designclass
design | engineering | technology

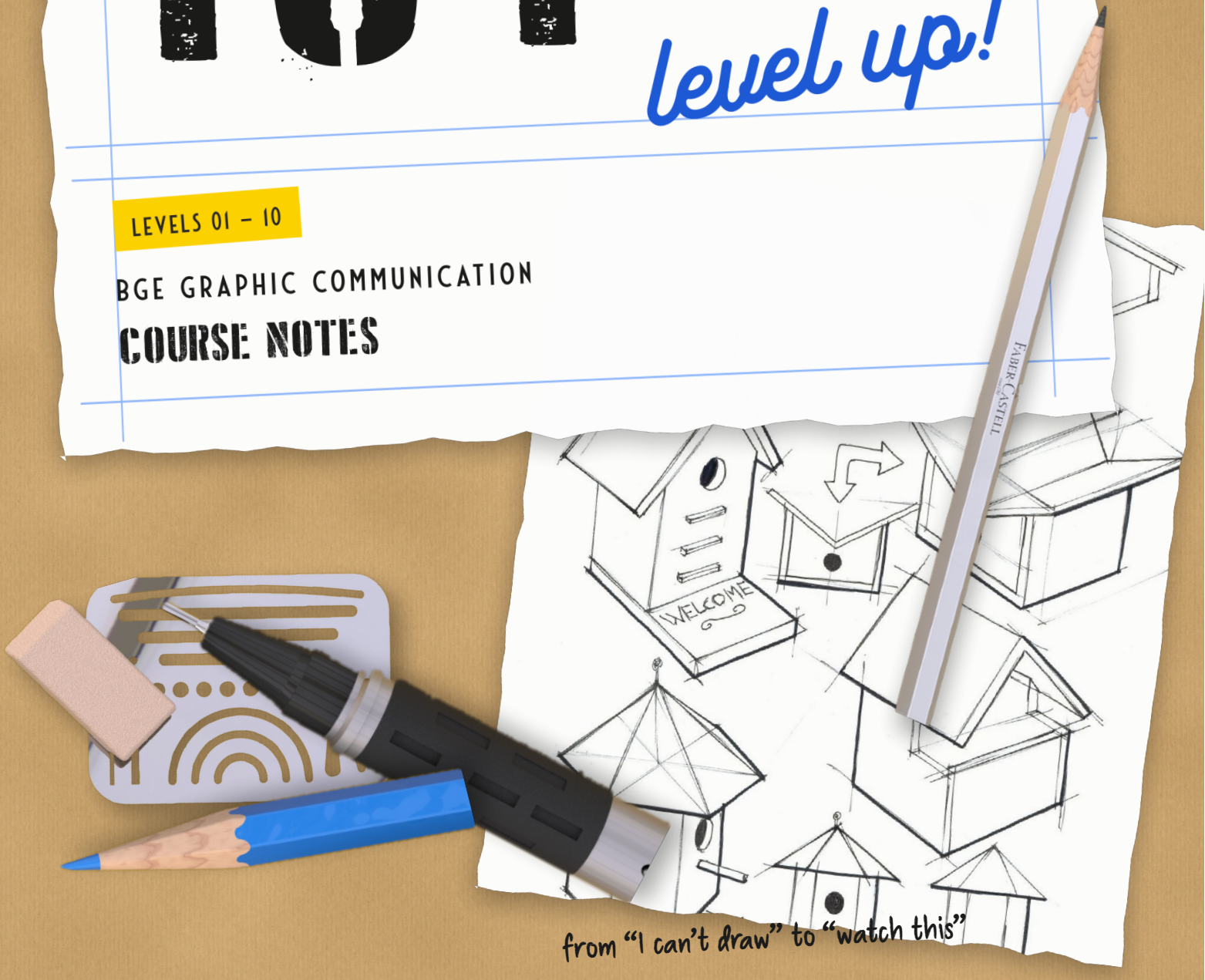
SKETCHING 101

level up!

LEVELS 01 – 10

BGE GRAPHIC COMMUNICATION

COURSE NOTES



from "I can't draw" to "watch this"

WELCOME

READY? PICK UP A PENCIL...

let's go!

Here is something you probably won't believe: everyone can sketch. Honestly, it's true.

Design sketching is **not art**, and we are not going to try to turn you into an artist. Design sketching isn't about pretty pictures (although it can look awesome). It is about **communicating** thoughts, plans and ideas to other people — quickly and clearly.

Designers and engineers all over the world use the same simple tricks. In this booklet you will learn them one level at a time. Each level builds on the one before, so **don't skip ahead** — and don't worry if something feels tricky at first. Every mistake is part of the journey.



design sketching is NOT art

HOW EACH LEVEL WORKS

- **Learn it** – read the notes and look closely at the step-by-step sketches.
- **Make this** – whenever you see the blue stamp, grab a pencil and practise.
- **Quick check** – answer the questions to make sure it has stuck.
- **Level-up check** – rate yourself honestly. "Not yet" is fine – it just means more practice.

YOUR KIT

- HB pencil (and a 2H if you have one)
- A biro or fineliner pen
- A good eraser
- Colour pencils
- Plain A4 or A3 paper, or a sketchbook

Keep everything!

Keep **all** your practice sketches – even the ones you don't like. In ten lessons' time you will be amazed how far you've come.

▶ WHERE THIS LEADS

The sketching skills in this booklet are exactly the ones you will need for **National 5 Graphic Communication** (pictorial and orthographic sketches with good proportion and line quality, perspective, tone and colour) and **National 5 Design & Manufacture** (sketching to generate, develop and communicate design ideas).

YOUR JOURNEY

THE ROAD TO CONFIDENCE

10 levels

Ten levels. One pencil. Loads of practice.

You start with confident straight lines, then build up to boxes, curved forms and perspective. Finally you add tone, materials and presentation tricks that make your sketches **pop**. Your teacher will tell you which level you are on — tick off each one on your **Confidence Tracker**.

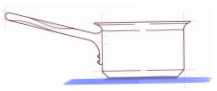
01 Everyone can sketch



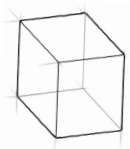
02 Sketching straight



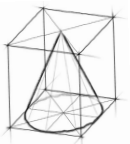
03 Crates & proportion



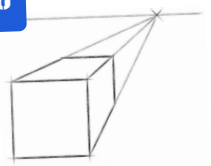
04 Cuboids & pyramids



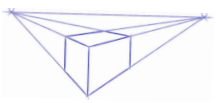
05 Circles, cylinders & cones



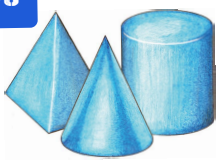
06 One-point perspective



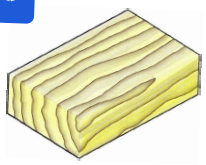
07 Two-point perspective



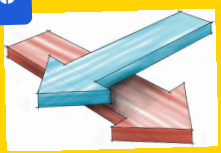
08 Tone, light & shadow



09 Rendering materials



10 Show it off!



BEFORE YOU START · THE 60-SECOND MUG

Set a timer for 60 seconds. Sketch a mug in the box. No eraser, no ruler — just do your best.

Don't worry about how it looks. This is your "before" sketch. You will sketch the mug again at the end of Level 10 and compare.

How confident do you feel about sketching right now?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

1 = not at all · 5 = super confident

MY 60-SECOND MUG

LEVEL 01

WHY BOTHER LEARNING TO SKETCH?

explore · explain · excite

Ever heard the phrase **"a picture is worth a thousand words"**? It's true.

A single sketch can be quicker to make, clearer to understand and more detailed than even the best written description. Designers and engineers rarely work on their own — at some point every idea has to be **recorded** or **shown to someone else**. Being able to sketch quickly helps you record, explore and communicate ideas, and it is a useful skill in lots of careers.

Be brave

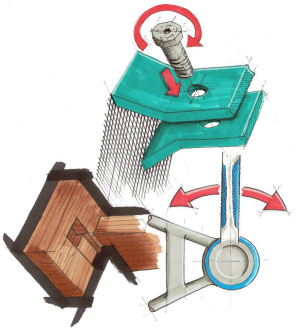
It can feel embarrassing, but show your sketches to people you trust. Ask: *Do you understand what I sketched? What is clear? What could be clearer?*

DESIGNERS SKETCH FOR THREE REASONS – THE THREE ES



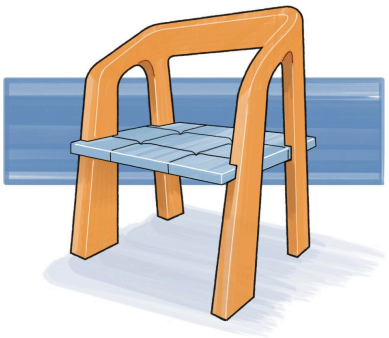
EXPLORE *ideas*

Quick, rough sketches used to **record and try out lots of different ideas**. They have little detail and are often only seen by the designer.



EXPLAIN *details*

Sketches that **show how parts fit together, work or move**. They often use arrows, close-up details and parts pulled apart (exploded).



EXCITE *people*

Polished sketches with colour and presentation to **excite a client or customer**. They take longest to make and are often used to promote a product.

▶ NEXT LEVEL: NATIONAL 5

In N5 Graphic Communication, graphics are grouped as **preliminary** (planning ideas – like *explore*), **production** (technical drawings used to make things) and **promotional** (selling a product – like *excite*). In N5 Design & Manufacture you will use sketches to **generate, explore, refine and communicate** design ideas.

