VCE Visual Communication Design Units 1 & 2

Chapter 4 — Design's influence and influences on design

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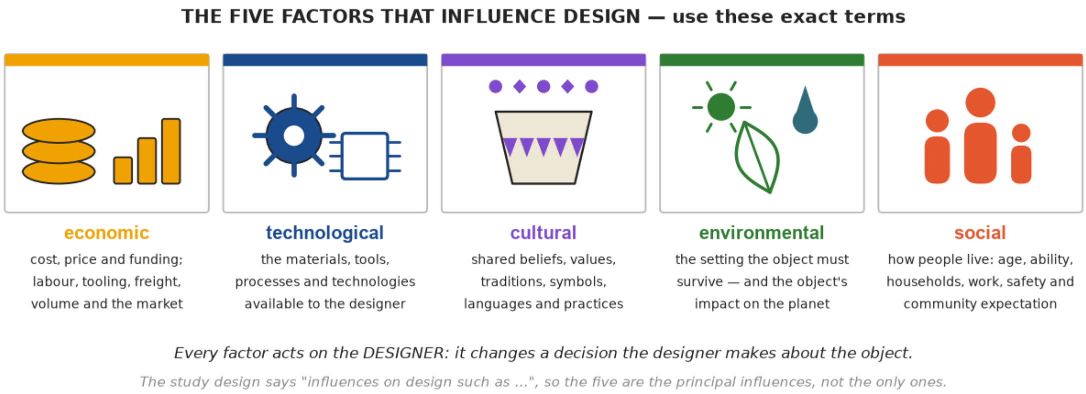
Chapter 4 Design's influence and influences on design — 4A Factors that influence design

Theory

This Area of Study asks two questions that point in opposite directions: **what influences design, and what does design influence?** This subtopic answers the first. Subtopic 4B answers the second (design's influence on behaviours, interactions, systems and outcomes) and 4C looks at sustainable and circular practices. Keeping the two directions apart matters, because the most common mistake in this Area of Study is answering the wrong one.

An **influence on design** is a pressure that comes from *outside the designer* and changes the decisions they make. The study design names five: **economic, technological, cultural, environmental** and **social** factors. Learn those five words exactly — they are the vocabulary you will be marked against, and "money", "green" and "people" are not substitutes for them.



Economic factors are everything to do with cost, money and markets: what the object may cost to make, what a buyer will pay, the cost of labour, tooling, materials and freight, the volume it will be produced in, who is funding the project, and what competitors charge. Economic pressure usually shows up in a design as *fewer parts, cheaper materials, simpler processes, smaller packaging* or a deliberately expensive material chosen to justify a premium price.

Technological factors are the materials, tools, machines, processes and technologies actually available to the designer — both the technology *inside* the object (a motor, a battery, a sensor, a polymer) and the technology used to *make and visualise* it (moulding, casting, welding, CNC machining, CAD, 3D printing). A designer cannot specify what does not exist yet, and cannot ignore what has just become cheap. Note that "technological" does *not* mean "on a computer": a new adhesive, a new alloy or a new joining method is just as much a technological factor.

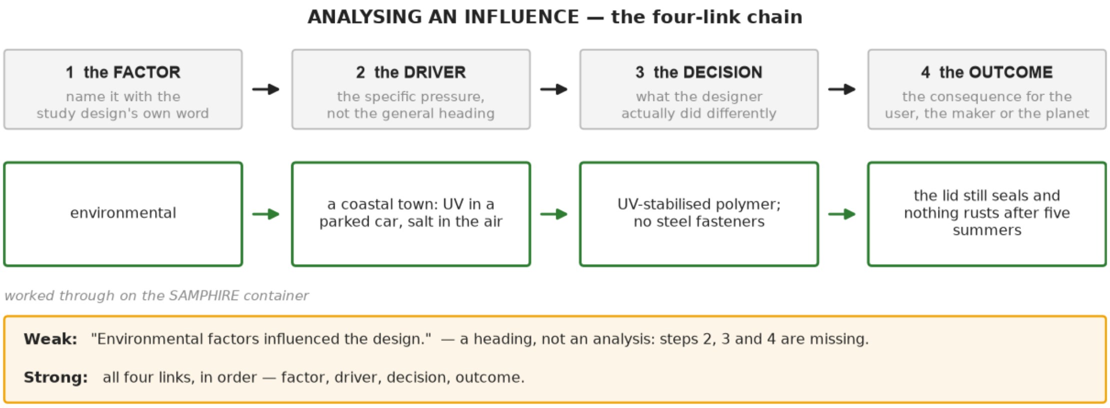
Cultural factors are the shared beliefs, values, traditions, symbols, languages, rituals and everyday practices of a group of people. They govern what an object means, what it is used for, what it may look like and what would give offence. Culture is why the same object is proportioned, decorated and named differently in different places, and why colour, motif and imagery cannot simply be transplanted from one audience to another.

Environmental factors carry **two distinct senses**, and both are examinable. The first is the **setting** the object must exist in — climate, weather, terrain, light, salt, dust, heat, humidity — which determines what the object must survive. The second is the object's **impact on the natural environment** — the materials it consumes, the energy it uses, the waste it becomes. A strong response says which sense it is using.

Social factors are how people actually live and relate to one another: age, ability and accessibility, household size and structure, income distribution, work and study patterns, health, safety expectations, education, and what a community regards as acceptable. Social factors are the reason a design must suit a five-year-old *and* an adult with limited grip strength, and the reason today's safety expectations differ from those of sixty years ago.

The study design's wording is "influences on design **such as** economic, technological, cultural, environmental and social factors", so these five are the *principal* influences rather than a closed list. Closely related pressures you will meet include **legal and regulatory** requirements, standards and the client's **brief** itself (see 2A and 2B). In a response, always name one of the five as your heading, then bring the related pressure in as evidence.

Every factor acts on the designer. This is the single most important idea in the subtopic. A factor is not a description of the finished object and not a description of how the audience reacts — it is a pressure that made the designer *choose differently than they otherwise would have*. If you cannot finish the sentence "because of this, the designer decided to …", you have not yet identified an influence.

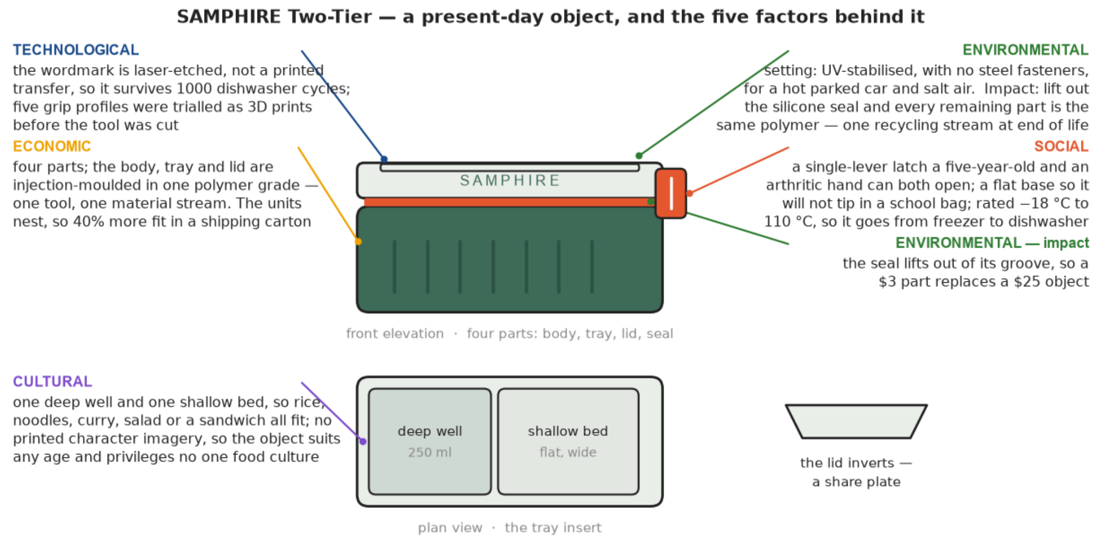


The analytical move — four links, in order. A complete analysis of an influence has four parts:

1. **The factor** — named with the study design's own word.
2. **The specific driver** — the actual pressure, not the general heading. Not "economic factors" but *"a retail ceiling of A$24.95, against a habit of buying a $6 disposable"*.
3. **The design decision** — what the designer did differently. This is the link most often missing.
4. **The outcome** — the consequence for the user, the maker or the planet.

Naming a factor and stopping is a heading, not an analysis. Two factors traced properly through all four links will always beat five factors listed.

One object, five factors. The object below is an original design example: **SAMPHIRE Two-Tier**, a reusable lunch container released in 2026 and sold through supermarkets and school canteens in coastal towns. Every call-out is a decision the designer made *because of* a factor.



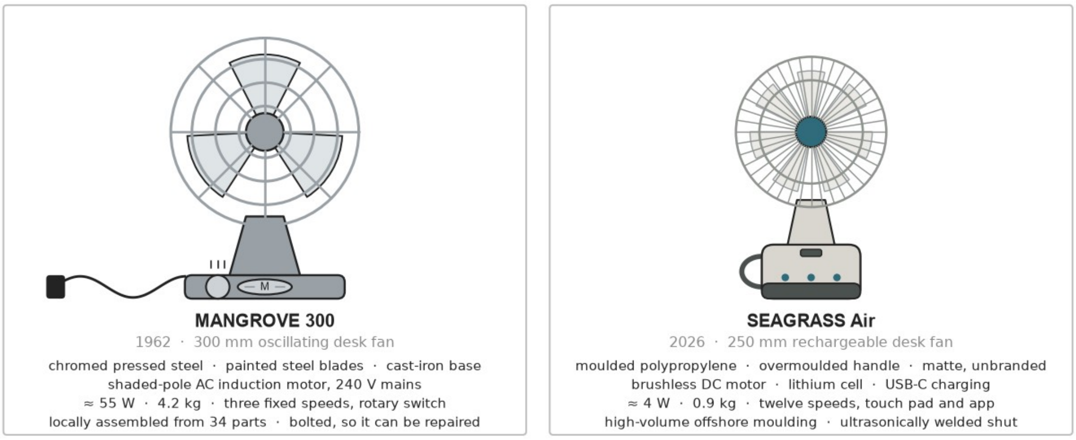
SAMPHIRE Two-Tier reusable lunch container, 2026 · polypropylene · retail A$24.95 · an original ClassBasics design example

Read those call-outs as chains rather than labels. The **economic** driver is an A$24.95 retail ceiling: the designer answered it by cutting the part count to four and injection moulding the body, tray and lid in a single polypropylene grade, so one tool and one material stream serve the whole product, and by shaping the walls so empty units **nest** — about 40% more fit in a shipping carton, which cuts the freight cost carried in every unit. The **technological** driver is what modern moulding and marking can do: tolerances tight enough for a silicone seal to sit in a moulded groove without adhesive, laser marking that survives a thousand dishwasher cycles where a printed transfer would peel, and cheap 3D printing that let five grip profiles be trialled in a week before an expensive steel tool was cut.

The **cultural** driver is that the object holds food, and food is cultural: one deep 250 ml well and one shallow bed mean rice, noodles, curry, dumplings, salad or a sandwich all fit, where a single sandwich-shaped cavity would suit one food culture and fight every other. The same reasoning removed printed character imagery, so the container reads as neither childish nor adult, and the lid inverts to become a share plate. The **environmental** driver operates in both senses at once: the *setting* is a hot parked car and salt air in a coastal town, so the polymer is UV-stabilised and there are no steel fasteners to corrode — which is what makes the product's five-year warranty affordable to offer; the *impact* is addressed by keeping every moulded part in one polymer, so that once the silicone seal is lifted out the remainder enters a single recycling stream, and by selling that seal separately — a $3 part replaces a $25 object. The **social** driver is who opens it: a single-lever latch tested with five-year-olds and with adults who have limited grip strength, a flat base so it will not tip inside a school bag, and a −18 °C to 110 °C rating so a household can move it from freezer to dishwasher without thinking.

Past and present. A key skill of this Area of Study is to "research and analyse **past and present** influences on design". The clearest way to see a factor is to compare the same kind of object in two different times, because what changed between them is exactly what the factors did.

THE SAME OBJECT, 64 YEARS APART — past and present influences on design



WHAT SHIFTED, FACTOR BY FACTOR (1962 → 2026)

economic	local assembly, high labour cost, priced like an heirloom and built to be repaired → global volume, price-led, welded shut
technological	AC induction motor, three tapped speeds, sheet metal and chrome → brushless DC, electronic control, injection moulding
cultural	an appliance to be displayed: chrome, symmetry, a badge → an appliance to disappear: matte, neutral, quiet, unbranded
environmental	metals recyclable by accident; running cost ignored → 4 W by design, but mixed materials and a cell glued in
social	heavy, wide guard pitch, shared in one room → light, finger-proof, personal and portable — but app control excludes some users

MANGROVE 300 (1962) and **SEAGRASS Air** (2026) are both original design examples, and both are desk fans that move air across a room. Almost every other decision differs, and each difference traces to a factor.

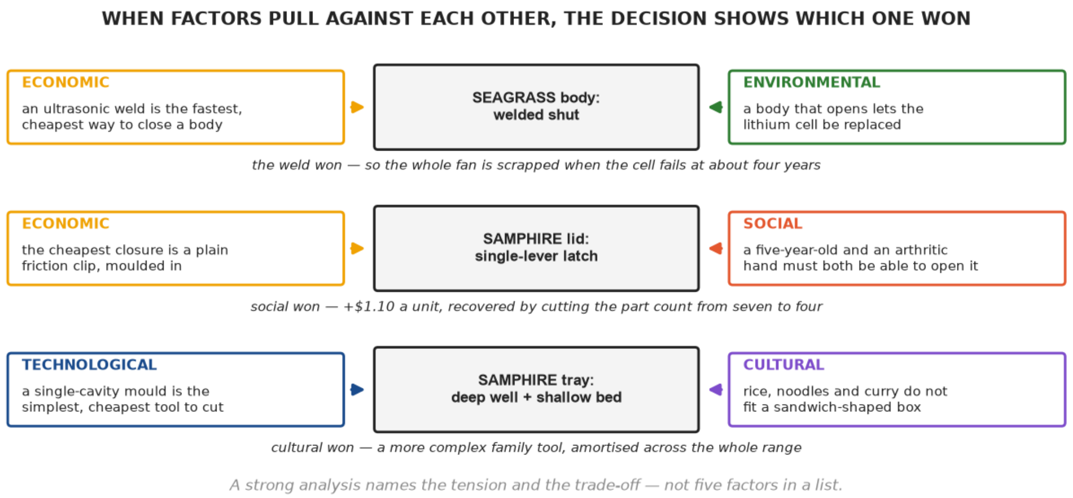
- **Economic.** MANGROVE was assembled locally in an economy where imported appliances carried high tariffs and local labour was comparatively cheap, so a fan built from 34 simple pressed and cast parts, bolted together by hand, was the economical way to make one. It also cost a large slice of a weekly wage, so it was designed to be *kept*: bolted rather than glued, with spare blades and cords sold separately. SEAGRASS is designed for a global supply chain where tooling is amortised over a million units, so the unit price is a couple of hours' wages — and at that price the brief shifts from "repairable for thirty years" toward "light, cheap and replaceable", which is why the body is ultrasonically welded shut rather than screwed.
- **Technological.** MANGROVE's shaded-pole AC induction motor ran straight off 240 V mains, and the only practical speed control was tapping the motor windings — hence exactly three fixed speeds and a rotary switch. Sheet-metal pressing and chrome plating were the mature, cheap processes of the day, and no polymer of adequate strength and heat resistance was available at that price. SEAGRASS uses a brushless DC motor with electronic speed control, so twelve speeds cost nothing extra; a lithium cell makes it cordless; injection

moulding makes a complex single-piece guard cheap; and the blade profile was refined in software to cut noise.

- **Cultural.** In 1962 an appliance was a visible sign of a modern household, so MANGROVE was styled to be *displayed*: chrome, symmetry, a badge, a colour-matched base, sitting on a sideboard. Today an appliance is expected to *disappear* — SEAGRASS is matte, neutral and unbranded, and quiet operation matters because homes are open-plan and people take calls in them.
- **Environmental.** Running efficiency was not a design criterion in 1962 at all; MANGROVE draws about 55 W, and its metal parts are recyclable more by accident than by intention. SEAGRASS draws about 4 W *by design*, and its 0.9 kg mass cuts freight emissions — but the welded body and glued-in cell mean the whole object is scrapped when the cell fails at about four years, and its polymer, magnets, cell and circuit board cannot be separated in a kerbside stream. Neither fan is simply "better" here.
- **Social.** MANGROVE weighs 4.2 kg and has a guard pitch that would not pass the finger-probe requirement of today's appliance safety standards; it was a shared object in one room of a larger household. SEAGRASS weighs 0.9 kg, has a finger-proof guard and no trailing cord, and is carried from room to room as a personal object — but its finest control is in an app, which excludes a user without a smartphone.

Watch-out — do not judge a past design by present expectations. MANGROVE is not a *worse* fan; it is a fan designed under different factors. It has no efficiency rating because electricity was cheap and unregulated; it has an unsafe guard pitch because the standard did not exist; it is heavy because the cheap material available was steel. Explaining a past object means reconstructing the factors of *its* time. Judging it against ours explains nothing.

Factors interact — and sometimes pull against each other. The five are not five separate boxes to tick. One decision often answers two factors at once, and just as often a designer must choose between them. Where two factors conflict, the finished object records which one won, and naming that trade-off is the mark of a genuinely analytical response.



Researching influences. You cannot analyse an influence you have not found, and for a past object the factors are not written on the object. Useful methods include:

- **Examining the object itself** — its parts, fasteners, materials, joins, tool marks and moulded codes. A screw says "meant to be opened"; a weld says "not meant to be opened".
- **Period documents** — catalogues, advertisements, price lists, instruction manuals, patents and trade journals. A 1962 price list against average weekly earnings gives you the economic driver directly.
- **Standards and regulations of the time** — what was required, permitted or simply unregulated.
- **Museum and archive collections**, and interviews with people who owned, made, repaired or sold the object.

Cross-check anything you find. One advertisement tells you what a maker *claimed*; the object tells you what the maker *did*.

Using this in your own design work. In this Area of Study you do not only analyse factors — you respond to a brief by designing a sustainable three-dimensional object, and the factors are the tool you use to justify your decisions. When you annotate an idea, name the factor, name the driver, and state the decision it produced: *"salt air on the site (environmental) — so a moulded polymer housing rather than steel fixings"* is a design justification, whereas *"I chose plastic because it looks good"* is not.

> **Units 3 & 4 preview — beyond the Units 1&2 study design.** The same five factors return in Units 3 & 4 for two tasks this course does not ask of you. In Unit 3, Area of Study 1 you explain the economic, technological, cultural, environmental and social factors that influence **design practices** — how contemporary designers work, collaborate, charge and are regulated — rather than the objects they make. In Unit 3, Area of Study 2 you must identify the influence of those factors on the **aesthetic decisions** of a design example you have never seen before, in the written examination, working from the Resource Book against the clock. That method — reading factors off an unseen supplied example under timed conditions — is not part of the Units 1&2 study design, and no question in this subtopic requires it. Here you research the factors behind an object you have chosen or been given, and use them to inform and justify your own design work.
>
> **Watch-out — use the five exact terms.** *Economic, technological, cultural, environmental, social.* "Money factors", "green factors", "people factors" and "practical factors" are not on the list and are not marked as though they were.
>
> **Watch-out — the factor must influence the DESIGNER.** State what the designer decided *because of* the factor. Describing the object ("it is made of plastic") or the audience's reaction ("shoppers like it") is not an influence on design.
>
> **Watch-out — "environmental" has two senses.** It means the setting the object must survive *and* the object's impact on the planet. Say which one you mean; if a question is worth four or more marks, both may be worth covering.
>
> **Watch-out — cultural is not social. Cultural** = shared beliefs, values, traditions, symbols, language and practices. **Social** = how people live and relate: age, ability, households, work, safety, community expectation. The test: does the driver come from what a group *believes and practises* (cultural) or from how people *live and function* (social)?
>
> **Watch-out — "technological" is not "digital".** A new alloy, adhesive, seal or joining method is a technological factor. So is the *absence* of a technology: MANGROVE has three speeds because electronic speed control did not yet exist at that price.
>
> **Watch-out — analyse, do not list.** Five factors named in five sentences earns less than two factors traced from driver to decision to outcome. Marks live in the chain, not the list.
>
> **Watch-out — do not confuse the two directions.** *Factors that influence design* (this subtopic) and *design's influence on behaviours, interactions, systems and outcomes* (4B) are opposite directions of the same relationship. Check which way the question points before you begin.

Real past and present influences

The examples above are original designs that teach the method. Here it is applied to two real Australian designs, seven decades apart.

Past — R152 Contour chair, Grant Featherston, designed in Melbourne in 1950. The example in the National Gallery of Victoria collection was manufactured in 1951 by Emerson Bros Pty Ltd, in plywood, hardwood, linen, hair, wadding and latex rubber, and the gallery purchased it in 1955. The **technological** and **economic** drivers are recorded together: forming a curved plywood shell called for a moulding press, and imported presses were prohibitively expensive — so Featherston worked out how a flat sheet could be sawn, curved and joined into a form-fitting shell without one, and lodged a patent application in May 1951. The **social** decision is in the name: the shell is shaped to the sitter, for indoor domestic use. The **cultural** pressure was the standing of post-war local manufacture against imported furniture. **Environmental** impact appears nowhere among the drivers the record names.

