The Production Manager · Teacher sheet

GCSE D&T · AQA 3.2.7 scales of production, 3.3.8 tolerances and quality control · application lesson · 50 minutes · works solo

The idea

Each student is a production manager. Orders arrive in their material area: one-offs, batches, mass and continuous runs. For each they choose the scale, a production aid and a quality check. Gold orders include a batch of measured parts to pass or fail against a tolerance.

How the orders work

There are three orders (Bronze, Silver, Gold) for each of the six AQA areas, plus multi-material Platinum orders. Students **start with the three orders in their own chosen area**, then do any others.

Print (per student)

- Production Guide (pages 2–3). Can be shared or laminated.
- Order Board (pages 4–5), double-sided.
- Production Plan (pages 6–7), double-sided.

Running it

1. **5 min:** PowerPoint to the worked example (a batch of acrylic coasters; not on the Order Board).
2. **30 min:** students work alone: their own area's three orders first, then any others, Platinum last.
3. **10 min:** students mark their OWN report in green pen using the answer slides.
4. **5 min:** totals and ranks. **The Audit:** anyone claiming Production Manager or Operations Director brings their report to you.

Fees

Bronze £100 · Silver £200 · Gold £300 · Platinum £500. **Full fee** = right scale + a suitable aid or process + a quality check (Gold: every pass and fail right, limits shown) · **Half fee** = one part wrong or missing · **£0** = wrong scale (Bronze/Silver) or two or more tolerance mistakes (Gold) · **+£50** = says why the scale suits the cost.

Ranks

£0–399 Trainee Supervisor · £400–899 Supervisor · £900–1,599 Production Manager · £1,600+ **Operations Director**

Production Guide

Use this for every order. Choose the scale, the production aid, and how you will check quality.

Scales of production

Scale	What it means	Example	Cost per item
One-off (bespoke)	A single, unique product made to order	Wedding dress, prototype, bespoke table	Very high
Batch	A set number of identical products, then the line can switch	School shirts, chair legs, bakery buns	Medium
Mass	Huge numbers on a production line, often automated	Phone cases, cars, flat-pack furniture	Low
Continuous	Runs 24 hours a day without stopping	Drinks cans, paper, steel, oil products	Very low

Production aids

Aid	What it does	Used for
Jig	Guides a tool so every part is cut or drilled in the same place	Drilling, bending, sawing
Template	A shape to draw or cut around, again and again	Card, timber, acrylic, fabric
Pattern	Paper shapes of each fabric piece, with seam allowance	Textiles
Mould / former	Shapes material the same way every time	Vacuum forming, injection moulding, laminating
Press tool / die	Cuts or bends sheet in one stroke	Metal brackets, card nets (die cutting)
CAD/CAM	Computer design sent to a machine: laser, CNC, embroidery	Any repeated, accurate part

Production Guide: quality

Quality control (QC)

Check	How it works
Tolerance	The allowed difference from the design size, e.g. 50 ± 0.5 mm means 49.5 to 50.5 mm
Go/no-go gauge	One end must fit (go), the other must not (no-go). Fast, no reading needed
Registration marks	Crosses that line up each printed colour
Colour bars	Printed strips to check ink density
Sampling	Test some products from each batch, e.g. 1 in 100
Visual inspection	Look for marks, loose threads, bad joints

How to check a tolerance

1 Work out the limits: size – tolerance and size + tolerance. **2** Each measurement on or between the limits **passes**. **3** Anything outside **fails**. For a percentage tolerance, find the percentage of the size first (5% of 200 = 10).

Quality control vs quality assurance

Quality control checks products as they are made. **Quality assurance** is the whole system that makes sure standards are met at every stage, from supplier to customer.

Worked tolerance example

Spacer: 30 ± 0.2 mm. Limits 29.8 to 30.2. A spacer at 30.2 **passes** (on the limit). A spacer at 29.7 **fails**.

Order Board

Do the three orders in YOUR material area first. Write the client's name on your report.

Papers and boards

Wedding Stationer — BRONZE £100	PrintPal — SILVER £200	BoxIt — GOLD £300
"1 hand-made, personalised wedding invitation design for a couple to approve before printing."	"5,000 leaflets, printed in four colours (CMYK) on an offset press."	"Box nets must be 120 ± 1 mm wide. Sample: 119.5, 121.2, 120.8, 118.7, 120.0. Which pass? Name the cutting aid."

Timber

Bespoke Table — BRONZE £100	ChairCo — SILVER £200	ShelfMate — GOLD £300
"A one-off oak dining table made to fit a client's unusual room."	"300 identical chair legs, each with a hole drilled 50 mm from the end."	"Shelf lengths must be 600 ± 0.5 mm. Sample: 600.3, 599.4, 600.5, 600.6, 599.8. Which pass? Suggest a production aid."

Metal

GateSmith — BRONZE £100	BracketPro — SILVER £200	Bolt Works — GOLD £300
"A one-off decorative steel gate for a historic house."	"2,000 steel brackets, each bent to 90°."	"Bolts must be 8.0 ± 0.2 mm diameter. Sample: 8.1, 7.7, 8.2, 8.0, 8.3. Which pass? How could checking be made faster?"

Order Board (continued)

Polymers

Fair Keyrings — BRONZE £100	CaseCo — SILVER £200	CapCorp — GOLD £300
“50 acrylic keyrings for a school fair, all the same shape.”	“100,000 identical phone cases a year.”	“Bottle caps must be 28 ± 0.3 mm. Sample: 28.2, 27.6, 28.4, 27.9, 28.3. Which pass? Name the scale and process.”

Textiles

Couture House — BRONZE £100	SchoolWear — SILVER £200	BagMakers — GOLD £300
“A one-off evening dress made to a client's measurements.”	“2,000 school polo shirts in five sizes.”	“Strap length must be 900 ± 10 mm. Sample: 905, 889, 910, 912, 896. Which pass? Name a production aid.”

Electronic and mechanical systems

Prototype Lab — BRONZE £100	GlowToys — SILVER £200	ResistCo — GOLD £300
“1 working prototype circuit to test an idea for a new alarm.”	“5,000 identical night-light circuit boards.”	“Resistors are 1 kΩ ± 5%. Sample (Ω): 1040, 960, 1060, 940, 1000. Which pass?”

Multi-material Platinum

CanCo — PLATINUM £500	FlatPack Furniture — PLATINUM £500
“Drinks cans: 500 million a year, made 24 hours a day. Give the scale, two production aids or systems, and two quality checks.”	“A new bookcase: 200 for a trial, then 50,000 if it sells. Plan both stages: scale, aids and QC.”

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Production Plan

Name: _____ My area: _____ Mark in GREEN pen

Example: *Batch · laser cutter with one CAD file · limits 99.5–100.5, pass 99.8 and 100.4, fail 101.0 · why: same part, 200 needed.*

Client	Scale	Production aid / process	Quality check (Gold: limits, pass/fail)	Why this scale	Fee £

Production Plan (page 2)

Name: _____ My area: _____ Mark in GREEN pen

Example: *Batch · laser cutter with one CAD file · limits 99.5–100.5, pass 99.8 and 100.4, fail 101.0 · why: same part, 200 needed.*

Client	Scale	Production aid / process	Quality check (Gold: limits, pass/fail)	Why this scale	Fee £

TOTAL EARNED: £_____ Rank: Trainee Supervisor · Supervisor · Production Manager · Operations Director (circle)