QUICK CHECK

1. Name the three Es – the three reasons designers sketch.

2. Which type of sketch would you use to show how two parts clip together?

LEVEL 01

WE SEE WHAT WE WANT TO SEE...

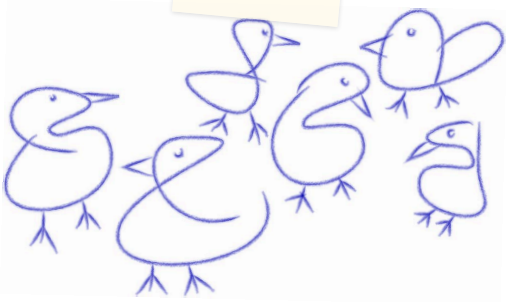
pareidolia

Have you ever looked at a cloud and seen a face or an animal? That is called **pareidolia** (say *pa-ray-DOH-lee-a*).

Humans are pattern-seeking animals. Our brains constantly look for shapes they recognise, and they **fill in the gaps** of any missing details.

Designers use this "fault" in our brains to their advantage. A sketch does not need to be perfect or packed with detail to be understood. In fact, too much detail can make a sketch **harder** to read. Focusing on a few important features is clearer and much quicker.

Look at the birds below. Each one is just a swirl, a triangle, a dot and a few lines — but your brain can't help seeing a bird. Nobody needs wings, feathers or a tail to get the message!



swirl + beak + eye + legs = bird!

MAKE THIS

Sketch a flock of birds. It is a great warm-up for flowing lines and confidence.

1. Draw a smooth, small looped curve without lifting your pencil from the paper.
2. Add a small triangle where you think the beak should go.
3. Add a small circle for the eye, close to the beak.
4. Add two feet, each made from three small straight lines, below the body.
5. Admire your new bird – then make ten more, all different!

MY BIRDS



Why birds?

Practising flowing shapes like these birds trains your hand to draw **smooth curves** – a skill professional designers use every day.

QUICK CHECK

1 What is pareidolia?

2 Why can too much detail make a sketch worse?

LEVEL 01

TOOLS OF THE TRADE

keep it simple

You don't need expensive kit. A few good tools that you use often are better than a huge collection that gathers dust.

When you are learning, **do not** start buying expensive pens, pencils and paper – they will not make your sketching better. Practice will. As you grow in confidence you may want to invest in better equipment.



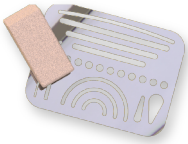
SKETCHING PENCILS

Graded by hardness. **H** pencils are harder and lighter – great for construction lines. **B** pencils are softer and darker. **HB** is in the middle.



FINELINER PENS

Come in different line thicknesses, called **weights**, measured in millimetres (e.g. 0.1 mm, 0.5 mm). Great for firming in sketches.



ERASER SHIELD

A thin metal mask. Rub through the holes to erase tiny areas – perfect for adding highlights.



SPIRIT MARKERS

Alcohol-based markers give smooth, streak-free colour. Brilliant, but expensive – learn colour pencil first.



BIRO

Every designer has a favourite pen. A simple biro works like a pencil: press lightly for faint lines and harder for dark lines.



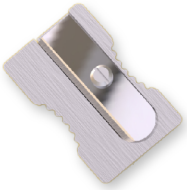
ERASER

Buy the best you can afford. Cheap erasers smudge and rip paper and can ruin your work.



COLOUR PENCILS

The most common way to add colour in school. Good quality pencils blend smoothly and give strong colour.



SHARPENER

A sharp pencil gives crisp lines. Don't drop pencils – the lead inside breaks and they won't sharpen!

PENCIL GRADES

9H	6H	4H	2H	H	HB	B	2B	4B	6B	9B

← **harder, lighter** – technical and construction lines

softer, darker – shading →

QUICK CHECK

1 Which pencil makes a lighter line: 2H or 2B?

2 What is an eraser shield used for?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
explain why designers and engineers sketch (the three Es)	☐	☐	☐
explain pareidolia and use it to keep sketches simple	☐	☐	☐
name the main sketching tools and pencil grades	☐	☐	☐

LEVEL 02

NOW PICK UP THE PENCIL...

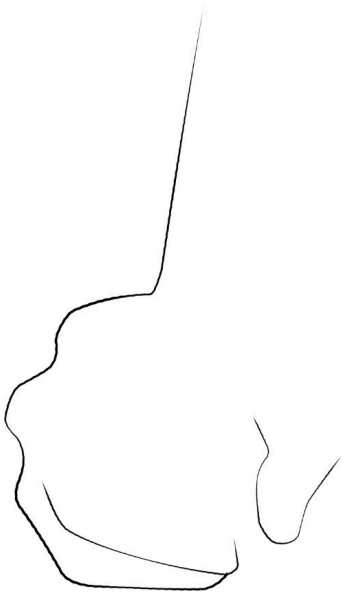
from the shoulder

How you hold a pencil for **writing** is NOT how you hold it for **sketching**.

You have spent years training your hand to write with small, tight finger movements. Sketching uses **big, relaxed movements from your shoulder**. It will feel strange at first – stick with it and it soon becomes natural.

HOW TO HOLD A PENCIL OR PEN FOR SKETCHING

1. **Sit comfortably** with your back straight and plenty of space around you.
2. Hold the pencil **further back** from the tip than you would for writing – about 3 cm – and don't grip too tightly.
3. **Float your hand** over the paper, lightly grazing the surface. Don't rest your wrist on the page.
4. **Move your whole arm from the shoulder**, not from your wrist or elbow.
5. **Push** the pencil away from you rather than pulling it towards you.
6. Find a position where your straight lines come out straight – then **keep it!** To sketch a line at a different angle, turn the paper, not your body.
7. **Don't use a ruler** or straight edge. Rulers slow you down and make sketches stiff.



Film it!

Ask a friend to watch you sketch, or film yourself. Are you moving from the shoulder? Are you pushing the pencil? Small changes make a big difference.

FAINT FIRST, FIRM LATER

Designers start every sketch with very **faint construction lines** – light "scaffolding" that helps you get shapes and sizes right. Only when you are happy do you **firm in** the final outline with darker lines. Light construction lines can stay – they show your thinking!

QUICK CHECK

1 Should you push or pull your pencil?

2 To sketch a line at a new angle, what should you turn?

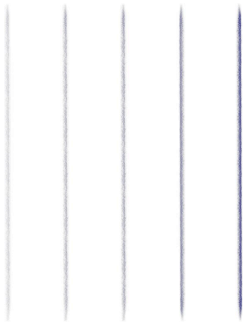
LEVEL 02

SKETCHING STRAIGHT

warm up!

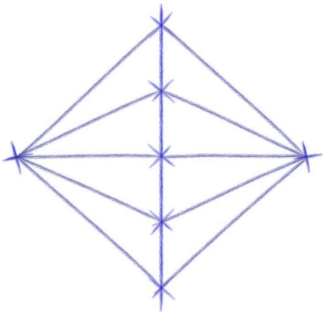
The most important skill of all: sketching straight lines without a ruler.

Before you sketch real objects you need to build up **muscle memory** – just like practising a sport or a dance move. These four drills are your daily warm-up. Do them often and you will be amazed how quickly your lines improve.



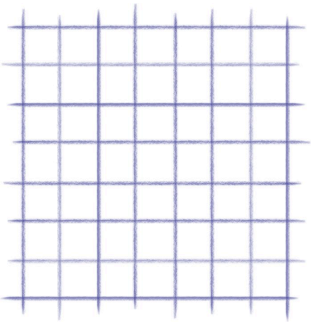
1 PARALLEL LINES

Sketch rows of lines as straight and evenly spaced as you can. Try very faint lines, then darker, bolder ones. **Parallel** lines never get closer together or further apart – like train tracks.



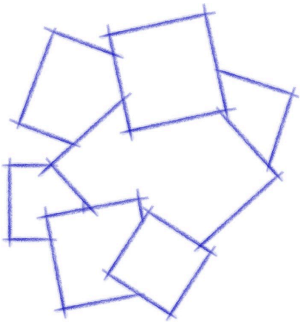
2 ACCURACY

Mark dots, then join them so the lines meet **exactly**, with no gaps and no big overlaps. Turn the paper to match the angle you need.



3 GRIDS

Sketch a grid of horizontal and vertical lines. Try to "guesstimate" equal gaps so the grid looks even all over.



4 BOXES

Sketch overlapping boxes. Start faint, make sure the lines meet at the corners, then darken some lines so the boxes look like they overlap.

MAKE THIS

Warm-up challenge: on your Level 02 worksheet, complete each drill. Then pick your best line of each type and circle it. Can you beat it tomorrow? **Five minutes of drills a day** is the fastest way to improve.



▶ NEXT LEVEL: NATIONAL 5

At National 5, sketches are judged on **proportion** and **line quality**. Line quality means confident, continuous lines that meet accurately at corners – exactly what these drills train.

QUICK CHECK

1 What does **parallel** mean?

2 Why should construction lines be sketched faintly?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
hold my pencil and sit correctly for sketching	☐	☐	☐
sketch straight parallel lines without a ruler	☐	☐	☐
join lines accurately at corners	☐	☐	☐

LEVEL 03

A SENSE OF PROPORTION

crate it!

