

1 Steps to create quality edge on acrylic:

1. Use a **coping saw** or **junior hacksaw** to create the shape
2. Use a **flat / round / half round file** to remove deep scratches
3. Use **sandpaper**: low to high number
4. Use **wet & dry paper**: low to high number

Junior Hacksaw		A saw used for cutting straight lines in woods, metals and plastics
Sand-paper		A low grade abrasive material used to smooth woods and plastics
Wet and dry paper		A high grade abrasive material used to achieve a high quality finish
Vice		Used to hold work in place when sawing and filing

Marking Out on to Polymers

Permanent marker pen



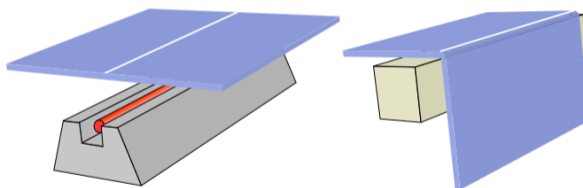
Chinagraph pencil



Scribe



2 Line Bending



Step 1: mark out the where to bend with a scribe, chinagraph pencil or permanent marker pen. A steel ruler or try square will make your line straight.

Step 2: place it over the strip of heat and heat it up from both sides until it softens

Step 3: bend the material to the correct angle using a jig and leave it to cool

Laser Cutting

Step 1: create the design on 2D De-sign computer software



Step 2: put the correct **colour, size and thickness** of acrylic on the laser cutter bed and ensure the lid is closed

Step 3: **program** the laser cutter for the right **settings** for **speed and power**

Step 4: turn the **extraction** on and **run** the program. **You must not use the laser cutter without proper extraction because of the fumes!**

Step 5: after it has finished, take your

Year 7 Product Design

3 Thermoforming Polymers

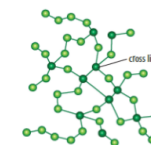
- can be reheated
- can be reshaped
- can be recycled



Examples: acrylic, HIPS, PVC

Thermosetting polymers

- can't be reheated
- can't be reshaped
- can't be recycled



Examples: urea formaldehyde, polyester resin

Acrylic is used for baths, menu holders, shower trays, rear car lights and shop signs



Tough, easily cleaned, food safe
Widely available
Easy to cut&finish
Can be shaped using heat
Self finishing

Can be scratched easily
Breaks easily if dropped



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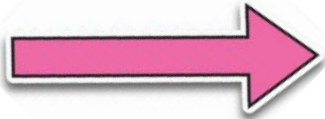
Smart Materials	Description	Uses
Thermochromic	Changes colour when temperature changes	Baby spoons/ cups, kettles,
Photochromic	Changes colour when UV light is present	Sunglasses, cockpit windows
Shape Memory Alloy	Can be deformed and will return to original shape when heated	Glasses frames, medical stents, orthodontic wires
Reactive Glass	Changes from translucent to opaque when an electric current is applied	Glass walls in museums and hotels, Tokyo public toilets



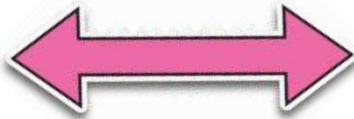
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Types of Motion

Linear: Moving in a straight line in one direction



Reciprocating: Moving backwards and forwards in a straight line



Oscillating: Motion that swings backwards and forwards in an arc from a central point

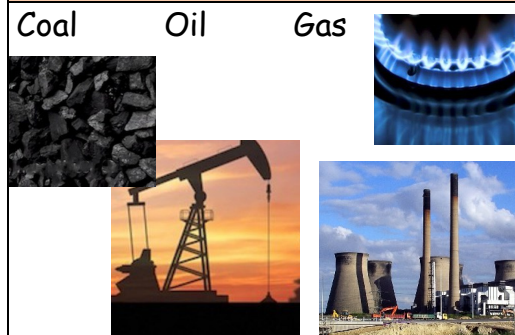


Rotary: Motion around a central point



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Non-renewable energy sources



Advantages:

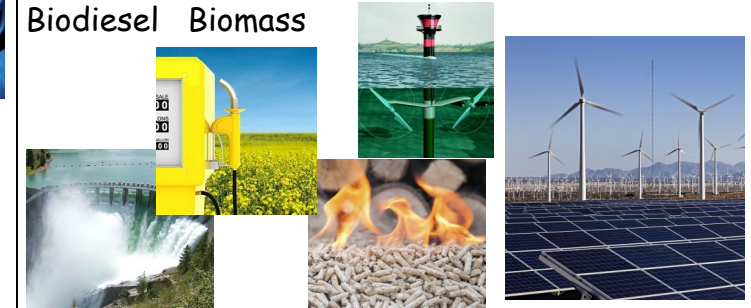
Stable and large-scale
High power electricity generation
Relatively cheap to convert

Disadvantages:

Highly polluting
Can significantly impact on the environment and landscape

Renewable energy sources

Solar Wind Hydroelectric Tidal
Biodiesel Biomass



Advantages:

Less pollution created
Less non-renewable resources are used
Some can be stable and a reliable source (e.g. tidal)

Disadvantages:

Some can vary (wind)
Can be expensive to set up
Some only available in certain areas