techskills

TEACHERS

Product and design in the classroom: the teacher pack

Activities, answers and the evidence behind every claim

Every figure was checked against its source on 4 November 2026. Free to use in your classroom.

About this pack

This is the printable companion to the Product and Design in the Classroom page on techskills.org. It holds everything you need at the front of a class: how to run each activity, the questions to ask, the numbers the games will show so you can predict what the class will see, three true stories to hand out, and the sources behind every fact.

Product and design is a screen and studio career, so there is no hard hat route to set against the desk. The balance in this pack is between activities that start at a screen and ones that start out in the world, and between the degree route and the apprenticeship route into the work. Each activity says where it starts.

There are twelve activities. Five need no devices at all, and eight are interactive on this page. Some start at a screen, some start with students walking round the building, watching someone try something or cutting paper, and some suit both, so a teacher with a student who likes to make and a teacher with one who likes to analyse each have something to run on Monday. Each one has a plain guide above it that says what it is, exactly what to do and what you should notice, and teacher notes with questions and things to watch for.

Every app, tester, colour list, funnel and card sort in the games is made up for the lesson, and each game says so. The walk-round and the watching activities use things in your own building: choose the route and the task in advance, keep students out of areas and off equipment that are not open to them, and avoid any screen that shows someone's private information.

For	Teachers and lecturers in schools, colleges and training providers. Written for England; see the curriculum section
Activities	12
Sources	69, each opened and read on 4 November 2026

The case for teaching it

We could just say that design matters and leave it there. But you are the one standing in front of students who will check, so here is what the evidence says, including the awkward parts, because the awkward parts are where the good lessons live.

The work is real and it is wide. The Design Council's 2026 study says the UK design economy employed 2.27 million workers in 2025 and was worth £136.7bn in 2023. Its list of design occupations is very broad: it includes programmers, engineers and architects as well as designers, so it is not a count of UX or product designers. Government figures put employment in the digital sector at about 1.81 million filled jobs in 2025, and the statisticians themselves warn that the estimate has data quality issues.

Is there a shortage of designers? The evidence is thinner than you might expect, so we do not claim one. A government survey of creative employers found that, among those with a skill-shortage vacancy caused by a lack of IT skills, 22.5% said graphic design skills were hard to get, against 6.4% of all businesses. The same report found creative employers less likely than all businesses to report a skill-shortage vacancy at all, 7.2% against 9.8%. The 2026 Digital and Technologies Jobs Plan projects around 800,000 digital and technology roles needing to be filled between 2025 and 2035, but that is for the whole field and not for design. We found no government source that says UX or product design in particular is short of people.

What the evidence does show is that getting design wrong is common and can be measured. WebAIM's 2026 study found detectable accessibility failures on 95.9% of the million most visited home pages, with low contrast text the most common at 83.9%, and warns that automatic tools miss things. The Department for Work and Pensions estimates that 16.7 million people in the UK are disabled, one in four, and Colour Blind Awareness says about 1 in 12 men and 1 in 200 women have a colour vision deficiency. Everyone in those figures uses the things your students will one day help to make.

And design is a subject students already study. The national curriculum for design and technology asks students to understand user needs, to work iteratively and to test their ideas against the views of the people they are for, and the independent curriculum review said that understanding the design process and developing iterative design skills should remain fundamental.

The evidence

Fact	Condition	Source
The Design Council says the design economy employed 2.27 million workers in 2025, up 15% since 2020.	"Design economy" employment counts designers plus non-designer staff in design industries; the Design Council says about 1.88 million of the 2.27 million are in design occupations. Based on ONS survey data, so an estimate.	Design Council, Design Economy 2026, key findings (Design Economy 2026, released 7 September 2026)

Fact	Condition	Source
The Design Council says the UK design economy was worth £136.7bn in GVA in 2023, up 40% since 2019.	GVA is for 2023, the latest year available. The growth figure is not adjusted for inflation (the Design Council says inflation was around 22% over 2019 to 2023). The press release says the £136.7bn equals 5.5% of UK GVA.	Design Council, Design Economy 2026, key findings (Design Economy 2026, released 7 September 2026)
The Design Council says its GVA growth figures are not adjusted for inflation, and that inflation was around 22% between 2019 and 2023.	Growth figures are in current money terms.	Design Council, Design Economy 2026: frequently asked questions (Published with Design Economy 2026, September 2026)
The Design Council says around 1.88 million people work in design occupations, which is 6.2% of all UK employment.	A 2025 estimate from the ONS Annual Population Survey. The Design Council's list of design occupations includes software and engineering roles.	Design Council, Design overtakes retail sector as biggest contributor to the UK economy (press release) (Embargoed to 7 September 2026)
The Design Council's design occupations list includes graphic designers (SOC 3421), web design and development professionals (SOC 2137) and product, clothing and retail designers (SOC 3422), but also programmers, civil engineers and architects.	So the 1.88 million figure is much broader than UX, product or graphic designers alone. The digital design group alone is 1,088,496 of the 2,269,815 in 2025, and its list of occupations includes programmers and software development professionals.	BOP Consulting for the Design Council, Data tables for Design Economy 2026 (Design Economy 2026, file last modified 3 September 2026)
The Design Council counts design occupations and industries using ONS SOC and SIC codes, and says these codes do not perfectly map to all roles, especially newer ones.	The report uses the 2007 SIC and 2010 SOC classifications. The Design Council also says ONS datasets do not fully capture newer occupations, freelancers and sole traders, and that Northern Ireland data is less complete.	Design Council, Design Economy 2026: frequently asked questions (Published with Design Economy 2026, September 2026)

Fact	Condition	Source
Government estimates put Digital Sector employment at approximately 1.81 million filled jobs in 2025, which is 5.2% of the UK's filled jobs.	An estimate from the ONS Annual Population Survey. The release is classed as Official Statistics in Development, and the page warns of quality concerns for smaller segments of the survey. This measures the digital industry (sector), not digital occupations, and the release gives no design-occupation breakdown.	Department for Science, Innovation and Technology and Department for Culture, Media and Sport, Economic Estimates: Employment in the Digital Sector, January 2025 to December 2025 (Published 1 October 2026)
The statisticians behind the digital sector jobs estimate warn that Annual Population Survey estimates have potential data quality issues and that users should consult a wide range of data sources.	Published 1 October 2026; the page says the Office for Statistics Regulation removed accreditation from this series at the department's request.	Department for Science, Innovation and Technology and Department for Culture, Media and Sport, Economic Estimates: Employment in the Digital Sector, January 2025 to December 2025 (Published 1 October 2026)
In 2022 Employer Skills Survey data, 22.5% of creative industries businesses with skill-shortage vacancies caused by a lack of IT skills said graphic design or design engineering skills were hard to obtain, against 6.4% of all businesses.	Percentages are of the subset of businesses with a skill-shortage vacancy caused by IT skills, not of all businesses. 2022 data, UK-wide, labelled Official Statistics in development. Graphic design only: the report gives no UX or product design figures.	Department for Culture, Media and Sport, Skills gaps and shortages in the creative industries: employer perceptions and actions, UK, 2022 (Published 11 February 2025)
The same DCMS analysis found creative industries employers were less likely than all businesses to report a skill-shortage vacancy, at 7.2% against 9.8%.	2022 Employer Skills Survey data. The report says design and designer fashion, advertising and marketing, architecture, and IT, software and computer services were not significantly different from all sectors, so this cautions against claiming a general design skills shortage.	Department for Culture, Media and Sport, Skills gaps and shortages in the creative industries: employer perceptions and actions, UK, 2022 (Published 11 February 2025)

Fact	Condition	Source
The government's Digital and Technologies Jobs Plan says around 800,000 digital and technology roles are projected to need filling between 2025 and 2035 in sectors backed by the Industrial Strategy.	A projection, not a count, for digital and technology roles generally and not for design or UX roles. It is made up of around 550,000 new roles in 30 priority occupations plus around 250,000 replacement roles in the Digital and Technologies sector.	Department for Culture, Media and Sport, Digital and Technologies Jobs Plan (Published 21 October 2026)
The WebAIM Million 2026 found detected WCAG 2 failures on 95.9% of the top one million home pages, up from 94.8% in 2025.	Results are from February 2026 (eighth annual study); WAVE automated detection only, so the true rate of full conformance is lower than 4.1%.	WebAIM, Utah State University, The WebAIM Million: 2026 report on the accessibility of the top 1,000,000 home pages (Last updated 30 March 2026; results from February 2026)
In the WebAIM Million 2026, low contrast text was the most common detected failure, found on 83.9% of home pages, with an average of 34 distinct instances per page.	February 2026 sample of one million home pages; WAVE automated detection; 79.1% in 2025.	WebAIM, Utah State University, The WebAIM Million: 2026 report on the accessibility of the top 1,000,000 home pages (Last updated 30 March 2026; results from February 2026)
WebAIM warns that automated tools such as WAVE cannot detect every conformance failure, and that a page with no detected errors is not necessarily accessible.	WebAIM's own methodology caveat in the 2026 report.	WebAIM, Utah State University, The WebAIM Million: 2026 report on the accessibility of the top 1,000,000 home pages (Last updated 30 March 2026; results from February 2026)
The DWP Family Resources Survey for 2024 to 2025 estimates 16.7 million disabled people in the UK, 25% of the population, or one in four.	Survey year 2024 to 2025 (published 26 March 2026), accredited official statistics. UK private households only (survey excludes people in nursing and retirement homes, so older-age figures are likely understated). Not age-standardised. Same 25% as 2023 to 2024.	Department for Work and Pensions, Family Resources Survey: financial year 2024 to 2025 (Published 26 March 2026)
DWP's Family Resources Survey counts a person as disabled if they regard themselves as having a long-standing illness, disability or impairment that causes substantial difficulty with day-to-day activities, which matches the core Equality Act 2010 definition.	Self-reported. DWP notes that some people with rights under the Equality Act, such as those whose long-standing condition is not currently affecting day-to-day activities, are not captured. Definition used since the 2012 to 2013 survey year.	Department for Work and Pensions, Family Resources Survey: background information and methodology, 2024 to 2025 (Published 26 March 2026)

Fact	Condition	Source
Colour Blind Awareness says colour blindness affects approximately 1 in 12 men (8%) and 1 in 200 women, and about 3 million people (about 4.5%) in the UK.	The source is a charity, Colour Blind Awareness, not the NHS. The wording is approximately, and the page gives no underlying study.	Colour Blind Awareness, About colour blindness (Page undated; site copyright 2026)
The Curriculum and Assessment Review says understanding the design process and developing iterative design skills should remain fundamental in D&T, and recommends embedding social responsibility and inclusive design.	Independent review recommendations, not government decisions. The report's footnote defines inclusivity as including 'user needs including abilities, ages, culture'.	Department for Education (independent review chaired by Professor Becky Francis), Curriculum and Assessment Review final report: Building a world-class curriculum for all (Published 5 November 2025)

Your school or college is a product too

Every school and college runs digital things that students use every day: the website, the timetable, the lunch payment system, the learning platform, the booking form for a parents' evening. They make a better teaching resource than any case study, because students can tell you in one sentence what is wrong with them and who it lets down.

It is also, quietly, a legal matter. Section 85 of the Equality Act 2010 applies the duty to make reasonable adjustments to the responsible body of a school, and section 20 says what that duty is. The public sector accessibility regulations cover the websites and apps of schools only partly, and government guidance says that bodies which are exempt or partly exempt still have the Equality Act duty. A good student project is to ask your school's web team what they have done, and listen to the answer. This is general information, not legal advice.