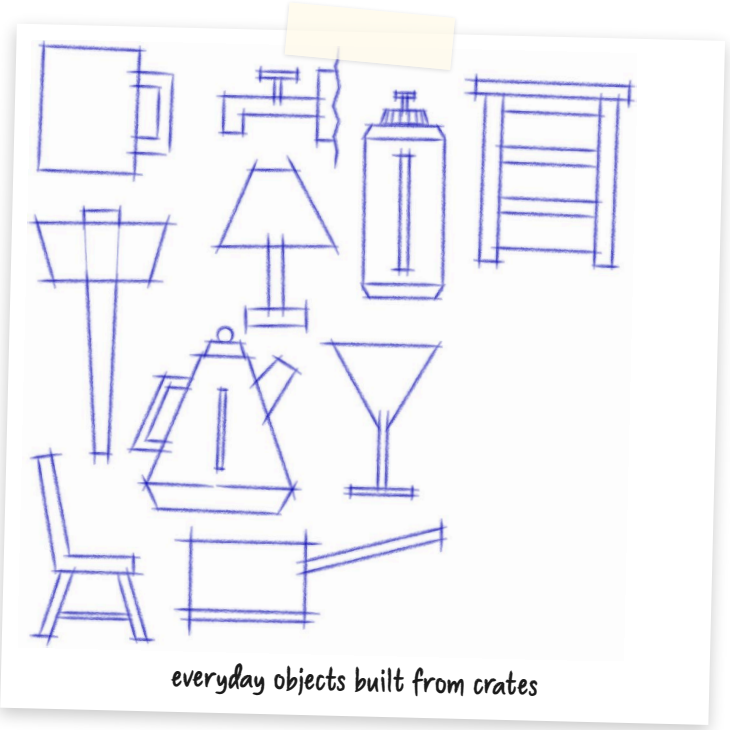
Mastered straight lines? Well done! Time to sketch real objects.

The key to a good sketch is good **proportion** – the size of one part being correct compared to another. Sketches that are out of proportion look unrealistic, childish and are hard to understand.

START WITH A CRATE

A **crate** is a simple box sketched lightly around an object or part. **Even if the object is curved, start with square or rectangular crates.**

- Reduce the object to the simplest shapes possible.
- Use the crates to judge whether each part is the right height and width compared to the others.
- Leave the details until the proportions are right.



everyday objects built from crates

Pencil measuring

Hold your pencil at arm's length and line it up with the object. Use your thumb to mark its height, then turn the pencil to compare with the width. Is it twice as tall as it is wide? Sketch it that way!

MAKE THIS

Start with a **mug**: get the height and width of the body right before the handle – remember a hand must fit through the gap. Then try something with an angled part, like a **saucepan** with a long handle. Then crate a lamp, a kettle and a chair. Keep them simple – no details yet!

BUILD YOUR SKILLS MAKE THIS SKETCH EVERY DAY

QUICK CHECK

1 What does **proportion** mean?

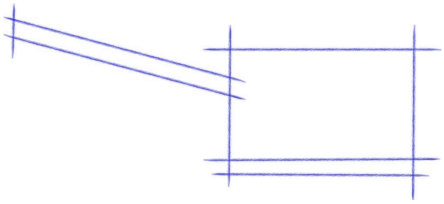
2 What is a **crate** and why do designers use one?

LEVEL 03

ADDING SOME DETAIL

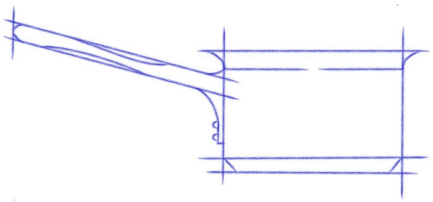
tell the story

Details help a sketch communicate – but only **after** the proportions are right.



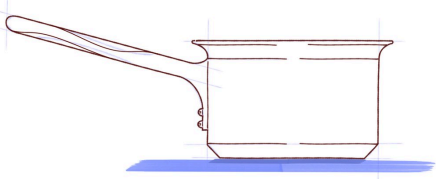
1 CRATE IT LIGHTLY

Always start with a crate. It makes the proportions easier to judge. Sketch it very lightly.



2 ADD DETAILS LIGHTLY

Add the details you need, including curves. Don't worry about lines overlapping – just get positions and sizes right.



3 FIRM IT IN

Darken the final lines. Make the outside edge – the **perimeter** – the darkest line for extra clarity.

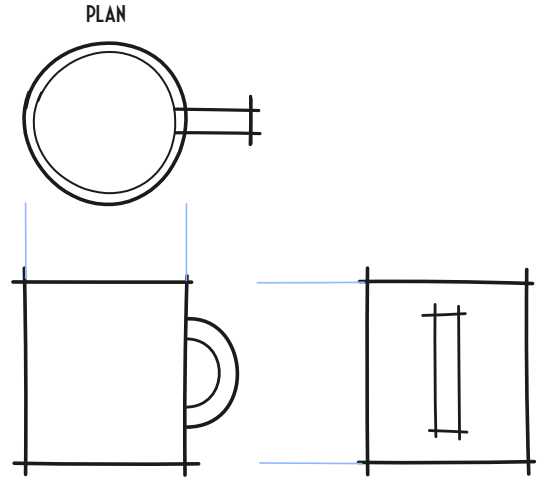
Only add details that help your audience understand: screws and fixings, grips and handles, moving parts, different materials or safety features. Don't try to show everything in one sketch – use **a series of sketches** that tell the story of your product.

FLAT VIEWS: ORTHOGRAPHIC SKETCHES

Sketches like the saucepan above show an object **flat-on from one direction** with no depth. Engineers call these **orthographic** views. The three main views are:

- **Elevation** – looking at the front of the object.
- **Plan** – looking down from above.
- **End elevation** – looking from the side.

At N5 (and in this course) we lay these views out in **third-angle projection**: the plan goes **above** the elevation, and a view from the right goes **on the right**. Faint projection lines keep the views lined up and the same size.



▶ NEXT LEVEL: NATIONAL 5

N5 Graphic Communication asks for **well-proportioned orthographic sketches with very good line quality**, laid out in third-angle projection. In N5 Design & Manufacture you will add **dimensions** to sketches so a design can be made.

QUICK CHECK

1 Name the three main orthographic views.

2 In third-angle projection, where does the plan go?

LEVEL 04

LEARN TO SKETCH CUBOIDS

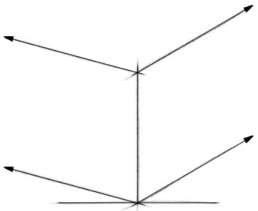
think in boxes

Cuboids are the building blocks of every **pictorial** (3D) sketch.

A cuboid makes the crate that your sketch sits inside. It helps you get proportions and positions right – so learning to sketch one quickly helps you sketch **everything else**.

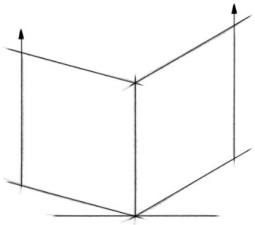
The golden rule

Parallel is the magic word. Lines going in the same direction must stay parallel – they never get closer together or further apart.



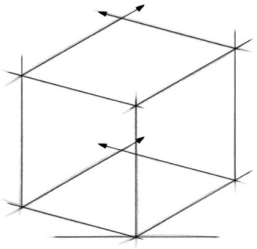
1 CORNER

Sketch a vertical line – the front corner – with a faint horizontal line through its base.



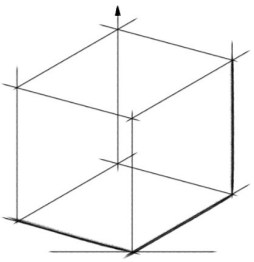
2 SIDES

From the top and bottom of the corner, sketch lines going back at an angle. Top and bottom lines must be parallel.



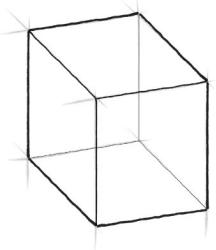
3 UPRIGHTS

Add new vertical lines. Make sure they are truly vertical and parallel to the first corner. (The trickiest step!)



4 TOP

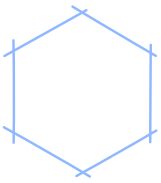
Join the tops of the new uprights with angled lines, parallel to the lines from step 2.



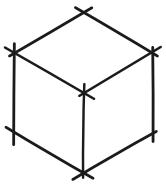
5 FIRM IN

Darken the outline so it stands out from your construction – or use it as a crate for something else.

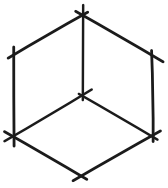
THE HEXAGON TRICK



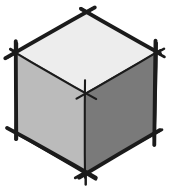
1. SKETCH A HEXAGON



2. LOOKING DOWN

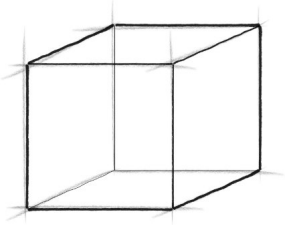


3. LOOKING UP



4. SHADE IT!

Sketch a regular hexagon, then join the centre to three corners. Depending on which corners you choose you look **down** on the cube or **up** at it. A cube drawn this way is **isometric** – its sides go back at 30°.



Oblique: the front face is flat-on and the depth goes back at an angle. Quick to sketch!