Present — Confetti range, GibsonKarlo (Sarah Gibson and Nicholas Karlovasitis) for DesignByThem, launched 2018. The **environmental** driver leads: the brief called for materials that are recycled and recyclable. The **technological** answer is rotational moulding of 100% recycled plastic, produced locally, and the studio states the pieces can be recycled after use; the range received a 2019 Australian Good Design Award in Product Design. The **economic** answer is geometry — round bases let many products come from the same moulded material without changing how it is made. The **social** setting is public rather than domestic: indoor and outdoor options, durable and easy to clean for high-traffic areas. The **cultural** reversal is sharpest — the designers state that recycled material is usually hidden, and they left it visible to be celebrated.

Source: R152 Contour chair — National Gallery of Victoria collection record, accession 1532-D4, https://www.ngv.vic.gov.au/explore/collection/work/20526/ ; Powerhouse Collection, “R152 Contour Chair designed by Grant Featherston”, https://collection.powerhouse.com.au/object/97939 . Confetti range — Good Design Australia, “Confetti Range by GibsonKarlo for DesignByThem”, 2019 Australian Good Design Awards, https://good-design.org/projects/confetti-range-by-gibsonkarlo-for-designbythem/ ; DesignByThem, “Confetti Chapter One: Celebrating Sustainable Design”, https://www.designbythem.com/blogs/edits/confetti-chapter-one-celebrating-sustainable-design .

Worked examples

Example 1 — scaffolded

*Explain how **economic** factors and **social** factors influenced two design decisions on the SAMPHIRE Two-Tier container. (4 marks)*

Working	Comment
Economic — the driver: SAMPHIRE had to retail at A$24.95 against a household habit of buying a $6 disposable, so every cent of unit cost mattered.	Start with the SPECIFIC driver, not the heading. A price ceiling is evidence; “economic factors” alone is not.
The decision: the designer cut the part count to four and moulded the body, tray and lid in a single polypropylene grade, so one tool and one material stream serve the whole product.	This is the link most answers skip — what the designer actually did differently. Note that it is a decision about the object, not a statement about money.
The outcome: tooling is bought once instead of three times, the assembly step that joined the extra parts disappears, and only one material has to be bought, stored and purged from the machine — which is how the A$24.95 price becomes possible.	Close the chain with the consequence. Two marks are now secure for the economic factor.
Social — the driver: the container is opened by five-year-olds at school and by adults with limited grip strength at home. **The decision:** a single-lever latch, tested with both groups, rather than the cheapest friction clip. **The outcome:** one product serves the whole household instead of only the strongest hand in it.	Same four links for the second factor. Because the question says “two design decisions”, each factor needs its OWN decision — do not attach both factors to the same feature.

Example 2 — scaffolded

*Compare how **technological** factors influenced the design of the MANGROVE 300 (1962) and the SEAGRASS Air (2026) desk fans. (5 marks)*

Working	Comment
MANGROVE — the available technology. A shaded-pole AC induction motor running directly off 240 V mains, with sheet-metal pressing and chrome plating as the mature low-cost processes, and no polymer of adequate strength and heat resistance at that price.	“Compare” needs a genuine two-sided treatment. Deal with the first example properly before moving on — do not alternate sentence by sentence.
The decisions it forced. Speed could only be changed by tapping the motor windings, so the fan has exactly three fixed speeds and a rotary switch; the guard, blades and housing are pressed steel; the base is cast iron; the cord is mains-tethered.	Trace the technology to specific decisions. The absence of a technology is a technological factor too.

Working	Comment
SEAGRASS — the available technology. A brushless DC motor with electronic speed control, a lithium cell, injection moulding of complex single-piece parts, and software refinement of the blade profile.	Same treatment, same depth, for the second example — that is what makes the comparison congruent.
The decisions it enabled. Twelve speeds cost nothing extra once control is electronic; the cell makes the fan cordless and portable; moulding makes a fine-pitch guard cheap; and the brushless motor with the software-refined aerofoil lets the fan run at about 4 W, where MANGROVE needed 55 W.	Again the chain, not a spec list. Notice that the SAME factor produced opposite decisions in the two objects.
Similarity and difference. In both fans the technology available set the limits of what could be designed: neither designer was choosing freely. The difference is the direction of the limit — MANGROVE's motor technology *restricted* control and *dictated* metal, whereas SEAGRASS's electronics and moulding *removed* those restrictions and shifted the design problem to noise, mass and battery life. ∴ the technological factor did not simply improve the object; it moved the design problem.	An explicit similarity AND an explicit difference. The ∴ statement lifts this from description to comparison and earns the final mark.

Example 3 — unscaffolded

*Analyse how **environmental** factors influenced the design of the SAMPHIRE Two-Tier container, referring to both senses of the term. (4 marks)*

Environmental factors influenced SAMPHIRE in both of the senses the term carries. In the sense of the **setting the object must survive**, the container was designed for coastal towns, where it will sit in a parked car in summer and be carried through salt air: the driver is UV exposure and airborne salt, and the designer answered it by specifying a UV-stabilised polymer and by eliminating steel fasteners entirely, so nothing chalks in the sun and nothing rusts. The outcome is that the lid still seals after five summers, which is what makes the product's five-year warranty economically possible. In the sense of the object's **impact on the natural environment**, the driver is that a reusable container only earns its existence if it displaces many disposables and then does not itself become mixed waste. The designer answered this by moulding the body, tray and lid in one polymer, so lifting out the silicone seal leaves a single-material object that a kerbside stream can actually accept, and by selling the seal as a $3 spare part, so the part most likely to fail can be replaced instead of the $25 object. ∴ the same factor shaped decisions at two different scales — material chemistry for the setting, and material *separation* for the impact — and the analysis is incomplete unless both are named.

Example 4 — unscaffolded

*Evaluate the extent to which **economic** and **environmental** factors were successfully balanced in the design of the SEAGRASS Air fan. (6 marks)*

Economic and environmental factors pull in the same direction in part of the SEAGRASS design and in opposite directions in the rest, and the balance struck is only partly successful.

Where they align. The economic driver of high-volume manufacture rewarded low mass and few parts, and the environmental driver of reduced impact rewarded exactly the same thing. The brushless DC motor and the software-refined aerofoil are the clearest success: the fan delivers useful airflow across a desk on about 4 W where MANGROVE drew 55 W to cool a room, so the environmental gain in use is very large, and the electronics that deliver it also gave twelve speeds at no extra cost. Its 0.9 kg mass likewise cuts both freight cost and freight emissions. Here the two factors reinforced each other and the designer was not forced to choose.

Where they conflict. The economic driver of the lowest possible assembly cost favoured closing the body by ultrasonic welding, which is fast, needs no fasteners and requires no assembly labour. The environmental driver favoured a body that opens, because the lithium cell is the shortest-lived part in the fan. The weld won. The consequence is that when the cell fails at about four years the entire object — polymer, magnets, circuit board and cell — is scrapped as mixed waste that no kerbside stream can separate, and a replacement is manufactured and shipped. A four-watt fan that is replaced every four years may well carry a larger total impact than a fifty-five-watt fan that lasted thirty years.

Judgement. The balance is successful in the **use** phase and unsuccessful at **end of life**. The designer optimised the part of the object's life that is easiest to measure and cheapest to improve, and accepted a durability penalty in the part that is hardest to measure. ∴ the two factors were balanced only over the period the designer chose to look at; four screws in place of the weld would have cost a few cents and a little assembly time, and would have made the object's life several times longer — so on the evidence the economic factor was allowed to outweigh the environmental one further than the design brief needed.

Practice questions

Scaffolded

Q1. Naming and tracing an influence: (a) Name the five factors that influence design, using the terms from the study design. *(2 marks)* (b) The empty SAMPHIRE containers are shaped so that they nest inside one another. Name the factor behind this decision and state the specific driver. *(2 marks)* (c) State the outcome of that decision. *(1 mark)*

Q2. Cultural and social factors: (a) Define a **cultural** factor and a **social** factor. *(2 marks)* (b) Classify each of the following SAMPHIRE decisions as cultural or social, and justify each classification in one sentence: the two differently sized compartments; the single-lever latch; the removal of printed character imagery. *(3 marks)*

Q3. The environmental factor: (a) State the two senses in which "environmental factors" is used. *(2 marks)* (b) A student writes: "Environmental factors influenced the SAMPHIRE container because it is made of recyclable plastic." State which sense they have used, and identify the two links of the chain that are missing from their answer. *(3 marks)*

Q4. Technological factors on the SAMPHIRE container: (a) Name the manufacturing process used to make the body, tray and lid. *(1 mark)* (b) Explain how a prototyping technology influenced the design of the grip. *(2 marks)* (c) Explain why the wordmark is laser-etched rather than printed as a transfer. *(2 marks)*

Q5. The four-link chain: (a) State the four links of a complete analysis of an influence, in order. *(2 marks)* (b) A council orders SAMPHIRE containers for a food-relief program and needs them at half price. Complete the chain for this economic driver: give one design decision it would produce and one outcome. *(3 marks)*

Q6. Researching past influences: (a) Name two methods you could use to research the influences on the MANGROVE 300. *(2 marks)* (b) Explain what each of your two methods could tell you that the other could not. *(2 marks)* (c) State one risk in judging a 1962 object against 2026 expectations. *(1 mark)*

Unscaffolded

Questions 7–20 refer to the SAMPHIRE Two-Tier container and to the MANGROVE 300 and SEAGRASS Air desk fans shown in this subtopic, as indicated in each question, unless otherwise stated. Question 21 refers to the R152 Contour chair and the Confetti range above.

Q7. Analyse how **social** factors influenced the design of the MANGROVE 300. *(4 marks)*

Q8. Explain how **cultural** factors influenced the appearance and finish of the MANGROVE 300. *(4 marks)*

Q9. Analyse how **social** factors influenced two design decisions on the SEAGRASS Air. *(4 marks)*

Q10. Discuss how cultural expectations of what a household appliance should look like and sound like influenced the design of the SEAGRASS Air. *(4 marks)*

Q11. Explain how **environmental** factors influenced the MANGROVE 300 in both senses of the term, and explain why one of those senses was barely a design criterion in 1962. *(5 marks)*

Q12. Compare how **economic** factors influenced the design of the MANGROVE 300 and the SEAGRASS Air. *(6 marks)*

Q13. Distinguish between **cultural** and **social** factors, using one example from each of the two fans. *(4 marks)*

Q14. Evaluate the extent to which the SAMPHIRE Two-Tier container responds to **social** factors. *(5 marks)*

Q15. Explain how **two** factors interacted in a single SAMPHIRE design decision, and state which factor the finished object shows was given priority. *(4 marks)*

Q16. The SAMPHIRE range is to be made for a hot, remote inland community 900 km from the nearest city. Explain how **environmental** and **cultural** factors would change the designer's decisions. *(5 marks)*

Q17. A student writes: "The MANGROVE 300 is a worse design than the SEAGRASS Air." Explain why this is not an adequate analysis of past influences on design, and rewrite the claim so that it is. *(4 marks)*

Q18. A levy is introduced on virgin plastic, raising the cost of new polypropylene by 30%. Explain how this single change would flow through the design of the SAMPHIRE container, naming every factor affected. *(5 marks)*

Q19. *(New scenario.)* You are responding to a brief to design a sustainable three-dimensional object for a community food-swap: a stackable, reusable produce crate. Explain how you would let **three** of the five factors shape your design decisions, giving one specific decision for each. *(6 marks)*

Q20. Explain the difference between a **factor that influences design** and **design's influence on behaviour**, using one example of each drawn from the objects in this subtopic. *(4 marks)*

Q21. Analyse how **technological** factors influenced the R152 Contour chair (Grant Featherston, manufactured 1951) and the Confetti range (GibsonKarlo for DesignByThem, launched 2018) *differently*. *(6 marks)*

Question 22 is a research task. It refers to a real design that you find for yourself, not to the objects in this subtopic. You will need a library or the internet, and time outside class.

Q22. *(Research task.)* Choose **one real, publicly documented Australian design** — an object, an appliance, a piece of furniture, a package, a poster or a piece of signage, past or present — other than the R152 Contour chair and the Confetti range analysed above. It must be one you can find in a museum or gallery collection record, an award citation, a patent, or the designer's or maker's own published account; the National Gallery of Victoria and Powerhouse collections cited above are good places to begin. Using **at least three** of the research methods set out under "Researching influences", research the influences on that design and write a research record. Your record must name each source and the research method it belongs to, state what each source told you that the others could not, cross-check two of your sources against each other, trace **one** influence through all four links of the chain with the evidence for each link attributed to a named source, and state one claim your sources could not settle, together with the source that would settle it. *(6 marks)*

Answers

Q1. (a) Economic, technological, cultural, environmental, social. (b) Economic — the A$24.95 retail ceiling and the freight cost carried in every unit. (c) About 40% more units per shipping carton, so a lower freight cost per unit. **Q2.** (a) Cultural = shared beliefs, values, traditions, symbols, language and practices; social = how people live and relate — age, ability, households, work, safety, community expectation. (b) Compartments = cultural; latch = social; removal of character imagery = cultural (accept social if justified by age range). See solutions. **Q3.** (a) The setting the object must survive; the object's impact on the natural environment. (b) The impact sense. Missing: link 2, the specific driver; and link 3, the design decision. **Q4.** (a) Injection moulding. (b) 3D printing — five grip profiles trialled before the steel tool was cut. (c) Laser etching survives the dishwasher; a printed transfer would peel. **Q5.** (a) Factor → specific driver → design decision → outcome. (b) See solutions. **Q6.** (a) Any two of: examining the object itself; period catalogues, advertisements, price lists, manuals or patents; the standards and regulations of the time; museum/archive collections; interviews with owners, makers or repairers. (b) See solutions. (c) You explain nothing about the object, because you judge it against factors — efficiency regulation, safety standards, cheap polymers — that did not exist when it was designed. **Q7–Q20.** See fully-worked solutions. **Q21.** Technology limited how the material could be *formed* in 1951 and determined what the material *was* in 2018. See fully-worked solutions. **Q22.** *(Research task — no single correct record.)* A complete record names at least three research methods, each attached to a real source you could cite, with what each source gave that the others could not; cross-checks two sources against each other; traces one influence through factor → driver → decision → outcome with every link attributed to a named source; and states one claim the sources could not settle plus the source that would settle it. See solutions for the marking guide and a model record.

Fully-worked solutions

Q1. (a) **Economic, technological, cultural, environmental** and **social** *(2 marks for all five correctly named; 1 mark for three or four).* (b) The factor is **economic**. The specific driver is the A$24.95 retail ceiling: freight is a real cost in every unit of a bulky, mostly empty object, and it had to come down for the price to work. (c) Nesting the empty units means about **40% more fit in a shipping carton**, so the freight cost carried by each unit falls *(1 mark — the outcome, not the decision).*

Q2. (a) A **cultural** factor is a shared belief, value, tradition, symbol, language or everyday practice of a group of people, which governs what an object means and what it is used for. A **social** factor is a feature of how people live and relate to one another — age, ability, household structure, income, work patterns, safety expectations and community norms. (b) **The two differently sized compartments — cultural:** the driver is that food itself is cultural, and one deep well plus one shallow bed accommodates rice, noodles, curry or dumplings as readily as a sandwich, where a single sandwich-shaped cavity would suit one food culture and fight the others. **The single-lever latch — social:** the driver is the range of hand strength among the people who open it, from a five-year-old to an adult with arthritis; that is about how people function, not about what they believe. **The removal of printed character imagery — cultural:** the driver is that character and sport imagery carries meanings that are read differently by different groups and dates quickly, so removing it keeps the object neutral. *(3 marks: one per decision, awarded for the justification rather than the label. Accept the third classified as social if the justification is that the object must suit every age in a household.)*

Q3. (a) First, the **setting** the object must exist and survive in — climate, weather, salt, dust, heat, light, terrain. Second, the object's **impact on the natural environment** — materials consumed, energy used, waste created. (b) The student has used the **impact** sense. What they have written is link 1 (the factor) attached to link 4 (a property of the finished object), with the middle of the chain missing: they have not given **the specific driver** — that a reusable container only earns its existence if it displaces many disposables and then does not itself become mixed waste — and they have not given **the design decision** — that the body, tray and lid are all moulded in *one* polymer and the silicone seal lifts out, which is what makes the object recyclable in practice rather than in principle. "It is made of recyclable plastic" describes the object; it does not say what the designer decided *because of* the factor *(3 marks: sense identified + both missing links named).*

Q4. (a) **Injection moulding** (from a family tool, so several parts come from one mould). (b) Cheap **3D printing** let the designer produce five different grip profiles in a week and put them in real hands, at a cost of a few dollars each. Because the steel injection-moulding tool costs tens of thousands of dollars and cannot be re-cut, the grip had to be right *before* the tool was made — so a prototyping technology, not the production technology, is what determined the final grip form *(2 marks: the technology named + why it mattered at that point in the process).* (c) The container is washed in a dishwasher, where heat, detergent and abrasion lift printed transfers. **Laser etching** marks the polymer surface itself, so the mark cannot peel; the decision is a technological answer to a durability requirement created by how the object is used *(2 marks).*

Q5. (a) **1** Name the factor; **2** identify the specific driver; **3** state the design decision it produced; **4** state the outcome. (b) *Factor:* economic. *Driver:* a food-relief program needs the container at half the retail price, in a single order of high volume. *Decision:* delete the separate tray insert and mould the two compartments directly into the body, taking the product from four parts to three and removing an assembly step; specify an uncoloured polymer and drop the laser etching. *Outcome:* unit cost falls far enough to meet the price, at the cost of the tray's flexibility and the brand mark — so the program gets a usable container and the retail version keeps the features that justify its price *(3 marks: a plausible decision that follows from the driver + a stated outcome + recognition of what was traded away).*

Q6. (a) Any two of: **examining the object itself** (parts, fasteners, materials, joins, tool marks, moulded codes); **period documents** (catalogues, advertisements, price lists, manuals, patents, trade journals); **the standards and regulations in force at the time**; **museum and archive collections**; **interviews** with people who owned, made, repaired or sold it. (b) *Model answer.* Examining the object tells you what the maker actually **did** — that the motor is bolted rather than riveted proves it was meant to be opened and repaired — but it cannot tell you what the fan cost or who it was sold to. A period price list beside average weekly earnings gives you exactly that economic driver, but it records what the maker **claimed** and charged, not how the object was built. ∴ the two sources answer different questions and should be used to cross-check each other *(2 marks: a distinct capability for each source).* (c) You explain nothing about the design, because you measure it against factors — efficiency regulation, safety standards, cheap engineering polymers — that did not exist when the decisions were made.

Q7. *Driver 1 — how the household used the object.* In 1962 households were larger, rooms were smaller and a fan was a **shared** possession serving one main room rather than a personal object. *Decision:* the designer specified a 300 mm fan on an oscillating head — larger and wider-sweeping than one person needs — and gave it a heavy cast-iron base so it could be set down once and left. *Outcome:* the fan cools a room of people rather than an individual, and it does not need to be moved or re-aimed. *Driver 2 — the safety expectations of the time.* Supervision, not guarding, was assumed to be the household's job, and no requirement equivalent to today's finger-probe test applied. *Decision:* the designer used a widely spaced pressed-steel guard, which is cheap, lets more air through and looks handsome in chrome, and accepted a 4.2 kg mass that a child could pull over. *Outcome:* the fan performs and looks better than a fine-pitch guard would have allowed, at a level of risk that would be unacceptable today. ∴ social factors shaped MANGROVE's **size, siting and guarding** — and because those social conditions have changed, the same factor now produces the opposite decisions *(4 marks: two social drivers, each traced to a specific decision and an outcome).*

Q8. In 1962 a household appliance was a visible sign of a modern, well-equipped home, and it was displayed rather than hidden. That cultural expectation is the driver. The designer answered it by treating the fan as an *object of display*: the guard and housing are chrome-plated so they catch the light, the composition is symmetrical and formal, a maker's badge is placed prominently on the base, and the base colour is matched to the housing. None of these decisions makes the fan move more air — they exist because the fan would sit on a sideboard in the main room of the house and be seen by visitors. ∴ the cultural factor influenced the *finish, styling and prominence* of the object rather than its function, and it is exactly this expectation that has reversed by 2026 *(4 marks: the cultural driver identified + at least two specific styling decisions + the link back to how the object was used socially and displayed).*

Q9. *Decision 1 — the guard.* The driver is today's social expectation that an appliance must be safe around children without supervision, expressed in appliance safety standards. The designer moulded a fine-pitch guard whose openings are too narrow to admit a finger, which is only affordable because moulding makes a complex guard cheap. The outcome is that the fan can be placed at a child's height in a shared room. *Decision 2 — mass and cordlessness.* The driver is that the fan is now a personal object carried between rooms in households where people study, work and sleep at different times, and that a trailing mains cord is a trip hazard. The designer held the whole fan to 0.9 kg and powered it from a rechargeable cell, so it can be lifted with one hand and used away from a power point. ∴ both decisions come from how people live now rather than from any change in what a fan has to do — though the app-only fine control shows the same factor being served incompletely, since it excludes a user without a smartphone *(4 marks: two social drivers, each traced to a decision and an outcome; credit the limitation).*

Q10. The cultural driver is a reversal of the 1962 expectation: an appliance is now expected to *recede*. Two aspects of that expectation shaped SEAGRASS. **Look:** the body is matte, neutral and carries no badge or chrome, so the fan reads as equipment rather than as a possession to be admired — the designer has deliberately removed the visual signals MANGROVE was given. **Sound:** because homes are open-plan and people take calls, watch, study and sleep in the same shared space, noise is now treated as a defect rather than as evidence that the machine is working; the designer therefore used seven narrow aerofoil blades refined in software and a brushless motor, both chosen to move air at a lower noise level rather than to move more air. ∴ the same object type has been re-styled and re-engineered because what a culture wants an appliance to *be* — invisible and inaudible, not proudly mechanical — has changed *(4 marks: the cultural expectation identified as the driver, applied to both appearance and sound, with the decisions named).*

Q11. *Sense 1 — the setting.* Australian summer heat and mains-only power are the drivers, and the designer answered them with a 300 mm fan large enough to move a lot of air in an unairconditioned room, mounted on a cast-iron base that carries much of the fan's 4.2 kg so it does not walk across a surface while oscillating, and finished in chrome plating that resists humidity better than bare steel. *Sense 2 — impact on the natural environment.* MANGROVE is almost entirely steel, iron and copper, so nearly every part can be recycled or re-machined, and it was built to be repaired rather than replaced — an outcome with a genuinely low lifetime impact. But this was **incidental**, not intended. Metals were used because polymers of adequate strength and heat resistance did not exist at that price, and repairability followed from the object's cost relative to a weekly wage. Impact was barely a design criterion in 1962 because electricity was cheap and its generation unregulated, no efficiency labelling or minimum standard existed, and end-of-life waste was not yet understood as a design problem for the person who made the object. ∴ MANGROVE's good environmental behaviour is a by-product of economic and technological factors, not a response to an environmental one *(5 marks: both senses treated, at least two decisions named, and the incidental/intended distinction made explicitly).*

Q12. Both fans were shaped decisively by economic factors, but the same factor produced opposite objects because the economy around each designer was different.