The evidence

Fact	Condition	Source
Equality Act 2010 section 20 sets a duty to make reasonable adjustments with three requirements: change a provision, criterion or practice; avoid a physical feature causing disadvantage; and provide an auxiliary aid, where a disabled person would otherwise be at a substantial disadvantage.	Section 20 applies in England, Wales and Scotland. Northern Ireland has separate disability discrimination law. Revised version, up to date to 4 November 2026.	legislation.gov.uk, The National Archives, Equality Act 2010, section 20: duty to make adjustments (Revised version, up to date to 4 November 2026)
Section 85(6) of the Equality Act 2010 applies the duty to make reasonable adjustments to the responsible body of a school.	Schools' duties to pupils sit in Part 6 of the Act (section 85), separate from the services provisions in section 29; section 91(9) applies the same duty to the responsible body of a further or higher education institution.	legislation.gov.uk, The National Archives, Equality Act 2010, section 85: pupils, admission and treatment (Revised version, up to date to 4 November 2026)
The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018 apply to websites and mobile apps of public sector bodies such as the State, regional or local authorities and bodies governed by public law, but only partly to schools and nurseries.	Regulation 4(1)(c) excludes the websites and mobile applications of schools or nurseries except for content relating to essential online administrative functions. Regulation 4 also excludes public service broadcasters, and non-governmental organisations unless they provide essential services or services for disabled people.	legislation.gov.uk, The National Archives, The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018, regulations 3 and 4 (In force 23 September 2018; revised version, no known outstanding changes)

Fact	Condition	Source
GOV.UK guidance says a public sector website or mobile app meets the legal requirements if it meets the WCAG 2.2 AA accessibility standard and publishes an accessibility statement.	GOV.UK page last updated 30 September 2024 (first published 9 May 2018). The regulations themselves do not name WCAG 2.2; this is the government's published guidance. The page also says primary and secondary schools and nurseries are partially exempt.	Government Digital Service and Central Digital and Data Office, GOV.UK, Understanding accessibility requirements for public sector bodies (Published 9 May 2018, last updated 30 September 2024)
GOV.UK says primary and secondary schools and nurseries are only partially exempt from the public sector accessibility regulations, and still need to cover the content people need to use their services, such as a form for school meal preferences.	Also says exempt or partly exempt bodies still have a legal duty to make reasonable adjustments under the Equality Act 2010, and partially exempt bodies need to publish an accessibility statement. Page last updated 30 September 2024.	Government Digital Service and Central Digital and Data Office, GOV.UK, Understanding accessibility requirements for public sector bodies (Published 9 May 2018, last updated 30 September 2024)

Starter: notice the design

Before you say the word design, ask students how they open the door to the canteen or the toilets. Give them two minutes to describe what they do. Some push, some pull, and some stop and look for a sign. Someone will have a story about a door that did the opposite of what it looked like.

That is the whole opportunity of this subject. Design is not decoration. It is the reason something works or does not, and nearly everything a student touches was made by someone who was not there when it was used. The work of a designer, a researcher and a product manager is to be there: to find out what people really do, and to change the thing to suit them. Some of that happens at a desk with a screen and some of it happens out in the building, watching someone try, and this pack has activities for both.

A ten minute walk round the building to find three things that work well and three that do not, from doors to hand dryers to the signs. Nobody has to have a screen.

What this is

A short walk round your own building to look at ordinary things as a designer would: doors, signs, taps, hand dryers, the printer, the vending machine. Nothing here needs a screen.

What to do

- Go in pairs and walk the route your teacher gives you. Take paper and a pen.
- Find three things that work well and three that do not. For each one write what it is, what it is for, what you tried first, and what happened.
- Choose the one that annoyed you most and write who it would let down, for example someone in a hurry, someone carrying a bag or someone who has never been here.
- Write the smallest change that would fix it.

What you should notice

Most of what goes wrong is not the person's fault. The thing told them to do one thing and meant another, and the people who made it were not there to see it.

Time	15 to 20 minutes
You need	Paper and pens, and a short walk round your building.
Where	Can be done with no devices. Starts out in the world.

Students will be able to

- Find a design problem in an ordinary object and say who it affects.
- Say what the designer probably meant people to do, and what they did instead.
- Explain that design is about how something works, not only how it looks.

Running it

- Tell students they are design inspectors for ten minutes. In pairs they walk a set route round the building and find three things that work well and three that do not.

- For each thing they write what it is, what it is for, what a person probably tries first, and what actually happens.
- Back in the room, each pair picks one thing that does not work and says who it lets down: someone in a hurry, someone carrying things, someone who cannot see well, someone new to the building.
- Finish by asking what the smallest change would be, and who would need to test it.

Questions to ask

- Who made this, and what did they think you would do?
- Did it work for everyone in your group, or only for some of you?
- Is a sign that needs explaining a good sign?

Watch for

- Students blaming the person who used it. The question is what the design made them do, not what they should have known.
- Everyone choosing the same door. Send pairs in different directions.
- Anything that needs a ladder, a key or going into a room that is not open to students. Choose a route in advance.

Your notes

Game: hit the target

Click between two bars as fast as you can while still hitting them, round after round, with the bars getting thinner and further apart. Then see the pattern in your own times.

What this is

A speed test for your hand. You click between two bars as fast as you can while still hitting them. Each round the bars are further apart and thinner, and the page works out how hard each round was and draws a line through your times.

What to do

- Press Start. Click the bright bar, then the other one, back and forth. The first click only starts the clock.
- When the round ends, press the button for the next round. There are six rounds, each harder than the one before.
- Look at the table of your results and at the chart. Is the time going up every round? Do the dots sit near a straight line?
- If you have no mouse, trackpad or touch screen, press Show a made-up student's results instead. Press Clear my results to start again.

What you should notice

The harder the round, the longer it took, and the dots lie roughly along a straight line. That is why designers make the things people press most big and close to where their hand already is.

Time	15 to 25 minutes
You need	A mouse, a trackpad or a touch screen, one device per student or per pair.
Where	Interactive on the page. Needs a screen. Starts at a screen.

Students will be able to

- Say why a small button a long way from where you are is slow to hit.
- Read a straight-line pattern off a chart of their own results.
- Explain that designers make the things people press most often big and close.

Running it

- Show the page on a projector and play round one together so everyone sees what to do. Then give students a device each, or one between two.
- Students play all six rounds. The page times only the clicks after the first in each round.
- Ask them to read their own table and chart: did the time go up each round, and was it a straight line?
- If a device has no mouse, trackpad or touch screen, press Show a made-up student's results and use that example for the discussion.

Questions to ask

- Which round took longest, and what made it hard: the distance, the width, or both?
- Where on a phone screen would you put the button people press most often?
- Why might a tiny close button on a pop-up advert be a bad design?

Watch for

- Times that are far higher in the first round than in round two: students were learning the game. Replay if it matters.
- A student with a motor difficulty, a tremor or an unfamiliar device. The game measures the device and the hand together, so do not rank students by it.
- The line of best fit looks neat with six points. It is a classroom picture, not a measurement of anyone.

The numbers the page shows

Round	Distance	Width	Bits of difficulty	Made-up student's time
1	120	90	1.22	412 ms
2	240	70	2.15	498 ms
3	360	50	3.04	571 ms
4	480	36	3.84	662 ms
5	560	24	4.60	735 ms
6	640	14	5.55	868 ms

Bits of difficulty are log base 2 of (distance divided by width, plus 1). The made-up student's times give a straight line of about 273 ms plus 103 ms for every bit, and r squared of 0.99. Distances and widths are in the units of a stage 700 units wide, so the ratio is the same on every screen. The times are made up.

The evidence

Fact	Condition	Source
NN/g says the time to reach a target depends on how big it is and how far away it is, so closer targets are faster to acquire and bigger targets are better.	Applies to pointer movement (mouse, finger, hand). NN/g adds that screen edges act as 'infinite' targets for mouse-driven interfaces but give no advantage on touchscreens.	Nielsen Norman Group, Fitts's Law and Its Applications in UX (31 July 2022, modified 24 January 2024)
NN/g notes that because Fitts's law contains a logarithm, a target twice as far away takes longer to reach but not twice as long.	NN/g's own printed formula is T = a + b log(2D/w), the original form, with a and b constants that vary by pointer type.	Nielsen Norman Group, Fitts's Law and Its Applications in UX (31 July 2022, modified 24 January 2024)

Fact	Condition	Source
In MacKenzie's handbook chapter, Fitts' law predicts movement time as MT = a + b ID, and the Shannon formulation of the index of difficulty is ID = log2(A/W + 1), where A is the movement amplitude (distance) and W is the target width.	MacKenzie calls the distance A, for movement amplitude. MT is in seconds, ID in bits, a is an intercept in seconds and b is a slope in seconds per bit. The standard that fixes how Fitts's law is tested, ISO 9241-411, is behind a paywall, so we cite MacKenzie, who describes it.	I. Scott MacKenzie, York University, in the Handbook of Human-Computer Interaction (Wiley, 2018), Fitts' law, chapter 17 of the Handbook of Human-Computer Interaction (2018)
Paul Fitts's original paper is 'The information capacity of the human motor system in controlling the amplitude of movement', Journal of Experimental Psychology, volume 47, issue 6, pages 381 to 391, June 1954.	Citation as given in the reference lists of NN/g and MacKenzie (2018) and in the Crossref record for DOI 10.1037/h0055392. The 1954 paper itself is behind a paywall.	Nielsen Norman Group, Fitts's Law and Its Applications in UX (31 July 2022, modified 24 January 2024)
WCAG 2.2 Success Criterion 2.5.8 (Level AA, new in 2.2) requires pointer targets to be at least 24 by 24 CSS pixels, unless an exception applies.	Level AA. Five exceptions: Spacing (undersized targets positioned so a 24 CSS pixel circle centred on each does not intersect another target or circle), Equivalent, Inline, User Agent Control, Essential.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))

Your notes

Lab: can you read it?

Pick a text colour and a background and get the contrast ratio the accessibility guidelines would give them, then see what a task list that uses only colour looks like in grey.

What this is

A checker for colour pairs. It works out the contrast ratio the Web Content Accessibility Guidelines use, from 1 to 21, and tells you whether the pair is readable for normal text, large text and the edges of a button. Part two shows what a colour-only task list looks like in grey.

What to do

- Under Start from a pair, choose The lightest grey that passes and read the ratio. Then choose One step lighter and read it again.
- Choose Gold on white, then Navy on gold. Notice which pass and which fail, and by how much.
- Type your own colours into the Text colour and Background colour boxes, six digits each, like 0d2436. Find a pair that fails and change one colour until it passes.
- In part two, compare the colour list with the grey one. Then tick Add a shape and a word to each one and look again.

What you should notice

One step on the grey scale is the difference between a pass and a fail, and you cannot see it. And two colours that are easy to tell apart by hue can be almost the same grey, so a colour should never be the only clue.

Time	20 to 30 minutes
You need	A projector for the whole class, or one device per pair.
Where	Interactive on the page. Needs a screen. Starts at a screen.

Students will be able to

- Say what a contrast ratio of 4.5 to 1 means and which text it applies to.
- Find a colour pair that fails and change one colour until it passes.
- Explain why a colour should never be the only way to tell two things apart.

Running it

- Start with the lightest grey that passes on white and the one a single step lighter. Ask the class to say which is easier to read before you show the numbers.
- Let students try the other pairs, including the gold on white and the navy on gold, then type in colours of their own, such as the colours in their school or a game they play.
- Ask them to find a pair that fails, then change one colour until it passes. Note how little they had to change.
- Part two: tick Add a shape and a word to each one and compare the grey list with and without it.

