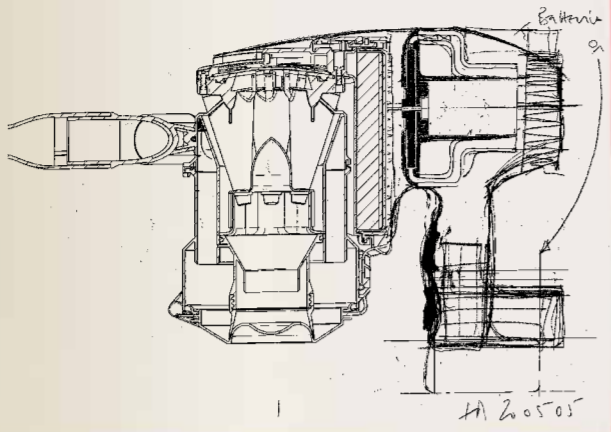


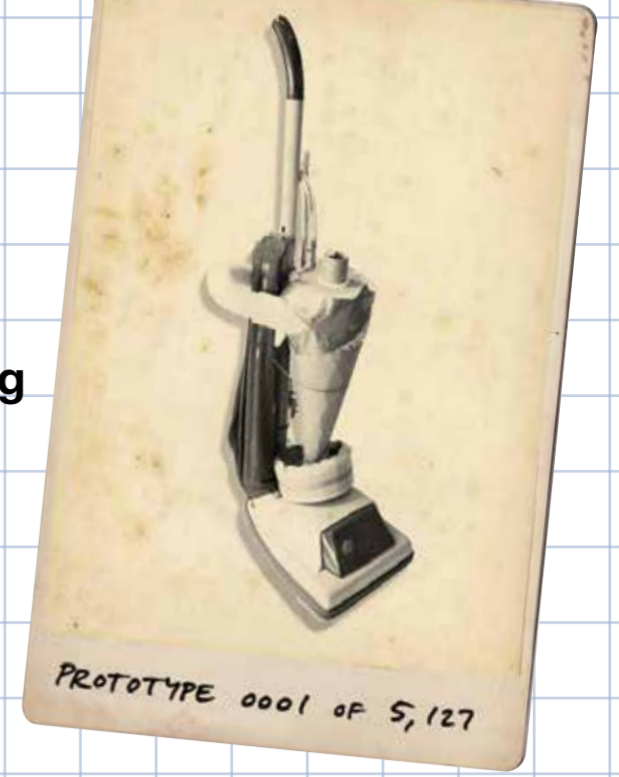
Sketching is the first step in making your idea a reality.



After sketching lots of different ideas, design engineers decide on one or two that they want to try out.

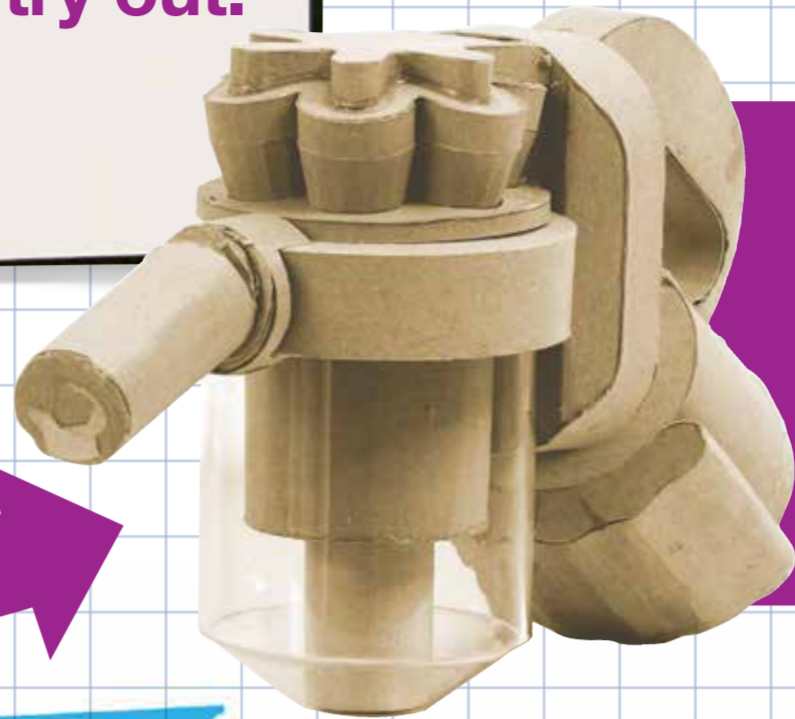
Did you know?

James Dyson's first prototype was made from cardboard and stuck on to his existing vacuum cleaner. It wasn't perfect, but it gave him an idea of how his invention might work.



Cardboard models

Dyson design engineers use cardboard to see what their design might look like in 3D. This is a quick and easy way of modelling.