MANGROVE. The drivers were high tariffs on imported appliances, comparatively cheap local labour, expensive tooling, and a retail price equal to a large slice of a weekly wage. The decisions that followed were 34 simple pressed and cast parts assembled by hand, bolted joints, and spare blades and cords offered for sale. The outcome is an object that was economical to make in modest local volumes and worth repairing for thirty years.

SEAGRASS. The drivers were a global supply chain, tooling amortised over a million units, low-cost offshore assembly, and a retail price of a couple of hours' wages. The decisions that followed were few complex mouldings instead of many simple pressings, and an ultrasonically welded body — the fastest, cheapest closure available, requiring no fasteners and no assembly labour. The outcome is an object that is very cheap to buy and effectively impossible to open.

The similarity is that in both cases the economic factor dominated the *architecture* of the object: how it is divided into parts, and how those parts are joined. **The difference** is what it optimised. In 1962 the economics of a costly object made **repairability** economical; in 2026 the economics of a cheap object made **replacement** economical, and the design records that shift in a single detail — a bolt became a weld. ∴ economic factors do not push designs toward "cheaper" in the abstract; they push toward whatever is cheapest in the economy of the time, and that can be the opposite decision in two different decades *(6 marks: at least two drivers traced on BOTH objects, a congruent similarity and difference, and an evaluative conclusion.)*

Q13. A **cultural** factor arises from what a group of people believes, values, celebrates and practises; a **social** factor arises from how people live, function and relate — their ages, abilities, households, work and safety expectations. **Cultural example (MANGROVE):** the belief that a modern household displayed its appliances, which is why the fan is chrome-plated, symmetrical and badged — decisions about *meaning and status*, not about performance. **Social example (SEAGRASS):** the expectation that an appliance must be safe around an unsupervised child, which is why the guard pitch is too narrow to admit a finger — a decision about how people *function and are protected*, not about what they believe. ∴ the two factors are distinguished by the source of the pressure: shared belief and practice on one side, the practical conditions of people's lives on the other. Note that they often act together — SEAGRASS's quietness answers a cultural expectation about what an appliance should be *and* a social reality about shared, open-plan living *(4 marks: both defined, one correct example each with the reasoning that places it in that category, and the distinction stated).*

Q14. SAMPHIRE responds to social factors deliberately and, for the most part, well.

Strengths. The single-lever latch was developed against the actual range of hand strength in a household — a five-year-old at a school lunch table and an adult with limited grip at home — and it was chosen over a cheaper friction clip precisely so that one product serves everyone, which is a substantive rather than cosmetic response. The flat base answers the reality that the container travels inside a school bag. The −18 °C to 110 °C rating answers the routine of households that fill containers from the freezer and wash them in a dishwasher on a weekday timetable. Removing character imagery lets the same object be carried without embarrassment by a five-year-old and a sixteen-year-old.

Limitations. At A$24.95 the container still costs four times a disposable, so the lowest-income households — the ones for whom the running saving matters most — are the least able to buy in; the design answers *ability* well and *income* poorly. The latch also closes with the same action whether or not the silicone seal is seated in its groove, and the container gives no click, no detent and no visible mark to confirm that it has — so a user who cannot see the seal seated finds out only when the bag is wet. The lid-as-share-plate assumes a flat surface, which a school ground often does not provide.

Judgement. For the accessibility and household-routine dimensions of the social factor, the response is strong and evidenced in the object itself. For the equity and use-feedback dimensions it is incomplete, and both gaps could be closed cheaply — a moulded detent that clicks when the latch is home costs nothing once the tool exists. ∴ SAMPHIRE responds well to social factors it tested for and poorly to the ones it did not, which is a limitation of the *research* behind the design rather than of the design decisions themselves *(5 marks: strengths with evidence, limitations with evidence, and a judgement that distinguishes which parts of the factor were served).*

Q15. *The decision:* the SAMPHIRE tray has one deep 250 ml well and one shallow bed rather than a single moulded cavity. **Cultural** factors pull one way: food is cultural, and rice, noodles, curry and dumplings need depth while a sandwich or salad needs a flat bed, so a single sandwich-shaped cavity would suit one food culture and fight the rest. **Technological** and economic factors pull the other way: a single-cavity mould is the simplest and cheapest tool to cut, and a two-well tray needs a more complex family tool with a higher up-front cost. The finished object has two compartments, so **the cultural factor was given priority**; the tooling cost was accepted and amortised across the whole product range. ∴ where factors conflict, the object itself is the record of the designer's priority — and naming which factor won, and what it cost, is what turns a list of factors into an analysis *(4 marks: one decision, two named factors pulling in opposite directions, the priority identified from evidence in the object, and the cost of the trade-off stated.)*

Q16. Environmental factors change first, and in the *setting* sense. The drivers are sustained extreme heat, intense UV, fine abrasive dust and, in place of salt air, very large day–night temperature swings. Decisions: raise the polymer's heat-deflection grade, because a container left in a vehicle inland will exceed anything a coastal summer produces; deepen the seal groove and choose a silicone with a wider service range, so repeated expansion and contraction does not break the seal; specify a light, high-reflectance colour rather than a dark one; and design out any recess where dust can lodge, since grit in the groove is what will actually kill the seal. In the *impact* sense the driver changes too: 900 km from the nearest city there may be no polymer recycling stream at all, so "mono-material for kerbside recycling" stops being a real benefit, and the better environmental decision becomes **maximum service life and full spare-part support** — a thicker section, a stronger latch and locally stocked seals.

Cultural factors change second. The compartment proportions were sized for a coastal town's food practices, and an inland community's may differ — the sizing must be re-researched with that community rather than assumed, and consultation, not inference, is the method. Where food is prepared and shared communally rather than portioned individually, a larger single vessel with a lid that genuinely works as a serving plate may be the appropriate object, which would change the product rather than just its dimensions. ∴ the same brief in a different place produces a different object, because the factors are properties of the place and its people, not of the product category *(5 marks: environmental treated in both senses with specific decisions, cultural treated as something to be researched with the community, and the recognition that the impact priority itself changes with local infrastructure.)*

Q17. The claim is not an analysis for three reasons. First, it **judges a past object against present factors**: MANGROVE has no efficiency rating because no efficiency standard or labelling scheme existed, and a guard pitch that fails a modern finger probe because that requirement had not been written. Second, it **ignores the factors that did apply**: given 1962's motor technology, available materials and tariff-protected local manufacture, pressed steel on a cast-iron base with three tapped speeds was a well-resolved answer to the design problem as it then existed. Third, it is **not supported on its own terms**: MANGROVE lasted decades and was repairable, while SEAGRASS is welded shut and is scrapped when its cell fails at about four years — so on durability and end-of-life impact the older object performs better.

A defensible rewrite: *"MANGROVE 300 and SEAGRASS Air are each well resolved for the factors of their own time. SEAGRASS is far more efficient in use and far safer, because electronic motor control and modern safety standards existed for its designer; MANGROVE is more durable and more repairable, because its cost relative to a weekly wage and the absence of cheap engineering polymers made a serviceable metal object the economical choice."* ∴ the analytical task is to reconstruct the factors that applied, not to rank objects across eras *(4 marks: at least two reasons the claim fails + a rewritten claim that attributes each object's strengths to the factors of its period.)*

Q18. A levy is an **economic** driver, but it does not stop there — it propagates into three of the other four factors.

Economic. Virgin polypropylene costs 30% more, so material is now a much larger share of unit cost and the A$24.95 ceiling is under pressure. Decisions: reduce wall thickness wherever structural analysis allows; specify recycled-content polypropylene, which the levy has just made competitive; consider raising the price and lengthening the warranty, so the object is sold on longevity rather than on price.

Technological. Recycled polypropylene is less consistent than virgin material — its flow behaviour and impact strength vary between batches. Decisions: re-test the latch, which is the thinnest, highest-stress feature; add a moulded rib where a thinner wall would otherwise flex; and re-qualify the seal groove, since tighter tolerances are harder to hold in recycled feedstock.

Environmental. The levy pushes in the same direction as the impact sense of the environmental factor. Decisions: publish the recycled content, design the parts so a recycler can identify the polymer (a moulded resin code), and expand the spare-parts range beyond the seal to the latch, so a failed component is replaced instead of the object.

Social. If the levy is absorbed by raising the price, the equity limitation identified earlier gets worse: the households least able to afford A$24.95 are least able to afford more. A design response is a stripped variant — no laser etching, uncoloured polymer, the compartments moulded straight into the body — sold at the original price.

∴ one change in one factor forces decisions in four, which is why the factors are best treated as an interacting system rather than as five separate headings *(5 marks: the economic driver identified and traced into at least three further factors, with a specific design decision in each.)*

Q19. *(Model response. Any three factors, each with a specific decision, is acceptable.)*

Environmental. The crate lives outdoors at a weekend market and then in sheds and car boots, so the setting driver is UV, rain and rough handling; and because the whole point of the object is to displace single-use cardboard, the impact driver is a long service life in one recoverable material. Decisions: a single recyclable polymer with no metal fixings or adhesives; a moulded resin code so it can be identified at end of life; and generous corner radii, because a cracked corner is what will actually retire the crate.

Social. The crate is lifted full by volunteers of every age, including people with reduced grip and back strength. Decisions: cap the internal volume so a crate full of potatoes stays under a comfortable two-handed lift; mould a continuous handhold along both long sides at a height that suits a low pallet and a car boot; and keep the base flat and the walls square so a loaded stack cannot lean.

Economic. A volunteer-run food swap has almost no capital, so the driver is the lowest possible unit cost at a small order quantity. Decisions: one part, no assembly, and no separate lid — the crates **nest** when empty so freight and storage cost little, and **stack** when full by locating the base of one crate on the rim of the next, which is the geometry that makes a lid unnecessary.

Where the factors conflict I would name the trade-off in my annotation: a thicker wall serves durability (environmental) and works against unit cost (economic), and I would resolve it by thickening only the corners and the handhold, so the material goes where the crate actually fails. ∴ the factors do not just describe the object afterwards — used at the ideation stage they generate and justify the decisions *(6 marks: three factors, each with a named driver and a specific, plausible design decision, plus one trade-off resolved.)*

Q20. The two run in opposite directions. A **factor that influences design** is an outside pressure that changes what the designer decides. *Example:* today's appliance safety standards and the expectation that a fan will be used near an unsupervised child (a social factor) led the SEAGRASS designer to mould a guard whose openings are too narrow to admit a finger — the influence runs from the world **into** the design.

Design's influence on behaviour is the reverse: the finished design changes what people do. *Example:* selling the SAMPHIRE seal as a $3 spare part changes a household's behaviour at the moment of failure. Confronted with a perished seal, the default action becomes *repair* rather than *replace* — and if enough people take that action, the wider system of consumption and waste around lunch containers shifts. Here the influence runs from the design **out into** people's actions.

∴ before answering any question in this Area of Study, check the direction: is the question asking what pressed on the designer, or what the design went on to do *(4 marks: both directions defined, one correct example each, and the direction of influence made explicit).*

Q21. Both designs were shaped decisively by the technology available to their designer, but that technology acted at opposite ends of the problem: in 1951 it limited how the material could be **formed**, and in 2018 it determined what the material **was**.

R152 Contour — the driver. A curved plywood shell of the kind the design required is normally formed in a moulding press, and presses had to be imported at a price the work could not carry — so the forming technology was, in effect, unavailable. *The decision.* Rather than give up the shell, Featherston worked out how a flat plywood sheet could be sawn to shape, then curved and joined into a form-fitting shell without a press, and lodged a patent application for the method in May 1951. *The outcome.* The chair could be manufactured in Melbourne — the NGV's example was made by Emerson Bros Pty Ltd in 1951 — because the design had been fitted to the equipment that was actually at hand.

Confetti — the driver. Rotational moulding of recycled plastic was mature and available, but each moulded form carries a tooling cost that has to be earned back across a whole range, and the brief required a material that was both recycled and recyclable. *The decision.* GibsonKarlo used round, geometric bases so that many different products could be made from the same moulded material without changing the way it is produced, specified 100% recycled plastic, and left the speckled surface the recycled feedstock produces exposed rather than covering it. *The outcome.* A range extending from stools and tables to planters and lounges, produced locally, that the studio states can be recycled after use.

The difference. For Featherston the technological factor was a **constraint to be got around**: the forming process did not exist at an affordable price, so the design effort went into inventing the process. For GibsonKarlo the process was already there and cheap, so the design effort went into **matching a range of products to it** and into choosing what should be fed through it. ∴ the same factor acted at different points in the two projects — on the making in 1951, on the material and the product range in 2018 — which is why "the technology improved" describes nothing and analyses less *(6 marks: the technological driver identified for each design, each traced to a specific decision and an outcome, and an explicit statement of how the factor acted differently in the two cases).*

Q22. *(Research task — there is no single correct record. The model below is worked on the R152 Contour chair, because you already hold both of its sources and can therefore see exactly what the format asks for. Your own record must be on a different design.)*

Marking guide. 1 mark — at least three research methods named, each attached to a real source you could cite. 1 mark — what each source gave that the others could not. 1 mark — an explicit cross-check between two sources. 2 marks — one influence traced through all four links, with the evidence for each link attributed to a named source. 1 mark — one claim the sources could not settle, and the source that would settle it.

Design researched. R152 Contour chair, Grant Featherston, designed in Melbourne in 1950.

Method 1 — museum and archive collections. *Source:* the National Gallery of Victoria collection record for work 20526, accession 1532-D4. *What only this source gave:* the physical description and the timeline — manufactured in 1951 by Emerson Bros Pty Ltd, in plywood, hardwood, linen, hair, wadding and latex rubber, and purchased by the gallery in 1955. A collection record catalogues what the object *is*; on its own it does not tell you why any of it was decided.

Method 2 — period documents. *Source:* the patent application for the R.152, lodged in May 1951 and recorded in the Powerhouse Collection entry for object 97939. *What only this source gave:* evidence that the *method of making* was novel enough to be worth protecting. That is a fact about the design process rather than about the finished chair, and no catalogue entry would carry it.

Method 3 — examining the object itself. *Source:* the chair as displayed and as photographed in the collection. *What only this source gave:* the shell is one continuous curved form shaped to the sitter, so the forming problem is visible in the object before you read a word about it — which is what tells you that the making method is the question worth researching.

Cross-check. The NGV and Powerhouse records agree on maker, date and construction, and each supplies what the other lacks. The NGV record fixes the materials and dates; the Powerhouse record supplies the reason — that the presses such a shell would normally need were prohibitively expensive to import, and that the shell was instead made from a flat sheet sawn, curved and joined. One record alone would have given a description without a driver, or a driver without a verified date.

One influence, traced with its evidence. *Factor:* technological, with an economic driver behind it — the two are recorded together. *Driver:* forming a curved plywood shell called for a moulding press, and presses had to be imported at a price the work could not carry — Powerhouse record 97939. *Decision:* Featherston worked out how a flat sheet could be sawn, curved and joined into a form-fitting shell without a press, and lodged a patent application for the method in May 1951 — Powerhouse record 97939. *Outcome:* the chair could be manufactured in Melbourne; the gallery's example was made there by Emerson Bros Pty Ltd in 1951 — NGV record 20526. Notice what the attribution adds: this is the same influence Q21 analyses, but a research **record** also shows where every link came from, so a reader can check it. An analysis asserts; a record proves.

What the sources could not settle. Neither record states what the chair sold for, so the economic driver at the buyer's end — what an R152 cost against average weekly earnings in 1951 — is unconfirmed, and until it is, any claim about who the chair was affordable to is guesswork. A period retailer's advertisement, catalogue or price list would settle it, as would a manufacturer's price schedule held in an archive.

∴ research is what turns an opinion about a past design into an account you can defend — and the gap you record honestly is worth as much as the facts you find *(6 marks, as set out in the marking guide above).*

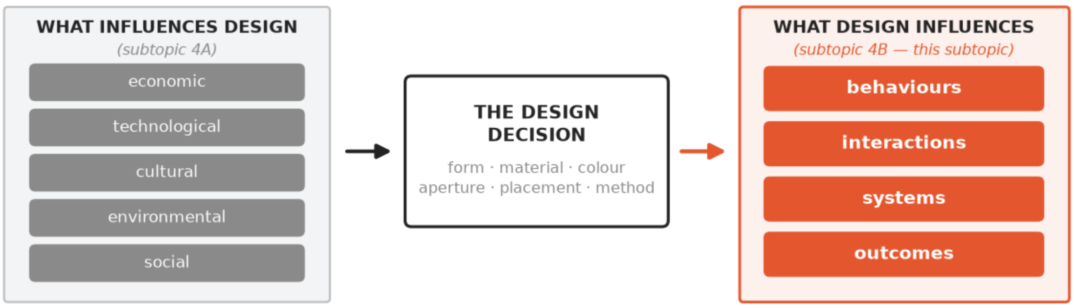
Chapter 4 Design’s influence and influences on design — 4B Design’s influence on behaviours & systems

Theory

This Area of Study asks a two-way question: **what influences design, and what does design influence?** Subtopic 4A dealt with the first half — the economic, technological, cultural, environmental and social factors that act **on** a designer. This subtopic deals with the second half: what a finished design does **to** the people who meet it, to the arrangements it plugs into, and to the world it leaves behind.

The Study Design is blunt about this. Visual communication is defined as “the practice of using visual language to communicate meaning and **influence behaviours**”, and designers are described as combining visual elements “to **influence how people experience or interact with places, systems and things**”. Influence is not a side-effect of designing. It is the reason design exists as a paid profession.

ONE AREA OF STUDY, TWO DIRECTIONS OF INFLUENCE



Both arrows sit inside Unit 1 Area of Study 3. Decide which one the question is asking about before you write.

The key knowledge, word for word. You are required to know *the influence of design on behaviours, interactions, systems and outcomes*. That is four nouns naming four different things. Weak responses use them as four words for the same idea; strong responses treat them as four levels of a single chain, each one larger in scale and longer in time than the last.

THE FOUR THINGS DESIGN INFLUENCES — one chain, four levels

	level	the question you must answer	example — a school's bottle-refill fountain
1	behaviours	What do people DO differently — what does the design make easy, hard or impossible?	*students refill a bottle at recess instead of buying a drink from the canteen*
2	interactions	How does the moment of use GO — the exchange between person and object?	*bottle held under the spout, sensor starts, the counter on the panel ticks over*
3	systems	What larger NETWORK of people, rules, money and materials is changed?	*the canteen orders fewer bottled drinks and the contractor collects a smaller bin*
4	outcomes	What RESULTS accumulate — for whom, over what timeframe, and were they intended?	*less plastic to landfill and lower waste costs — but a long queue at every recess*

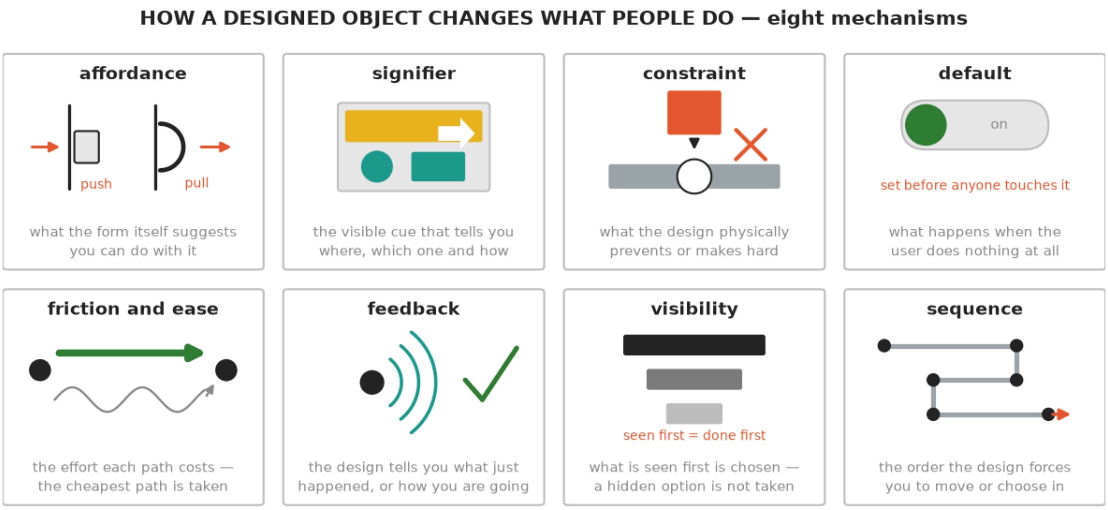
Each level is larger in scale and longer in time than the one above it. A design decision that changes level 1 will usually change all four.

