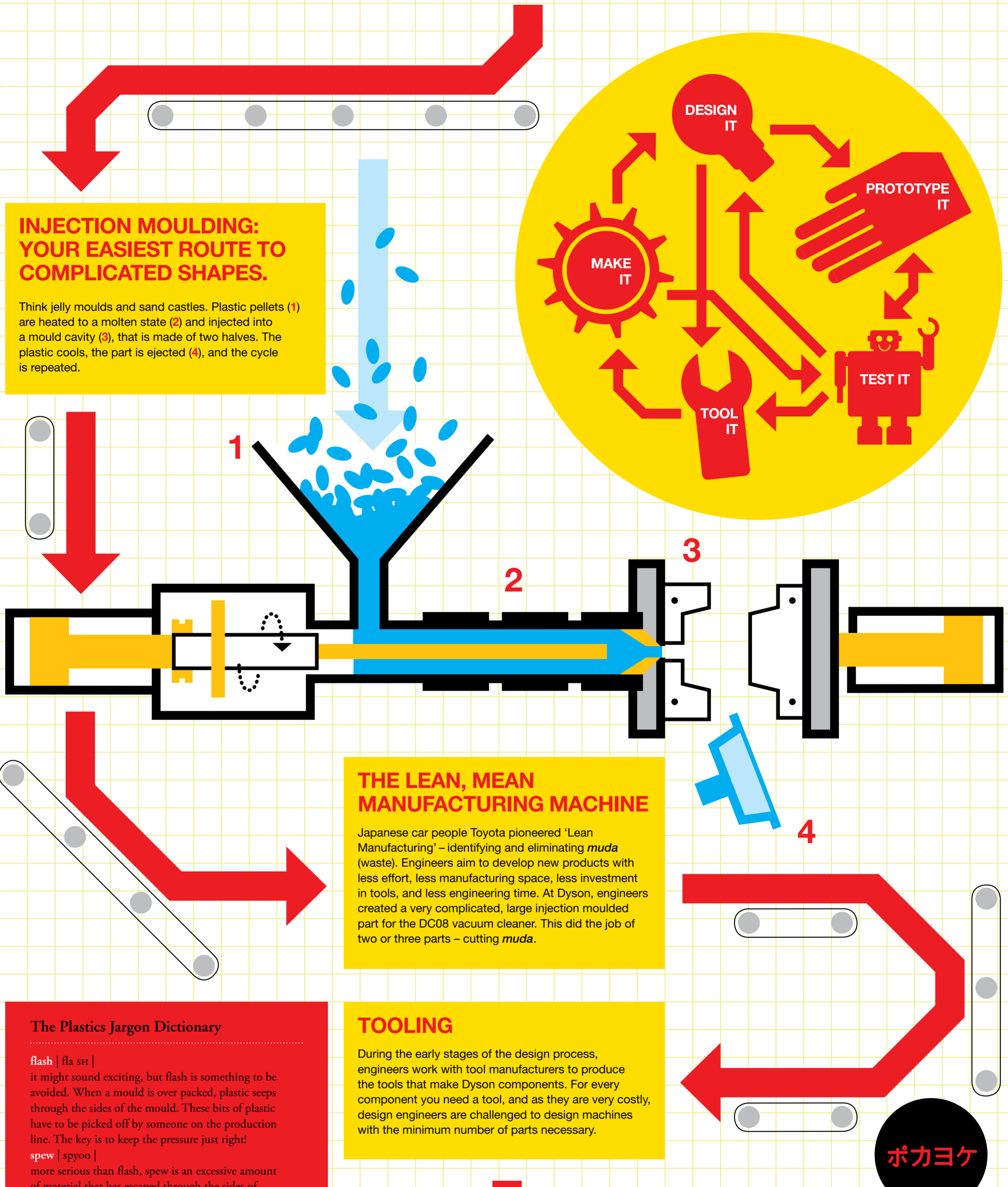


MANUFACTURE IT

MANUFACTURING DOESN'T JUST COME AT THE END OF THE DESIGN PROCESS. ENGINEERS HAVE TO DESIGN THEIR PRODUCTS FOR MANUFACTURE RIGHT FROM THE START. IT'S NO USE HAVING A PROTOTYPE THAT'S PASSED ALL YOUR TESTS, BUT IS IMPOSSIBLE TO MAKE!



INJECTION MOULDING: YOUR EASIEST ROUTE TO COMPLICATED SHAPES.

Think jelly moulds and sand castles. Plastic pellets (1) are heated to a molten state (2) and injected into a mould cavity (3), that is made of two halves. The plastic cools, the part is ejected (4), and the cycle is repeated.

THE LEAN, MEAN MANUFACTURING MACHINE

Japanese car people Toyota pioneered 'Lean Manufacturing' – identifying and eliminating *muda* (waste). Engineers aim to develop new products with less effort, less manufacturing space, less investment in tools, and less engineering time. At Dyson, engineers created a very complicated, large injection moulded part for the DC08 vacuum cleaner. This did the job of two or three parts – cutting *muda*.

The Plastics Jargon Dictionary

flash | fla SH |
it might sound exciting, but flash is something to be avoided. When a mould is over packed, plastic seeps through the sides of the mould. These bits of plastic have to be picked off by someone on the production line. The key is to keep the pressure just right!

spew | spyoo |
more serious than flash, spew is an excessive amount of material that has escaped through the sides of the mould.

drool | drool |
like flash and spew, this is material that escapes from the nozzle of the mould.

packing | 'paki NG |
the action of squirting melted plastic into a mould cavity. Plastic shrinks as it sets, so if you don't pack in enough plastic, the component will warp.

split line | split lin |
the fine line showing where two sides of an injection mould meet.

TOOLING

During the early stages of the design process, engineers work with tool manufacturers to produce the tools that make Dyson components. For every component you need a tool, and as they are very costly, design engineers are challenged to design machines with the minimum number of parts necessary.

ASSEMBLY

It is about putting things in and out, but not your arms and legs. 'Pokie yokie' comes from *Poka-yoke* meaning fail-safing (or idiot-proofing). Engineers pokie yoke a design so that people can only put it together one way, avoiding mistakes and confusion. Think about how USB sticks and floppy disks can only be inserted one way round.