LD F TEST

BUILD F T

F DESIGN

F TEST

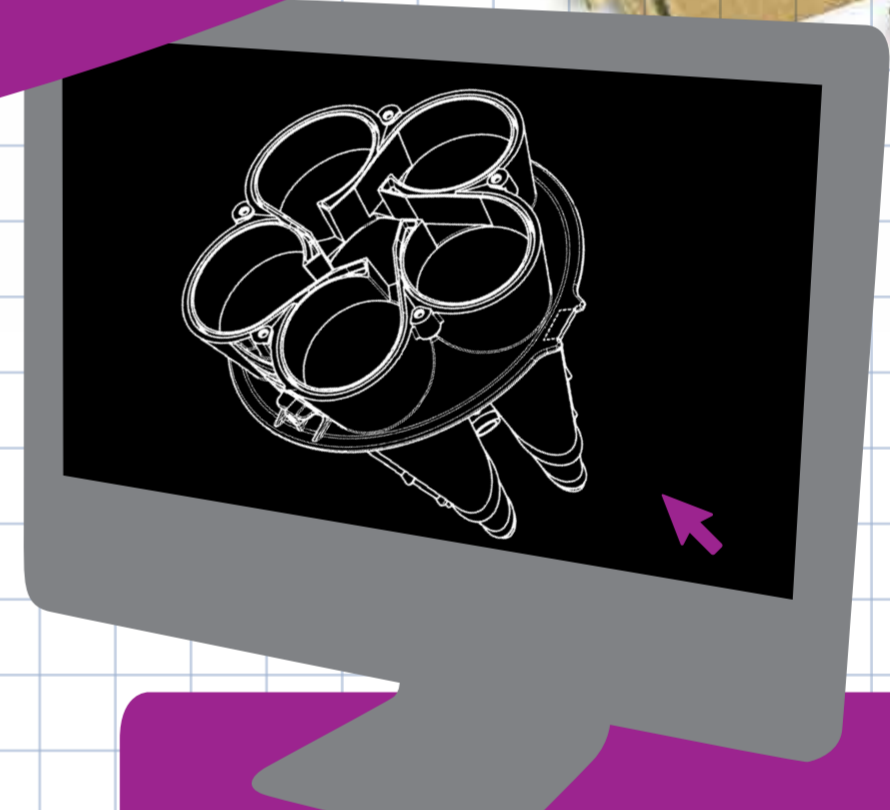
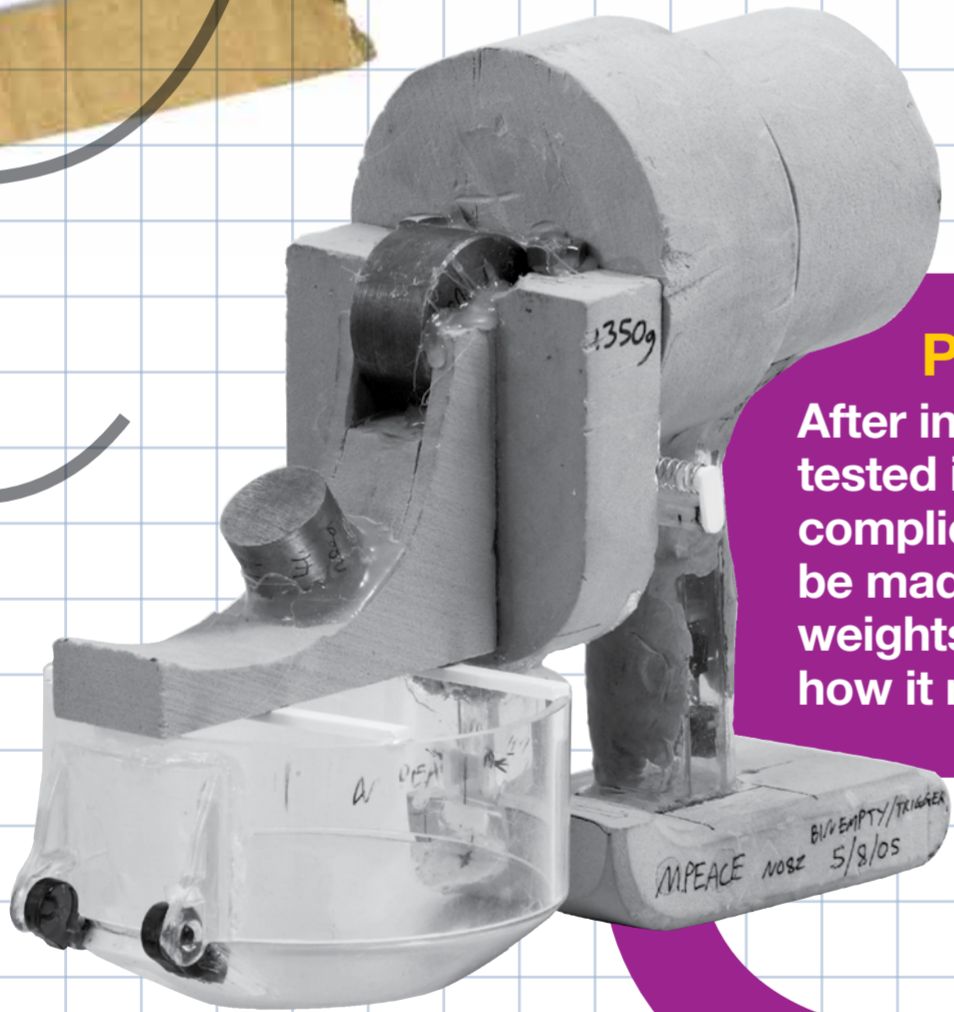
F BUILD F

EST F DE

DESIGN

Prototypes

After initial ideas have been tested in cardboard, more complicated prototypes can be made. Engineers can add weights to a model to see how it might feel to use.



Computer Aided Design

Design engineers use Computer Aided Design (CAD) to make detailed 3D models of their products on the computer. These images are then sent to a 'rapid prototyping' machine, just like you would send a document to the printer.



3D printing

The rapid prototyping machine prints lots of layers of material to make a 3D model in plastic. This process is expensive, costing up to £10,000 for a whole vacuum cleaner, but it can help get a design just right.

Materials matter – what should your product be made of?

Would you make a saucepan from wood? Why not?

When thinking about the final product, design engineers have to decide what material would be best. They have to consider where and how it will be used, and who will be using it.