- **Behaviours** — what people **do**. The actions a design makes easy, hard, obvious, rewarding or impossible, including the action of doing nothing. Behaviour is the observable action, not the feeling behind it.
- **Interactions** — how the **moment of use goes**: the exchange between a person and the designed thing, step by step, and the exchange *between people* that the design allows or blocks. Two designs can produce the same behaviour through completely different interactions — one quick and certain, the other slow and confusing.

- **Systems** — the larger **network** of people, objects, rules, money and materials that the design sits inside: a supply chain, a waste stream, a maintenance routine, a transport network, a service, a set of standards. A system-level influence changes how the parts of that network work together, not just how one person acts.
- **Outcomes** — the **results that accumulate**: for users, for people who never use the thing, for other species and for the planet; over a week or over fifty years; intended and unintended; positive and negative.

Behaviours and interactions happen at the point of use, in seconds. Systems change over weeks and years. Outcomes are what is left when the design has been in the world long enough to have a history. A single design decision usually moves all four.

How a designed object actually changes what people do. "The design encourages people to recycle" is an assertion, not an analysis. To analyse influence you must be able to name the **mechanism** — the specific way the object acts on a person. Eight mechanisms cover almost everything you will meet in this Area of Study.



1. **Affordance** — what the **form itself suggests** you can do with it. A flat plate says push; a loop says pull; a slot says post something thin. A person acts on what the shape offers before they read any words.
2. **Signifier** — the **visible cue** that tells a person where, which one, and how. Colour bands, icons, arrows, a worn track through grass. An affordance is in the form; a signifier is a marker added so the affordance is noticed.
3. **Constraint** — what the design **physically prevents or makes hard**. A 90 mm round hole will not take a pizza box. A constraint removes the wrong action instead of asking people not to do it.
4. **Default** — what happens when the user **does nothing**: the option that is already selected, the nearest bin, the tap that closes itself. Most people accept the default most of the time, so the default is one of the most powerful decisions a designer makes.
5. **Friction and ease** — the **effort each path costs**. Design decides which path is cheapest in time, attention and effort, and people take the cheapest path. Adding friction to an unwanted path is as much a design decision as removing it from the wanted one.
6. **Feedback** — the design **tells you what just happened**, or how you are going: a click, a counter, a colour change, a window you can see through. Without feedback people cannot tell whether they succeeded, so they stop trying.
7. **Visibility** — what is **seen first is chosen**. A hidden option is not taken, however good it is. This is hierarchy doing behavioural work rather than compositional work.
8. **Sequence** — the **order the design forces** you to move or choose in: a queue rail, a wayfinding route, the order of fields on a form, the position of a bin on the way out of a food line.

The two terms come from different fields. **Affordance** came into design from perceptual psychology, where it named what a surface or an object offers to a creature that perceives it. **Signifier** was borrowed from semiotics, the study of signs, where it names the visible form that carries a meaning. Writers such as Donald Norman brought both into everyday design language. You will meet both in design writing, and both are worth using in your own annotations.

Influence is not the same as intention. A designer's intention is what they hoped for; a design's influence is what actually happens. The two often differ, and the gap is where most of the interesting analysis lives. Every design therefore has effects in two dimensions at once:

- **intended or unintended** — did the designer plan this effect, or did it emerge in use?
- **positive or negative** — and, always, **for whom**? An effect that is positive for the client can be negative for a bystander, a maintenance worker or a river.

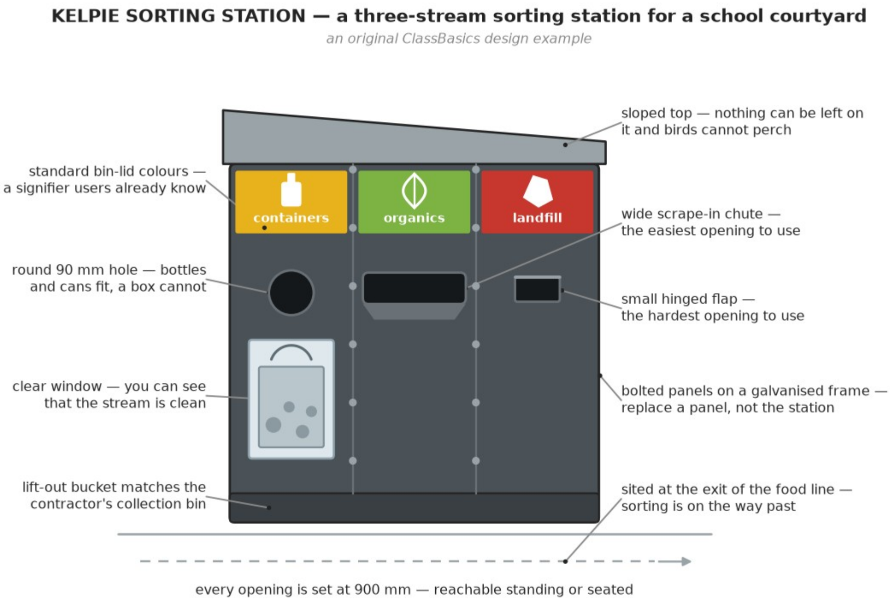
An analysis that reports only the intended, positive effects is a description of the brief, not an analysis of the design.

Follow the influence past the user. The Study Design asks you to "move beyond human-centred mindsets to also consider the needs of other species, our planet and its future". So when you trace an influence, keep going past the person holding the object: to the people who make and maintain it, to people who never use it but live beside it, to the animals that share the site, to the materials stream it eventually joins, and to whoever inherits it decades later.

Analysing influence in past and present contexts. The matching key skill is to *research and analyse the influence of design in past and present contexts*. Use a five-step move every time:

1. **Name the design decision** — the form, material, colour, aperture, dimension, placement or method. Be specific: "a 90 mm round aperture", not "the design of the bin".
2. **Name which of the four** you are analysing — behaviour, interaction, system or outcome.
3. **Trace the mechanism as a chain** — what the person perceives, what they therefore do, and what therefore results. Three links, minimum.
4. **Say for whom, and over what timeframe.**
5. **Judge it** — intended or unintended, positive or negative, and what evidence would confirm it.

For a **past** design, add a sixth move: state the context it was made for, then ask whether that context still holds. A design's influence can reverse without the design changing at all, because the world around it changed.



Every labelled decision is a choice about what students will DO — not about how the station looks.

A worked case — the KELPIE Sorting Station. The original object above is a three-stream sorting station for a secondary-school courtyard. Read it as a set of behavioural decisions rather than as a piece of styling.

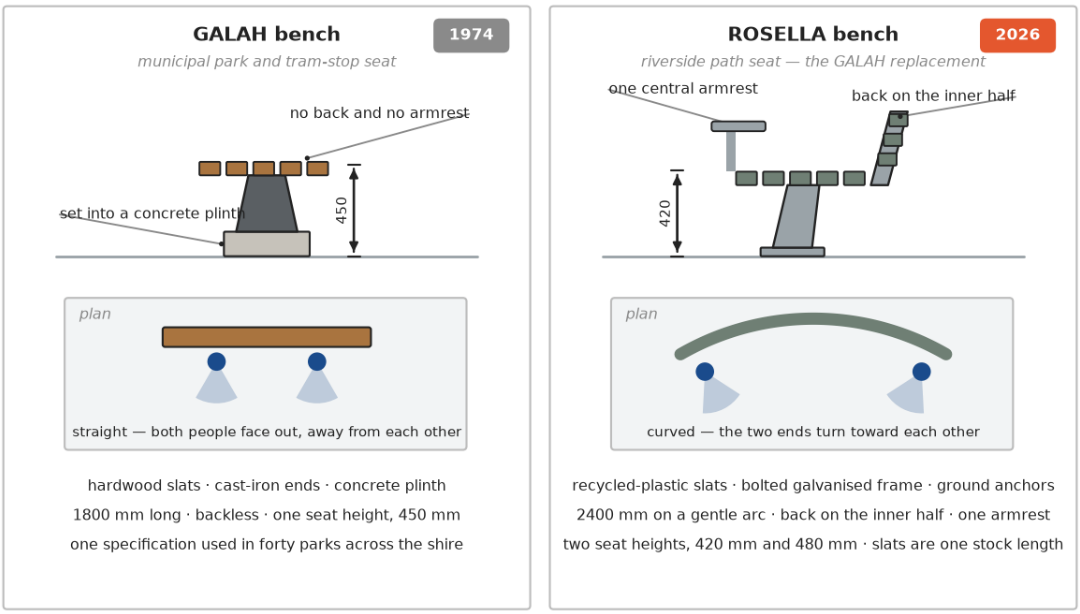
The three **apertures** are deliberately different. The containers stream has a **round 90 mm hole**: its shape *affords* posting a bottle or a can and *constrains* everything wider, so a cardboard tray cannot be pushed in even by a student in a hurry. The organics stream has a **wide scrape-in chute** with a lip — the easiest opening on the station, because scraping a plate is the action the school most wants. The landfill stream has the **smallest opening**, a stiff hinged flap that must be pushed: the same rubbish, more effort. That difference in effort is **friction and ease** used as a design tool, and it does more work than any sign would. The three bays are also **ordered** along the run: walking out from the food line a student passes containers first, then organics, and reaches the landfill flap last. That order is **sequence** — the least-wanted stream is met only after both sorted openings have already been passed.

The **colour bands and icons** are **signifiers**, and they are not invented: they borrow the household bin-lid colours used across Australia — red for general waste, yellow for recycling, lime green for food and garden organics — so the station is legible to a Year 7 student on their first day, because the habit was already learned at home. All three bands run across the top of the body at the same height and the same width, above the apertures, so the whole set of choices is **visible** at once from several metres away and no stream is buried where it would be overlooked. The **clear window** on the containers bay supplies **feedback**: a student can see that the stream inside is clean, which both confirms that they chose correctly and shows them what everyone else has been doing. The **sloped top** is a **constraint** that removes two behaviours at once: nothing can be left balanced on the station, and birds cannot perch and pick through it. And because the station is **sited at the exit of the food line**, sorting sits on the path students are already walking — it is the **default**, not a detour.

Now follow the same decisions up the chain. At the level of **interaction**, a student approaches with a plate and a bottle, reads three colours, makes two choices and leaves in about four seconds — a short, low-doubt exchange. At the level of **systems**, the **lift-out buckets** are sized to the waste contractor's collection bins, so the cleaner's round changes from bagging one mixed bin to lifting three sorted buckets; the organics bucket now feeds the school's garden beds rather than the contractor's truck; and because the body is built from **bolted panels on a galvanised frame**, a damaged panel is unbolted and replaced instead of the whole station being condemned — maintenance shifts from *replace* to *repair*. At the level of **outcomes**, the school's waste audit for the following term recorded container-stream contamination of 6% where it had been 31%, and a −45% change in landfill volume by weight; less loose litter blows from the courtyard into the creek at the boundary; and the ibis that used to raid the open bins have moved on.

Not every outcome was intended. The landfill flap is deliberately hard to use, and students carrying genuinely mixed rubbish — a wrapper fused to a half-eaten roll — now sometimes leave it on the paving beside the station rather than fight the flap. Friction pushed the behaviour somewhere, but not always into the right stream. That is an **unintended, negative outcome** produced by a decision that was intended and positive, and naming it is not a criticism of the analysis — it *is* the analysis.

THE SAME PROBLEM, FIFTY-TWO YEARS APART — two original public benches



The same problem, two contexts. The two original benches above were designed for the same basic need — somewhere to sit in a public place — fifty-two years apart.

The **GALAH bench (1974)** was hardwood slats on cast-iron ends, set into a concrete plinth: 1800 mm long, backless, one seat height, no armrest, and one specification used across forty parks in the shire. In its own context those decisions were coherent. Backless seating **afforded** a short sit and nothing more, which suited a busy tram stop where turnover mattered; the straight form put strangers side by side, facing out, so two people could share a bench without the social demand of facing each other; the plinth made the bench immovable, so it could not be stolen or dragged; and the single specification simplified a whole **system** — one slat size, one repair kit, one supplier, forty parks.

Its **outcomes** across fifty years are mixed, and only some of them were foreseeable. It has survived five decades of weather with almost no failures. But the absence of an armrest means there is nothing to push up from, so the bench quietly excluded older people and people with limited mobility from the day it was installed — an influence on behaviour the 1974 brief simply never asked about. And the system that once made it efficient has become the thing that condemns it: that hardwood is no longer available and the cast ends are no longer made, so a single broken slat now sends an entire serviceable bench to landfill.

The **ROSELLA bench (2026)** replaces it on a riverside path. Recycled-plastic slats sit on a bolted galvanised frame with ground anchors; the seat runs 2400 mm along a gentle arc with a back on the inner half, one central armrest, and two seat heights, 420 mm and 480 mm. The **curve** is the decisive decision, and it works on **interaction** rather than on behaviour: it turns the two ends slightly toward one another so that people sitting at either end are inside each other's field of view, and conversation between strangers becomes possible instead of awkward. The **armrest** is doing two jobs at once — it is an **affordance** that gives an older user something to push up from, and a **constraint** that makes it impossible to lie down. The **two seat heights** let a child and an adult sit at a comfortable height side by side. At **system** level the slats are one stock length in one material, so a damaged slat is unbolted and replaced from a shelf, the old slat re-enters the same recycling stream it came from, and the frame is galvanised so it is repainted rather than replaced; the ground anchors mean the bench can be relocated when patterns of use shift, instead of being poured into place forever.

ROSELLA is not a perfect design, and you should not write about it as though it were. Its recycled slats chalk and fade under UV, so it looks tired within a few years; its curve leaves no gap at either end for a wheelchair user to join a group, so an inclusive-looking bench can still exclude; and the central armrest that helps an older person stand is also the standard device for stopping people sleeping on a bench. Whether the council intended that last effect or not, the design produces it.

Where this subtopic stops. Subtopic 4A covers the factors acting *on* designers; subtopic 4C covers *sustainable and circular design practices* as practices you adopt. This subtopic is about the mechanism in between — how a designed object reaches out and changes what people do and how systems run. You will use all three together when you develop your own sustainable object, but in a question you must answer the one that was asked.

> **Units 3 & 4 preview — beyond the Units 1&2 study design.** In Units 3 & 4 this material returns in a different form: you *analyse supplied design examples* in a written examination, where you must name the **aesthetic** a designer has created, explain the relationship between those **aesthetic decisions** and the **purpose, context and audience or users** of the example, and identify the example's **field of design practice** (messages, objects, environments or interactive experiences). That naming-and-analysing method is not part of the Units 1&2 study design and no question in this subtopic requires it. Here you analyse what a design *does* to people and systems, not what aesthetic it creates.
>
> **Watch-out — which direction is the question asking about?** "Explain how technological factors influenced the ROSELLA bench" and "explain how the ROSELLA bench influences behaviour" are opposite questions. Read the sentence, find which side the design is on, and answer that side only.
>
> **Watch-out — behaviours, interactions, systems and outcomes are four different things.** Behaviour is what a person does; interaction is how the moment of use goes; a system is the network of people, rules, money and materials around the design; an outcome is what accumulates as a result. If a question names one of them, answer at that level.
>
> **Watch-out — name the mechanism, do not assert the effect.** "It encourages students to recycle" earns nothing. Say *which* decision, working through *which* mechanism — a 90 mm aperture that constrains what fits, a flap that adds friction, a colour band that signifies — and then what the person does as a result.
>
> **Watch-out — influence is not intention.** Analyse what the design actually produces, including the effects the designer never planned. Unintended and negative influences are examinable, and a response that reports only the good news is incomplete.
>
> **Watch-out — follow the influence past the user.** Ask who else is changed: the cleaner, the maintenance contractor, the neighbour, the person who cannot use it at all, the birds on the site, the material stream, the people who inherit it in forty years.

Watch-out — a "system" is not just "the environment". Name the actual network — the waste contract, the collection round, the spare-parts store, the supply chain, the shire's forty-park specification — and say precisely what changed inside it.

Real designs and their influence

The cases above are teaching examples. The key skill asks you to run the same method on a real design.

Harry Beck's Underground diagram (1933). Beck was an engineering draughtsman who had worked for London Transport since 1925. In 1931, while between jobs, he redrew the Underground's geographic map as a diagram: the coloured lines straightened to verticals, horizontals and 45° diagonals, the only landmark kept a schematic River Thames, and accuracy of position given up in favour of showing the connections and interchanges between lines. Management first rejected it as too revolutionary; a trial of 500 copies ran in 1932, and after the pocket edition appeared in 1933 roughly 850,000 copies were printed in two months.

Read in the context it was made for, the decisive decision is the distortion itself. The Victoria and Albert Museum's record names both halves of the trade: the diagram is misleading about distances between stations, and it is very clear and easy to use. Discarding true distance dropped the one thing a passenger underground cannot act on and made room for what they can — which line, how many stops, where to change. The **interaction** with the map shifted from measuring to tracing and counting.

Read in a present-day context, the same decision produces an influence nobody designed. A 2011 study in *Transportation Research Part A* analysed London Underground passenger data and found that distance *on the map* predicted which route travellers took about twice as strongly as actual travel time did — and the effect held even for constant users. In August 2016 Transport for London published a walking version giving steps and minutes between central stations — Leicester Square to Covent Garden, 400 steps, about four minutes — a second design issued to work against a behaviour the first one produces.

Source: English Heritage, blue plaque record for Harry Beck, english-heritage.org.uk/visit/blue-plaques/harry-beck; Victoria and Albert Museum, collections record O1361001, collections.vam.ac.uk/item/O1361001; Guo, Z. (2011), 'Mind the map! The impact of transit maps on path choice in public transit', Transportation Research Part A 45(7), 625–639, doi.org/10.1016/j.tra.2011.04.001; Transport for London media release, 29 August 2016, 'New Tube map launched to help get Londoners walking', tfl.gov.uk. All accessed 28 July 2026.

Worked examples

Example 1 — scaffolded

Explain how ***two design decisions*** *in the KELPIE Sorting Station influence the behaviour of the students who use it. (4 marks)*

Working	Comment
Decision 1 — the round 90 mm aperture on the containers stream. Its shape affords posting a bottle or a can, and constrains anything wider.	Name a SPECIFIC decision with its dimension. "The bin has different holes" is not a design decision.
A student holding a drink bottle can see at a glance that it will fit, so the bottle goes in without hesitation; a student holding a cardboard tray physically cannot force it through, so it does not enter the recycling stream.	This is the CHAIN: what is perceived, what is therefore done. Note that the wrong behaviour is removed rather than discouraged.
Decision 2 — the small hinged flap on the landfill stream. It is the smallest opening on the station and must be pushed open.	The second decision must be genuinely different from the first — here, effort rather than shape.
Because the landfill path now costs more effort than the two sorted paths, students who could go either way take the easier sorted opening. Friction has changed the behaviour without a single instruction being given.	Name the mechanism (friction and ease) and finish on the behaviour. Four marks = two decisions, each with a mechanism and a resulting action.

Example 2 — scaffolded

Discuss how the KELPIE Sorting Station influences the school's waste ***system****, and identify* ***one outcome*** *of that change. (5 marks)*

Working	Comment
The station changes a network, not just a habit: the people, containers, routines and contracts through which the school's waste moves.	"Discuss" wants the system IDENTIFIED before it is discussed. Name the network.
The cleaner's round changes. Three lift-out buckets are sized to the contractor's collection bins, so the cleaner lifts three sorted buckets straight into three bins instead of bagging one mixed bin and re-sorting nothing.	One specific, traceable change inside the system, tied to a named design decision (the sized buckets).
The material flows change. The organics bucket now goes to the school's own garden beds rather than onto the contractor's truck, so one stream leaves the commercial waste system altogether.	A second change, at a different point in the network. Discussion marks come from showing *how* it is used, with evidence.
The maintenance routine changes. Because the body is bolted panels on a galvanised frame, a damaged panel is unbolted and swapped; the station is repaired rather than replaced.	A third change — and note that this one is about the object's own life, not the rubbish. Systems thinking includes the design itself.
One outcome: container-stream contamination fell from 31% to 6%, so the load the contractor collects is clean enough to be recycled rather than rejected.	The question asks for ONE outcome, so give one and make it a *result*, not another system change.

Example 3 — unscaffolded

Analyse how the KELPIE Sorting Station influences the ***interaction*** *between a student and the station, and explain how that differs from its influence on* ***behaviour****. (4 marks)*

The interaction is the four-second exchange at the point of use, and the station is designed to make that exchange short and certain. A student arrives already carrying a plate and a bottle, because the station is sited at the exit of the food line rather than off to one side. Three colour bands and three icons present the whole set of choices simultaneously, and because they repeat the household bin-lid colours the student already knows, no reading or decoding is required. The apertures then confirm the choice physically — the bottle drops through the round hole, the scraps go down the wide chute — and the clear window closes the exchange with **feedback**, showing a clean stream inside. The interaction is therefore glance, choose, act, confirm: four steps, no doubt, no queue behind them.

That is a different claim from an influence on behaviour. **Behaviour** is the action that results — the bottle ends up in the containers stream instead of in landfill. **Interaction** is the quality and sequence of the encounter that produced it. Two stations could produce exactly the same sorting behaviour while offering completely different interactions: one instant and confident, another slow, hesitant and dependent on reading a sign. **Overall**, the design decisions here shape both, and a full analysis names which level it is talking about at each point.

Example 4 — unscaffolded

With reference to the GALAH bench (1974) and the ROSELLA bench (2026), compare how each design influenced the behaviour of the people who sat on it. (6 marks)

Both benches solve the same problem — somewhere to sit in a public place — and both shape behaviour through their form rather than through any instruction, but they push it in opposite directions.

The **GALAH bench** influenced behaviour largely by what it withheld. It was backless and set at a single 450 mm height, so it afforded a short, upright sit and nothing more; people arrived, waited and left, which suited the busy tram stop it was specified for. Its straight 1800 mm form set people side by side facing outward, so strangers could share it without facing one another — a low-commitment arrangement that made sharing easy. Because it was set into a concrete plinth it could not be moved, so people arranged themselves around the bench rather than the bench around them. What it withheld also excluded: with no armrest there was nothing to push up from, so an older person or a person with limited mobility often did not sit there at all.