MAKE THIS

Sketch 10 cuboids – tall, flat, long, cubes – at different angles. Then turn three of them into real objects: a cereal box, a phone, a brick.



▶ NEXT LEVEL: NATIONAL 5

Isometric and **oblique** are common pictorial formats at N5. Sketched cuboids are used as crates for almost every N5 pictorial sketch.

LEVEL 04

LEARN TO SKETCH PYRAMIDS

find the centre

Pyramids are more useful than you might think...

Lamp shades, roofs, packaging and tool tips all use pyramid forms. Pyramids can have different shaped bases, but the most common is the **square-based pyramid**. The point at the top is called the **apex**. A pyramid with its top cut off is called **truncated**.

Off-centre apex

The apex is usually in the centre of the top face, but it doesn't have to be! Find the centre first, then sketch a construction line to where you want the apex.



1 CRATE

Sketch a cuboid crate. Its size and angle decide what the pyramid will look like.

2 FIND THE CENTRE

Sketch faint diagonal lines from corner to corner on the top face. Where they cross is the centre.

3 APEX LINES

The centre is the apex. Sketch lines from it to the four bottom corners.

4 FIRM IN

Darken the pyramid outline so it stands out from the construction lines.

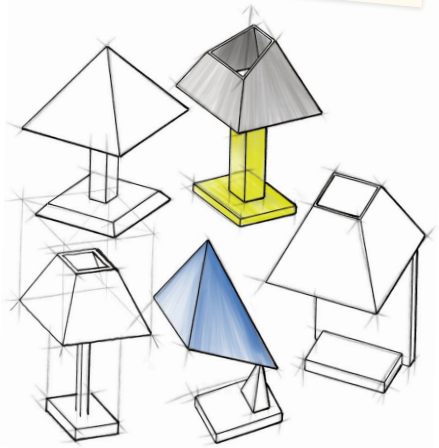
5 TRUNCATE IT

Want a flat top? Sketch the cut with lines parallel to the base edges *before* you firm in.

MAKE THIS



Sketch pyramids at different angles and proportions – including one on its side, where an edge points at you. Then design three desk lamps using only cuboids, pyramids and truncated pyramids.



lamps built from cuboids + pyramids

QUICK CHECK

1 How do you find the centre of a face?

2 What is a **truncated** pyramid?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
sketch a cuboid with parallel edges	☐	☐	☐
use the hexagon trick to sketch a cube	☐	☐	☐
sketch a pyramid and a truncated pyramid from a crate	☐	☐	☐

LEVEL 05

LEARN TO SKETCH CIRCLES

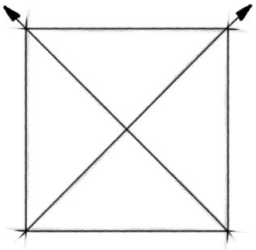
start with a square

Want to sketch circles? Start with straight lines.
No, really...

Circles and cylinders are some of the most useful forms to sketch – and the most challenging to get right. There are many techniques, so experiment to find the one that works for you. Templates are fine if you are really stuck, but try to sketch freehand where you can.

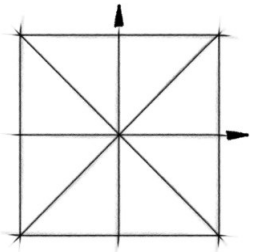
Square or not?

If you sketch a rectangle instead of a square you will end up with an **ellipse** (an oval)! Use that to your advantage later.



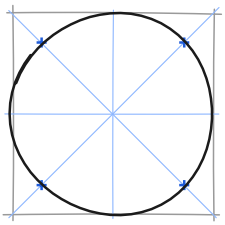
1 SQUARE

Sketch a square. Find its centre by sketching faint lines from corner to corner.



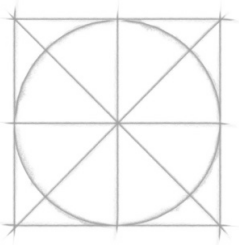
2 FLAG

Sketch a horizontal and a vertical line through the centre. It now looks like a small flag.



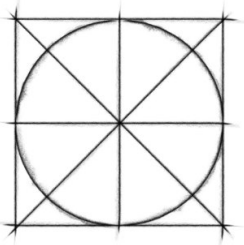
3 MARK IT

On each diagonal, make a small mark about **70%** of the way from the centre to the corner.



4 ORBIT

Lightly sketch the circle through the four side midpoints and your four marks. "Orbit" your hand a few times.

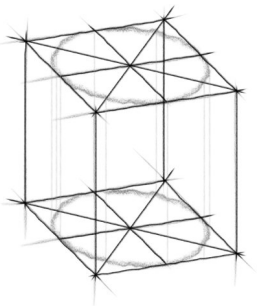


5 FIRM IN

Once a neat circle appears, darken it. Remember: it's a sketch, so it doesn't need to be perfect.

CIRCLES IN 3D BECOME ELLIPSES

When a square face is sketched in 3D it becomes a **parallelogram**, so the circle inside it becomes an **ellipse**. Use exactly the same steps: diagonals, centre lines, marks, then orbit. The ellipse must touch the middle of each side of the face.



MAKE THIS

Sketch six circles of different sizes using the square method. Then sketch a cuboid and draw an ellipse on its top face.



QUICK CHECK

1 A circle is sketched inside which shape?

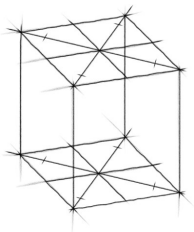
2 What does a circle look like on a 3D face?

LEVEL 05

CYLINDERS & CONES

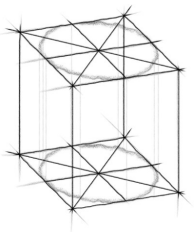
mix it up

CYLINDERS



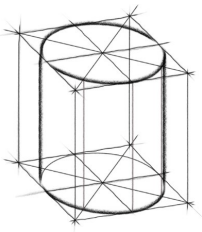
1 CRATE

Sketch a cuboid crate and divide its top and bottom faces like a flag.



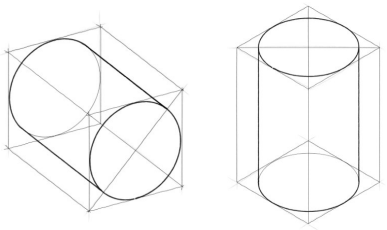
2 ELLIPSES

Lightly sketch an ellipse on the top and bottom faces.



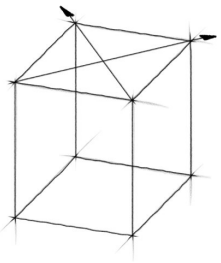
3 TANGENT SIDES

Join the ellipses with vertical lines that just touch their outer edges – they are **tangent**.



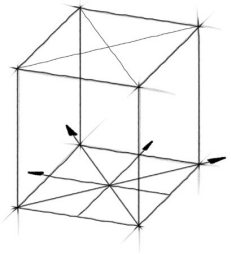
A cylinder lying on its side is tricky – but worth practising.

CONES



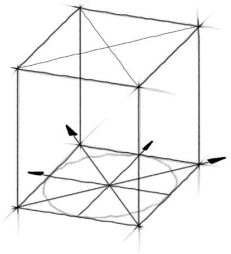
1 CRATE

Sketch a cuboid crate in the size and angle you want the cone to be.



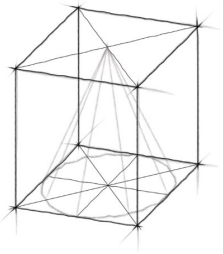
2 APEX

Find the centre of the top face. This is the apex (point) of the cone.



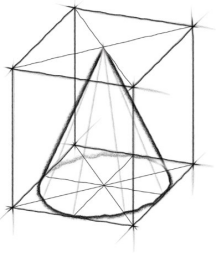
3 BASE FACE

Divide the bottom face like a flag, just like a cylinder.



4 ELLIPSE + LINES

Sketch the base ellipse, then lines from its outer edges up to the apex.



5 FIRM IN

Darken the outline: the base ellipse and the two lines tangent to it.



jugs, glasses & lamps = cylinders + cones

MAKE THIS

Sketch a can, a glass and a traffic cone. Then sketch a cone lying on its side.



QUICK CHECK

1 What does **tangent** mean?

2 Which point of a cone is the apex?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
sketch a circle using the square method	☐	☐	☐
sketch a cylinder with tangent sides	☐	☐	☐
sketch a cone from a crate	☐	☐	☐

LEVEL 06

ONE-POINT PERSPECTIVE

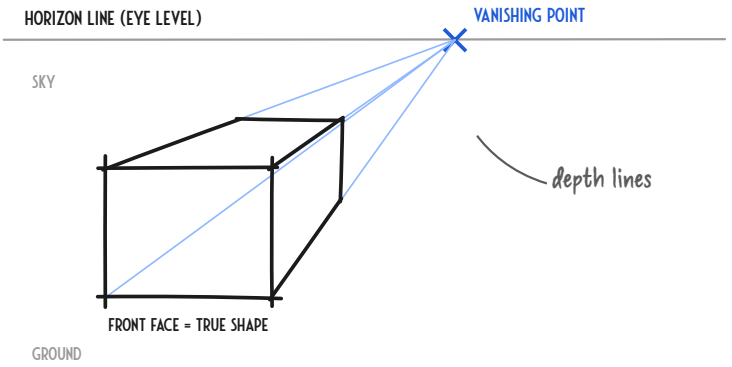
vanishing act

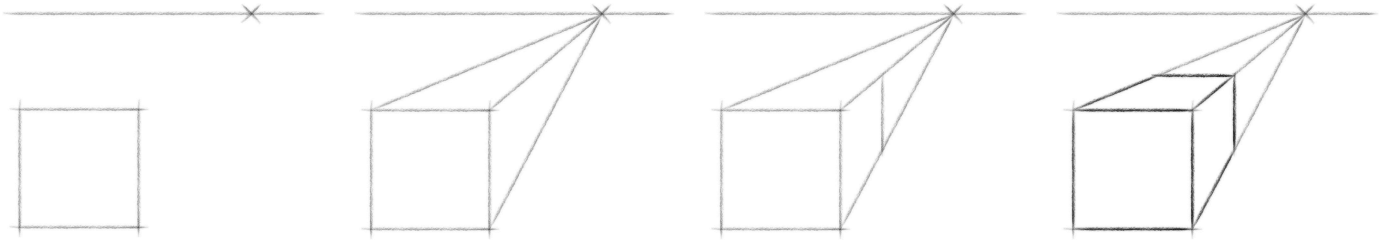
Perspective takes your sketching to a whole new level.

