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Opening extract from
How We Make Stuff

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Who invented factories?

Every day, we use an awful lot of stuff - from clothes and food to books and computers. So where does all this stuff come from? Just a few hundred years ago, everything was made using simple tools in homes or small workshops. But in 1769, a British wig-maker called Richard Arkwright invented a machine for spinning cotton, and constructed a large building filled with workers to operate these machines. This was the first factory.

Artisans

Before skilled workers called artisans used simple tools by hand. But most of the stuff that we buy today comes mass-produced in factories by machines.

The story of stuff

1 Extraction

When there's a need for a product, the story of our stuff always begins with us taking raw materials from the earth.

We extract metals and gases from the earth and use them to make things like cars and planes. Some materials can't be replaced once they've been used.

6 Dumping



Much of our rubbish ends up buried in the ground in dumps. But we can get a big part of the waste that ends up here. The first is extracted when we extract raw materials and make stuff.

5 Recycling

Recycling turns waste into new products. It's often linked to recycling plants around the world.

Some stuff can be recycled and turned into new products. It's often linked to recycling plants around the world.

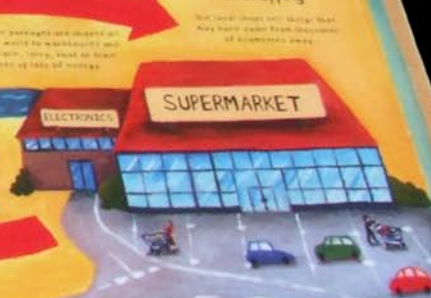
2 Manufacturing



4 Using our stuff

We make the things we buy into bags and bring them home. When we're finished with them, we give them back to the world.

3 Shopping



In the 1760s, one of the first people to build a factory was Richard Arkwright. He used water power to run his spinning machines. This was the first factory. It was called the 'water frame'.

The water frame
Richard Arkwright's water frame could spin lots of better threads of cotton and became the main machine for making clothes.

The rotary steam engine
James Watt invented a steam engine that could turn wheels and power machines in factories. It was called the 'rotary steam engine'.

The spinning mule
James Hargreaves invented a machine that could spin cotton and power machines in factories. It was called the 'spinning mule'.

The steam locomotive
George Stephenson built the first steam locomotive in 1825. It was called the 'Locomotion No. 1'.

Gas lighting
William Murdoch invented gas lighting in 1792. It was called 'Muriatic Acid'.

The internal combustion engine
Nikola Otto invented the internal combustion engine in 1876. It was called the 'Otto engine'.

The motorcar
Karl Benz built the first motorcar in 1885. It was called the 'Benz Patent-Motorwagen'.

The electric lightbulb
Thomas Edison invented the first electric lightbulb in 1879. It was called the 'Edison lightbulb'.

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Where do burgers come from?

The meat



The beef in your burger may well have come from a cow that grazed on Irish pastures for about 2 years before being sent to an abattoir. The meat is then packed in a processing plant, then transported to your local shop.

Today, there are 1.3 billion cows being farmed for meat. So how do we feed them all?



The bun



The flour to make the bun might have come from wheat grown in vast fields in Canada. Chemicals are sprayed to add nutrients to the soil and get rid of unwanted bugs and weeds. The grain is harvested by machine and ground into flour.

The cheese



The cheese could have been made from the milk of dairy cows in the USA. The animals are kept in sheds and fed grass, hay and silage. They are milked by machine every day.

What is processed at home with a blender? From



The sesame seeds



The seeds on the bun come from the sesame plant, which grows in warm countries such as Venezuela. When the seed pods are ripe, they burst open. The harvesting is often done by hand.

The pickles



The pickles might be from the UK. Fresh, small cucumbers are soaked in brine, vinegar, salt and spices, then packed in airtight jars. They are then left to pickle.

The black pepper



The pepper comes from a plant that grows in tropical countries such as India. The fruit containing the pepper seeds is picked by hand and then dried.

The tomatoes and lettuce



These started life as seeds sown on a farm, perhaps in sunny Spain. Machines are used to water the plants and spray chemicals to protect against weeds and veggie-munching bugs.

Where is our food from?

A brief history of farming



Or is your burger from...

a local farm, where cows feed on fresh pastures, manure is used to feed the soil, vegetables are carefully watered, fresh buns and homemade pickles are produced, and hedges are home to ladybirds that feast on unwanted bugs?



When you eat a burger, do you ever wonder where all the different ingredients have come from? They might well have started off on the other side of the world, travelling thousands of kilometres by plane, ship and lorry to reach your plate. Why? Because we like to buy our favourite foods all year round, as cheaply as possible, so we often import them from other countries. When Oscar Weber Bulby served the first burger on his farm in Oklahoma in 1891, he had no idea that years later over 35 million burgers would be eaten every day in the USA alone!