The **ROSELLA bench** influences behaviour by what it offers. The back on the inner half and the gentle 2400 mm arc afford settling in, so people stay longer rather than perching. The central armrest gives leverage for standing, so the users GALAH excluded can now use the seat — and the same armrest makes lying down impossible, so it also forbids a behaviour. Two seat heights, 420 mm and 480 mm, let a child and an adult sit comfortably side by side, and the removable ground anchors mean the council can shift the bench when patterns of use change instead of leaving it where 1974 put it.

The similarity is that neither bench asks for anything: each simply makes some actions easy and others impossible, and people follow the path of least effort. The difference is which actions were chosen and who was thought about when choosing them. GALAH designed for turnover, durability and a standard specification, and excluded some users as a by-product. ROSELLA designs for dwell time, for standing up again and for a mix of ages — while still using the same mechanism to forbid sleeping. **Overall**, both benches prove the same point from opposite ends: the form of a public object decides who uses it and how, long before anyone puts up a sign *(6 marks: behaviour treated on both benches, mechanisms named, a congruent similarity and difference, and a judgement about who was designed for).*

Practice questions

Scaffolded

Q1. The four levels of influence: (a) Name the four things the study design says design can influence. *(2 marks)* (b) State which of the four each of the following describes: (i) a student drops a bottle through the round hole instead of pushing it into the landfill flap; (ii) the student pauses, reads the yellow band and the bottle icon, then chooses an opening; (iii) the cleaner now empties three lift-out buckets into three separate contractor bins; (iv) the courtyard's landfill volume by weight falls by 45% over the term. *(4 marks)* (c) Give one reason a designer should analyse all four levels rather than only the first. *(1 mark)*

Q2. Affordance and constraint on the KELPIE Sorting Station: (a) Define **affordance** and **constraint**. *(2 marks)* (b) Identify one example of each on the station. *(2 marks)* (c) Explain how the round 90 mm aperture reduces contamination in the containers stream. *(2 marks)*

Q3. Signifiers and feedback on the KELPIE Sorting Station: (a) Name the two signifiers used above each aperture. *(1 mark)* (b) Explain how the clear window works as **feedback** and what it changes for the student. *(2 marks)* (c) State one limitation of using a clear window on a bin. *(1 mark)*

Q4. Defaults and sequence: (a) Define **default** as a mechanism of design influence. *(1 mark)* (b) Explain how siting the station at the exit of the food line makes sorting the default. *(2 marks)* (c) State one behaviour that would change if the station were moved to a far corner of the courtyard. *(1 mark)*

Q5. Unintended consequences: (a) Explain what is meant by an **unintended consequence** of a design. *(1 mark)* (b) Identify one unintended consequence of the KELPIE Sorting Station and explain which design decision produces it. *(3 marks)*

Q6. Who else is influenced: (a) List three groups of people, other than the students using it, whose work or experience is changed by the KELPIE Sorting Station. *(3 marks)* (b) Explain how the cleaner's work is changed, referring to one design decision. *(2 marks)*

Unscaffolded

Questions 7–21 refer to the GALAH bench (1974) and the ROSELLA bench (2026), and to the KELPIE Sorting Station, as indicated in each question.

Q7. Explain how **visibility** and **sequence** have each been used in the KELPIE Sorting Station, and state what each one changes about what a student does. *(4 marks)*

Q8. Explain how the curve of the ROSELLA bench influences the **interaction** between two people sitting on it. *(3 marks)*

Q9. Discuss how the ROSELLA bench changes the **system** by which the council maintains its street furniture. *(4 marks)*

Q10. Identify one **unintended outcome** of the ROSELLA bench, explain which design decision produces it, and state whom it affects. *(4 marks)*

Q11. Compare the influence of the GALAH and ROSELLA benches on the council's **materials and waste systems**. *(6 marks)*

Q12. The GALAH bench has not changed since 1974, but the judgement of it has. Explain how a design's influence can change when its **context** changes. *(4 marks)*

Q13. Distinguish between a **system** and an **outcome**, using the ROSELLA bench for both examples. *(3 marks)*

Q14. Explain how **friction and ease** have been used in the KELPIE Sorting Station, and describe how the same mechanism could be applied at the ROSELLA bench site to reduce litter on the riverside path. *(4 marks)*

Q15. Explain the difference between a designer's **intention** and a design's **influence**, using the GALAH bench as your example. *(3 marks)*

Q16. Discuss how the KELPIE Sorting Station influences **species other than humans**, and explain why the study design asks designers to move beyond human-centred thinking. *(4 marks)*

Q17. Evaluate the effectiveness of the ROSELLA bench in influencing behaviour on a riverside path used by a mixed community. *(6 marks)*

Q18. Analyse how the central armrest of the ROSELLA bench works as both an **affordance** and a **constraint**, and explain how each affects who can use the bench and how. *(5 marks)*

Q19. The school wants to stop rubbish being left on the paving beside the KELPIE Sorting Station. Propose one change to the design and predict its influence on behaviour, on the school's waste system and on outcomes. *(5 marks)*

Q20. "A designed object changes what people do more reliably than a sign telling them what to do." Discuss this statement with reference to the KELPIE Sorting Station. *(4 marks)*

Q21. Choose **either** the KELPIE Sorting Station **or** the ROSELLA bench. Analyse its influence across all four levels — behaviours, interactions, systems and outcomes — and identify one influence that was probably not intended. *(6 marks)*

Q22. Harry Beck's Underground diagram (1933) has kept the same basic decision for decades: it shows the connections between lines rather than the true distances between stations. Analyse how the influence of that decision reads differently in the context it was designed for and in a present-day context. *(5 marks)*

Answers

Q1. (a) Behaviours, interactions, systems, outcomes. (b) (i) behaviour; (ii) interaction; (iii) system; (iv) outcome. (c) See solutions. **Q2.** (a) Affordance = what the form suggests you can do; constraint = what it prevents or makes hard. (b) Affordance = the wide scrape-in chute; constraint = the 90 mm round hole (accept the sloped top). (c) See solutions. **Q3.** (a) The colour band and the icon (accept the stream name printed in the band). (b) See solutions. (c) It shows a full or dirty bin as readily as a clean one, and it can be scratched or clouded. **Q4.** (a) What happens when the user does nothing — the option already in place. (b) See solutions. (c) Fewer students would sort at all, because sorting would become a detour rather than the path they were already on. **Q5.** (a) An effect the designer did not plan. (b) Rubbish left on the paving; caused by the small, stiff landfill flap. **Q6.** (a) Any three of: the cleaner, the waste contractor, the school's grounds or garden staff, teachers on yard duty, the neighbours near the creek, the school business manager who pays the waste bill. (b) See solutions. **Q7–Q21.** See fully-worked solutions. **Q22.** See fully-worked solutions.

Fully-worked solutions

Q1. (a) **Behaviours, interactions, systems** and **outcomes** *(2 marks for all four; 1 mark for two or three).* (b) (i) **Behaviour** — an action a person takes. (ii) **Interaction** — the moment of use, the exchange between the person and the station. (iii) **System** — the network of people, containers and contracts through which the school's waste moves. (iv) **Outcome** — a result that has accumulated over time. (c) Because a design can change what one person does without changing anything that matters, and because the value or the harm of a design usually appears further up the chain — in the system it reorganises and the outcomes it leaves — often long afterwards and often to people who never used it *(1 mark).*

Q2. (a) An **affordance** is what the form of an object itself suggests you can do with it, before any words are read. A **constraint** is what the design physically prevents or makes hard, so the wrong action is removed rather than discouraged. (b) *Affordance:* the wide scrape-in chute on the organics stream, whose open lip invites a plate to be scraped into it (accept the round hole). *Constraint:* the 90 mm round hole, which will not admit anything wider (accept the sloped top, which prevents anything being left on the station). (c) The hole is sized to the objects the stream is for: a bottle or a can passes, but a cardboard tray or a wrapped roll physically will not go through. A student in a hurry therefore cannot put the wrong thing in, even carelessly, so the material that reaches the contractor is clean enough to be recycled instead of rejected *(2 marks: the constraint mechanism + the contamination result).*

Q3. (a) The **colour band** and the **icon**. (b) The clear window lets a student see the contents of the containers bay from outside. That does two things: it confirms that their own action was correct, which is what feedback means — the design telling you what just happened — and it shows what everyone else has put in, so a student who is unsure copies the stream they can see. Feedback closes the exchange, so the student leaves confident rather than guessing *(2 marks: the mechanism + the effect on the student).* (c) The window shows a contaminated or overflowing bay just as clearly as a clean one, so on a bad day it advertises failure; it can also be scratched, clouded or covered in stickers, at which point it stops providing feedback at all *(1 mark for either).*

Q4. (a) The **default** is what happens when the user does nothing deliberate — the option already in place, the nearest container, the path they are already on *(1 mark).* (b) Students leave the food line already carrying a plate and a bottle, and the station stands on the route they are walking. Sorting therefore costs no detour: doing the intended thing is what happens if they simply keep going, while doing the wrong thing would require them to carry the rubbish somewhere else. The designer has not persuaded anyone; the design has made the desired action the default *(2 marks: placement identified + the effort comparison).* (c) Sorting would drop sharply, because reaching the station would become a deliberate detour rather than the default path, and most students would use whatever bin was closer or drop rubbish on the way *(1 mark).*

Q5. (a) An **unintended consequence** is an effect the design actually produces that the designer did not plan or want *(1 mark).* (b) Rubbish is now sometimes left on the paving beside the station. The decision that produces it is the deliberately small, stiff landfill flap. Friction was added to the landfill path to push students toward the two sorted openings, and for most items that works — but a student holding genuinely mixed waste, such as a wrapper fused to a half-eaten roll, has no easy stream available and abandons the attempt at the point where the flap resists. The friction did move the behaviour; it simply did not move all of it into a bin *(3 marks: the consequence named + the specific decision + the mechanism explained as a chain).*

Q6. (a) Any three of: the **cleaner** who empties it; the **waste contractor** who collects and processes the streams; the school's **grounds or garden staff**, who now receive the organics; **teachers on yard duty**; the **neighbours** near the creek, who see less wind-blown litter; the **business manager** who pays the waste bill *(1 mark each).* (b) The design decision is that the inner buckets **lift out and are sized to the contractor's collection bins**. Before, the cleaner bagged a single mixed bin and carried it out; now three sorted buckets are lifted straight into three bins with no re-handling and no sorting by hand. The work is faster and cleaner, but it is also *different* work — three lifts instead of one, and a route past the garden beds for the organics *(2 marks: decision named + the change to the work, including that it is not simply "easier").*

Q7. Both mechanisms do their work before the student has touched anything.

Visibility. The three **colour bands** run across the top of the body at the same height and the same width, above the apertures, so all three options can be read from several metres away. Nothing is hidden under a lid or tucked around a side, and no stream is made smaller or duller than the others, so none of them is overlooked simply because it was not noticed. What is seen first is chosen — and here the whole set is seen at once, so the student arrives at the station with the choice already made instead of stopping in front of it to work the options out.

Sequence. The three bays are **ordered along the run**: leaving the food line a student passes containers first, then organics, and meets the landfill flap last. The order puts the two streams the school wants on the path *before* the one it does not, so landfill is reached only after both sorted openings have already been passed. A student carrying a bottle and a plate therefore meets the two openings they need in the order they will use them, and the least-wanted action is the last one available rather than the first *(4 marks: 2 for each mechanism — the specific decision named, and the change to what the student does).*

Q8. The bench runs 2400 mm along a gentle arc, so the two ends are turned slightly toward each other rather than lying on one straight line. Two people sitting at opposite ends are therefore inside each other's field of view without having to twist, whereas on a straight bench of the same length they would both be facing directly out and would have to turn their heads to speak. Because eye contact and speech are possible without an obvious effort, a conversation between strangers becomes an easy option instead of an awkward one. The curve does not change what people *do* so much as the *quality of the exchange* between them — which is precisely what an influence on interaction means *(3 marks: the decision + the perceptual mechanism + the effect on the exchange).*

Q9. The system in question is the council's routine for repairing, replacing and stocking street furniture. The ROSELLA bench changes it at three points. First, the **slats are one stock length in one material**, so a damaged slat is a shelf item: the depot holds one part instead of a shelf of bench-specific timbers. Second, the slats and frame are **bolted, not fixed**, so a maintenance crew unbolts and swaps a component in place — the unit of repair becomes the part, not the bench, and a single point of damage no longer condemns the whole object. Third, the **ground anchors** are removable, so relocating a bench becomes a maintenance task rather than a demolition and re-pour. Together these shift the council's routine from *replace* to *repair and relocate*, which changes what the depot stocks, what a crew carries in the truck and how a work order is written *(4 marks: the system identified + at least two specific decisions traced into changes inside it).*

Q10. One unintended outcome is that a **wheelchair user cannot join a group at the bench**. The decision producing it is the continuous 2400 mm curved seat: the arc was chosen to bring people into each other's view, but it leaves no gap at either end and no level hardstand beside it, so a person using a wheelchair must sit outside the curve, at the edge of the conversation the curve was designed to create. The people affected are wheelchair and mobility-scooter users and anyone with them, and the effect is sharpened by the fact that the bench presents itself as the sociable, inclusive option. It is almost certainly unintended — the same designer added an armrest specifically to help people stand — which is exactly why designers must test influence rather than assume it *(4 marks: outcome + decision + who is affected, with the intended/unintended distinction made. Accept the UV chalking of the recycled slats, or the armrest preventing people sleeping, if argued as well.)*

Q11. Both benches sit inside a council materials and waste system, and in each case the material and fixing decisions decide what happens at end of life — but they produce opposite results.

GALAH used hardwood slats on cast-iron ends across a **single specification in forty parks**. In 1974 that was a highly efficient system: one slat size, one repair kit, one supplier, and a depot that could service every park from the same shelf. Its weakness was that the system depended on the parts remaining available. That hardwood is no longer supplied and the cast ends are no longer made, so there is nothing to repair with; a single broken slat now means the whole serviceable bench is scrapped, and the material leaves the council's hands as landfill.

ROSELLA uses **recycled-plastic slats** drawn from the council's own kerbside stream, on a bolted galvanised frame. The repair unit is the slat, the replaced slat re-enters the same recycling stream it came from, and the frame is repainted rather than replaced. Material therefore circulates inside the council's own system instead of leaving it.

The similarity is that both designs standardised parts to make maintenance efficient, and both therefore shaped a whole network from a small specification decision. The difference is what the standard was tied to: GALAH standardised on a material the council did not control and could not renew, so the system worked brilliantly until it failed completely; ROSELLA standardises on a material the council itself produces, so the same efficiency continues to hold. **Overall**, the lesson is that a materials decision is a systems decision, and its consequences arrive decades after the bench is installed *(6 marks: both benches treated on the same criteria, specific decisions cited, a similarity and a difference, and a judgement.)*

Q12. A design's influence is produced by the design *and* the context together, so when the context moves, the influence moves with it even though the object is unchanged. The GALAH bench is the same object it was in 1974: backless, plinth-mounted, no armrest. What has changed around it is the set of expectations and conditions it meets. Its backless seat was appropriate when services were frequent and a wait was short; now that services are less frequent, the same seat produces discomfort rather than turnover. Its lack of an armrest was invisible in a brief that did not consider mobility; measured against current expectations of accessible public space, the same absence reads as exclusion. And its single-specification hardwood was an efficiency when the timber was available; now that it is not, the same decision is what condemns the bench to landfill. **Overall**, this is why the key skill asks you to analyse influence in *past and present* contexts: you judge a past design against the context it was made for, and then ask separately what the same design does in the context it now sits in *(4 marks: the principle stated + at least two decisions whose influence has reversed without the design changing).*

Q13. A **system** is the network of people, objects, rules, money and materials that a design plugs into and reorganises; an **outcome** is the result that accumulates because of that reorganisation. For ROSELLA, the **system** is the council's maintenance routine: bolted, single-stock-length slats mean the depot holds one part, a crew swaps a component in place, and a work order becomes a repair rather than a replacement. The **outcome** is what that produces over years — a lower whole-of-life cost per bench, less material sent to landfill, and benches that stay in service longer. The test is simple: a system is an *arrangement* you can describe in the present tense, while an outcome is a *result* you can only measure after time has passed *(3 marks: both defined, both illustrated from ROSELLA, and the distinction made explicit).*

Q14. On the KELPIE station, effort is distributed deliberately. The organics chute is wide, open and scrape-in — the least effort on the station, for the action the school most wants. The containers hole is easy for the right object and impossible for the wrong one. The landfill flap is the smallest opening and must be pushed, so the least-wanted path costs the most effort. Because people take the cheapest path available, the distribution of effort decides the distribution of rubbish. The same mechanism could be applied at the ROSELLA site: at present a person finishing food on the bench must walk to find a bin, so littering is the cheapest path. Placing a bin within arm's reach of the seated position — at the open end of the curve, at seat height, on the side people walk in from — makes binning cost almost nothing, while leaving the litter still costs the same. No sign is needed; the effort ordering does the work *(4 marks: friction and ease explained with at least two KELPIE examples + a specific, plausible application at the bench site).*

Q15. A designer's **intention** is the effect they set out to produce; a design's **influence** is what it actually produces in use, whether planned or not. The GALAH bench shows the gap clearly. The intention behind a backless, plinth-mounted bench in a standard specification was durability, turnover and cheap maintenance across forty parks, and the bench delivered all three for fifty years. But its influence also included something never intended: with no armrest there was nothing to push up from, so older people and people with limited mobility were quietly excluded from a public seat. Nobody decided to exclude them — the exclusion was produced by an omission. **Overall**, this is why analysis must be based on what people actually do rather than on what the brief hoped for *(3 marks: both terms defined + a GALAH example where the two diverge).*

Q16. The station influences the birds and animals that share the courtyard, mainly through two decisions. The **sloped top** means nothing can be balanced on the station and no bird can perch and work at the openings, and the **small apertures** mean there is no open mouth to reach into — so the ibis and magpies that used to raid the old open bins no longer feed there. That has two further effects: the birds are not being fed food waste that harms them, and much less rubbish is pulled out and scattered, so far less wind-blown litter reaches the creek at the school boundary and the animals living in it. The study design asks designers to move beyond human-centred mindsets and consider “the needs of other species, our planet and its future” because a design’s influence does not stop at the person using it: the same object also acts on the animals on the site, on the material streams it feeds and on the people who inherit it. A design that works perfectly for its user can still be doing harm one step outside the frame *(4 marks: at least two decisions traced to a non-human effect + the reason for the wider frame, referenced to the study design).*

Q17. The ROSELLA bench is, on balance, effective at influencing behaviour on a riverside path used by a mixed community, but it succeeds unevenly across that community.

Strengths. The back on the inner half and the gentle arc afford settling in rather than perching, so people stay longer and the path becomes a place to sit rather than only a route — the behaviour the council wanted. The curve turns the ends toward one another, so conversation between people who arrived separately becomes easy, which is a genuine change to how the space is used and not merely to how it looks. The central armrest gives leverage for standing, so older users and users with limited mobility can use a seat that GALAH effectively closed to them, and the two seat heights, 420 mm and 480 mm, let a child and an adult sit comfortably side by side.

Limitations. The same armrest that helps a person stand also makes lying down impossible, so the bench excludes anyone with nowhere else to sleep — a real behavioural effect whether or not the council intended it. The continuous curve leaves no gap and no adjacent hardstand, so a wheelchair user cannot join the group the curve was designed to create; the design’s most inclusive feature is also the site of its sharpest exclusion. The recycled slats chalk and fade under UV, and a bench that looks neglected is used less, so some of the behavioural gain erodes over a few summers.

Judgement. Measured against its likely criteria — longer dwell time, use across age groups and lower whole-of-life cost — the bench works, and it works through form rather than instruction, which is the more reliable mechanism. Measured against a broader test of who a public seat is for, it succeeds for most of the community and fails for two identifiable groups. **Overall**, it is an effective design whose limitations are not accidents of manufacture but consequences of two specific decisions — the armrest and the unbroken curve — and both could be addressed without giving up what the bench does well *(6 marks: strengths and limitations, each with evidence from named decisions, and a judgement tied to criteria and audience).*

Q18. The central armrest is a single component doing two opposite jobs, which is why it is worth analysing on its own. As an **affordance**, its form — a horizontal bar set roughly 200 mm above the seat, within easy reach of a seated person — suggests “grip me and push”. A person with limited leg strength can transfer weight through the arm to stand, which turns a seat they would previously have avoided into one they can leave unaided. The behaviour it enables is not sitting; it is *getting up again*, and that is what decides whether an older user chooses this bench at all. As a **constraint**, the same bar interrupts the seat halfway along its 2400 mm length, so the continuous surface a person would need in order to lie down no longer exists. That is not persuasion: it is physical impossibility, and it is the standard device for preventing sleeping on public seating.

The two effects land on different people. The affordance widens access for older users and users with limited mobility. The constraint narrows it for people who have nowhere else to sleep, and, more mildly, for a parent who might have wanted to lay a small child down. **Overall**, the armrest is a good example of why “who is influenced?” must always follow “what is the influence?” — the same piece of galvanised steel is inclusive and exclusionary at once, depending on whose behaviour you trace *(5 marks: both mechanisms correctly named and explained from the form, both groups of users identified, and the tension between them drawn out).*

Q19. The change. Replace the small hinged landfill flap with a hooded opening about 200 mm wide — wide enough for a genuinely mixed handful, still hooded so nothing can be tipped in loosely — and leave the landfill bay where it is, at the end of the run, so the containers and organics openings remain the first two a student passes.