Perspective means objects appear to get **smaller the further away they are**. Think of railway lines that seem to meet in the distance. Perspective sketches look realistic, are easy to understand – and are quick to make once you know how.

Every perspective sketch starts with two things:

- **Horizon line** – where the sky meets the ground. It is always at your **eye level**.
- **Vanishing point (VP)** – the point on the horizon where things seem to disappear.





1 SET UP

Sketch a faint horizon line and mark a vanishing point. Sketch the front face of your crate true shape – a normal square or rectangle.

2 DEPTH LINES

From each corner of the front face, sketch faint lines towards the vanishing point. Be accurate!

3 BACK EDGES

Decide how deep the object is. Sketch the back edges **parallel** to the front edges.

4 FIRM IN

Firm in the outline with pen or a darker pencil. Faint construction lines can stay.

Where is your eye?

Objects **below** the horizon show their top. Objects **above** the horizon show their underneath. Objects on the horizon show neither!

QUICK CHECK

1 What is the horizon line?

2 In one-point perspective, which face is sketched true shape?

LEVEL 06

PRACTISE ONE-POINT

flex those skills

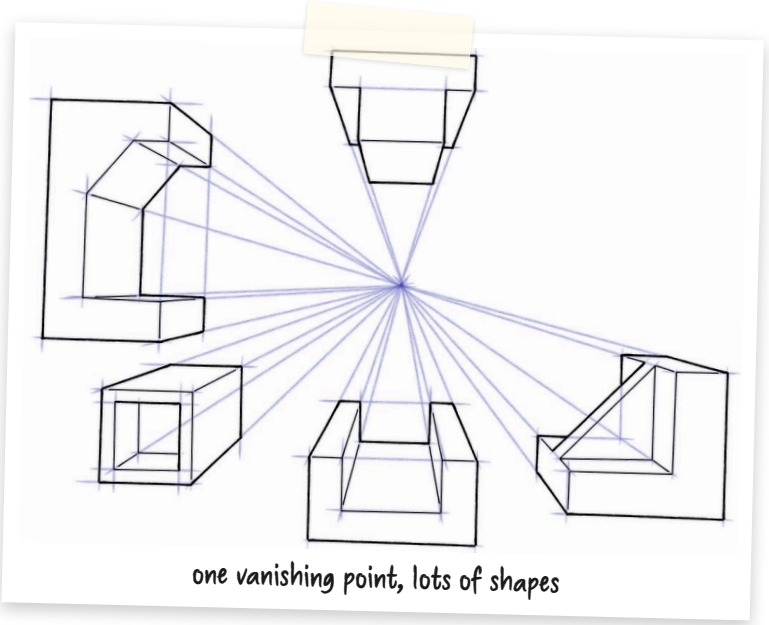
Time to flex your perspective skills!

Create a series of shapes that all share **one vanishing point** in the centre of the page. Start with simple crates, then cut details out of them – steps, slots, holes and L-shapes.

Keep to flat-sided forms until you are confident. Curves can come later.

TWO PENS = INSTANT IMPACT

Use a **thick** pen (or press harder) for the **outline** of each shape – the edges where you can only see one of the faces that meet there. Use a **thin** pen for edges **inside** the shape, where you can see both faces. A tiny gap between thick and thin lines looks very professional.



one vanishing point, lots of shapes

MAKE THIS

Fill a page with at least six one-point shapes around a central VP. Challenge: sketch two shapes that could slot **into** each other.

MAKE THIS

Name game: sketch your initials as big block letters in one-point perspective.

▶ NEXT LEVEL: NATIONAL 5

N5 Graphic Communication names **vanishing points** and **single- and two-point perspective** as sketching skills you must have. One-point perspective is also brilliant for sketching rooms and interiors.

QUICK CHECK

1 Thick or thin: which pen weight is used on the outline?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
set up a horizon line and vanishing point	☐	☐	☐
sketch a crate in one-point perspective	☐	☐	☐
cut details out of a one-point crate	☐	☐	☐

LEVEL 07

TWO-POINT PERSPECTIVE

twice the drama

Two-point perspective is the favourite pictorial sketch of designers and engineers.

It uses **two vanishing points** instead of one, which is closer to how our eyes really see objects. Instead of a flat front face, you look at an object's **corner**.

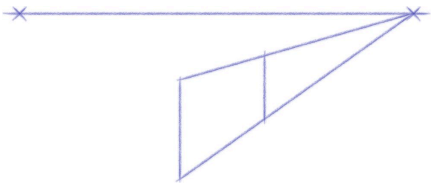
Spread out!

Put your two VPs far apart – near the edges of the page or even off it. VPs that are too close make objects look stretched and distorted.



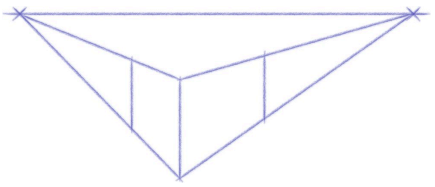
1 HORIZON + CORNER

Sketch a horizon with two vanishing points. Sketch a vertical line – the front corner of the object.



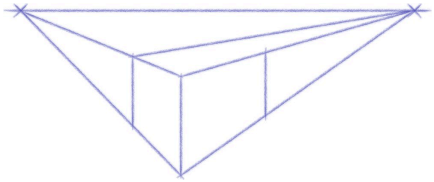
2 ONE SIDE

From the top and bottom of the corner, sketch faint lines to **one** VP. Close the face with a vertical line.



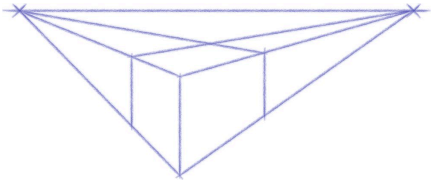
3 OTHER SIDE

Repeat step 2 towards the other vanishing point.



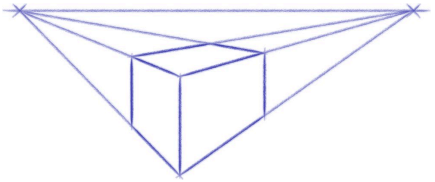
4 TOP: PART 1

From the top of a back vertical line, sketch a line to the **opposite** VP.



5 TOP: PART 2

Repeat from the other back vertical. Where the two lines cross is the back corner.



6 FIRM IN

Firm in your sketch – and admire it!

▶ NEXT LEVEL: NATIONAL 5

Two-point perspective is used throughout N5 Graphic Communication and Design & Manufacture to show products realistically. Learn it well – you will use it for years!

QUICK CHECK

1 How many vanishing points does two-point perspective use?

2 An object is **above** the horizon. Do you see its top or its underneath?

LEVEL 07

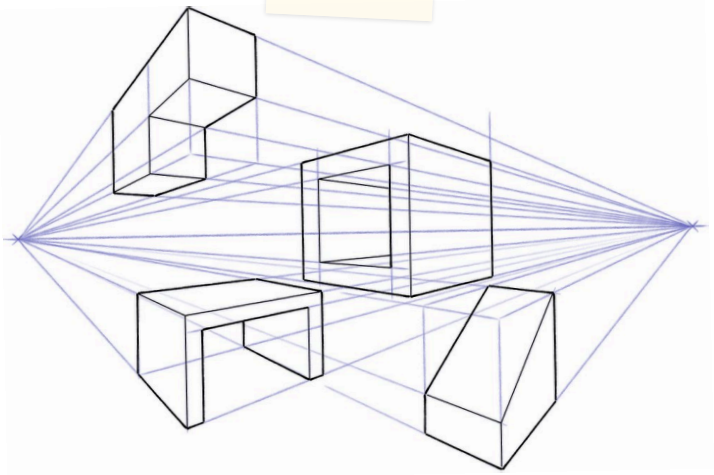
PRACTISE TWO-POINT

above & below

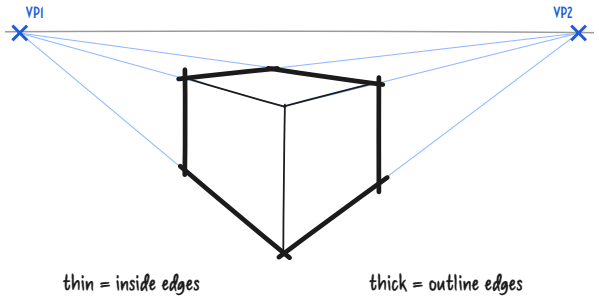
Two-point perspective can look dramatic.