Questions to ask

- What did you have to change to make a failing pair pass, and did it look worse?
- Which three places in our school or on our website use colour alone to tell you something?
- Who else, besides someone with colour blindness, benefits from text that is easy to read?

Watch for

- Students believing a pass means good design. Contrast is one of many things a design needs.
- Screens differ. A pair that is fine on a bright monitor can be hard in sunlight.
- The grey version is a rough check, not a simulation of any one kind of colour blindness, and the page says so.

The answer for every starting pair

Pair	Text	Background	Ratio	Normal text (4.5)	Large text (3)	Controls (3)
Black on white	#000000	#ffffff	21.00 to 1	Passes	Passes	Passes
The lightest grey that passes	#767676	#ffffff	4.54 to 1	Passes	Passes	Passes
One step lighter	#777777	#ffffff	4.47 to 1	Fails	Passes	Passes
Pale placeholder grey	#aaaaaa	#ffffff	2.32 to 1	Fails	Fails	Fails
Classic link blue	#0000ee	#ffffff	9.39 to 1	Passes	Passes	Passes
Navy on gold	#0d2436	#f5a623	7.83 to 1	Passes	Passes	Passes
Gold on white	#f5a623	#ffffff	2.02 to 1	Fails	Fails	Fails
Red on green	#c43c2c	#2f7d32	1.01 to 1	Fails	Fails	Fails

The ratio is cut to two places and never rounded up, because the guidelines compare the exact ratio with the line. The colours are ones we chose for the lesson. The grey view in part two is a rough check on lightness, not a simulation of any one kind of colour blindness.

The evidence

Fact	Condition	Source
WCAG 2.2 Success Criterion 1.4.3 (Level AA) requires a contrast ratio of at least 4.5:1 for text and images of text, with a lower requirement of at least 3:1 for large-scale text.	Level AA. Exceptions with no contrast requirement: inactive user interface components, pure decoration, text not visible to anyone, text in pictures with significant other visual content, and logotypes.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))

Fact	Condition	Source
WCAG 2.2 defines large-scale text as at least 18 point, or at least 14 point bold.	Font size is the size when the content is delivered, not after a user resizes it. W3C notes that 14 and 18 point are roughly 1.2 and 1.5 em (120% and 150% of default body text) for many mainstream body fonts, but authors must check for their own fonts. WCAG defines it in points, not CSS pixels.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))
WCAG 2.2 Success Criterion 1.4.11 (Level AA) requires user interface components and parts of graphics needed to understand the content to have a contrast ratio of at least 3:1 against adjacent colours.	Level AA. Excludes inactive components and components whose appearance is determined by the user agent and not modified by the author; graphics are excluded where a particular presentation is essential.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))
WCAG 2.2 defines contrast ratio as (L1 + 0.05) / (L2 + 0.05), where L1 is the relative luminance of the lighter colour and L2 that of the darker colour, giving ratios from 1:1 to 21:1.	Backgrounds: if no background colour is specified, white is assumed for 1.4.3 and 1.4.6 (NOTE 3 to the definition).	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))
WCAG 2.2 defines relative luminance as the relative brightness of any point in a colorspace, normalised to 0 for darkest black and 1 for lightest white, and for sRGB gives L = 0.2126 * R + 0.7152 * G + 0.0722 * B.	Formula is given in NOTE 1 to the definition and is taken by W3C from the sRGB specification. R, G and B are linearised from the 8-bit channel values divided by 255.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))
WCAG 2.2 currently prints the sRGB linearisation threshold as 0.04045 (not the older 0.03928), and W3C says the change has no practical effect on contrast calculations.	Before May 2021 the definition printed 0.03928. Many older tools, articles and code samples still use 0.03928.	W3C, Web Content Accessibility Guidelines (WCAG) 2.2 (Recommendation of 12 December 2024 (republished with errata; first published 5 October 2023))
WCAG 2.2 is a W3C Recommendation first published on 5 October 2023 and republished on 12 December 2024 with errata fixes, and W3C says it does not replace WCAG 2.1.	The December 2024 update fixed errata and left the success criteria unchanged.	W3C Web Accessibility Initiative, WCAG 2 Overview (Updated 17 September 2026)
In the WebAIM Million 2026, low contrast text was the most common detected failure, found on 83.9% of home pages, with an average of 34 distinct instances per page.	February 2026 sample of one million home pages; WAVE automated detection; 79.1% in 2025.	WebAIM, Utah State University, The WebAIM Million: 2026 report on the accessibility of the top 1,000,000 home pages (Last updated 30 March 2026; results from February 2026)

Fact	Condition	Source
Colour Blind Awareness says colour blindness affects approximately 1 in 12 men (8%) and 1 in 200 women, and about 3 million people (about 4.5%) in the UK.	The source is a charity, Colour Blind Awareness, not the NHS. The wording is approximately, and the page gives no underlying study.	Colour Blind Awareness, About colour blindness (Page undated; site copyright 2026)

Your notes

Lab: how many testers?

Twelve made-up testers try a made-up lunch app with twenty problems in it. Add them one at a time, watch the problems found climb, and compare it with the curve the usual rule predicts.

What this is

Twelve made-up people try a made-up school lunch app that has twenty problems in it. You add them one at a time and see how many different problems have been found, next to the curve the usual model predicts.

What to do

- Move the Testers who have tried it slider to 1. Read how many problems that one person found.
- Move it up one at a time, and before each click guess whether the total will jump or creep.
- Tick Show the problems nobody has found yet and read the rare ones.
- Under Chance one tester finds one problem, in the model, try 10%, 20%, 31% and 40% and read how many testers it takes to find 85% of the problems.

What you should notice

The first few testers find most of the problems and each one after finds fewer new ones, so the line flattens. The testers are made up and the problems are very uneven, so the real curve and the model do not match exactly. That is why the rule of five is argued about.

Time	20 to 30 minutes
You need	A projector for the whole class, or one device per pair.
Where	Interactive on the page. Needs a screen. Starts at a screen.

Students will be able to

- Explain why a handful of testers finds many of the problems and each extra tester finds fewer new ones.
- Read a curve that levels off.
- Say why the rule of thumb is argued about, and what it assumes.

Running it

- Introduce the made-up lunch app and say the twenty problems are made up. Move the slider to one tester and ask how many problems they found.
- Add a tester at a time. Before each click ask the class to predict whether the total will jump or creep.
- Switch on Show the problems nobody has found yet and read some of the rare ones.
- Change the chance in the model between 10%, 20%, 31% and 40% and see how many testers it takes to find 85% of the problems.

Questions to ask

- Why did the early testers find more new problems than the later ones?
- What kind of problem would a small group of testers keep missing?

- If your product is used by very different people, what does that do to the rule of five?

Watch for

- Students taking five as a rule. The page shows it is an average from a model and that people argue about it.
- The made-up testers are fixed, so every device shows the same twelve. That is on purpose.
- Mixing up the number of testers with the number of problems.

The made-up testers, one at a time

Testers	Different problems found	Share of the 20	Model at 31%
0	0	0%	0%
1	8	40%	31%
2	10	50%	52%
3	14	70%	67%
4	14	70%	77%
5	15	75%	84%
6	15	75%	89%
7	17	85%	93%
8	17	85%	95%
9	17	85%	96%
10	17	85%	98%
11	17	85%	98%
12	17	85%	99%

At 31% the model says 6 testers reach 85% of the problems, and at 10% it says 19. The app, its 20 problems and its 12 testers are made up, and the testers are fixed, so every device shows these numbers.

The problems, from most to least obvious

Problem in the made-up lunch app	Chance one tester finds it
The Order button is the same colour as the background	85%
Nothing says whether the lunch has been ordered	80%
The back arrow throws away the basket	70%
The menu calls a sandwich a 'bundle'	60%
The text on the picture of the soup cannot be read	55%
The search box does not find 'jacket potato'	50%
The price shows after the order, not before	45%

Problem in the made-up lunch app	Chance one tester finds it
The 'Allergies' tab is hidden in a menu	40%
The buttons are too small to press with a thumb	35%
Signing in asks for a password the school never gave out	30%
The date picker starts at last year	25%
An error message says only 'Something went wrong'	20%
The basket empties after five minutes without a warning	18%
The vegetarian symbol is the same as the vegan one	15%
Zooming the page hides the Order button	12%
The receipt cannot be saved	10%
A screen reader reads the prices before the names	8%
The app logs you out in the lunch queue	6%
Two items share one photograph	5%
The help page is a link to the school homepage	4%

The evidence

Fact	Condition	Source
Nielsen says that he and Tom Landauer showed the number of usability problems found with n test users depends on N (the total number of problems) and L (the proportion found by a single user), with a typical L of 31%.	The formula appears on the NN/g page only as an image. The usual algebraic form is Found(n) = N(1 - (1 - L)^n), from Nielsen and Landauer's 1993 paper (ACM INTERCHI '93, pages 206 to 213), which we have not opened. With L at 31% and n at 5 it gives 84%, which NN/g rounds to 85%.	Nielsen Norman Group (Jakob Nielsen), Why You Only Need to Test with 5 Users (18 March 2000, modified 2 February 2024)
Nielsen says the first study with five participants finds 85% of the usability problems, and that after the fifth user you are mostly seeing the same findings again.	Nielsen's advice is to run several small tests of about 5 users and fix problems between them, not to stop after one test. He also says the curve shows you need at least 15 users to discover all the problems.	Nielsen Norman Group (Jakob Nielsen), Why You Only Need to Test with 5 Users (18 March 2000, modified 2 February 2024)

Fact	Condition	Source
Nielsen says the formula only holds for comparable users, that sites with several highly distinct user groups need more testing (3 to 4 users per group for two groups, at least 3 per group for three or more), and that 3 studies of 5 users beat one study of 15.	These are caveats stated by Nielsen on the same page as the 5-user advice.	Nielsen Norman Group (Jakob Nielsen), Why You Only Need to Test with 5 Users (18 March 2000, modified 2 February 2024)
In 2012 Nielsen wrote that 5 users suits qualitative usability studies, but quantitative studies need at least 20 users, card sorting at least 15 per user group, and eyetracking heatmaps 39 users.	Applies to the style of study: 5 is for qualitative studies that aim at insights, not numbers.	Nielsen Norman Group (Jakob Nielsen), How Many Test Users in a Usability Study? (3 June 2012, modified 31 January 2024)
Faulkner (2003) tested 60 users and sampled random sets from them: some sets of 5 found 99% of the problems but others found only 55%, and with 10 users the worst set found 80%, with 20 users 95%.	Abstract only; the full paper is behind a paywall. One study of one piece of software, so it shows the spread of outcomes and not a rule for every project. Author: Laura Faulkner, University of Texas at Austin.	Behavior Research Methods, Instruments, and Computers, held by the US National Library of Medicine, Beyond the five-user assumption: benefits of increased sample sizes in usability testing (abstract) (August 2003)

Your notes

Make: watch someone try

One student tries to do a small real task with something in your school, and says out loud what they are thinking. Everyone else watches, says nothing and writes down where they stop.

What this is

You watch someone try to do one small real task with something in your school, and write down what they do. You say nothing and you do not help. It is the cheapest way there is to find out what is wrong with something.

What to do

- Your teacher picks the task and one student volunteers. They say out loud what they are looking at and thinking as they go.
- Everyone else writes two columns: what the person did, and where they paused, went the wrong way or looked confused. Write what you saw, not what you think.
- After five minutes, compare notes. Find the pauses that more than one of you saw.
- Pick one and write the change you would make.