Influence on behaviour. The rubbish left on the paving is produced by friction: a student holding genuinely mixed waste meets an opening that resists, and gives up at that point. Making the landfill opening usable removes the moment of resistance, so that waste goes into a bin. Because the sorted openings are still passed first and are still the easiest for the objects they are designed for, students carrying a clean bottle or a plate of scraps have no new reason to change what they do — the friction is removed only where it was doing harm.

Influence on the system. A slightly larger landfill share will go to the contractor, so the landfill bucket fills faster and the cleaner's round changes a little. Against that, the cleaner and the grounds staff stop picking up loose rubbish from the paving, which is unbudgeted work that nobody planned for.

Influence on outcomes. Less litter blows from the courtyard into the creek; the station stops looking like a failure, which matters because a station that looks ignored gets ignored; landfill volume rises slightly, but from waste that was previously on the ground rather than from waste that was previously sorted. **Overall**, the change trades a small amount of landfill for the removal of an unintended consequence, and the trade is worth making *(5 marks: a specific, plausible change + a traced prediction at each of the three levels, including at least one cost of the change).*

Q20. The statement is largely defensible, and the KELPIE station demonstrates why. A sign asks for a decision: the student must notice it, read it, understand which stream their item belongs to and then choose to comply, and every one of those steps can fail — at a distance, in a rush, in a crowd, or for a student who does not read English fluently. The station's decisions bypass all of that. The **90 mm round hole** does not ask a student not to put a tray in the recycling; it makes it impossible. The **bin-lid colours** do not have to be read at all, because the association was already learned at home. **Placement at the exit of the food line** means sorting requires no decision to go anywhere. **Friction** on the landfill flap changes the balance of effort rather than the balance of argument. In each case the design acts on perception and effort, which are immediate and involuntary, rather than on attention and goodwill, which are not.

The statement is not unconditional, though, and the same station shows the limit. Friction pushed some mixed waste onto the paving instead of into a bin — an object changes behaviour reliably, but not always into the behaviour you wanted. **Overall**, form is a more reliable instrument than instruction, which is precisely why designers carry responsibility for effects they did not intend *(4 marks: a clear position, at least three station decisions used as evidence, and a qualification that shows the limit of the claim).*

Q21. *(Model, using the KELPIE Sorting Station.)*

Behaviours. Three decisions do most of the work. The 90 mm round aperture affords a bottle and constrains a tray, so the wrong item cannot enter the containers stream. The wide scrape-in chute makes the organics action the cheapest on the station. The small hinged landfill flap makes the least-wanted path the most effortful. Students sort correctly not because they were asked to but because the sorted paths cost less than the alternative.

Interactions. The exchange itself is designed to be short and certain: three colour bands and three icons present all the options at once, in colours already learned from household bins, so no reading is required; the apertures confirm the choice physically; and the clear window closes the exchange with feedback that the stream inside is clean. Glance, choose, act, confirm — about four seconds, with no queue building behind.

Systems. The lift-out buckets are sized to the contractor's collection bins, so the cleaner lifts three sorted buckets rather than bagging one mixed bin. The organics bucket leaves the commercial waste system entirely and goes to the school's garden beds. The bolted panels on a galvanised frame mean a damaged panel is swapped rather than the station replaced, so the school's maintenance routine shifts from replace to repair.

Outcomes. Container-stream contamination fell from 31% to 6% and landfill volume by weight fell 45% in a term, so the collected material is clean enough to be recycled rather than rejected; less litter blows into the creek at the boundary; and the ibis that raided the old open bins have moved on.

One influence that was probably not intended. Students carrying genuinely mixed waste now sometimes leave it on the paving beside the station rather than force the stiff landfill flap. The friction that was designed to redirect behaviour redirected only part of it, and the remainder ended up on the ground — a negative outcome produced by a decision that was both intended and, for most items, effective *(6 marks: all four levels treated with specific decisions and mechanisms, and one unintended influence correctly identified and explained. Accept an equivalent ROSELLA response: behaviour — the back and arc afford settling in, the armrest affords standing; interaction — the curve turns the ends toward each other so conversation becomes easy; systems — single-stock-length bolted slats change the depot and the repair routine; outcomes — longer dwell time, mixed-age use, lower whole-of-life cost; unintended — the armrest prevents sleeping, or the unbroken curve excludes a wheelchair user.)*

Q22. The decision. Beck straightened the Underground's lines to verticals, horizontals and 45° diagonals and abandoned true distance, so the diagram reports the sequence of stations and the points where lines meet rather than where anything actually is.

Its influence in the context it was made for. The distortion removed information a passenger travelling underground cannot act on — how far apart two stations really are — and made room for the information they can act on: which line to board, how many stops to sit through, and where to change. The **interaction** with the map therefore changed from measuring a route to tracing and counting one, and the **behaviour** it produced was a passenger committing to an unfamiliar line without hesitating. Uptake is the evidence available: the design was first rejected as too revolutionary, ran as a trial of 500 copies in 1932, and once the pocket edition appeared in 1933 about 850,000 copies were printed within two months. The V&A's record of the diagram states the trade-off exactly — it is misleading about distances between stations, and it is very clear and easy to use.

Its influence read in the present. The decision has not changed; what is known about its effect has. A 2011 study of London Underground passenger data found that distance on the map predicted which route travellers chose roughly twice as strongly as the actual travel time did, and that the effect persisted even among people who used the network constantly — passengers trusted the diagram over their own experience. The distortion that once made the network legible now overrides it, so some people travel underground between stations that are a few minutes' walk apart. That is an **unintended outcome** at **system** scale: avoidable crowding and journeys that need not have been made. Transport for London's response in August 2016 was not to redraw the diagram but to publish a second, walking version giving steps and minutes between central stations.

Why the two readings differ. Nothing about the object changed. What changed was the context around it — a larger network, and criteria that now include health, crowding and short walking trips — and the evidence available about what it actually does. Judged against 1933 the decision is sound; judged against the present it produces an influence its designer never chose, which is precisely why a past design must be analysed twice *(5 marks: the decision named specifically; its influence traced in the original context; a documented present-day influence of the same unchanged decision; and the point that the design is constant while the context and the criteria are not).*

Theory

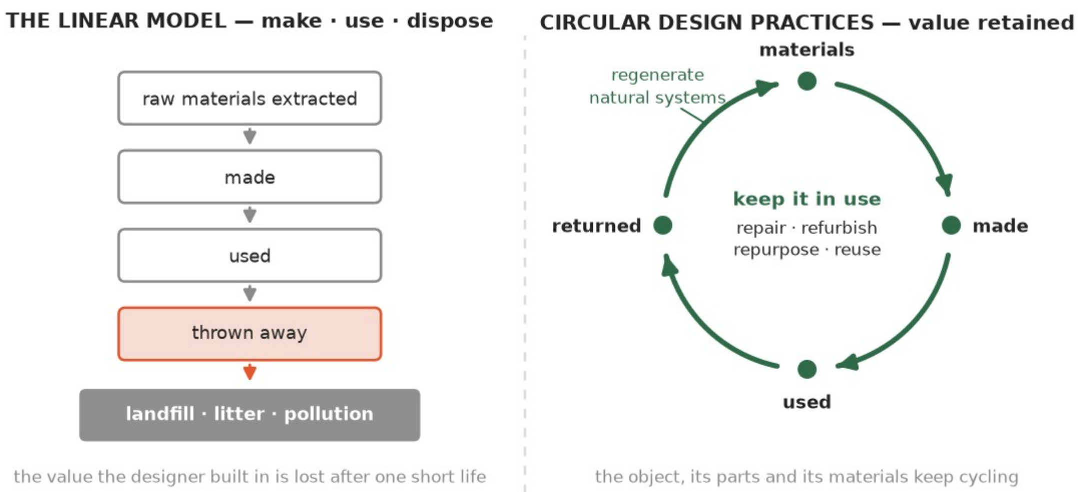
Everything you have designed so far has been judged by how well it serves people — the audience, the users, the client. In this Area of Study the test gets larger. You still design for people, but you also design for **other species, the planet and its future**, because an object does not stop existing when its owner stops wanting it. That widening of the brief is what **sustainable design** and **circular design practices** are for.

The reason this belongs in a *design* subject, rather than in a recycling campaign, is that the decisions which fix most of an object's impact are made on paper, before anything is manufactured. What it is made from, how many parts it has, how those parts are joined, whether a worn part can be replaced, how it is finished, how many fit in a carton — all of that is decided by a designer holding a pencil. As the Study Design puts it, design decisions play a key role in **minimising waste, pollution and hazardous substances during manufacture or use**.

Two terms, and the difference between them.

- **Sustainable design** is the *goal*: designing so that an object meets a need without using up or damaging the systems that people, other species and future users depend on. It is a judgement about the whole life of the object, not a feature you add at the end.
- **Circular design practices** are the *method* by which designers pursue that goal. Designers who adopt them consider not only the needs of audiences or users but the **enduring environmental and social impact** of their work. They **reject the linear model of make–use–dispose** and instead look for ways a design can **retain its value**. They aim to **extend life cycles and regenerate natural systems**, prioritising outcomes that are **durable, adaptable**, and that can be **repaired, refurbished, repurposed or reused**.

Learn that list of qualities word for word — durable, adaptable, repaired, refurbished, repurposed, reused. Notice what is *not* in it: recycling.



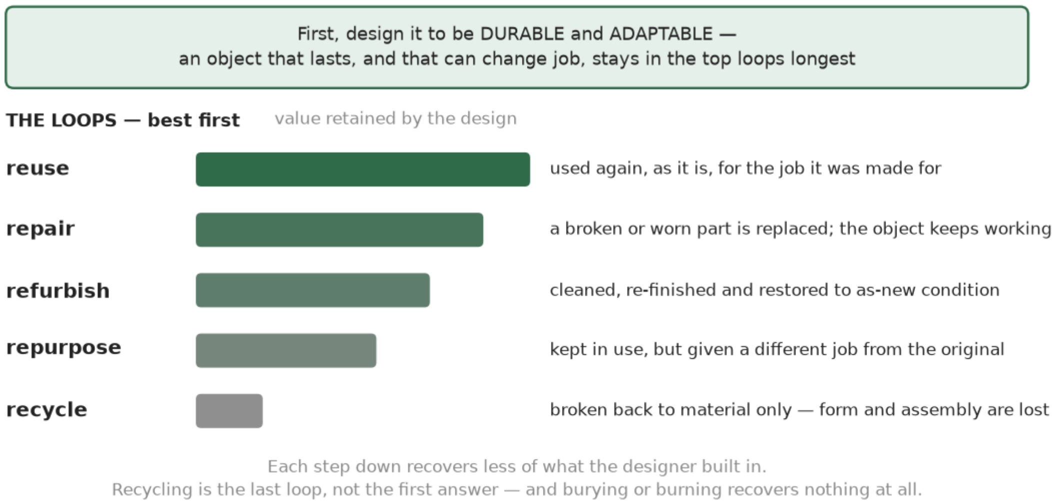
The model being rejected. In the **linear model** a material is extracted, made into something, used for a while and thrown away: *make – use – dispose*. Every step in that chain costs material, energy, water and habitat, and at the end of it the whole investment — the material, the making, the designer's own work — ends in landfill, litter or the air. Circular design closes the line into a loop so that the object, its parts and its materials keep coming back into use, and the value stays in the system instead of leaking out of it.

The three commitments of circular design. Read the definition again and it resolves into three things a designer commits to.

1. **Design out waste, pollution and hazardous substances** — and do it *at the decision*, not at the bin. This means choosing materials that can actually be recovered, avoiding coatings and adhesives that contaminate

them, cutting the offcuts by laying parts out efficiently, and reducing the volume an object occupies in transport.

2. **Keep the object, its parts and its materials in use** — make it **durable** so it does not fail, **adaptable** so it does not become irrelevant, and then plan for the loops below.
3. **Regenerate natural systems** — aim to give back more than you take: renewably grown or regeneratively farmed material, finishes with no toxic run-off, and supply choices that restore habitat rather than clearing it. This is the commitment students most often forget, and it is the one that separates *doing less harm* from *doing some good*.



The loops, best first. When an object does come back, what happens to it matters, because each loop recovers less of what the designer built in.

- **Reuse** — the object is used again, as it is, for the job it was made for. Nothing is lost.
- **Repair** — a broken or worn part is replaced and the object keeps working. Only the failed part is consumed.
- **Refurbish** — the object is cleaned, re-finished and restored to as-new condition, then returned to service.
- **Repurpose** — the object is kept in use but given a different job from the original one.
- **Recycle** — the object is broken back to material only. The material returns; the **form, the assembly and the making do not**.

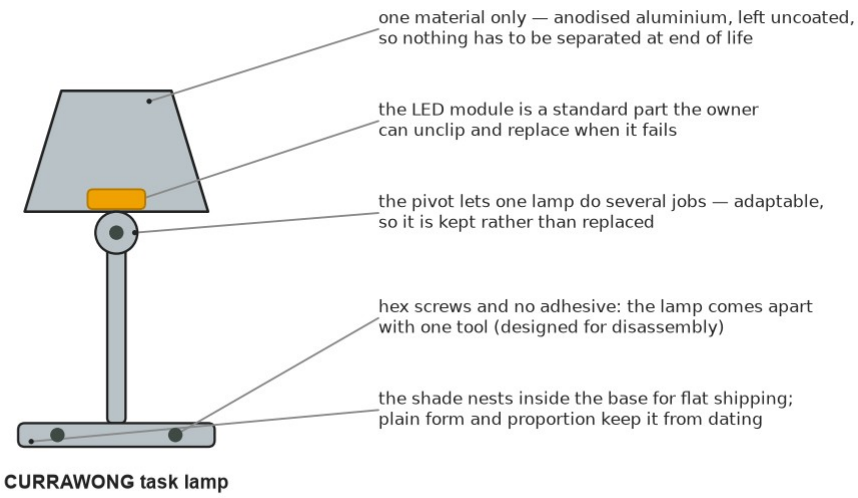
The order above holds for most objects, although the exact ranking depends on the object — what never changes is that recycling sits at the *bottom* of the list, and burying or burning sits below the list altogether. Recycling is the **last loop, not the first answer**. It is also usually a *downgrade*: mixed or contaminated material comes back as a lower grade than it went in, which is why "it is recyclable" is such a weak claim to make about a design.

The decisions that actually deliver it. Circular intentions are worth nothing until they become drawing decisions. Four groups of decision do almost all the work.

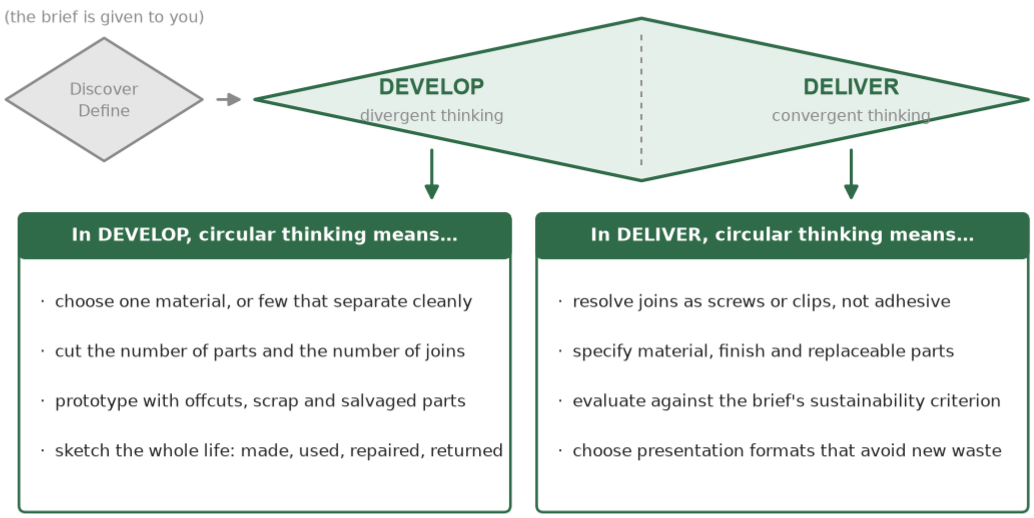
- **Material.** Choose **one material**, or few that separate cleanly by hand. Avoid materials fused into a laminate, because a laminate can be neither of its parents at end of life. Prefer recycled or renewable stock. Leave hazardous coatings and finishes out. Where you can, leave the material honest — an uncoated surface can be re-finished, whereas a painted one usually cannot.
- **Parts and joins.** Fewer parts, and fewer joins between them. **Mechanical fasteners** — screws, bolts, clips — instead of adhesive or welding, so the object can be taken apart with one common tool. This is **design for disassembly**, and it is the single decision that makes repair, refurbishment and material recovery all possible at once. Use **standard, replaceable components** for the parts you know will fail first.
- **Form and proportion.** These are design elements and principles doing sustainability work. A **form** that nests or stacks cuts the volume an object occupies in transport, so fewer trips carry more goods. Well-judged **proportion** and a plain **form** date slowly, and an object that is still liked is still kept — durability is partly a

matter of how something looks, not only how it is built (designers call this *emotional durability*). **Texture** and **tone** can be chosen so that wear reads as patina rather than damage.

- **The system around the object.** A designer working circularly designs the *return* as well as the thing: a deposit or take-back scheme, a refill, a repair service, a supply of spare parts. This is where the object stops being a product the client sells and becomes part of a **service** the client operates — and it is the step that decides whether the loops in the diagram above are real or theoretical.



A worked object. The **CURRAWONG** task lamp above was designed for a not-for-profit that fits out study spaces in community libraries. Its brief asked for a lamp that would survive ten years of student use and be repairable by library staff. Every circular decision on it is visible in the drawing. The body is **one material only** — aluminium pressed from recycled sheet and anodised rather than painted, so there is no coating to separate and the offcuts go back into the same stream. It is assembled with **four hex screws of one size and no adhesive** (two of them visible in the front elevation above), so a staff member with one key can open it. The **LED module is a standard part** that unclips, which means the most likely failure does not kill the lamp. The **pivot** at the stem makes one lamp serve several tasks, so it is **adaptable** and survives a change of use. The **shade nests inside the base** for flat shipping, cutting the volume of every carton. And the **form and proportion are deliberately plain**, so the lamp is unlikely to look dated before it wears out.

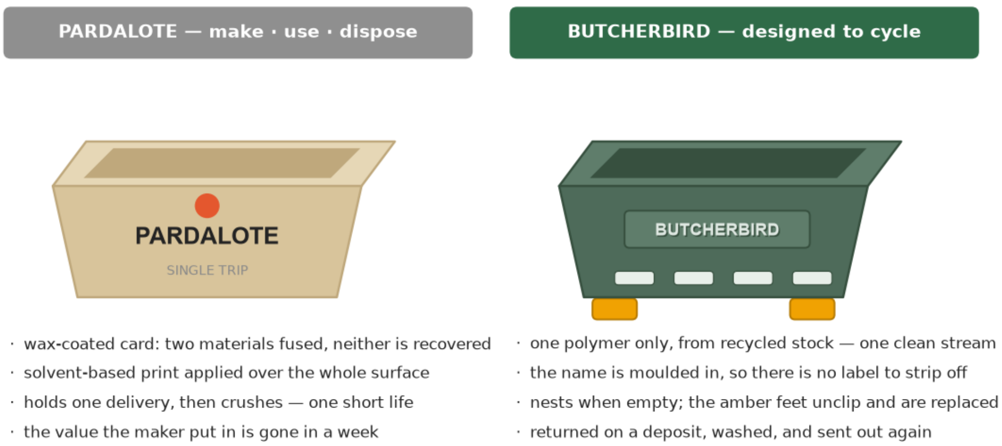


Where this happens in the VCD design process. In this Area of Study the brief is *given* to you, so your Discover and Define work is already done. Your circular thinking therefore lands in the **Develop** and **Deliver** stages. In **Develop** you think divergently: sketch many ideas, choose materials that separate cleanly, cut the part count, prototype with offcuts, scrap and salvaged parts, and sketch the whole life of the object — made, used, repaired, returned. In

Deliver you think convergently: resolve the joins as screws or clips rather than adhesive, specify material, finish and replaceable parts on your documentation, and evaluate your concept against the sustainability criterion in the brief. Even the presentation format is a decision — a concept board that becomes waste the day after the pitch is arguing against itself.

Their value. The key knowledge says "sustainable and circular design practices, **and their value**", so half the topic is being able to say who benefits and how. The word *value* does double duty here, and both meanings are examinable.

- **Value retained in the object.** A design that can be repaired or reused holds on to the material, the energy and the making that went into it. A design that cannot is worth nothing the moment it fails.
- **Environmental value.** Less material extracted, less waste and pollution created, fewer hazardous substances released during manufacture or use, less habitat cleared, and less transport per item delivered.
- **Social value.** Cleaner air, water and soil for the communities near the making and the discarding; safer materials for the people who assemble and use the object; repair work and skills kept in local economies; and products that stay affordable because they can be maintained rather than replaced.
- **Economic value.** For the client: lower material and waste costs, a resale, repair or refill revenue stream, less exposure to material price shocks and to tightening regulation, and the brand trust that comes from a claim they can actually evidence. For the user: a lower cost of ownership, because the thing lasts and can be fixed.
- **Value to the design itself.** Circular constraints are generative. "One material, four fasteners, must come apart" forces simpler, cleverer, more honest objects — which is also a decent definition of good design.



