of words to find is given below (note to designer please note these are currently in pink for illustration only)

P	H	O	T	O	S	Y	N	T	H	E	S	I	S
	A	X	V	D	I	P	L	C	N	T	O	Z	M
W	L	Y		F	L	A	M	E		V	O		O
O	N	G	F	P	V	B	A	R	K		T	B	K
O	U	E	C	M	E	R	J	I	S	B	J	U	E
D	A	N	G	E	R			D	F			R	
S	Q		X	A	B	K	Z	S	A	F	P	N	U
U	V		J	Q	I	V		G	N	I	K	I	V
R	H	V		Y	R	D		O	M	R	G	E	F
E	E	A	K	U	C		M	L	B	E			H
J	A	P	F	A	H	L	Q		Y	A	W	N	
	T	O	H			O	A	K	M	L	O		Q
P		U	N	O	I	T	S	U	B	M	O	C	I
C	A	R	B	O	N	D	I	O	X	I	D	E	

Bark
 Burnie
 Carbon Dioxide
 Combustion
 Danger
 Dry
 Fire
 Flame
 Heat
 Hot
 Logs Direct
 Oxygen
 Photosynthesis
 Silver Birch
 Smoke
 Soot
 Vapour
 Viking
 Wood
 Woodsure
 Yawn



About Logs Direct

At Logs Direct, we like to keep people warm and cosy, by making sure they have wood for their fires and their woodburning stoves. We also make sure that they have wood to cook with, if they own a pizza oven that burns wood. But more importantly, we make sure it is dry, 'Ready to Burn' wood, so that we help our customers protect the environment.

As our friend 'Burnie' will tell you, we go to a lot of trouble to make sure this happens, drying our wood out in a massive kiln, until less than 20% of it is water. We then remove the wood and package it, or put it into crates, ready to send out to our customers.

We also help to protect the environment in other ways. We have raised a lot of money to help protect the red squirrels that live in our woodland areas in the northwest and which need our help to survive. We also help people enjoy woodland areas more, by helping to remove some of the trees and branches that fall and prevent people using pathways. We try to find eco-friendly products that recycle something and pack it into a briquette. Would you believe that we have logs made of the coffee grounds that are left once you have made coffee in a percolator, or that we also gave logs made from the grape seeds that are left over when wine is made?

Every two years, we have a special day at our log yard near Lancaster and invite our local community to come and visit us. Check our website to see if we have one this year, if you live close to us, as we would love to meet you.