What you should notice

What people do and what they say they did are often different, and the pauses are where the design is failing. Watching is harder than it looks, because it is very hard not to help.

Time	25 to 35 minutes
You need	Something real to try (a school web page, a printer, a vending machine), paper and pens.
Where	Can be done with no devices. Starts out in the world.

Students will be able to

- Observe someone without helping them, and record what they did rather than what they said.
- Tell the difference between what a person did and the reason they gave.
- Turn three observations into one change you would make.

Running it

- Pick a real task with something in your school: finding the term dates on the school website, using the library catalogue, topping up a lunch account, working a vending machine.
- One student does the task and says out loud what they are looking at and thinking. They have never done it before, if you can manage that.
- Everyone else watches and writes down, in two columns, what the person did and where they paused or went wrong. Nobody helps and nobody talks.
- After five minutes, compare notes: which pauses did several people see? Choose one and write one change you would make.

Questions to ask

- What did they say they were doing, and what did they actually do?
- How hard was it not to help?
- Would the same thing have happened to someone who had never used a computer?

Watch for

- The person being tested feeling they are being marked. Say the thing is being tested, not them.
- Observers writing what they think rather than what they saw. Ask for the action, not the opinion.
- Private information on a screen. Use a public page or an account made for the lesson.

The evidence

Fact	Condition	Source
Service Standard point 1 says to develop a deep understanding of users and the problem you are trying to solve for them.	Last updated 30 May 2022, when links were added with no change to the content of the point.	Government Digital Service, GOV.UK Service Manual, Service Standard point 1: Understand users and their needs (Published 8 May 2019, last updated 30 May 2022)
Service Standard point 6 says to put in place a multidisciplinary team that can create and operate the service in a sustainable way.	Point 6 page last updated 29 January 2026.	Government Digital Service, GOV.UK Service Manual, Service Standard point 6: Have a multidisciplinary team (Last updated 29 January 2026)
The GOV.UK Service Manual says that when doing research you need to include disabled people and people who use assistive technologies, and that accessibility is different from assisted digital support.	Page published 9 March 2016; last updated 17 December 2025.	Government Digital Service, GOV.UK Service Manual, Making your service accessible: an introduction (Published 9 March 2016, last updated 17 December 2025)

Observation notes: what they did, and where they paused

Method: sort the cards

Put fourteen things a bus and train app can do into groups, then see how eight made-up people grouped them and where they agreed. Cut the cards from paper, or use the page.

What this is

A card sort. You group fourteen things a made-up bus and train app can do into groups that make sense to a passenger, then see how eight made-up people grouped the same cards.

What to do

- Cut or write the fourteen card names on slips of paper and sort them into groups of your own choosing. Give each group a name.
- Open the page. Under Pick a card, choose Buy a ticket and read which cards the eight made-up people put it with.
- Try Lost property and Sign in. Notice which ones the people agree about and which ones they split over.
- Compare with your own groups. Where did you agree with the eight, and where did you not?

What you should notice

Where six or more of the eight agree, the cards probably belong under one heading. Where nobody agrees, the card name is probably unclear or it belongs in more than one place. The eight people are made up, so the pattern is for practice.

Time	25 to 35 minutes
You need	Index cards or paper slips, or a projector or one device per pair.
Where	Interactive on the page. Can be done with no devices. Suits both a screen and the world outside it.

Students will be able to

- Group a list of things in a way that makes sense to the person using them, not the person who built them.
- Read a table of how often people put two things together.
- Say what it means when people disagree about where something goes.

Running it

- Give each pair fourteen slips with the card names from the page. Ask them to group the slips in a way that would make sense to a passenger, and to name each group.
- Do not tell them how many groups to make. Collect the groupings on the board.
- Open the page, pick a card and show how often the eight made-up people put each other card with it. Then compare with the class's own sorts.
- Ask where the class agreed and where it split, and what the split says about the words on the cards.

Questions to ask

- Where did people split, and was it the card or the group name that was the problem?
- Would a passenger group these the way the app's builder would?
- What would you do with a card that nobody can agree about?

Watch for

- Students sorting by who would make each feature, not by who would use it.
- The eight sorts are made up. Do not present the pattern as how real passengers think.
- Cards that sit alone. A lone card is information, not a mistake.

The fourteen cards

- Timetables
- Live departures
- Buy a ticket
- Season tickets
- Refunds
- Delays and cancellations
- Lost property
- Help for disabled passengers
- Contact us
- Trip planner
- Station maps
- Fares
- Student discounts
- Sign in

What the eight made-up people agreed on

Card	Put with it most often	People out of 8
Timetables	Trip planner	8
Live departures	Timetables, Trip planner	7
Buy a ticket	Season tickets, Fares	8
Season tickets	Buy a ticket, Fares	8
Refunds	Buy a ticket, Season tickets, Fares	5
Delays and cancellations	Live departures	6
Lost property	Contact us	6
Help for disabled passengers	Lost property, Contact us	5
Contact us	Lost property	6
Trip planner	Timetables	8
Station maps	Timetables, Help for disabled passengers, Trip planner	4

Card	Put with it most often	People out of 8
Fares	Buy a ticket, Season tickets	8
Student discounts	Buy a ticket, Season tickets, Fares	7
Sign in	Student discounts	5

The eight people and their sorts are made up. Six or more of the eight is where the page says cards probably belong under one heading.

The evidence

Fact	Condition	Source
NN/g defines card sorting as a research method in which participants place individually labelled cards into groups that make most sense to them, to uncover users' mental models of information architecture.	NN/g's separate guidance is at least 15 users per user group for card sorting.	Nielsen Norman Group, Card Sorting: Uncover Users' Mental Models for Better Information Architecture (2 February 2024, modified 6 June 2024)

Your notes

Make: prototype on paper

Draw a school lunch ordering screen on paper in ten minutes, then swap and test someone else's by pointing and talking, with you playing the part of the computer.

What this is

A paper prototype: a screen drawn on paper in ten minutes, tested by a real person who pretends it is real. It is how a team finds the big mistakes before anyone has built anything.

What to do

- Draw a school lunch ordering screen on one sheet of paper, for someone in a hurry. Buttons are boxes. Take no more than ten minutes.
- Swap with a partner. They are the user: they point at what they would press and say what they expect to happen. You are the computer: you show or draw the next screen when they press something.
- Do not help. Write down three things they did that you did not expect.
- Swap back, then change your drawing for one of the things you saw.

What you should notice

A tester will find a problem in your drawing in minutes that you could not see in an hour of looking at it yourself. Paper is quick and cheap to throw away, so nobody minds being told it is wrong.

Time	30 to 40 minutes
You need	Paper, pens and scissors. No devices.
Where	Can be done with no devices. Starts out in the world.

Students will be able to

- Sketch a screen quickly enough that throwing it away does not hurt.
- Test an idea with a real person before anything is built.
- Say what they learned from watching someone use their drawing.

Running it

- Give a brief: a school lunch ordering screen for someone who is in a hurry. Students have ten minutes to draw it on paper, one screen on one sheet, with buttons drawn as boxes.
- Pairs swap. One person is the user and says what they would press. The other is the computer: they hold up the screen that would come next, which they draw or cut out as they go.
- Swap back and ask each pair to write down three things the tester did that the drawer did not expect.
- Close by asking what they would change, and how long it took to find that out compared with building the app first.

Questions to ask

- What did you learn from watching someone use your drawing that you could not have learned by looking at it?
- How much of the design did you throw away, and did that matter?
- What can you not find out with paper?

Watch for

- Students trying to make the drawing look good. Ugly paper is quicker to change and people are kinder to criticise it.
- The computer helping the user. They only show the next screen when the user presses something.
- Scissors. Agree how they are handled before you start.

The evidence

Fact	Condition	Source
The GOV.UK Service Manual says teams must make prototypes of a service to explore, share and test different designs before committing to building anything, and that prototypes range from a pen and paper sketch to a code prototype.	The page says sketches suit discussing basic ideas and code prototypes are better for user research because they are more realistic; it says prototype code should not be copied into production.	Government Digital Service, GOV.UK Service Manual, Making prototypes (First published 18 October 2016)
The Design Council describes the Double Diamond as a visual representation of the design and innovation process, a simple way to describe the steps in any design and innovation project.	The page is undated. The framework is licensed under CC BY 4.0.	Design Council, The Double Diamond (Page undated; copyright 2026)
The Design Council says the Double Diamond has four phases, named Discover, Define, Develop and Deliver.	The history page says the team 'deliberately' sought a memorable device. The framework for innovation page stresses that the process is not linear.	Design Council, History of the Double Diamond (Page undated; copyright 2026)
The Design Council says its team began work on the Double Diamond in 2003 and started sharing it at conferences in 2004.	The year 2005, often quoted, does not appear on either Design Council page. The history page says work began in 2003 and sharing began in 2004.	Design Council, History of the Double Diamond (Page undated; copyright 2026)
Design Council says it later incorporated lessons into an expanded Double Diamond within its Framework for Innovation, which adds four principles including 'Iterate, iterate, iterate'.	The page gives no year for the update. It says the process is not linear and no idea is ever finished.	Design Council, Framework for Innovation (Page undated)

Your notes

Lab: where do people give up?

A made-up school trip payment form loses most of the people who start it. Guess where, then find out, and see why the step that loses the most people is not always the one to fix first.

What this is

A made-up school trip payment form, with how many of a thousand parents got to each step. You guess where the most people were lost, then see the numbers two ways.

What to do

- Look at the five bars. Under Where were the most people lost, pick the step you think loses the most people.
- Read the table. For each step it shows the share who carried on and how many were lost.
- Read the three boxes: Most people lost, Smallest share carried on, and Got all the way.
- Decide which step you would fix first, and write what you would need to find out before you change it.

What you should notice

The step that loses the most people is not the same as the step with the smallest share carrying on. A number tells you where people left but never why.

Time	20 to 25 minutes
You need	A projector for the whole class, or one device per pair.
Where	Interactive on the page. Needs a screen. Starts at a screen.

Students will be able to

- Work out what share of people carry on from one step to the next.
- Tell the step that loses the most people from the step with the smallest share carrying on.
- Say what you would want to find out before changing the form.

Running it

- Show the five steps and say the numbers are made up. Ask each student to write down where they think most people were lost, then press their choice.
- Read the table of the share who carried on and the number lost at each step. Show the three boxes.
- Ask whether the step losing the most people is the same as the step with the smallest share carrying on, and why that matters.
- Finish by asking what you would want to find out before changing the form, and how you would find it out.

Questions to ask

- Which would you fix first, and what would make you choose?
- A number says people left. What does it not say?
- What would you ask someone who left at the payment step?

Watch for

- Students taking the numbers as proof of why people left. They show where, not why.
- Confusion between a share and a count. Write both on the board for one step.
- The data is made up. Do not let it be quoted as a real school's figures.

The answer

Step	People	Carried on	Lost
Got the link	1,000		
Opened the form	640	64%	360
Picked the trip	600	94%	40
Added payment details	270	45%	330
Paid	240	89%	30

24% got all the way. The most people were lost before "Opened the form", 360 of them. The smallest share carried on before "Added payment details". The numbers are made up.

Your notes

Lab: is B really better?

Version B of a made-up button beats version A, 15% against 12%. Is that a win or luck? Make the test bigger to find out, then watch twenty tests where nothing changed at all.

What this is

A made-up button comes in two versions. B did better than A, 15% against 12%. The page shows whether that gap is a win or luck, in tests of different sizes, and then twenty tests where the two versions were exactly the same.

