

[1] Processing operation	Result
Shaping and sizing French fries	This affects the uptake of fat. Thick cut strips absorb less fat than thin cut (because there is proportionately less surface area). Cracks and rough shapes increase the fat absorption. Ideally all fries should be cut uniformly so they cook uniformly.
A large amount of waste water is produced during the production of French fries. This occurs during washing, peeling, blanching, slicing and trimming. The equipment also has to be sanitised	This pollutes ground water. The waste water contains - dirt etc (from washing the potatoes) - peel and starch from peeling - small pieces of potato and starch from slicing/trimming The waste from sanitising (chemicals, fats etc) also contaminates the environment.
Drying French fries	This helps to reduce the fat uptake. Drying causes a skin to form on the surface and reduces fat vapour transport through the surface layer
Freezing fries – either by rapid freezing (cryogenically) or slow freezing (mechanically)	Rapid frozen chips have a lower fat content and better organoleptic (sensory) qualities. Also have higher moisture content. Better quality fries (slow freezing causes structural damage, ice deposits, melts on refrying and more fat gets in).

[2] Tests	Role
A clump of pom-pom mixture is squeezed	The mixture should stay together. If not, it hasn't got enough starch.
Colour tests	Pom-poms should be dark brown after frying. If not, they need to be fried more. Raw potato for fries and potato chips should be an even light colour. If not, the amount of starch in the potato needs to be reduced.
Snap test	This is used as a measure of crispiness of potato chips. The cooking time or amount of starch might need to be adjusted.

[3] Making fries at home/in the classroom	Making fries in industry
Potatoes are washed in the sink, dirt removed with a brush. A hand held peeler is used.	Because of the greater volume of potatoes being processed, high pressure steam loosens the skin and automated brush peelers remove it.
Any low quality potatoes would not be washed or peeled, they would be thrown away before that. Or the good parts of the potato would be used.	After peeling, low quality potatoes and foreign matter are removed.
At home we cut our chips by hand—we try to make them the same size. At school, we have a hand held cutter—it is like a square grid—the potatoes come out the same thickness but sometimes the lengths are different.	Potatoes are cut to size with a cutting machine. The type of fries wanted determines the system used to process i.e. a rotary mechanical slicer or a hydraulic system that throws them against cutting blades. Industry tries to get the same size fries, so that they evenly cook.
Any defects that are found after cutting are chopped out with a knife. These would not taste good and could cause illness.	An automatic defect-removal machine gets rid of any remaining imperfections.
At home/in the classroom we may not do the blanching stage that they do in industry—as we are not so worried about the colour when it is for home use. We use a clean lint free towel to dry off the potato before frying.	Blanching machines are used to remove sugars so that the French fries don't discolour. After drying with air dryers, the fries are put on an equilibrium belt to balance the moisture.
We fry the potatoes once and then eat them straight away.	The potato is lightly fried then put in a freezing tunnel. They are refried before eating.

[4] The MPI (Ministry of Primary Industries) website states that manufacturers of food products that are to be sold for human consumption, will most likely operate under the Food Act 1981. To comply with this, manufacturers can either operate under the Food Hygiene Regulations which are administered by the manufacturers local council or under a Food Safety Programme audited by an external expert. The 2013 food labelling guide would have to be followed. Also the Health and Safety in Employment Act 1992. because we are consuming the fries ourselves, we don't have to adhere to these regulations in the classroom. But we do follow the guidelines as set out in the Technology safety manual.

The Chip Group is a group of companies (including Potatoes New Zealand) who are involved in the chip industry. They, along with the Heart Foundation, have established a set of standards for deep fried chips to help improve their nutritional value and quality, while still retaining a delicious flavour and texture. The standards promote thicker chips (less fat), keeping fryer topped up with oil, filtering it, covering oil when not in use, discarding when degrading, using the 'good oil' (below—28% saturated fat, 1% trans fat, 3% linolenic acid), keeping oil at the right temperature (175/180 C for 3-4 minutes), draining off

<p>[5] Gather Potatoes required weight & shape of fresh potatoes that have the desired sugar and starch density</p>	<p>Check for too many blemishes, bugs, too much 'green' - discard</p>
<p style="text-align: center;">↓</p>	
<p>Storing the potatoes Fresh potatoes will keep longest when stored in a cool, dry, dark area with good ventilation</p>	<p>Check temperature. Ideally, storage areas should range between 5-10° C.</p>
<p style="text-align: center;">↓</p>	<p>Control the feeding speed and the quality of potato as they go into the production line.</p>
<p>Rough Washing</p>	<p>Wash away the dust on the potatoes</p>
<p style="text-align: center;">↓</p>	<p>Control the quantity of cleaned potatoes into peeler</p>
<p>Peeling Peel the skin of the potato</p>	<p>Check for efficiency and amount of peel loss</p>
<p style="text-align: center;">↓</p>	
<p>Inspection Conveyor</p>	<p>Check the quality of peeled potato. Defects need to be removed</p>
<p style="text-align: center;">↓</p>	
<p>Slicing</p>	<p>Check that the slices are of uniform thickness</p>
<p style="text-align: center;">↓</p>	
<p>Washing of the Starch Wash potato chips by warm water in order to prevent dark fried potato chip</p>	<p>Test chips for starch level</p>
<p style="text-align: center;">↓</p>	
<p>Water Draining Conveyor Draining the water in the potato chips in order to promote the frying quality.</p>	<p>Check moisture content</p>
<p style="text-align: center;">↓</p>	
<p>Frying By automatic conveyor fryer Will depend on thickness and desired outcome</p>	<p>check oil quality – free from pesticides, fatty acids, sediment, check oil absorption rate</p>
<p style="text-align: center;">↓</p>	
<p>Oil draining and cooling By conveyor</p>	
<p style="text-align: center;">↓</p>	
<p>Seasoning Spray seasoning evenly</p>	