The same job, two models. The two original designs above are produce trays for the same regional growers' market co-operative. **PARDALOTE** is what the co-operative used first. It is **wax-coated card** — two materials fused, so the card cannot go to a paper mill and the wax cannot be recovered either — printed in solvent ink across the whole front, and it holds one delivery before it is crushed. Its whole life is *make – use – dispose*, and the value the maker put into it is gone within a week. **BUTCHERBIRD** is the redesign. It is moulded in **one polymer** from recycled stock, so it returns as a single clean stream. Its name is **moulded into the panel** as raised letterforms in the same material, so there is no adhesive label to strip off and nothing to peel in the wash. Its walls **taper**, so empty crates nest into one another and the return leg carries several times as many; turned end-for-end, a full crate seats squarely on the rim of the one below. Its **amber feet** — the part that wears — unclip and are replaced, and their **contrast** with the green body tells anyone at a glance which part is the serviceable one. And it is **returned on a deposit**, washed, and sent out again, which is the decision that makes all the others count.

Notice that BUTCHERBIRD costs the co-operative far more per unit than PARDALOTE. That is a real **trade-off**, and a good evaluation names it: the crate only repays its cost because it makes many trips, so the deposit system is not a nice extra but the thing the whole design depends on.

> **Units 3 & 4 preview — beyond the Units 1&2 study design.** In Unit 3, Area of Study 1 you will use this vocabulary for a different task: researching **contemporary designers** (those working from 2000 onwards) and evaluating **the extent to which** they adopt sustainable and circular design practices, as part of a comparative analysis of professional practice that is assessed in the examination. That comparative method,

and the requirement to evidence your claims from a real named designer's practice, are not part of the Units 1&2 study design, and no question in this subtopic asks for them. Here you apply circular practices to an object of your own and explain their value.

Watch-out — recycling is the last loop, not the answer. "It is recyclable" is the weakest thing you can say about a design. Reach for durable, adaptable, repairable, refurbishable, repurposable and reusable first, and say what happens to the object *before* it is ever broken back to material.

Watch-out — name the decision, not the intention. "Eco-friendly materials" and "sustainable processes" earn nothing. Name the actual decision (*one polymer, no adhesive label, replaceable feet*) and say what it prevents (*a contaminated recycling stream, a crate scrapped for a worn foot*).

Watch-out — a claim needs a design decision behind it. A green leaf on the packaging, or the word *sustainable* in a rationale, is **greenwashing** unless a specific decision supports it. In an evaluation, test each claim against the drawing.

Watch-out — say which impact, and at which stage. "Sustainable" is not one thing. Say whether you are reducing waste, pollution, hazardous substances, energy, transport or habitat loss, and whether that happens when the object is **made, used, kept or returned**.

Watch-out — the loops have exact names. Repair replaces a failed part; **refurbish** restores the whole object to as-new; **repurpose** gives it a different job; **reuse** is using it again as it is; **recycle** recovers material only. Markers accept the right word, not the nearest one.

Watch-out — answer the value half. If a question says *value*, name **who** benefits (the planet, the community, the client, the user) and **how**. A description of the practice with no beneficiary is half an answer.

Watch-out — circular decisions have trade-offs. Heavier, dearer, harder to make, fewer colours — naming the trade-off and explaining why the decision is still worth making is what turns a description into an evaluation.

Worked examples

Example 1 — scaffolded

*Explain what is meant by **circular design practices**, and describe **two** ways the CURRAWONG task lamp applies them. (4 marks)*

Working	Comment
Circular design practices reject the linear model of make–use–dispose. The designer considers the enduring environmental and social impact of the object, and looks for ways it can retain its value — extending its life cycle and regenerating natural systems by making it durable, adaptable, and able to be repaired, refurbished, repurposed or reused.	Open with the definition in the study design's own terms. The phrase "rejects make–use–dispose" and the list of qualities are what a marker looks for. Do not open with recycling.
Way 1 — one material only. The body is aluminium pressed from recycled sheet and anodised instead of painted, so there is no coating to separate and the whole lamp returns as a single stream at end of life.	"Describe two ways" means two SPECIFIC decisions visible in the design, each with the consequence attached. A named material plus what it makes possible.
Way 2 — a replaceable standard part. The LED module unclips, so the failure most likely to occur first can be fixed by library staff rather than ending the lamp's life.	Choose a second decision of a *different kind* from the first — material, then repairability — so the answer covers more of the practice.
∴ both decisions keep the lamp, its parts and its material in use rather than sending them to landfill after one life.	One closing line ties the two examples back to the definition, which is what "explain … and describe" together require.

Example 2 — scaffolded

*Explain the **value** of designing the CURRAWONG lamp so that its LED module can be replaced. (5 marks)*

Working	Comment
The mechanism first. The LED is the part with the shortest life. Because it unclips as a standard module, its failure ends the life of one small part instead of the whole lamp.	Value questions still need the cause-and-effect chain. Establish WHAT the decision does before saying who benefits.
Value retained in the object. The aluminium body, the pivot and the making of them all stay in service, so the material and energy already invested keep working.	This is the study design's own sense of the word "value" — the thing retains its value. Lead with it.
Environmental value. One replacement module is a fraction of the material, energy and transport of a replacement lamp, and one failed component rather than a whole lamp goes to waste.	Name the impact specifically (material, energy, transport, waste) rather than saying "better for the environment".
Economic and social value. The library replaces a cheap module instead of buying a new lamp, so the fit-out costs less to run; staff and local repairers keep the skill and the work; and the lamp stays serviceable for a not-for-profit with a small budget.	Two more beneficiaries, each with a mechanism. Marks here come from naming WHO benefits and HOW.
A **limitation**: the module must still be available in eight years, so the value depends on the client specifying a standard part rather than a proprietary one. ∴ replaceability is valuable only when the supply of the replacement is designed for too.	A trade-off or condition lifts the answer from description to explanation, and shows the decision is a system decision, not just a detail.

Example 3 — unscaffolded

Explain how the BUTCHERBIRD crate rejects the linear model of make–use–dispose. (4 marks)

In the linear model a tray is made, used once and thrown away, and the material and making are lost with it. BUTCHERBIRD breaks that chain at every step. It is not *disposed of*, because it is **returned on a deposit**, washed and sent out again — the crate is used many times for the job it was made for, which is the reuse loop. It is not made *unrepairable*, because the amber feet, the part that wears, unclip and are replaced, so a worn foot costs a foot rather than a crate. It is not made *unrecoverable*, because the body is a single polymer with the name moulded in rather than an adhesive label printed over it, so when it finally fails it returns as one clean material stream instead of contaminated mixed waste. And it is not *wasteful in transit*, because the tapered walls let empty crates nest, so the return leg carries several times as many. ∴ instead of one short line ending in landfill, the crate travels a loop — made, used, returned, repaired, used again — and the value the co-operative paid for stays in the loop with it.

Example 4 — unscaffolded

Compare the PARDALOTE tray and the BUTCHERBIRD crate, and evaluate which better reflects circular design practices. (6 marks)

Both designs solve the same problem — moving produce from a grower to a market stall — and both are three-dimensional objects made in volume, so the comparison is a fair one. **Material:** PARDALOTE is wax-coated card, two materials fused together, so neither the card nor the wax can be recovered; BUTCHERBIRD is one polymer from recycled stock, so it returns as a single clean stream. **Graphics:** PARDALOTE is printed in solvent ink across its whole front, which puts ink over the entire surface, whereas BUTCHERBIRD's name is moulded into the panel in the same material, so there is no label to strip and no ink to contaminate the melt. **Life:** PARDALOTE holds one delivery and is then crushed, while BUTCHERBIRD is returned on a deposit, washed, repaired when a foot wears, and sent out again — the difference between a single life and many.

The one respect in which PARDALOTE performs better is **first cost and weight**: it is cheap and light, so a single trip carries less mass and the co-operative risks less capital. That is a genuine **trade-off**, and it explains why BUTCHERBIRD only works if the deposit system actually brings the crates back; a returnable crate that is not returned is worse than the tray it replaced.

Overall, BUTCHERBIRD reflects circular design practices far better. It is durable, its worn parts are replaceable, it is designed to be reused many times, and its material is recoverable at the end — four of the study design's own priorities, against none for PARDALOTE, whose life is *make – use – dispose* by design. ∴ on the evidence of the two designs, BUTCHERBIRD is the circular solution, provided the return system is treated as part of the design rather than as an afterthought.

Practice questions

Scaffolded

Q1. Using the diagram of the two models: (a) Name the three stages of the linear model. *(1 mark)* (b) State what happens to the value a designer built into an object at the end of a linear life. *(1 mark)* (c) Explain one way circular design practices change that outcome. *(2 marks)*

Q2. Using the CURRAWONG task lamp: (a) Identify one decision that supports **repair** and one that supports **reuse**. *(2 marks)* (b) Distinguish between **repair** and **refurbish**. *(2 marks)* (c) Explain why using only one material matters at the end of the lamp's life. *(2 marks)*

Q3. Using the diagram of the loops: (a) State which loop retains the most of what the designer built in, and why. *(2 marks)* (b) Explain why recycling sits at the bottom of the list. *(2 marks)* (c) Name the two qualities the study design asks a designer to build in *before* any loop is needed. *(2 marks)*

Q4. Terminology: (a) Define **sustainable design**. *(1 mark)* (b) Define **circular design practices**. *(2 marks)* (c) State one way the two terms differ in emphasis. *(1 mark)*

Q5. Circular practices in the design process: (a) Name the two stages of the VCD design process in which you adopt circular design practices when responding to a given brief for a sustainable object. *(1 mark)* (b) Describe one circular decision you would make in the first of those stages. *(2 marks)* (c) Describe one circular decision you would make in the second. *(2 marks)*

Q6. The value of circular design practices: (a) State one **environmental** value of designing an object to be repaired. *(1 mark)* (b) State one **economic** value of the same decision to a client. *(1 mark)* (c) State one **social** value of the same decision to a community. *(1 mark)*

Unscaffolded

Questions 7–21 refer to the PARDALOTE tray, the BUTCHERBIRD crate and the CURRAWONG task lamp shown in this subtopic, as indicated in each question, unless otherwise stated.

Q7. Explain how the BUTCHERBIRD crate addresses each of the three commitments of circular design — designing out waste and pollution, keeping the object in use, and regenerating natural systems — and identify the commitment it addresses least well. *(5 marks)*

Q8. Explain the value of the BUTCHERBIRD design to the growers' market co-operative as the client, including one cost the co-operative carries. *(4 marks)*

Q9. Explain why the PARDALOTE tray cannot be recovered as either card or wax, and describe one change to the design that would make its material recoverable. *(3 marks)*

Q10. Discuss how the design **elements** and **principles** have been used on the BUTCHERBIRD crate to do circular work, referring to at least three of them. *(4 marks)*

Q11. Distinguish between **reuse** and **repurpose**, giving one example of each drawn from the designs in this subtopic. *(3 marks)*

Q12. Explain what **design for disassembly** means and how the CURRAWONG lamp achieves it. *(3 marks)*

Q13. Explain how designing an object to be **adaptable** extends its life, referring to the CURRAWONG lamp. *(3 marks)*

Q14. A student writes: *"The BUTCHERBIRD crate is sustainable because it is made from recycled plastic."* Evaluate this claim. *(4 marks)*

Q15. Write one sustainability **design criterion** that could appear in the brief for the BUTCHERBIRD crate, and explain how you would evaluate a design concept against it during the Deliver stage. *(4 marks)*

Q16. Explain, with one example, how a circular design decision can create a **trade-off** the designer must justify. *(3 marks)*

Q17. Circular design practices ask a designer to move beyond a purely human-centred mindset. Explain what this means, referring to other species, the planet's future and the commitment to regenerate natural systems. *(4 marks)*

Q18. Explain how a deposit-and-return system changes the crate from a product the co-operative buys into part of a **service** the co-operative runs, and why that matters for circularity. *(4 marks)*

Q19. Write **two** evaluative annotations for the CURRAWONG lamp using appropriate design terminology — one identifying a strength of its circular performance and one identifying a limitation with a suggested improvement. *(4 marks)*

Q20. Compare how the CURRAWONG lamp and the BUTCHERBIRD crate each keep their object in the top loops, and explain which strategy is better suited to its own context. *(6 marks)*

Q21. A council wants a returnable cup for its weekend markets, replacing single-use cups. Explain **three** circular design decisions you would make, and the value of each. *(6 marks)*

Answers

Q1. (a) Make – use – dispose (extract/make, use, dispose). (b) It is lost — landfill, litter or pollution. (c) See solutions. **Q2.** (a) Repair = the unclipping LED module (or the hex screws that let the lamp be opened); reuse = the durable aluminium body and plain, slow-to-date form, so the lamp is handed on and used again as a lamp. (b) Repair replaces a failed part; refurbish restores the whole object to as-new. (c) There is nothing to separate — the anodised aluminium body returns as one clean material stream, whereas a painted or laminated body would come back as lower-grade mixed material. **Q3.** (a) Reuse — the object is used again as it is, so nothing is lost. (b) It recovers material only; the form, assembly and making are lost, and the material usually returns at a lower grade. (c) Durable and adaptable. **Q4.** (a) Designing so a need is met without using up or damaging the systems people, other species and future users depend on. (b) See solutions. (c) Sustainability is the goal; circular practices are the method. **Q5.** (a) Develop and Deliver. (b)/(c) See solutions. **Q6.** (a) Less material extracted and less waste created. (b) Cheaper to maintain than to replace. (c) Repair work and skills stay in the local community. **Q7–Q21.** See fully-worked solutions.

Fully-worked solutions

Q1. (a) **Make – use – dispose** (the object is made from extracted material, used, then thrown away). (b) It is **lost** — the material, the energy and the designer's work end as landfill, litter or pollution. (c) Circular design practices close the line into a loop: because the object is designed to be **durable, adaptable and able to be repaired, refurbished, repurposed or reused**, it comes back into use instead of being disposed of, so the value stays in the object and in the system *(2 marks: the mechanism named + the outcome for the value)*.

Q2. (a) **Repair** — the LED module unclips and can be replaced (accept: the four hex screws let the lamp be opened). **Reuse** — the durable one-material body and the plain, slow-to-date form mean the lamp can be handed on to another study space and used again *as a lamp*, rather than replaced (the pivot is better described as **adaptability**). (b) **Repair** replaces a broken or worn *part* so the object keeps working; **refurbish** restores the *whole object* — cleaning, re-finishing and returning it to as-new condition — before it goes back into service. (c) Because the body is aluminium only, anodised rather than painted, there is nothing to separate: the whole body can go back as one clean material stream. A painted or laminated body would either have to be stripped or would come back as a lower-grade mixed material *(2 marks: single-stream recovery + the contrast with a mixed material)*.

Q3. (a) **Reuse.** The object is used again exactly as it is, for the job it was made for, so the material, the assembly and the making are all still doing work — nothing has to be recovered because nothing has been lost. (b) Recycling recovers **material only**. The form, the assembly and the energy of making are destroyed, and mixed or contaminated material usually comes back at a lower grade than it went in, so less is recovered than at any loop above it. It is the last loop, not the first answer. (c) **Durable** and **adaptable**.

Q4. (a) **Sustainable design** is designing so that an object meets a need without using up or damaging the systems that people, other species and future users depend on — a judgement about the whole life of the object. (b) **Circular design practices** reject the linear make–use–dispose model. Designers consider not only the needs of audiences or users but the enduring environmental and social impact of their work, minimising waste, pollution and hazardous substances during manufacture or use, and seeking ways for the design to retain its value — extending life cycles and regenerating natural systems by prioritising outcomes that are durable, adaptable, and can be repaired, refurbished, repurposed or reused *(2 marks: rejection of the linear model + retaining value / the list of qualities)*. (c) Sustainability names the **goal**; circular design practices are the **method** used to reach it.

Q5. (a) **Develop** and **Deliver** — the brief is given, so the Discover and Define work is already done. (b) *Develop (divergent).* For example: generate ideas around a **single material** that can be recovered as one stream, and test them as low-fidelity prototypes made from offcuts and salvaged parts, so the material decision is explored cheaply and without creating new waste *(2 marks: a specific decision + why it is circular)*. (c) *Deliver (convergent).* For example: resolve every join as a **mechanical fastener** rather than adhesive, and specify the material, the finish and the replaceable parts on the documentation drawing, so the object as built can actually be opened, repaired and recovered *(2 marks)*.

Q6. (a) Fewer objects have to be manufactured, so less material is extracted and less waste is created — one failed part is consumed instead of a whole object. (b) The client replaces a cheap component instead of buying a new object, lowering the cost of running the fit-out, and can offer repair as a service rather than losing the customer at failure. (c)

Repair work, spare-part supply and the skills that go with them stay in the local community, and the object stays affordable for people who cannot replace it.

Q7. *Designing out waste and pollution:* the crate is one polymer from recycled stock with the name **moulded in** rather than printed on an adhesive label, so nothing contaminates the material and no ink is applied over the surface; the tapered walls let empties nest, so the return leg carries several times as many crates and transport emissions per delivery fall. *Keeping the object in use:* it is durable, it is **returned on a deposit** and reused many times, and the amber feet — the part that wears — unclip and are replaced, so a worn foot costs a foot rather than a crate. *Regenerating natural systems:* using recycled feedstock reduces the demand for new polymer and the extraction that goes with it, and replacing thousands of single-trip trays removes a stream of unrecoverable waste. The commitment it addresses **least well is regeneration**: a polymer crate reduces harm but does not actively restore soil, water or habitat the way a renewably grown material from a regenerative source could *(5 marks: each commitment applied with evidence + a justified weakest commitment)*.

Q8. The design is valuable to the co-operative because it converts a recurring cost into an asset. Each crate replaces many trays, so the cost per delivery falls once the crate has made enough trips; because the feet are replaceable, wear does not scrap the asset; because empties nest, the return trip carries more crates and costs less per unit moved; and because the crates come back on a deposit, the co-operative keeps control of them rather than buying trays again every week. There is also brand value: the co-operative can make a sustainability claim its own crates evidence. The **cost it carries** is a much higher first price and a heavier object per trip, plus the work of running the washing and return system. ∴ the value is real but conditional — it depends on the crates actually coming back often enough to repay the investment *(4 marks: at least two mechanisms of value + the cost/condition named)*.

Q9. The tray is **wax-coated card**: the wax and the card are fused into one laminate. A paper mill cannot process it because the wax will not break down with the fibre, and the wax cannot be recovered because it is spread through the card — so neither parent material can be reclaimed and the tray becomes mixed waste. **One change:** specify a single material — for example an uncoated moulded-fibre tray whose water resistance comes from the forming process rather than from a wax layer — so the whole tray can go back to a fibre stream (accept: replace the wax with a compostable coating certified for the same stream, or replace the printed graphic and coating with an embossed mark) *(3 marks: the laminate problem explained + a change that produces a single recoverable stream)*.

Q10. Form: the tapered walls are the circular decision — empty crates nest into one another, so the return leg of the loop carries several times as many crates and the deposit system stays economic. **Proportion:** the rim is proportioned so that, turned end-for-end, a full crate seats squarely on the rim of the one below, so crates stack without crushing produce and without a second stacking component being added. **Contrast:** the amber feet contrast strongly with the green body, so the one serviceable part is identifiable at a glance and gets replaced instead of the crate being scrapped. **Type:** the name is set as raised letterforms moulded in the same polymer, which removes the adhesive label and its ink from the material stream entirely. **Colour and tone:** a single mid-tone green is dark enough to absorb the colour variation of recycled feedstock, so the recycled content does not have to be hidden under a coat of paint *(4 marks: at least three elements or principles, each tied to a circular consequence — not merely described)*.

Q11. Reuse is using an object again *as it is*, for the job it was made for — the BUTCHERBIRD crate is washed and sent out to carry produce again, delivery after delivery. **Repurpose** is keeping an object in use but giving it a *different* job from the original one — a BUTCHERBIRD crate whose rim has cracked past repair being used as a raised planter or a storage tote at the market shed. The distinction is the **function**: reuse keeps it; repurpose changes it, which is why repurposing sits lower in the loops — some of the design's original value is no longer being used *(3 marks: both defined, both exemplified, the distinction drawn)*.

Q12. Design for disassembly means designing an object so that it can be taken apart again — into its parts and its materials — without destroying it, using ordinary tools. CURRAWONG achieves it by being assembled with **four hex screws of one size and no adhesive**: one key opens the base, the stem and the pivot, and the LED module unclips rather than being bonded in. Because it comes apart, the same decision makes three things possible at once — repair of a failed part, refurbishment of the whole lamp, and clean recovery of the aluminium at end of life *(3 marks: definition + the specific decisions + what disassembly enables)*.

Q13. An object dies of irrelevance as often as it dies of breakage. **Adaptable** means the object can serve more than one need, so a change in how it is used does not end its life. The **pivot** on CURRAWONG lets the same lamp be a task light over a desk, a reading light beside a chair or an upward wash on a wall, so when a library re-arranges a study space the lamp is re-deployed instead of replaced. ∴ adaptability extends the life cycle by keeping the object useful through changes of context, which is why the study design lists it beside durability, before any of the loops *(3 marks: adaptability defined + the specific feature + the effect on the life cycle)*.

Q14. The claim is **partly supported but incomplete, and as written it is greenwashing**. What is right: recycled feedstock does reduce demand for new polymer and the extraction and processing that go with it, so the material choice is a genuine circular decision. What is wrong: "sustainable" is a claim about the object's **whole life**, and recycled content alone does not deliver it — a crate moulded from recycled polymer and then thrown out after one trip would still be a linear design. The decisions that actually make BUTCHERBIRD circular are the ones the student has not mentioned: it is **returned on a deposit and reused** many times, its worn **feet are replaceable**, its **moulded-in name** keeps the material stream clean, and it **nests** so the return leg is efficient. The claim would also need evidence — a verified proportion of recycled content, not an assertion. ∴ the student should rewrite it as a claim about the whole life, supported by named design decisions *(4 marks: what is valid, what is missing, the greenwashing point, the corrected claim)*.