What to do

- Under People who saw each version, start at 1,000. Read the gap, the chance of a gap that big by luck, and the range the true gap probably lies in.
- Choose 100, then 10,000. Notice what stays the same and what changes.
- In part two, count the tests marked looks like a win. Every one of them is two identical versions.
- Say, in one sentence, why you should not trust one lucky test.

What you should notice

The gap is the same size every time, 3 points, but with 100 people it is nowhere near enough to tell from luck and with 10,000 it is clear. And in twenty tests of two identical versions, about one still looks like a win.

Time	20 to 30 minutes
You need	A projector for the whole class, or one device per pair.
Where	Interactive on the page. Needs a screen. Starts at a screen.

Students will be able to

- Explain why the same gap can mean nothing in a small test and something in a big one.
- Read a chance of luck and a range for the true gap.
- Say why a test that looks like a win once in twenty tries proves nothing on its own.

Running it

- Start at 1,000 people on each side: 12% against 15%. Ask the class whether B won, and let them argue it before you read the chance of luck.
- Move up and down through the sizes. Ask what changes and what does not.
- Part two: show the twenty tests where both versions are the same. Count the ones that look like a win.
- Ask what that means for a team that runs lots of tests and only reports the wins.

Questions to ask

- Why does the gap stay the same while the answer changes?
- If you ran twenty tests and one looked like a win, would you trust it?
- What else besides luck could make B look better?

Watch for

- Students reading the chance of luck as the chance that B is better. It is not the same thing, and the page words it carefully.
- The twenty identical tests use a fixed seed, so every device shows the same twenty. A real set would vary.
- The test uses a normal approximation. It is fine at these sizes and rough at 100 people, and the page says so.

The same gap at every size

People on each side	Clicks A	Clicks B	Gap	Chance by luck	True gap probably between
100	12	15	3.0 points	53.5%	-6.5 and 12.5 points
300	36	45	3.0 points	28.2%	-2.5 and 8.5 points
1,000	120	150	3.0 points	5.0%	0.0 and 6.0 points
3,000	360	450	3.0 points	under 0.1%	1.3 and 4.7 points
10,000	1,200	1,500	3.0 points	under 0.1%	2.1 and 3.9 points

Part two: 20 tests of two identical versions with 500 people on each side and 12% clicking. 1 of them look like a win at the 5% line, with no change at all. The people and clicks are made up, and the test is a two-proportion z test with a normal approximation, which is rough at 100 people.

The evidence

Fact	Condition	Source
The Office for Health Improvement and Disparities says A/B testing compares 2 versions of a design to see which performs better, and warns that you will need many users for the data to be statistically significant.	Written for digital health products but generic about A/B testing. The same page says its worked example (161,587 text reminders, 9 versions) was 'a large A/B test' and that 'A/B testing is often carried out on a much smaller scale'.	Office for Health Improvement and Disparities, GOV.UK, A/B testing: comparative studies (Published 30 January 2020, last updated 3 September 2020)
OHID guidance says answers drawn from a sample are estimates, that confidence depends on the size of the sample, and that a wide confidence interval means the estimate is less precise.	This is general statistical guidance for evaluating digital health products, not a page about small A/B tests. The link to small tests is our own inference.	Office for Health Improvement and Disparities, GOV.UK, Analyse your data: evaluating digital health products (Published 30 January 2020)
The KS4 maths programme of study says pupils should understand that unbiased samples tend towards theoretical probability distributions with increasing sample size, and infer properties of populations from a sample while knowing the limitations of sampling.	Standard type, so taught to all students.	Department for Education, National curriculum in England: mathematics programmes of study (Updated 28 September 2021)

Your notes

Three true stories about design

Each story below comes from a source you can open, and each ends with a question for the class. The third is about a real alert that frightened real people, so read it first and decide how to handle it.

A map that ignored geography. The Transport for London archive says that in 1931 Harry Beck, an unemployed engineering draughtsman, sketched a version of the Underground diagram that straightened the lines, tried diagonals, evened out the distances and showed the connections instead of the geography. It was rejected: 45 and 90 degree angles were thought too revolutionary and incomprehensible for the public. Nearly a year later the publicity team changed its mind and trialled it, and Beck was paid 10 guineas for the design, the card folders and the artwork. The V&A points out the catch: ignoring geography makes the map misleading about the distances between stations, and very clear to use. Which matters more to someone changing trains?

A sign for reading at speed. The Design Museum says Jock Kinneir and Margaret Calvert designed Britain's road and motorway signs between 1957 and 1967. Kinneir began with a question: what do I want to know, trying to read a sign at speed. They concluded that a mix of upper and lower case letters would be more legible than capitals, developed the typeface later named Transport, tested signs in a car park and in Hyde Park, and used a new reflective material so white lettering could be read at night. The Department for Transport says the committee on motorway signs was set up in 1958, and the committee on all other roads began in 1961 (the Design Museum dates the first to 1957). The GOV.UK brand guidelines say the GOV.UK typeface is based on the road sign typeface. What would you have tested first?

A menu that sent a real alert. On 13 January 2018 a false alert about a ballistic missile threat was sent to the public in Hawaii. The US Federal Communications Commission found that it caused 38 minutes of confusion, fear and uncertainty before it was corrected, and that it came from a combination of human error and inadequate safeguards. One of those safeguards was the screen: the software let people send live alerts and internal test alerts from the same interface, with the test option and the live option on the same drop-down menu, and the confirmation prompt was the same for both and did not show the message text. The FCC says common industry practice is to keep the live system separate. It also says the employee mistakenly believed the threat was real, so the menu was one part of what went wrong and not the whole of it. What would you change, and who would you test it with?

The evidence

Fact	Condition	Source
TfL's archive research guide says Harry Beck, an unemployed engineering draughtsman, produced a sketch of the Underground Diagram in 1931, straightening the lines, experimenting with diagonals and evening out the distances, and emphasising connections over geography.	TfL Corporate Archives guide, footer dated 16 October 2024. The sketch was submitted to the Publicity Department and rejected for its use of 45 and 90 degree angles.	Transport for London, TfL Corporate Archives Research Guide 24: Harry Beck (Guide footer dated 16 October 2024)

Fact	Condition	Source
TfL's archive guide says the Publicity Team changed its mind nearly a year later, trialled Beck's diagram after he made conciliatory changes, and that Beck received 10 guineas for the design, card folders and artwork.	The guide gives no print-run number. Ten guineas is the guide's wording for the design, the card folders and the artwork together. The guide adds that his fees stayed unchanged despite large reprint orders.	Transport for London, TfL Corporate Archives Research Guide 24: Harry Beck (Guide footer dated 16 October 2024)
TfL says Harry Beck, an Underground electrical draughtsman, produced the Tube map design in 1933, based it on circuit diagrams rather than geographical accuracy, and that it was first rejected as too radical until a successful trial print-run.	TfL's page gives 1933 as the date of the design and its archive guide gives 1931 for the first sketch.	Transport for London, Harry Beck's Tube map (Page undated)
The V&A says Beck ignored geographical accuracy to emphasise connections and interchanges, which made the map misleading about distances between stations but very clear to use.	The V&A record is for a 1934 poster map and says the design was first introduced to the public in 1933.	Victoria and Albert Museum, Map (Beck, Harry), object O1361001 (Record created 7 July 2016)
The Design Museum says Jock Kinneir and Margaret Calvert designed the British road and motorway signage system from 1957 to 1967, with coordinated lettering, colours, shapes and symbols for motorways in the late 1950s and all other roads in the early 1960s.	Design Museum designer profile, no page date shown. Calvert became a partner in 1964 per the same page.	Design Museum, Jock Kinneir and Margaret Calvert (Page undated)
The Design Museum says Kinneir started from the question of what a driver wants to know when reading a sign at speed, and concluded that mixed upper and lower case letters would be more legible than capitals, leading to the Transport typeface.	Quotes are Kinneir's and Calvert's, as reported by the Design Museum. The page also describes testing the signs in a car park, in Hyde Park and at Benson Airfield with signs on cars driven towards observers, and says the Road Research Laboratory found a later 1963 lettering revision gave only marginal readability gain.	Design Museum, Jock Kinneir and Margaret Calvert (Page undated)
The Design Museum says the signs were tested in a car park and in Hyde Park, first appeared on the Preston by-pass in 1958, and used a new reflective material for white lettering so signs could be read at night.	Design Museum profile; no page date shown.	Design Museum, Jock Kinneir and Margaret Calvert (Page undated)
The Department for Transport's 'Know Your Traffic Signs' says the Anderson Committee was set up in 1958 to consider new motorway signs (larger, blue backgrounds) and the Worboys Committee began in 1961 to review the complete system of traffic signing, with conversion of British signs beginning in 1965.	Crown copyright 2023. The Design Museum dates Anderson's appointment to 1957, a year earlier than the Department for Transport does.	Department for Transport, Know Your Traffic Signs (Official edition, Crown copyright 2023)

Fact	Condition	Source
The National Archives catalogues the Worboys report as the 'Report of the Committee on Traffic Signs for All-Purpose Roads 1963'.	A catalogue entry for file MT 103/275, covering 1963 to 1965, which holds a file about considering action on the report.	The National Archives, Report of the Committee on Traffic Signs for All-Purpose Roads 1963 (file MT 103/275) (Covering dates 1963 to 1965)
The GOV.UK brand guidelines say GDS Transport is based on the typeface Jock Kinneir and Margaret Calvert designed in the 1960s for UK road signs, made to be clear and readable for drivers travelling at high speeds, and adapted by GDS in 2012.	GOV.UK brand guidelines page; no date shown.	Government Digital Service, Typography, GOV.UK brand guidelines (Page undated)
The FCC report says Hawaii's alert software let users send live and internal test alerts from the same interface, and its drop-down menu listed the internal 'Test missile alert' option together with the 'Missile alert' option on the same screen.	The FCC adds that common industry practice is to keep the live environment separate, with clear visual cues for tests. It found a combination of human error and inadequate safeguards, not the menu alone: the employee mistakenly believed the threat was real. The menu in the report's appendix is the version updated after the false alert.	Federal Communications Commission, Public Safety and Homeland Security Bureau, Report and Recommendations: Hawaii Emergency Management Agency, January 13, 2018 False Alert (Report dated April 2018; released 10 April 2018)
The FCC report says the confirmation prompt read 'Are you sure that you want to send this Alert?', was the same for tests and live alerts, and did not let the officer review the message text.	The FCC timeline places this at 8:07 a.m. Hawaii Standard Time on 13 January 2018. Footnote 87 says all vendors interviewed offered a pause at the end, but some display the message text and HI-EMA's software did not.	Federal Communications Commission, Public Safety and Homeland Security Bureau, Report and Recommendations: Hawaii Emergency Management Agency, January 13, 2018 False Alert (Report dated April 2018; released 10 April 2018)
The FCC Bureau found that a combination of human error and inadequate safeguards contributed to the false alert, which caused 38 minutes of confusion, fear and uncertainty before a correction.	The alert text was 'BALLISTIC MISSILE THREAT INBOUND TO HAWAII. SEEK IMMEDIATE SHELTER. THIS IS NOT A DRILL.' The report is dated April 2018.	Federal Communications Commission, Public Safety and Homeland Security Bureau, Report and Recommendations: Hawaii Emergency Management Agency, January 13, 2018 False Alert (Report dated April 2018; released 10 April 2018)

A map that ignored geography, a road sign built to be read at speed and a menu that sent a real alert, each told from a source, with questions that make a class decide what the designer should have done.