Create a series of shapes that share the same two vanishing points. Experiment with shapes **above**, **below** and **through** the horizon line – notice how the view changes.

Just like one-point, always start with a crate, then cut details from it – from a simple square hole to sloping sides and steps.



one horizon, two VPs, lots of shapes



MAKE THIS

Sketch six shapes in two-point perspective: two above, two below and two through the horizon. Use thick and thin line weights.

MAKE THIS

Product challenge: sketch a speaker, a games console or a phone in two-point perspective, starting from a crate.

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
place two vanishing points on a horizon line	☐	☐	☐
sketch a crate in two-point perspective	☐	☐	☐
use thick and thin line weights	☐	☐	☐

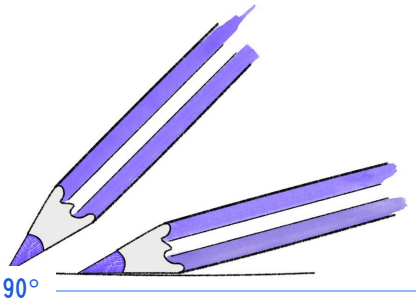
LEVEL 08

TIME TO GET TONAL...

light to dark

Colour and tone lift a sketch off the page and grab attention.

Tone is how light or dark a colour is. With pencil, you change the tone by pressing harder or adding more layers. Understanding tone is the secret to making sketches look **3D**, because it shows which parts of an object are lighter and darker.

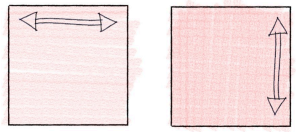


USE THE SIDE OF THE PENCIL

Don't shade with the sharp tip – it scratches the paper and leaves stripy, scribbly colour. Use the **side** of the lead. You press more gently and get a smooth, even tone.

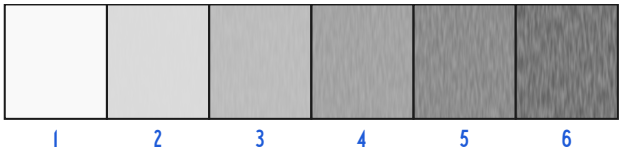
TWO COATS AT 90°

Apply colour in **one direction** only. Then apply a second coat at **90°** to the first. No scribbles, no streaks!



STEPPED TONAL SCALE

Split a rectangle into blocks. Shade each block a little darker than the one before, from lightest to darkest.



GRADUATED TONAL SCALE

Once you can do steps, try a smooth change from light to dark in one rectangle – no visible jumps.



Blending

Colour pencils can be blended to make tones smoother. Try rubbing gently with a cotton bud (or a tiny bit of petroleum jelly on a cotton bud – ask your teacher first). Don't use too much, or try it on thin paper!

QUICK CHECK

1. What is **tone**?

2. Why should you shade with the side of the pencil?

LEVEL 08

LIGHTS & SHADOWS

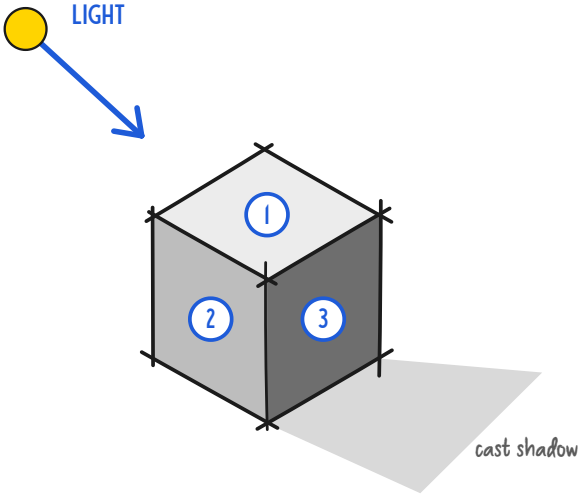
make it 3D

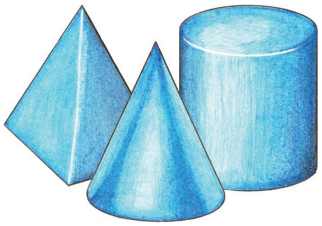
Highlights and shadows make sketches look real – and can even suggest a material.

The human brain expects light to come **from above**. Faces turned towards the light are **light**; faces turned away are **dark**. Use your tonal scale to plan each face:

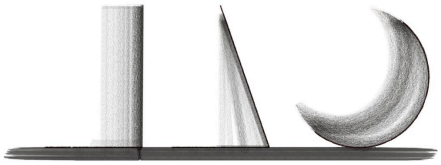
- **1 – Lightest:** the face closest to the light (usually the top).
- **2 – Medium:** the face at an angle to the light.
- **3 – Darkest:** the face turned away from the light.

Use the **same colour pencil** as the base colour and press harder for darker faces. Keep black pencil for the very darkest areas, and use it sparingly.

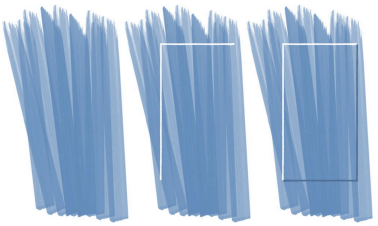




Curved forms change tone **gradually** – use a graduated scale.

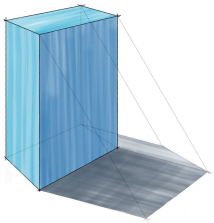


On coloured paper: **white pencil** for light, **black** for shadow.



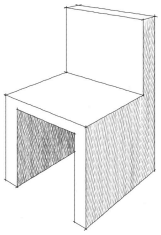
Rub through an **eraser shield** to add crisp highlights.

CASTING SHADOWS



To plan a shadow, project lines from the corners away from the light onto an imaginary ground. Join them up, keeping edges parallel. That shape is the darkest, "hard" shadow.

HATCHING



Pen or pencil lines can shade a face. The **closer** the lines, the **darker** it looks. Cross-hatch (two directions) for very dark areas.

▶ NEXT LEVEL: NATIONAL 5

N5 Graphic Communication asks you to illustrate sketches to show **surface texture, tonal change and colour**, and to show the effect of a **light source** with shadow and reflection.

QUICK CHECK

1 Light comes from above. Which face of a cube is darkest?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
shade a stepped and a graduated tonal scale	☐	☐	☐
shade a cube with three different tones	☐	☐	☐
add highlights and a cast shadow	☐	☐	☐

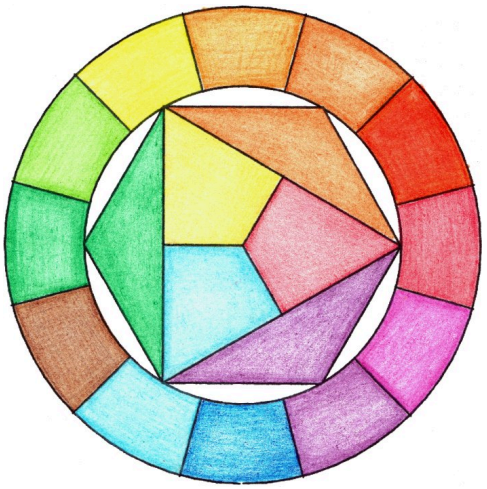
LEVEL 09

COLOUR & RENDERING

wood · plastic · metal

COLOUR BASICS

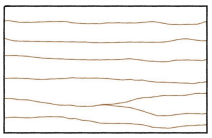
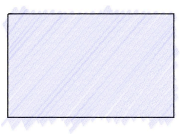
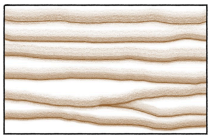
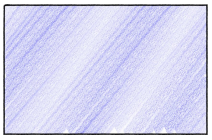
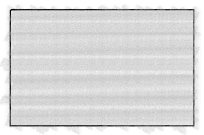
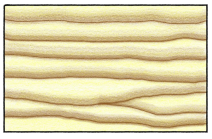
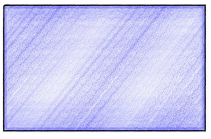
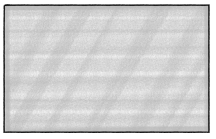
On the **colour wheel** used for paint, pens and pencils, the **primary** colours are red, yellow and blue. Mix two primaries to get a **secondary** colour (orange, green, purple). Mix a primary with a secondary to get a **tertiary** colour.



- **Hue** – the pure colour itself, e.g. red.
- **Tint** – a hue with **white** added (lighter).
- **Shade** – a hue with **black** added (darker).
- **Warm colours** (reds, oranges, yellows) seem to come towards you – they **advance**. **Cool colours** (blues, greens) seem further away – they **recede**.

RENDERING MATERIALS IN 2D

Rendering means adding colour, tone and texture so a sketch looks like a real material. Wood, plastic and metal are the three most common material families. Keep it quick – you don't want to get bogged down rendering one idea.

	Wood	Plastic	Metal
STEP 1	 Sharp brown pencil: sketch rough wavy lines for the **grain**.	 Very light base colour. Move the pencil **diagonally**.	 Gentle grey tone **along the length** of the shape.
STEP 2	 Gentle tone on **one side** of each grain line, fading to white.	 Darker diagonal bands, same direction, to show **reflection**.	 A second, fainter coat at **90°** to the first.
STEP 3	 Pale **yellow** over the remaining white areas.	 Firm edge round the outside. Eraser to lighten areas.	 Dark perimeter; diagonal strokes for darker sections.

