

Paper and plastics

<p><b>Plastic</b>, the most widely used material in the world, is made from <b>fossil fuel</b> derived synthetic resins.</p>	<p><b>Paper</b> is made from <b>renewable</b> resources.</p>	<p>Integrated <b>pulp</b> and <b>paper</b> production makes extensive use of <b>biofuels</b>. The plastics industry uses mainly <b>fossil fuels</b>.</p>
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Forest products — an environmentally responsible alternative...

*Forest products like paper, paper packaging and dissolving wood pulp are sustainable renewable alternatives to fossil fuel derived products such as plastic*

**What is paper used for?** **What is plastic made from?**

For centuries, paper has been used to inform and communicate. Despite 21st century information and communication technologies, people are using more paper than ever before, particularly in the developed world. Other uses include packaging, cleaning and various industrial applications.

Initially, plastics were based on natural materials such as chewing gum, which led to the use of chemically modified natural materials such as natural rubber, and finally to entirely synthetic molecules such as epoxy, polyvinyl chloride and polyethylene.

**What is plastic used for?**

The most widely used material in the world, plastic is used in a wide variety of applications, including packaging, clothing and industrial uses.

Today most plastics are made from synthetic resins (polymers) through the industrial process of polymerisation, a chemical reaction in which two or more small, similar molecules are combined to make larger molecules.

**What is paper made from?**

Essentially, paper is still made in the same way as it first was in China in the first century. The Chinese used plant fibres such as tree bark, bits of rope, rags and worn-out fishing materials. These were pulped and then spread out as a thin layer over screens to dry.

**Which is more environmentally friendly – paper or plastic?**

There are a number of issues that need to be considered to determine how environmentally friendly a product is, including:

Today, the most common source of fibre used in papermaking is wood pulp from pulpwood trees. Plant fibres such as cotton, hemp, linen, rice and bagasse are also used.

**Source of raw materials**  
Most plastics are made from fossil fuel derived synthetic resins (polymers) through the industrial process of polymerisation. Oil is a finite, non-renewable resource.

Our paper on other hand is made from wood, a renewable resource grown in sustainably managed forests.

<p>In South Africa in FY2017, <b>of all energy generated, 41.3%</b> was from <b>renewable resources</b>.</p>	<p><b>Paper</b> is fully <b>biodegradable</b>, without leaving any toxic residue.</p>	<p><b>Plastics</b> like PET<sup>1</sup> take over <b>450</b> years to <b>degrade</b>. Some hard plastics may <b>never degrade</b>.</p>
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**Which is more environmentally friendly...continued**

We use independently audited third-party forest certification systems to guarantee that the wood used for pulp and paper production complies with the principles of sustainable plantation and forest management.

We do not endorse one certification as 'better' than another. Our goal is to use as much independently certified wood as possible, which is why we have pursued and achieved certification by the three most internationally recognised forest products certification programmes:

- FSC**<sup>®2</sup> Forest Stewardship Council<sup>®</sup>
- SFI**<sup>®</sup> Sustainable Forestry Initiative<sup>®</sup>
- PEFC**<sup>™</sup> Programme for the Endorsement of Forest Certification<sup>™</sup>.

**Fuel sources**

All fuels used in the manufacturing of plastics are fossil-based. Burning fossil fuels such as coal and gas, releases carbon that has been stored (locked-up) safely within the earth's crust as coal, oil or gas for millions of years. The carbon released into the atmosphere, in the form of greenhouse gases, is responsible for climate change. Producing one ton of plastic requires four tons of fossil fuel.

Burning renewable biofuels on the other hand, releases only the carbon stored in the biomass — a carbon neutral process. We make extensive use of biofuels throughout our manufacturing processes in integrated pulp and paper mills. Globally, during FY2017, 45.2% of the energy we used was derived from renewable resources, mainly black liquor, sludges and biomass.

**Biodegradability**

Materials – such as plastic, styrofoam and polystyrene — cannot be readily processed by nature. Some may photo-degrade (break up into smaller pieces when exposed to sunlight), but cannot be naturally assimilated back into the ecosystem in the same way that paper can.

Under normal environmental conditions (not in a landfill, where the process takes much longer) some plastics like PET (Polyethylene Terephthalate), often used to make plastic bottles, take 450 years to degrade and, even then, they will leave toxic residues in the soil and water. Some hard plastics may never degrade.

Paper, being derived from wood, is strong, versatile, beautiful, re-usable and recyclable; it is also fully biodegradable. In seawater conditions, paper biodegrades within 2-8 weeks, assimilated by nature without leaving any toxic residue.

**What is the difference between biodegradable and non-biodegradable?**

**Biodegradable organic materials**, such as paper can be broken down by micro-organisms, into simple naturally occurring compounds such as water and carbon dioxide, and recycled into the ecosystem. **Non-biodegradable materials**, such as plastic, styrofoam and polystyrene, cannot be recycled by nature in this way. Some may photo-degrade — when exposed to sunlight they break up into smaller pieces. However, these fragments cannot be reabsorbed into nature as useful compounds in the same way that paper can.

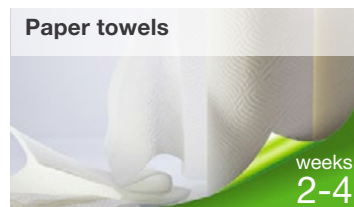
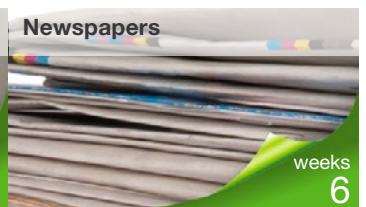
**Where does all the plastic go?**

The world's largest garbage dumps are the Great Pacific Ocean Garbage Patch and the more recently discovered North Atlantic Garbage Patch. The former is estimated to be approximately the size of South Africa. These patches are made up almost entirely of nurdles and discarded post-consumer plastic products that photo-degrade into ever smaller fragments of plastic. The nurdles and plastic fragments act as chemical sponges, accumulating harmful industrial and agricultural pollutants. Ingested by fish, they find their way into our food chain, ultimately ending up on our plates.



Hundreds of millions of nurdles (tiny plastic pellets used as raw material in the plastics industry) are spilled or lost every year and work their way into the oceans and other water systems.

**Biodegradation in seawater**

<b>Paper towels</b>  weeks 2-4	<b>Newspapers</b>  weeks 6
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**Photo and mechanical degradation in seawater**

<b>Waxed cartons</b>  months 3	<b>Plastic bags</b>  years 10-20
<b>Nylon fabric/netting</b>  years 30-40	<b>Foam cups</b>  years 50
<b>Tin cans</b>  years 50-100	<b>Aluminium cans</b>  years 80-200
<b>Plastic bottles</b>  years 450	<b>Fishing line</b>  years 600

The above tables show how long products take to degrade in seawater. Some paper products biodegrade in as little as two weeks; most biodegrade in less than two months. Source: Pocket Guide to Marine Debris, The Ocean Conservancy, 2005, based on research conducted by the Mote Marine Lab.

1 Polyethylene terephthalate  
2 Our mills' and forestry certification details, including FSC<sup>®</sup>, SFI<sup>®</sup> and PEFC<sup>™</sup>, are available online (<https://www.sappi.com/certifications>) and summarised in the Sustainability FAQs — Our certifications.