What this is

Three true stories about design, each from a source you can open. Read one, answer three questions, then swap and argue with another group.

What to do

- Get one story from your teacher. Read it, including the source named at the end.
- Answer: what was the problem, what did the designer change, and who did it help or hurt?
- Swap with another group. Tell them what you would have tested first, and with whom.
- As a class, say what the three stories have in common.

What you should notice

In each one a small choice about how something looked or worked had a big effect on a lot of people, and in each one someone could have found out earlier by watching a real person try it.

Time	20 to 30 minutes
You need	Printed copies of the three stories from the teacher pack, or a projector.
Where	Can be done with no devices. Suits both a screen and the world outside it.

Students will be able to

- Say what each designer changed and who it helped.
- Explain how a small interface choice can have a large effect on people.
- Argue for a different design and say what they would test first.

Running it

- Print the three stories from the teacher pack, one per group, with their sources. Each group reads its story and answers: what was the problem, what did the designer change, who did it help.
- Groups swap and argue with each other: what would you have tested first, and who would you have tested it with?
- Bring the class together and ask what the three stories have in common.
- Ask students to find a story of their own from something they use every day.

Questions to ask

- Was the problem the designer's fault, the user's, or neither?
- What could you have tested cheaply before anything was built?
- Who was left out of the design?

Watch for

- Treating a design as if one person did it all. Each story names its sources and who did what.
- Hindsight. Ask what the designer could have known at the time.
- The third story is about a real alert that frightened real people. Handle it with care and let students step out of it.

Your notes

Eight kinds of product and design job

Pick any of the eight areas of product and design work, from user research to design systems, and see the jobs in it, what it suits, what it pays and where the pay comes from.

What this is

The eight areas of product and design work, taken from the TechSkills Career Matrix, with the jobs in each, what it suits, and what it pays with the source for the pay.

What to do

- Choose an area from the tabs. Read what the work is and the jobs in it.
- Read Jobs in this area and Best suited to, then find Pay, with its source.
- Choose a second area that sounds nothing like the first. Compare them.
- Pick the one you would try first and write why.

What you should notice

Design is not only drawing. User research, product management, content design and accessibility each ask for different strengths, and several do little or no drawing at all.

Time	15 to 20 minutes
You need	A projector or one device per pair.
Where	Interactive on the page. Needs a screen. Suits both a screen and the world outside it.

Students will be able to

- Name at least three different jobs in product and design that do not involve drawing.
- Say which area they would want to try first and why.
- Find the pay for a role and the source for it.

Running it

- Open the map and give each pair a different area of work. Ask them to find the jobs in it and what it suits.
- Pairs report back in one sentence: a job that surprised them, and one thing that job does that is not drawing.
- Look at one area's pay together and click through to its source. Ask what the figure does and does not tell you.
- Point to the full careers page for students who want more.

Questions to ask

- Which of these jobs would you not have known existed?
- Which needs the most writing, and which the most maths?
- Which would you try first, and what would you need to find out?

Watch for

- Students thinking design means drawing. Several areas here do little drawing at all.
- Pay ranges are a guide from the sources shown and vary by employer and place.
- Any area can be reached by more than one route. Nothing here is a ceiling.

Area	Jobs	Pay, with its source	Best suited to
01. UX Research	UX Researcher, Content Strategist, UX Writer, A11y Specialist	£30,000 to £65,000+ (Accessibility Specialist to Senior UX/User Researcher, Glassdoor & IT Jobs Watch UK)	Curious minds who love asking 'Why?' and digging into behaviour.
02. UI & Product Design	UI Designer, Product Designer, Design System Lead, Interaction Designer	£38,322 to £100,000+ (median, Junior UX Designer to Lead Product Designer, IT Jobs Watch UK)	Creative builders with a sharp eye for detail and visual harmony.
03. Product Management	Product Manager, Product Owner, Associate Product Manager, Feature Lead	£32,500 to £95,000+ (median, Junior Product Owner to Head of Product Management, IT Jobs Watch UK)	Leaders who enjoy the intersection of business, tech, and design.
04. Service & Experience	Service Designer, CX Manager, Strategic Designer, Journey Lead	£50,000 to £80,000+ (Service Designer to Lead Service Designer, IT Jobs Watch UK, CX Manager/Journey Lead widened, no dedicated listings found)	Big-picture thinkers who want to fix broken systems and flows.
05. Design Leadership	Head of Design, Design Manager, Creative Director, VP Design	£57,000 to £165,000+ (Design Manager to VP Design/Creative Director, Glassdoor UK)	Experienced designers who find joy in helping others grow.
06. Emerging Design	Spatial Designer, AI Experience Lead, VUI Designer, Future Tech Designer	£35,000 to £95,000+ (Conversation/Voice UI Designer to Senior Conversational AI Designer, Glassdoor UK, Spatial/Future Tech Designer widened, no UK listings found)	Early adopters who want to define the rules for new technologies.
07. Content Design & UX Writing	Content Designer, UX Writer, Microcopy Specialist, Information Designer	£34,000 to £65,000+ (Content Strategist 25th percentile to Senior Content Designer, Glassdoor & IT Jobs Watch UK)	Wordsmiths who believe good writing is invisible, it just makes sense.
08. Design Systems & Accessibility	Design Systems Lead, Accessibility Specialist, UI Engineer, Design Ops Manager	£37,818 to £90,000+ (Digital Accessibility Specialist to UI Engineer, Glassdoor & IT Jobs Watch UK)	Systems thinkers who care as much about consistency as they do about craft.

The evidence

Fact	Condition	Source
The government capability framework for digital roles is now called the Government Digital and Data Profession Capability Framework, last updated 30 September 2026, and its website has moved to a new domain.	The page says its 30 September 2026 update changed only the domain name. It was previously called the DDaT Capability Framework. Each role page carries its own last updated date.	Government Digital and Data Profession, GOV.UK, Government Digital and Data Profession Capability Framework (Published 23 March 2017, last updated 30 September 2026)
The framework groups eight roles under User-centred design: accessibility specialist, content designer, content strategist, graphic designer, interaction designer, service designer, technical writer and user researcher.	Roles as listed on the framework's home page on 4 November 2026. Product manager sits in a different group, Product and delivery roles.	Government Digital and Data Profession, GOV.UK, Government Digital and Data Profession Capability Framework (Published 23 March 2017, last updated 30 September 2026)
The framework groups product manager with agile coach, business analyst, delivery manager, digital portfolio manager, programme delivery manager and service owner under Product and delivery roles.	Roles as listed on the framework's home page on 4 November 2026.	Government Digital and Data Profession, GOV.UK, Government Digital and Data Profession Capability Framework (Published 23 March 2017, last updated 30 September 2026)
The framework says user researchers plan, design and carry out research with users to help teams get a deep understanding of the people who use government services.	Wording is from the framework's own role page, which describes the role in central government, not every employer. Role page last updated 29 August 2025.	Government Digital and Data Profession Capability Framework, User researcher (role page) (Last updated 29 August 2025)
The framework says an interaction designer works out the best way to let users interact with services, in terms of both overall flow and individual design elements.	Wording is from the framework's own role page, which describes the role in central government, not every employer. Role page last updated 28 August 2026.	Government Digital and Data Profession Capability Framework, Interaction designer (role page) (Last updated 28 August 2026)
The framework says content designers make things easier for people to understand and use.	Wording is from the framework's own role page, which describes the role in central government, not every employer. Role page last updated 28 August 2026.	Government Digital and Data Profession Capability Framework, Content designer (role page) (Last updated 28 August 2026)
The framework says service designers design the end-to-end journey of a service.	Wording is from the framework's own role page, which describes the role in central government, not every employer. Role page last updated 29 May 2026.	Government Digital and Data Profession Capability Framework, Service designer (role page) (Last updated 29 May 2026)

Fact	Condition	Source
The framework says a product manager makes sure their products provide value and achieve the right outcomes by balancing user and business needs.	Wording is from the framework's own role page, which describes the role in central government, not every employer. Role page last updated 28 February 2025.	Government Digital and Data Profession Capability Framework, Product manager (role page) (Last updated 28 February 2025)
The GOV.UK Service Standard has 14 points, starting with "Understand users and their needs", "Solve a whole problem for users" and "Provide a joined up experience across all channels".	The landing page shows no date. Individual points were last updated between 30 May 2022 and 29 January 2026.	Government Digital Service, GOV.UK Service Manual, Service Standard (Individual points last updated between 30 May 2022 and 29 January 2026)

Two ways in, side by side

Two routes into product and design are worth putting next to each other, and neither comes first on this page. One is a university degree. The other is a degree apprenticeship, which is a job with a degree in it. Product and design is a screen and studio career, so unlike some of the other families there is no hard hat route here to set against the desk, and we have not made one up.

Skills England lists the Digital UX professional apprenticeship, ST0470, at level 6, typically 48 months, and the Creative digital design professional apprenticeship, ST0625, at level 6, typically 36 months. Both are integrated degree apprenticeships. It also lists a Service designer standard, ST0894, at level 6 and 24 months, and a Digital product manager standard, ST0964, at level 4 and 24 months, which is the only one of the four below degree level. The TechSkills Career Matrix maps the first two.

What about degrees? The Design Council's data tables show that 68.1% of the people in its broad list of design occupations held a degree or equivalent in 2025, and 77.4% in its digital design group. That list includes programmers and engineers, and the table gives the highest qualification held, not the route taken, so it cannot tell you how many designers taught themselves or built a portfolio. We found no government source that does, and we would rather say so than guess.

There is a third door at level 3. The T Level in Digital Software Development is a two-year course that lists web designer and user experience designer among the roles students can progress into, and says students can use it to go on to a higher apprenticeship or a degree course. And the Chartered Society of Designers awards Chartered Designer status through a five-stage pathway that any designer may apply for.

The degree route and the apprenticeship route into design side by side, with the same information for each, from the people who set the standards.

What this is

The university degree route and the paid degree apprenticeship route into design, in two equal columns, with the same facts for each from the people who set the standards.

What to do

- Read the headings of the two columns before you read the detail.
- In each column find the level, how long it takes, and what the day looks like.
- Open the apprenticeship standard from its link and find the entry requirements.
- Write one question you would still ask before choosing either, and say who you would ask.

What you should notice

Neither route is the better one. They suit different people, both lead to degree level and a route in is not a ceiling: a student can move between them.

Time	20 to 25 minutes
You need	A projector or one device per pair.
Where	Interactive on the page. Needs a screen. Suits both a screen and the world outside it.

Students will be able to

- Compare a degree route and a degree apprenticeship route on level, length and who pays.
- Say what each route tends to suit, as a tendency and not a rule.
- Explain that a route in is not a ceiling and that students can move between routes.

Running it

- Show the two columns together and read the headings. Ask students to say what each column has in common before you compare them.
- Ask pairs to take one column each and list three questions someone choosing it would want answered. Then check the page for the answers.
- Open the standard for the apprenticeship column and read the entry and length together.
- Close by asking what a student who picked one route and wanted to change would do.

Questions to ask

- What does each route cost a student, and what does it pay them?
- Who is each route likely to suit, and who might it leave out?
- What is missing from both columns?

Watch for

- Treating either column as the better one. They have equal weight and a student who picks one is not locked in.
- Entry requirements change each year and by employer. Send students to the standard, the employer and the course for the current ones.
- Both routes lead to degree level. The page says there is no shorter standard in the Matrix, and that other routes exist.

Grad cap: the university degree route

Often suits someone who wants to study design in some depth before they work, or who is not yet sure which area of design they would choose.