QUICK CHECK

1 What is the difference between a **tint** and a **shade**?

2 Name one warm and one cool colour. Which one advances?

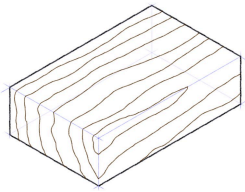
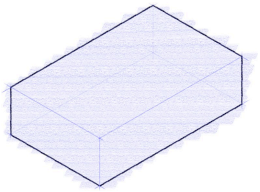
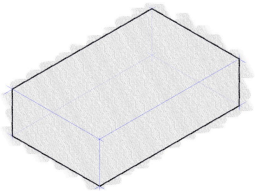
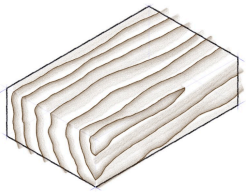
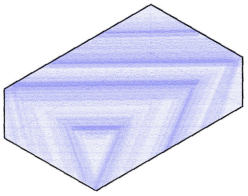
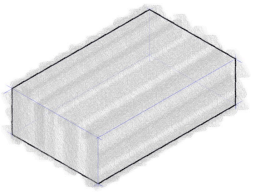
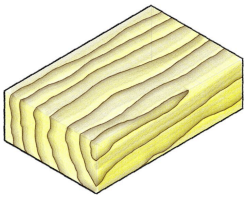
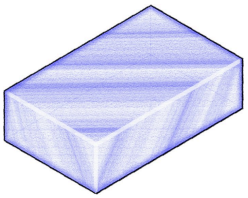
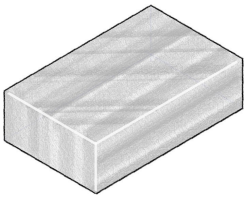
LEVEL 09

RENDERING MATERIALS IN 3D

make it real

Rendering in 3D needs a bit more practice – now you combine **material**, **tone** and **light**.

Remember your light source: top faces lightest, faces turned away darkest. Think about what makes each material special – like the **growth rings** on the end of a piece of wood.

	Wood	Plastic	Metal
STEP 1			
	Sharp brown pencil for the grain. Join the grain at one end with curves to show **growth rings**.	Very light base colour over the whole form.	Very gentle tone: grey for aluminium or steel, yellow/orange for brass or copper.
STEP 2			
	Tonal scale on one side of each brown line.	Darker bands in the same colour – "bend" them over each face.	Darken some areas, leave others light to suggest reflection.
STEP 3			
	Yellow over white areas; pale brown or orange on the darker face.	Darken the outline; thick eraser-shield highlights on edges.	Darken the outline; **thin** eraser-shield highlights on edges.

MAKE THIS

Render the three blocks on your Level 09 worksheet in wood, plastic and metal. Then find a product at home made from each material and render a swatch of it.



▶ NEXT LEVEL: NATIONAL 5

In N5 Design & Manufacture, design sketches should show which **materials** you are considering. In N5 Graphic Communication you will render sketches to show **surface texture**, tone and colour.

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
explain hue, tint, shade, warm and cool colours	☐	☐	☐
render wood, plastic and metal in 2D	☐	☐	☐
render a 3D block to look like a material	☐	☐	☐

LEVEL 10

HOW TO SHOW OFF

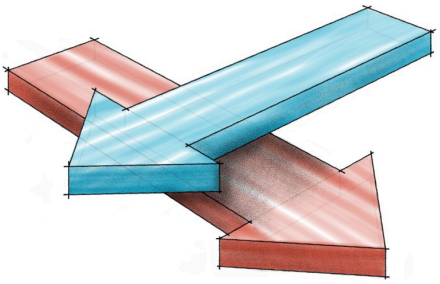
make it pop

Some sketches are just for you. Others need to stand out and communicate to other people.

When you want to explain an idea or tell a story, presentation techniques make your design work pop. Here are six simple ones.

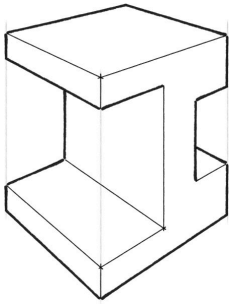
Dessert last

Presentation techniques are the **dessert**, not the main meal. Get your sketches right first – then make them stand out. And don't use all six at once!



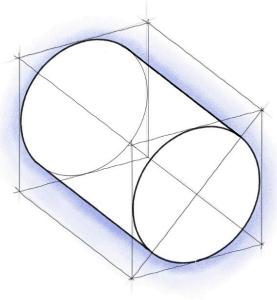
USE ARROWS

Arrows lead the viewer's eye to a feature or through a series of sketches. They can also show that something **moves**.



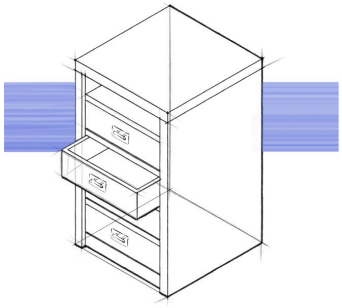
BOLD OUTLINE

A big, bold black outline makes a sketch stand out from the background – and can tidy up messy lines.



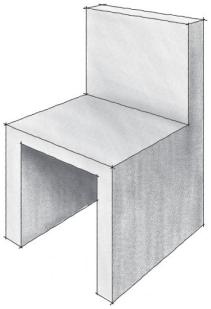
HALOS

Colour pencil applied round the outside of a sketch creates a soft, glowing effect. Quick and great for highlighting your best idea.



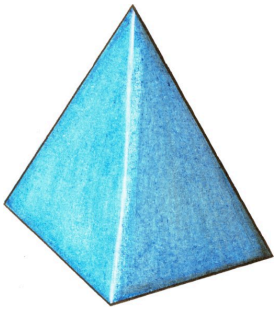
BACKGROUND FILLS

A block of colour behind a sketch adds depth. Choose the colour carefully – colour changes the mood.



LINE WEIGHT

The quickest technique of all. Thick lines on the outline (one face visible), thin lines inside (two faces visible).



PARTIAL BORDERS

A broken frame that sits behind the sketch. It adds depth and can frame a few notes neatly.

MAKE THIS

Pick your three best sketches from Levels 04–09. Apply a **different** presentation technique to each one.



QUICK CHECK

1. Name three presentation techniques.

LEVEL 10

ANNOTATION & LETTERING

say it clearly

ANNOTATION: SAY WHAT THE SKETCH CAN'T

Annotations are short notes added to a sketch. They explain things that are hard to show with lines alone. Good annotations:

- are **short** – a phrase or a sentence, not a story;
- sit **next to** the feature they describe, with a neat line or arrow pointing to it;
- explain **materials, sizes, how it works, how it moves, how it is used** or **why** you made a decision.

WEAK	STRONG
"This is the handle."	"Rubber grip on the handle stops it slipping when hands are wet."

▶ NEXT LEVEL: NATIONAL 5

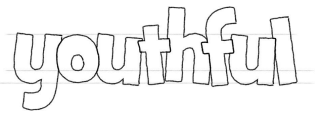
Annotation is a key skill at N5. In Design & Manufacture you should annotate your ideas to explain your thinking. In Graphic Communication you will use **thumbnails and annotation** to plan layouts.

LETTERING

Titles should match the **mood** of your sketch. Start any lettering with a faint grid: a space for each letter and the gaps between them.



Dramatic – tall, straight capitals. The easiest!



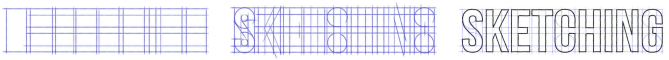
Youthful – overlapping, tilted lower-case bubbles.



Scripted – joined-up, hand-written style. Tricky!



Finished – outlined, then marker strike-through.



1 GRID

Faint grid with mid-points.

2 BUILD

Construct each letter lightly. Plan curvy S, C, O first.

3 OUTLINE

Outline the letters, then add colour.

QUICK CHECK

1 What should a good annotation tell the reader?

2 Re-write this weak annotation to make it stronger: "It is made of wood."

LEVEL 10

THEMATIC PRESENTATION

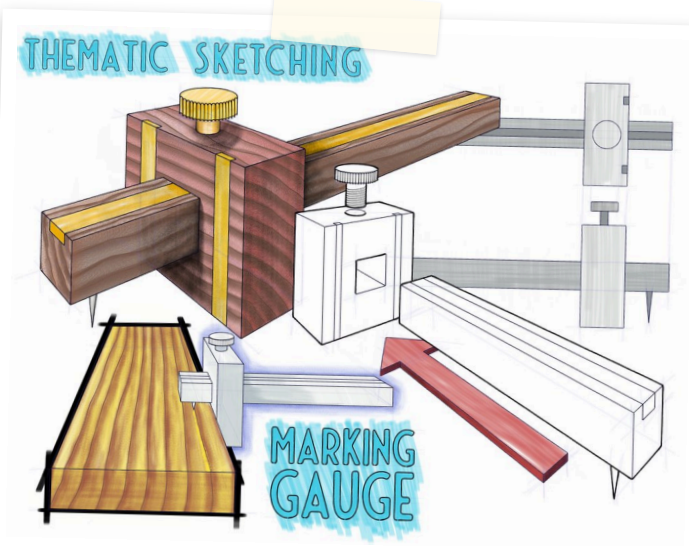
the final level

A **thematic presentation** is a page of sketches all about **one object or topic**.