Step	Level and length	What it is
T Level in Digital Software Development	Level 3, 2 years	A course that lists web designer and user experience designer among the roles students can progress into, and says students can use it to go on to a related higher apprenticeship or a degree course.
A BA or BSc degree in a design subject	Level 6	The same discipline studied at university. The UX apprenticeship standard, for example, names a BA or BSc Digital User Experience degree at level 6 as the degree its apprentices complete.

Where it can lead: The Chartered Society of Designers says any designer may apply for its five-stage pathway to Chartered Designer status, however they trained. T Level students can also go on to a higher apprenticeship.

The evidence

Fact	Condition	Source
The T Levels website says the Digital Software Development T Level is a level 3, 2-year course, and lists web designer and user experience (UX) designer among the roles students can progress into. It also says students can use the T Level to do a related higher-level apprenticeship or degree course.	The page names UX designer as a possible role but does not describe a UX design specialism: its specialist content is on designing, implementing and testing software.	T Levels, Department for Education, Digital Software Development (T Level) (Page undated)
ST0470 is an integrated degree apprenticeship: the standard requires a BA or BSc Digital User Experience (UX) degree at level 6.	Listed under Other mandatory qualifications. English and maths must also be completed under the funding rules.	Skills England, Digital user experience (UX) professional (integrated degree), ST0470 (Page updated 16 February 2022; approved for delivery 3 February 2020)
The Design Council data tables show 68.1% of people in design occupations had a degree or equivalent in 2025, with 6.7% holding other higher education, 21.5% GCSE or A level and 3.8% other or no qualification.	Annual Population Survey estimates for the Design Council's broad design occupations list, which includes engineers, programmers and architects. The table gives the highest qualification held, not the route taken, so it cannot show how many were self-taught or built a portfolio. Percentages are the table's figures rounded to one place.	BOP Consulting for the Design Council, Data tables for Design Economy 2026 (Design Economy 2026, file last modified 3 September 2026)
In the Design Council data tables, 77.4% of the digital design group and 75.4% of the graphic design group held a degree or equivalent in 2025, against 27.9% in the craft group.	Group-level Annual Population Survey estimates. The digital group includes programmers, so this is not a UX-only figure. Percentages are the table's figures rounded to one place.	BOP Consulting for the Design Council, Data tables for Design Economy 2026 (Design Economy 2026, file last modified 3 September 2026)
The Chartered Society of Designers says Chartered Designer status is awarded to designers who demonstrate and maintain the highest standards of professional design practice, through a five-stage pathway of registration, portfolio, review, ratification and compliance.	Description is the Society's own. Application fees and annual subscriptions apply (the page lists a £245 application fee for non-members).	Chartered Society of Designers, Chartered Designer (Page undated)
The Chartered Society of Designers says it has held a Royal Charter since 1976 and holds The Register of Chartered Designers.	The Society's own statement about itself.	Chartered Society of Designers, Chartered Society of Designers (Page undated)

The degree apprenticeship route

Often suits someone who would rather learn the work inside an employer from the start, and who is comfortable with a longer route in exchange for being employed while they study.

Step	Level and length	What it is
Digital user experience (UX) professional (integrated degree) (ST0470)	Level 6, typically 48 months	Investigating, analysing and designing the experience people have with digital products and services.
Creative digital design professional (integrated degree) (ST0625)	Level 6, typically 36 months	Providing compelling digitally enabled design solutions to internal and external clients.
Service designer (ST0894)	Level 6, typically 24 months	Improving or redesigning services and developing new service propositions to meet the needs of the user as well as the business and other stakeholders.
Digital product manager (ST0964)	Level 4, typically 24 months	Driving and managing digital products through the complete product lifecycle.

Where it can lead: The standards list typical job titles: UX designer, UX researcher, interaction designer and UI designer for ST0470, digital designer, web designer and creative director for ST0625, and associate product manager, product manager and lead product designer for ST0964.

The evidence

Fact	Condition	Source
Skills England lists the Digital user experience (UX) professional (integrated degree) apprenticeship, ST0470, as a level 6 standard with a typical duration of 48 months, approved for delivery and available for starts.	The 48 months does not include the end-point assessment. Version 1.0, page updated 16 February 2022. The page gives no date for a review or withdrawal.	Skills England, Digital user experience (UX) professional (integrated degree), ST0470 (Page updated 16 February 2022; approved for delivery 3 February 2020)
Skills England describes the Digital UX professional occupation as investigating, analysing and designing the experience people have with digital products and services.	This is the standard's own overview line, written by the employer group that developed it.	Skills England, Digital user experience (UX) professional (integrated degree), ST0470 (Page updated 16 February 2022; approved for delivery 3 February 2020)
The ST0470 standard lists typical job titles including UX designer/engineer, UX researcher, interaction designer, UI designer, UX information architect and UX product manager.	Job titles are as listed by the standard and are examples, not a complete list of UX roles.	Skills England, Digital user experience (UX) professional (integrated degree), ST0470 (Page updated 16 February 2022; approved for delivery 3 February 2020)
Skills England lists the Creative digital design professional (integrated degree) apprenticeship, ST0625, as a level 6 standard with a typical duration of 36 months, approved for delivery and available for starts.	The 36 months does not include assessment. Version 1.0, page updated 4 February 2022. The page gives no date for a review or withdrawal, and it calls the degree integrated in one place and non-integrated in another.	Skills England, Creative digital design professional (integrated degree), ST0625 (Page updated 4 February 2022; approved for delivery 3 February 2020)

Fact	Condition	Source
Skills England says the broad purpose of the Creative digital design professional occupation is to provide compelling digitally enabled design solutions to internal and external clients.	Occupation summary wording from the standard.	Skills England, Creative digital design professional (integrated degree), ST0625 (Page updated 4 February 2022; approved for delivery 3 February 2020)
The ST0625 standard lists typical job titles including digital designer, interaction designer, web designer, creative designer and creative director.	Job titles are examples listed by the standard.	Skills England, Creative digital design professional (integrated degree), ST0625 (Page updated 4 February 2022; approved for delivery 3 February 2020)
Skills England lists a Service designer apprenticeship, ST0894, at level 6 with a typical duration of 24 months and a maximum funding band of £15,000.	An end-point assessment of about 6 months comes on top of the 24 months, and Skills England lists the route as Business and administration, not Digital. Approved for delivery 23 March 2023.	Skills England, Service designer, ST0894 (Page updated 28 March 2023; approved for delivery 23 March 2023)
Skills England describes the Service designer occupation as improving or redesigning services and developing new service propositions to meet the needs of the user as well as the business and other stakeholders.	Taken from the overview on the standard's page.	Skills England, Service designer, ST0894 (Page updated 28 March 2023; approved for delivery 23 March 2023)
Skills England lists a Digital product manager apprenticeship, ST0964, at level 4 with a typical duration of 24 months and a maximum funding band of £18,000.	Version 2.0, a revised standard and assessment plan, has an earliest start date of 1 September 2026. Version 1.0 had a latest start date of 31 August 2026. Route: Digital. This is a level 4 standard, not a degree apprenticeship.	Skills England, Digital product manager, ST0964 (Version 2.0, page updated 8 September 2026; version 2.0 starts on 1 September 2026)
Skills England describes the Digital product manager occupation as driving and managing digital products through the complete product lifecycle.	Taken from the overview on the standard's page.	Skills England, Digital product manager, ST0964 (Version 2.0, page updated 8 September 2026; version 2.0 starts on 1 September 2026)
The ST0964 Digital product manager standard was revised, with version 2.0 starting on 1 September 2026 and version 1.0 closing to new starts on 31 August 2026.	From the page's version log. Anyone quoting it in 2026 to 2027 should point to version 2.0.	Skills England, Digital product manager, ST0964 (Version 2.0, page updated 8 September 2026; version 2.0 starts on 1 September 2026)

Your notes

The Translator

Jargon in plain English, with a comparison from school life. Where the comparison stops working, it says so.

Term	In plain English	Think of it like this
A/B test	Showing two versions of something to different people at the same time and counting which one works better.	Giving half the class one version of a worksheet and half another, and seeing which half finishes more of it. Where that stops working: Two classes differ in many ways. In an A/B test people are split at random, so the only real difference is the version.
Accessibility	Making something usable by as many people as possible, including people who are blind, deaf, colour blind, dyslexic, have a motor difficulty or are using it in difficult conditions.	A ramp as well as the steps: it was built for wheelchair users and it helps anyone with a trolley, a pram or a sprained ankle. Where that stops working: A ramp is built once. Accessible design is checked every time something changes, and with real users.
Backlog	The list of things a team could build next, put in the order the team thinks matters most.	Your revision list, with the topics you are worst at at the top, which you change after every mock. Where that stops working: A revision list ends at the exam. A backlog never runs out, because every release shows something new to do.
Card sort	A method where people put cards, each naming one thing, into groups that make sense to them, so the people building a product can see how its users think.	Giving everyone the same stack of revision cards and seeing which ones each person puts together. Where that stops working: A card sort shows how people group things on cards. It does not show how they search when they are in a hurry.
Content design	Working out what words and information people need, and writing them in the order and the plain language that gets them to what they came for.	Rewriting a school notice so that the date and what to bring are in the first line, not the fifth paragraph. Where that stops working: Editing one notice is quick. Content design covers every message in a product, including the error messages people only see when something has gone wrong.
Contrast ratio	A number from 1 to 21 for how different the lightness of two colours is. Black on white is 21 and the same colour twice is 1. It decides whether text can be read.	Chalk on a blackboard compared with chalk on a grey wall: the same chalk, a very different chance of being read from the back row. Where that stops working: The ratio only measures lightness. It does not account for the font, the size, the screen or the room.
Design brief	A short written statement of what has to be designed, for whom, and what it has to do, agreed before the work starts.	The task sheet for a design and technology project: what to make, who it is for and what it has to do. Where that stops working: A school brief is given to you. At work, working out the real brief is often the hardest part of the job.

Term	In plain English	Think of it like this
Design system	A shared set of ready-made parts, such as buttons, forms, colours and rules for how they are used, so that every screen in a product looks and behaves the same way.	The school style guide that says which font, logo and colours every letter home must use. Where that stops working: A style guide covers how things look. A design system also holds the working code and the rules for how each part behaves.
Funnel	The steps people take to get something done, with a count at each step of how many carried on, which shows where people give up.	Everyone who signs up for the school trip, then returns the form, then pays: each step loses someone. Where that stops working: A funnel counts people but cannot say why they left. For that you have to ask or watch.
Information architecture	How the content of a product is organised and labelled, so that people can find things where they expect them to be.	How the library is arranged: the shelves, the sections and the signs that tell you where to look for what you want. Where that stops working: A library has one system. A website has several ways in, so the structure has to work from a search result as well as from the home page.
Iteration	Making something, trying it, learning from it, and making it better, round after round.	A draft of an essay that you hand in, get comments on and rewrite. Where that stops working: An essay has a deadline and a mark. A product can keep being improved for as long as it exists.
Microcopy	The very small words in a product: the text on a button, the hint in a box, the message when something goes wrong.	The labels on the school water fountain: Push and Hold are two words that decide whether you get a drink or a wet sleeve. Where that stops working: Labels in school are read once. In a product, the same few words are read thousands of times, so each one has to earn its place.
Product manager	The person who decides what a product should do next, by weighing what users need, what the business wants and what the team can build in the time.	The student who runs the school magazine and has to choose which stories go in, with a fixed number of pages. Where that stops working: A magazine editor works to a deadline. A product manager works on something that keeps going and has to decide when to stop adding.
Prototype	A rough, early version of something, made to test an idea cheaply. It can be paper, a clickable set of screens or a model, and it is made to be thrown away.	A rough plan for a school play that you walk through on the stage with scripts in hand before anyone makes the costumes. Where that stops working: A prototype looks like the real thing only up to a point. The bits that do not yet work are exactly the bits you have to ask people to imagine.
Service design	Designing the whole of a service from the person's side, including the parts that are not on a screen, such as the letter, the phone call and the person at the desk.	Planning the whole of a school open evening: the invitation, the parking, the signs, the tour and the follow-up email, not only the stalls. Where that stops working: An open evening happens once a year. A service has to work every day, for people who are stressed, rushed or doing it for the first time.

Term	In plain English	Think of it like this
UI	The things you see and touch to use something: buttons, menus, text, icons, colours and the layout of the screen.	The controls on the classroom projector: the buttons on the remote, the menu on the screen and the labels on them. Where that stops working: A good looking interface can still be a bad experience. Looking right and working right are different jobs.
Usability test	Watching real people try to do real tasks with something while you stay quiet, to see where they get stuck.	Handing a new student the school map and watching how they find the science block, without telling them where to go. Where that stops working: A test shows where people struggle. It does not always tell you why, so you ask afterwards.
User research	Finding out about the people who will use something, by asking them, watching them or looking at what they do, before and after it is built.	Asking the people in your year what they would actually use before you spend the school council's money on a new vending machine. Where that stops working: A survey of your friends is a start. Real research tries to include people who are not like the person doing it.
UX	How it feels to use something from start to finish: whether you can find what you want, whether it does what you expect, and whether you would put up with it again.	The experience of getting a lunch at school: the queue, the menu, the payment and the seat, not only the food. Where that stops working: A lunch is one thing in one place. A product's experience also covers things nobody sees, such as what happens when it goes wrong.
Wireframe	A plain drawing of a screen that shows where things go and what they do, with no colour or style, so everyone argues about the layout and not the look.	The floor plan of a house, which shows where the rooms and doors are before anyone chooses the paint. Where that stops working: A floor plan is finished once drawn. A wireframe is expected to change several times.

The Curriculum Translator

Where it comes from	What the curriculum says	Activities that support it
Design and technology, national curriculum, secondary	"use research and exploration, such as the study of different cultures, to identify and understand user needs"	Notice the design, Watch someone try, Sort the cards
Design and technology, national curriculum, secondary	"use a variety of approaches [for example, biomimicry and user-centred design] to generate creative ideas and avoid stereotypical responses"	Notice the design, Prototype on paper
Design and technology, national curriculum, primary and secondary	"engage in an iterative process of designing and making"	Prototype on paper, How many testers?, Watch someone try
Design and technology, national curriculum, secondary	"develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations"	Prototype on paper
Design and technology, national curriculum, secondary	"test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups"	Watch someone try, Prototype on paper, How many testers?
GCSE design and technology, DfE subject content	"identify and understand client and user needs through the collection of primary and secondary data"	Watch someone try, Sort the cards, Where do people give up?, Notice the design
GCSE design and technology, DfE subject content	"iterative design processes of exploring, creating and evaluating"	Prototype on paper, How many testers?, Watch someone try
GCSE design and technology, DfE subject content	"use different design strategies, such as collaboration, user-centred design and systems thinking, to generate initial ideas and avoid design fixation"	Notice the design, Prototype on paper, Sort the cards
Computing, national curriculum, secondary	"create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability"	Hit the target, Can you read it?, Where do people give up?
Mathematics, national curriculum, later secondary	"infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling"	How many testers?, Is B really better?
GCSE art and design, DfE subject content	"use visual language to communicate personal ideas, meanings and responses"	Prototype on paper, Can you read it?
Curriculum for Wales, Science and Technology	"Being part of a user-centred design process will encourage them to use creativity to develop ideas, manage and mitigate risks, and minimise complexities."	Prototype on paper, Watch someone try
Curriculum for Excellence, Technologies, TCH 4-09a	"I can apply design thinking skills when designing and manufacturing models/products which satisfy the user or client."	Prototype on paper, Watch someone try

Where it comes from	What the curriculum says	Activities that support it
Curriculum and Assessment Review, 2025 (a recommendation, not a decision)	"understanding the design process and developing iterative design skills should remain fundamental"	Prototype on paper, How many testers?, Watch someone try
Planned, first teaching from 2028	"We will revise the design and technology curriculum and GCSE subject content to focus on developing pupils' design capability and introduce the concept of sustainability within the programme of study."	Prototype on paper, Notice the design

Be aware of the limits

- User needs, iterative design and testing with users are all in design and technology, which is where most of the links above sit. The secondary computing programme of study mentions meeting the needs of known users, and design and usability, once, in its first part. The programme for the later secondary years has three bullet points and does not mention user interfaces, usability, accessibility or user needs, and the current GCSE computer science content has no lines on user needs, usability or accessibility either.
- The word accessibility does not appear in the computing programme of study. The accessibility activities in this pack, such as the contrast checker, are supported by the design and technology wording on user needs and, from the review, inclusive design, and not by an accessibility statement in the computing curriculum.
- A base 2 logarithm is not taught before AS and A level maths. The click game works out the log for students and shows it as a number of bits, so nobody has to calculate one. The sampling statement above is in the later secondary maths programme of study for all students.
- The two rows from Wales and Scotland are one line each, to show that design thinking is in those curricula too. We have not mapped them in detail, and Northern Ireland is not covered.
- The last two rows are a recommendation and a plan, not a curriculum. The independent review in November 2025 recommended that the design process stay fundamental and that inclusive design be taught. The government's response says it will revise the design and technology curriculum, publish a revised national curriculum in 2027 for first teaching in 2028, update GCSEs for first teaching from 2029 onwards, and replace the computer science GCSE with a GCSE in computing. A March 2026 policy paper says a consultation will take place later in 2026. We found no sign on GOV.UK that it has opened or that draft programmes of study exist.
- We read the Department for Education's own documents, not any exam board's specification, so the GCSE rows are the DfE subject content that every board's course must follow. Check your own board's current specification, and for England the version your school currently follows.

Questions students, parents and colleagues ask

Do you need a degree to work in product and design?

It depends on the job, and the honest answer is that the evidence is partial. The Design Council's data tables show 68.1% of people in its broad list of design occupations held a degree or equivalent in 2025, and 77.4% in its digital design group. That list includes programmers and engineers, and the table cannot show whether someone taught themselves or built a portfolio.

The government's apprenticeship standards for UX and creative digital design are integrated degrees at level 6, ST0470 typically 48 months and ST0625 typically 36 months, and the Service designer standard, ST0894, is also level 6. The Digital product manager standard, ST0964, is level 4 and typically 24 months. A student can also start at level 3 with the T Level in Digital Software Development, which lists UX designer among the roles it can lead to.

Do students have to be good at drawing to work in design?

No. The government's capability framework groups eight roles under user-centred design, including user researcher, content designer, service designer and accessibility specialist, and puts product manager in a separate group of product and delivery roles. A user researcher plans and carries out research with users, and a content designer makes things easier for people to understand and use, and neither is a drawing job.

The TechSkills Career Matrix lists eight areas of product and design work, and several of them, such as user research, product management and content design, do little or no drawing at all.

Do students need to be good at maths or coding?

Not to start. The sums in this pack are percentages, ratios and charts. The one logarithm, in the click game, is worked out by the page, and the national curriculum does not teach logarithms until AS and A level. Some of the work does lean on numbers: a team reading a funnel or an A/B test needs to be able to tell a real difference from luck, and the secondary maths programme of study asks students to infer from a sample while knowing the limits of sampling.

The UX apprenticeship, ST0470, requires English and maths to be completed under the funding rules, which is a reason to keep both going.

Is there a shortage of designers, so that it is a safe career?

We cannot say that, and we would rather not. A government survey of creative employers found graphic design skills hard to get for 22.5% of those with an IT-skills vacancy against 6.4% of all businesses, but it also found creative employers less likely than all businesses to report a skill-shortage vacancy overall, 7.2% against 9.8%. The 2026 Jobs Plan projects around 800,000 digital and technology roles to fill by 2035, but that covers the whole field. We found no government source saying UX or product design in particular is short of people.

What we can say is that design work exists in a lot of industries: the Design Council says around 80% of designers now work in industries other than the design industries.

What is the difference between UX and UI?

UI is the things you see and touch: buttons, menus, text and colours. UX is how the whole thing feels to use from start to finish, including whether you can find what you want and what happens when something goes wrong. A good looking interface can still be a bad experience, and the reverse. The Translator on this page has both terms, with a comparison from school life.

Is it true that five testers is enough?

It is a rule of thumb with a clear origin and some honest limits. Jakob Nielsen says that he and Tom Landauer showed that a typical single test user finds about 31% of the problems and that five users find about 85%, and that after the fifth you mostly see the same things again. He also says the model only holds for comparable users, that products with several very different user groups need more testing, and that for quantitative studies you need at least 20 users.

A 2003 study by Laura Faulkner tested 60 users and drew random sets from them: some sets of five found 99% of the problems and others only 55%. That is one study of one piece of software, but it is a good reason to treat five as a starting point and to test again after each change.

If a design passes the contrast checker, is it accessible?

No. Contrast is one of many things a design has to get right. The WCAG 2.2 rules ask for a contrast ratio of at least 4.5 to 1 for text and 3 to 1 for large text, and at least 3 to 1 for parts of controls and graphics that you need to see, but a pair that passes can still be hard to read in the wrong font, size or light. WebAIM, which counts accessibility failures every year, warns that automatic tools miss things and that a page with no detected errors is not necessarily accessible.

The government's Service Manual asks teams to test with disabled and older users as well as with automated tools, because tools alone miss problems.

How many people are colour blind?

Colour Blind Awareness, a charity, says approximately 1 in 12 men and 1 in 200 women. The page gives no study behind the figure, so treat it as a good estimate and not a measurement. The practical lesson is the same whatever the exact number: never use colour as the only way to tell two things apart.

Does the law say a school's website has to be accessible?

In England, Wales and Scotland the Equality Act 2010 applies the duty to make reasonable adjustments to the responsible body of a school. The 2018 public sector accessibility regulations cover the websites and mobile apps of schools and nurseries only partly, for content about essential online administrative functions, and government guidance says that exempt and partly exempt bodies still have the Equality Act duty. This is general information, not legal advice, and a school's web team or its legal adviser is the right person to ask.

Is design a good fit for a student who likes making things with their hands?

It can be, though it is worth being straight about what the TechSkills Career Matrix says. It treats product and design as screen and studio work and has no hard hat route for this family, unlike networks or cyber security. Hands-on skill shows up in making prototypes, from paper sketches up, and in watching people use things out in the world, which are the activities in this pack that start away from a screen.

The Matrix also lists service and experience design, which looks at the whole of a service including the parts that are not on a screen, and the Service designer apprenticeship, ST0894, is described by Skills England as improving or redesigning services to meet the needs of the user as well as the business.

What about AI? Will it do the design?

We do not know, and neither does anyone who tells you with confidence. What we can say is what is written down. The Career Matrix lists emerging design as one of its eight areas, including roles for AI experiences and voice interfaces. The government's response to the curriculum review says it will rebalance computing towards digital literacy including AI literacy. Neither says what any particular job will look like in ten years.

Sources and how we checked them

Each source was opened and read on 4 November 2026. Where a source warns about its own figures, we pass the warning on.