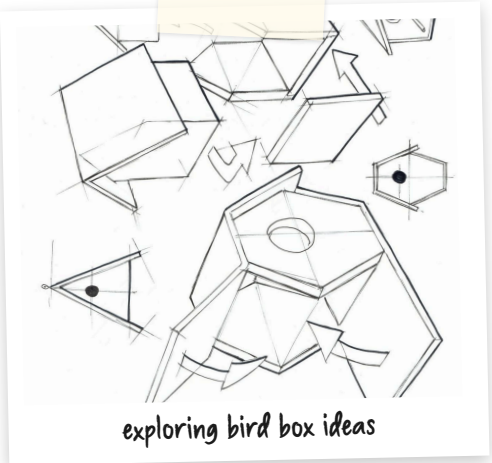
Designers make them to practise their skills – and to explain a product completely, so that someone understands what it looks like **and** how it works. It is your final challenge.

HOW TO DO IT

1. **Choose a product** you can hold and examine – a hand tool, a kitchen tool, a simple toy or a bird box. Avoid lots of curves or buttons (no game controllers or TV remotes!).
2. **Plan**: what do you want to show? What does it look like? How does it work? Which views will explain it best – 2D, one-point or two-point?
3. **Sketch first**: crates, proportions and line weight. Fill the page with a variety of views – whole product, close-up details, parts pulled apart, how it moves.
4. **Then present**: tone, materials, arrows, halos, borders and a title. Scan or photocopy your sketches first, in case of mistakes.
5. **Annotate** anything the sketches can't explain on their own.



thematic sketch: marking gauge



exploring bird box ideas

Learn from instructions

Look at the pictures in flat-pack furniture or construction toy instructions. They explain a whole process with almost no words. How clear are they? What could you borrow?

LEVEL-UP CHECK – I CAN...	NOT YET	GETTING THERE	NAILED IT!
use at least three presentation techniques	☐	☐	☐
write annotations that explain my design	☐	☐	☐
plan and complete a thematic presentation	☐	☐	☐

LEVEL COMPLETE

BEFORE & AFTER

look how far!

You did it! Ten levels complete. Time to see how far you've come.

AFTER · THE 60-SECOND MUG

Set a timer for 60 seconds and sketch a mug again – this time using everything you have learned: a crate, ellipses, line weight, maybe a little tone.

Now turn back to page 3. Compare your before and after sketches.

Three things that have improved:

How confident do you feel now?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

MY 60-SECOND MUG – THE SEQUEL

WHERE YOUR SKETCHING GOES NEXT

YOUR SKILL	N5 GRAPHIC COMMUNICATION	N5 DESIGN & MANUFACTURE
Crates, proportion & line quality (L02–04)	Pictorial and orthographic sketches that are "accurate, well-proportioned and with very good line quality".	Quick, confident sketches to generate lots of ideas.
Orthographic views (L03)	Third-angle projection, elevations and plans.	Dimensioned sketches used to make a product.
Perspective (L06–07)	Vanishing points, one- and two-point perspective.	Realistic sketches of design proposals.
Tone, colour & rendering (L08–09)	Illustrating sketches to show texture, tonal change and colour; colour theory.	Showing materials in design ideas.
Presentation & annotation (L10)	Thumbnails, annotation and promotional layouts.	Annotated ideas that explain your design thinking.

WORD BANK

SKETCHING GLOSSARY

talk like a designer

ANNOTATION
Short notes added to a sketch to explain things the sketch can't show.

APEX
The point at the top of a pyramid or cone.

CONSTRUCTION LINES
Faint lines that help build a sketch – like scaffolding on a building.

CRATE
A simple box sketched lightly around an object or part to help get proportions right.

ELLIPSE
A circle seen at an angle – an oval shape.

ELEVATION
An orthographic view looking at the front (or side, for an end elevation) of an object.

ERASER SHIELD
A thin mask used to rub out small areas, e.g. to add highlights.

FORM
A 3D shape, e.g. cuboid, cylinder, cone.

HALO
A soft band of colour round the outside of a sketch.

HORIZON LINE
Where the sky meets the ground. It is always at eye level.

HUE
A pure colour, without any white or black added.

ISOMETRIC
A pictorial format where the sides go back at 30°.

LINE WEIGHT
The thickness of a line. Thick for outlines, thin for edges inside.

OBLIQUE
A pictorial format with the front face flat-on and depth going back at an angle.

ORTHOGRAPHIC
Flat views of an object from one direction with no depth, e.g. elevation, plan.

PARALLEL
Lines that never get closer together or further apart.

PAREIDOLIA
When the brain sees a recognisable object in a random shape or pattern.

PERSPECTIVE
Objects appear smaller the further away they are.

PICTORIAL
A sketch that shows an object in 3D.

PLAN
An orthographic view looking down from above.

PROPORTION
The size of one part compared with another.

RENDER
Adding colour, tone and texture to make a sketch look like a material.

SHADE
A hue with black added to make it darker.

SHAPE
A flat, 2D outline, e.g. square, circle, triangle.

SPIRIT MARKER
An alcohol-based pen that gives smooth, streak-free colour.

TANGENT
A line that just touches a curve at one point.

THEMATIC PRESENTATION
A page of sketches all about one product or topic.

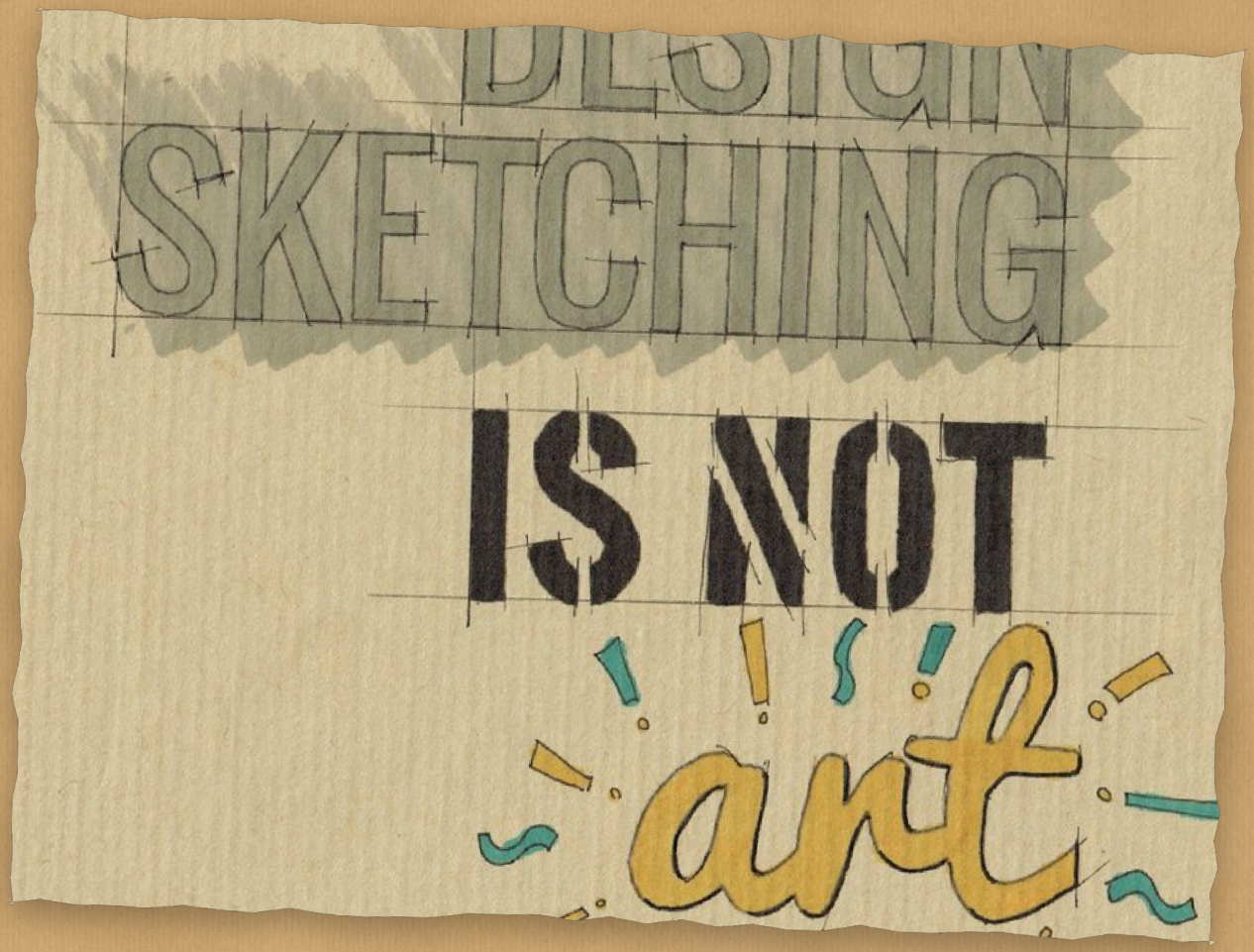
THIRD-ANGLE PROJECTION
The layout of orthographic views used at N5: plan above the elevation, side views next to it.

TINT
A hue with white added to make it lighter.

TONE
How light or dark a colour is.

TRUNCATED
A pyramid or cone with its top cut off.

VANISHING POINT
The point on the horizon where objects seem to disappear.



KEEP SKETCHING.

every day, a little better

Practice sheets, worksheets and video demonstrations: **DesignClass.co.uk**

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