Q15. A workable criterion: *"The design solution must be able to complete at least 200 delivery trips, with any worn part replaceable by market staff and the whole crate recoverable as a single material stream."* This is a criterion rather than an aspiration because it is **specific, and it can be tested**. To evaluate a concept against it in the **Deliver** stage I would check each clause against my own documentation and prototype: count the materials specified on the drawing and confirm they are one stream; identify which part fails first and confirm the drawing shows it as a separate, unclipping component with a fastener a staff member can undo; and test the low-fidelity prototype for the load and stacking the trips demand, recording where it fails. I would then annotate the concept with the strength and the shortfall against each clause and refine accordingly *(4 marks: a specific and testable criterion + a described evaluation method tied to the Deliver stage)*.

Q16. A circular decision usually costs something elsewhere, and the designer has to argue that the exchange is worth it. **Example:** BUTCHERBIRD's single-polymer body makes the crate recoverable as one clean stream, but it rules out a softer second material for the hand grips, so the crate is less comfortable to carry than a two-material design would be. The designer justifies the trade-off by resolving the grip through **form** instead of material — a moulded recess with a generous radius — so the comfort loss is minimised and the single-stream benefit is kept. (Accept any genuine trade-off correctly justified: extra weight against many trips, higher first cost against cost per use, restricted colour range against recycled feedstock.) *(3 marks: the trade-off identified + both sides + the justification)*.

Q17. A purely human-centred mindset asks only what the audience or user needs. Circular design practices widen that: the designer also weighs the **enduring environmental and social impact** of the object on those who never chose it. For **other species**, that means the habitat cleared to extract the material, the run-off from a finish entering a waterway, and the fragments of a discarded object entering a food chain. For the **planet's future**, it means that materials are finite and that emissions and landfill outlast the object's owner — so a decision made now is a decision made for people not yet born, who inherit both the consequences and the waste. The commitment to **regenerate natural systems** goes one step further than reducing harm: the designer chooses renewably grown or regeneratively farmed material, specifies finishes with no toxic run-off, and selects supply that restores soil, water or habitat rather than depleting it — aiming to give back more than the object takes *(4 marks: the widening of the mindset + other species + future users + regeneration as more than harm reduction)*.

Q18. With a **deposit**, the co-operative does not sell the crate and lose sight of it — it lends the crate and gets it back, so the crate stays on the co-operative's books as an asset. That changes the business from *selling a delivery* to *operating a returns loop*: collecting, washing, inspecting, replacing worn feet and sending crates out again. Because the co-operative still owns the crate, it has a direct financial reason to want it to last, to be repairable and to come back — the interests of the client and the interests of the material point the same way for the first time. It also changes the **designer's** job: the return step has to be designed too, so the crate must survive washing, nest for the return trip, carry a visible deposit marking, and present its worn part for easy replacement. ∴ circularity is a property of the object *and* the service around it; without the service, the loops in the model stay theoretical *(4 marks: ownership retained + the incentive it creates + the design consequences + the link to circularity)*.

Q19. Strength. *"One material only: the body is anodised, uncoated aluminium, so the whole lamp returns as a single clean stream and the surface can be re-finished rather than replaced. The plain **form** and even **proportion** carry no styling that will date, and the low-contrast **tone** of the raw metal suits both a library and a home, so the lamp is likely to be kept as well as to last — durability of desire as well as durability of build."*

Limitation and improvement. *"The uncoated surface is the weak point: fingerprints and scratches read as damage rather than patina on a smooth finish, and a user who thinks a lamp looks worn out replaces it even though it still works. Adding a fine brushed **texture** to the base and shade would break up handling marks and let wear read as patina, without introducing a second material or a coating that would compromise recovery." (4 marks: two annotations, each using design terminology, one evaluating a strength and one a limitation with a specific and consistent improvement.)*

Q20. Both designs aim at the **top loops** — keeping the object itself in use rather than recovering its material — but they get there by different routes because their contexts differ. **CURRAWONG** works through **durability and repair by the owner**: one material, four identical hex screws, an unclipping LED module and a pivot that lets the lamp change job. Its context is a library fit-out where a single lamp stays in one building for years and is maintained on site, so the design puts its effort into being opened and fixed by whoever happens to own it. **BUTCHERBIRD** works through **reuse inside a managed system**: a deposit brings every crate back to one place, where it is washed, inspected and re-footed before going out again. Its context is a high-frequency logistics loop with hundreds of units and a single operator, so the design puts its effort into surviving the loop and travelling cheaply — nesting walls, a moulded-in name that survives washing, feet that a depot worker can change in seconds.

The **similarity** is that both refuse to let one failure end the object: each identifies the part that will wear first and makes it replaceable. The **difference** is who does the keeping — an individual owner with one tool, or a client operating a service at scale.

Overall, each strategy suits its own context better than the other would. CURRAWONG could not rely on a deposit system, because there is nowhere for a single library lamp to be returned to; BUTCHERBIRD could not rely on owner repair, because its users are dozens of growers with no incentive to maintain someone else's crate. ∴ the right circular strategy is not the most ambitious one but the one the object's context can actually sustain *(6 marks: both strategies analysed with evidence, a congruent two-sided comparison, similarity and difference, and a justified judgement about context)*.

Q21. Decision 1 — one material, lid included. Mould the cup and its lid from a single polymer, or make both from one grade of stainless steel, with no second-material seal or sleeve. *Value:* the cup returns as one clean stream with nothing to sort, so its material is genuinely recoverable at end of life instead of being contaminated by a mixed component — and nothing has to be pulled apart by hand at the wash-up.

Decision 2 — a nesting form and one standard size. Proportion the cup so empties nest into a returns crate and specify a single size for every vendor at the market. *Value:* a returns crate carries many times more cups than a loose stack, so collection trips and storage space fall; and because every vendor uses the same cup, one wash cycle and one stock of replacement lids serve the whole market, which is what makes the loop cheap enough for a council to actually run.

Decision 3 — no printed graphic and no date. Emboss the council's mark into the wall in the same material and leave off the year, the event name and any applied ink or label. *Value:* there is no adhesive label to strip and no ink to contaminate the melt, the mark survives hundreds of wash cycles without wearing off, and the cup is not made obsolete by next season's market — so the design does not build in its own end of life.

(6 marks: three genuinely different decisions, each named as a design decision rather than an intention, each with a specific beneficiary and mechanism. Accept any three defensible decisions — for example a deposit and return system, a separately replaceable lid, or a form that reads as reusable rather than disposable — provided the value of each is explained.)

Topic Test 2 — Generating, refining and resolving; design's influence and influences on design

Reading time: 5 minutes • Writing time: 45 minutes • Total 40 marks

Structure of test

Section	Number of questions	Number of questions to be answered	Number of marks
A	5	5	24
B	3	3	16
		Total	**40**

- Materials permitted: pens, pencils, highlighters, erasers, sharpeners, rulers, a protractor, set squares, aids for curve sketching, coloured pencils, fineliner pens (0.6 mm or less), compasses, and circle and ellipse templates.
- Materials NOT permitted: any technology, notes of any kind, blank sheets of paper and/or correction fluid/tape.
- A **Resource Sheet** is provided with this test.
- All written responses must be in English.

Instructions

- Write your responses in the spaces provided in this book.
- Drawings must be completed in the spaces provided.
- All questions must be answered.

This topic test covers Chapters 3 and 4. It mirrors the structure, timing and materials of the VCAA examination at reduced scale. It is an original ClassBasics paper; no VCAA question is reproduced.

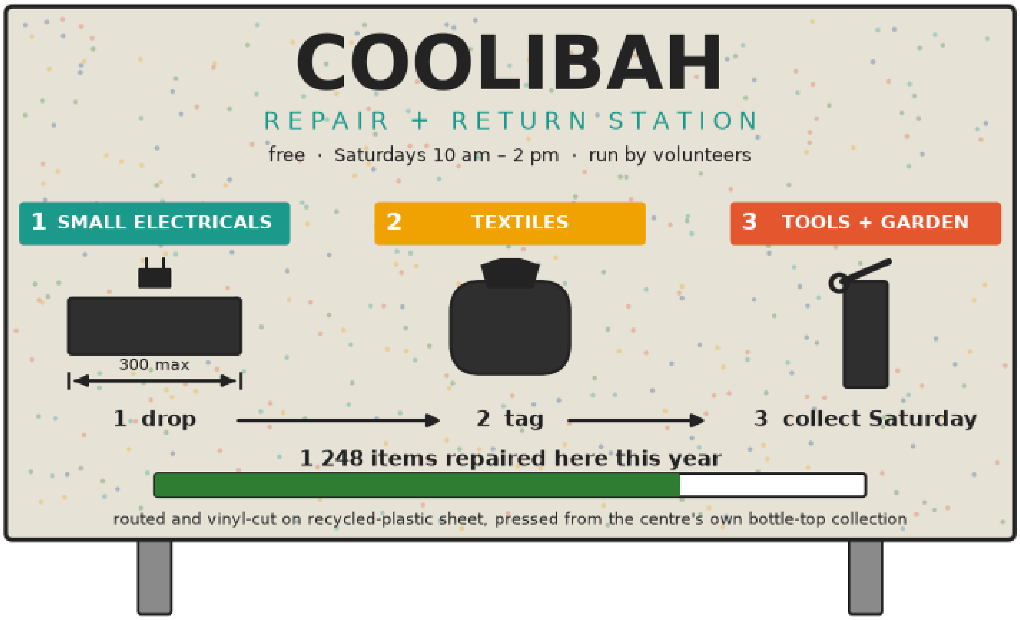
Topic Test 2 — Resource Sheet

Use these design examples to answer Section A. Each example is an original ClassBasics artifact created for this test.

Design example 1 — Objects

SPINIFEX — retail carton for a native seed-raising kit, 2026. The carton holds a moulded board tray, ten seed packets and a growing guide, and is sold at a community nursery. 190 × 260 mm, hand screen-printed by nursery volunteers in two inks on 100% recycled unbleached kraft board; the pack is slot-and-tab assembled with no glue, no laminate and no plastic window.

Design example 2 — Environments



COOLIBAH — a self-service repair and return station, 2026. It stands on the walkway between the supermarket doors and the car park at a suburban shopping centre, so shoppers pass it on the way out. Items are posted through one of three apertures, volunteers repair them on Saturdays and the owner collects. 2400 × 1200 mm, routed and vinyl-cut on recycled-plastic sheet pressed from the centre's own bottle-top collection. The opening-hours line and the repair counter are separate cut-vinyl strips, so they can be peeled and re-cut without remaking the panel.

Section A

Instructions for Section A: Answer all questions in the spaces provided. Where a question carries a tick line, tick the box of the ONE design example you have chosen and refer to that example throughout your response. Where a question names a design example, use the example named.

Question 1 (4 marks)

Tick the design example you have chosen:

[ ] Design example 1 — SPINIFEX (Objects) [ ] Design example 2 — COOLIBAH (Environments)

The group that made the design example you have chosen has asked you to design **one more piece** to go with it: a **swing tag** to hang from the SPINIFEX carton, or a **directional sign** to stand at the supermarket doors and point shoppers to the COOLIBAH station. Your piece must be produced by the same people, in the same place, as the example you have chosen.

a. Name the **material** you would produce your piece on or from. 1 mark

b. Name the **method** and the **medium** you would use, then explain why that combination suits **the people who will produce it** and **where it will be used**. 3 marks

Question 2 (4 marks)

This question refers to **Design example 1 — SPINIFEX**.

Before it was produced, the SPINIFEX carton was pinned up as a work-in-progress concept at a design critique.

a. Write the **rationale** the designer could give for **one** decision that is visible in the carton. Name the decision, the reason for it, and the criterion or audience it serves. 2 marks

A student-critic responded: *"It's a bit boring — you've played it safe again."*

b. Identify **two** qualities of constructive feedback that this comment fails, then rewrite the comment so that it is constructive. 2 marks

Question 3 (6 marks)

Tick the design example you have chosen:

[ ] Design example 1 — SPINIFEX (Objects) [ ] Design example 2 — COOLIBAH (Environments)

a. Name **two** of the five factors that have influenced the design example you have chosen. 2 marks

b. For **one** of the factors you named, explain how it influenced the **designer's** decisions about the design example. 4 marks

Question 4 (4 marks)

This question refers to **Design example 2 — COOLIBAH**.

a. Identify **one** way the station has been designed to make a person act — for example an affordance, a signifier, a constraint, a default, feedback or a sequence. 1 mark

b. Analyse how the design of the station influences the **behaviours** of the people who use it and the **system** it sits inside. 3 marks

Question 5 (6 marks)

Tick the design example you have chosen:

[ ] Design example 1 — SPINIFEX (Objects) [ ] Design example 2 — COOLIBAH (Environments)

a. Identify **one** circular design practice evident in the design example you have chosen. 1 mark

b. Explain how that practice helps the design **retain its value**. 2 marks

c. Recycling is described as the last loop rather than the first answer. Discuss **one** decision the designer has made that keeps the design out of the recycling stream for longer. 3 marks

Section B

Instructions for Section B: Answer all questions in the spaces provided. You may use any of the drawing methods, media and materials permitted in this test. All three questions refer to the design problem below.

The design problem

KURRAJONG COMMUNITY PANTRY is a volunteer-run food pantry in a regional town. Every Thursday about 120 members collect a share of donated fruit and vegetables. The pantry currently packs the produce into single-use cardboard cartons donated by a wholesaler. The cartons are damp by the time they leave the building, almost none are brought back, and every one of them goes to landfill. The pantry has one storeroom shelf to spare.

Communication need

A **reusable produce carrier** that a member borrows when they collect their produce and returns on their next visit.

Design criteria

The design solution must:

1. carry 8 kg of loose fruit and vegetables and be carried 500 m on foot or on a bus;
2. be made from **one material**, or from materials a volunteer can separate by hand;
3. **fold flat or nest when empty**, so that 30 empty carriers occupy less than one shelf;
4. be **repairable** by a volunteer using ordinary hand tools;
5. be recognisable as the pantry's, so that members bring it back.

Criteria **2, 3 and 4** are the **sustainability criteria**. They are the criteria you will evaluate against in Question 8.

Question 6 (4 marks)

Develop

a. Generate **three** design ideas for the KURRAJONG produce carrier. Draw each as a quick ideation sketch in the space below and number it. Your three ideas must be genuinely different from one another, not three variations of one form. 3 marks

b. Name the **method** you used to generate your ideas. 1 mark

Question 7 (6 marks)

Refine

a. Select **ONE** of your three ideas and develop it into **two** design concepts. Draw both concepts in the space below. 4 marks

b. Annotate each concept to name **one design element** and **one design principle** you have applied, and to state the **method, media and material** you would use to produce it. 2 marks

Question 8 (6 marks)

Resolve

a. Choose **ONE** of your two concepts. Complete the table below to evaluate it against the three sustainability criteria. For each criterion, give the evidence from your own concept and a judgement of *met*, *partly met* or *not met*. 4 marks

Sustainability criterion	Evidence in your concept	Met / partly met / not met
2. one material, or materials that separate by hand		
3. folds flat or nests when empty		
4. repairable with ordinary hand tools		

b. State which concept you would take forward to resolve, and justify your decision by reference to **one** of the sustainability criteria. 2 marks

Topic Test 2 — Answers and marking guide

Marking guide

Question	Marks	What is being assessed
1a	1	Names a MATERIAL, correctly categorised — not a method and not a medium. Only the first material named is marked
1b	3	Names a method and a medium, each correctly categorised (1) + the choice justified against the capability of the people producing it (1) + justified against the setting the piece will be used in (1)
2a	2	A rationale = the decision (1) + the reason for it linked to a criterion or the audience (1)
2b	2	Two qualities of constructive feedback correctly named (1) + a rewrite that is specific, descriptive, respectful and actionable (1)
3a	2	Two of the five factors, named with the study design's exact terms (1 mark each)
3b	4	The specific driver + a decision the DESIGNER made because of it + the outcome
4a	1	Names one mechanism of influence evident in the example
4b	3	The behaviour produced, with evidence, + an influence at the level of the system or the outcome
5a	1	Names one circular design practice evident in the example
5b	2	Explains value retention — the object, its parts or its making kept in use
5c	3	One decision + the mechanism by which it delays recycling + why recycling recovers material only
6a	3	Three ideation sketches (1), genuinely distinct ideas (1), drawn at IDEA level rather than as finished renderings (1)
6b	1	Names a method (a process), not a medium or a program
7a	4	ONE idea carried into TWO concepts (1); each drawn at concept level, showing construction (2); a real difference a criterion could choose between (1)

Question	Marks	What is being assessed
7b	2	One element and one principle correctly named and applied on each concept (1) + method, media and material stated (1)
8a	4	Evidence and a judgement for each of the three criteria (3) + at least one criterion honestly judged partly met or not met, with the limitation named (1)
8b	2	A concept chosen (1) + justification tied to a NAMED criterion, with evidence (1)

Section A — general marking note. Questions 1, 3 and 5 can be answered from either design example. Award marks for a response that is accurate for the example the student has ticked; do not require the example used in the model answers below. Where a student ticks no example but the response clearly refers to one, mark the response. Where a student answers from both examples, mark the first only. Questions 2 and 4 name the design example to be used; a response written about the other example cannot be awarded marks for evidence.

Question 1

a. *Design example 1 (a SPINIFEX swing tag):* the same **100% recycled unbleached kraft board** the carton is cut from, so the tag can be cut from the offcut. *Design example 2 (a COOLIBAH directional sign):* **recycled-plastic sheet**, pressed from the centre's bottle-top collection, as the panel is. *(1 mark — only the first material named is marked. Any material the student can defend in (b) is accepted; the mark is for correct categorisation, not for matching the model. "Screen printing" is a method and "vinyl" is a medium, so neither earns this mark. "Cardboard" is accepted; "paper" alone is not, because the weight is the point.)*

b. *(Model, Design example 1 — SPINIFEX.)* Method — **hand screen printing**, a manual method. Medium — the **two flat inks**, charcoal and ochre. That combination suits **the people who will produce it**, because a community nursery has no press, no laminator and no digital printer: it has screens, a squeegee and a bench, and volunteers who have already printed one job with exactly this method and these two inks. The tag can be ganged onto the sheet the cartons are printed on, so it is made with the equipment, the screens and the hands the group already has, and asks no new skill of them. It suits **where it will be used**, because the tag hangs on a pack on an outdoor nursery bench that is watered daily and is handled by customers with wet hands. A screen-printed ink film sits in the surface of uncoated board and takes that handling, whereas a desktop inkjet print would bleed at the first splash and would need a laminate or a plastic sleeve to protect it — and this pack carries no laminate and no plastic anywhere. *(3 marks: a method and a medium named and correctly categorised (1); the choice justified against the capability of the people who will produce it (1); justified against the setting the piece will be used in, or the audience who will read it there (1).)*

(Model, Design example 2 — COOLIBAH.) Method **—** **vinyl cutting**, a digital method. Medium **—** **cut vinyl**. The centre already routs and vinyl-cuts its own panel, so a sign that is one word and an arrow needs no equipment the makers do not have and can be cut on an offcut of the same sheet. Cut vinyl also suits the walkway: the sign stands outdoors between the doors and the car park and is read on the move from several metres, so it needs solid colour with no ink to fade in the sun, and an arrow cut large enough to read at walking pace. Because the copy is a lifted strip rather than routed lettering, the sign can be peeled and re-cut if the station is moved.

> **Marking trap.** A method is a *process*, a medium is what makes the mark, and a material is what the mark is made on or from. "Illustrator" is a **medium**, not a method; "kraft board" is a **material**, not a medium. A response that names three materials, or a method in both parts, cannot be awarded the naming mark. The explanation must be about *these* producers and *this* setting: "screen printing is cheap and effective" is a general merit of the method and earns nothing.

Question 2

a. *(Model.)* "I placed the **return loop mark and the words RETURN THE TRAY on the front of the pack, at the bottom left**, rather than on the back panel, **because** the buyer is a nursery customer who reads the front once, at arm's length, and decides there — if the return offer sits on the back it will not be seen before the tray is thrown out." *(2 marks: the decision named specifically (1); the reason given and tied to a criterion, the purpose or the audience (1). A rationale that offers only a preference — "I thought it looked better there" — scores 0, because it gives critics nothing to respond to.)*

b. The comment fails **specific** — it names no part of the work, only "it"; and **descriptive** — it reports a feeling ("boring") rather than what the critic saw. It also fails **respectful**, because *"you've played it safe again"* addresses the designer rather than the work, and **actionable**, because it leaves the designer nothing to do. *(Any two of the four, correctly matched to the evidence in the comment, earn 1 mark.)*

Model rewrite: "From about a metre away I read SPINIFEX and then stopped — the seed-head illustration and the wordmark are the same charcoal at almost the same weight, so nothing tells me where to look second. Could the illustration drop to the ochre ink, or the sub-heading come up in size, so the eye has a clear next step?" *(1 mark: the rewrite must name the part of the work, say what the critic saw, address the work rather than the designer, and leave a possible action.)*

Question 3

a. *Design example 1:* any two of **economic, technological, cultural, environmental, social** that can be supported in (b) — most readily **economic** and **environmental**. *Design example 2:* most readily **social** and **environmental**. *(1 mark each; the study design's exact term is required. "Money", "green" and "people" are not accepted as substitutes.)*

b. *(Model — the **economic** factor, Design example 1.)* The specific driver is that SPINIFEX is printed by volunteers in short runs at the nursery, so every additional ink means a separate screen, a separate registration pass and a separate afternoon of labour. Because of that pressure the designer **decided** to build the entire pack from two inks plus the unprinted board: one charcoal ink carries the illustration, the wordmark and all the body copy, while the single ochre ink is spent only where it does a job the charcoal cannot — the sub-heading and the return loop. The same pressure led the designer to **reject a die-cut window**, which would have required a second tool and a plastic patch, and to let the kraft ground do the work a printed background colour would otherwise have done. The **outcome** is a pack a volunteer can print in one session, at a cost the nursery can carry, which still reads as a considered piece of design rather than a cheap one. *(4 marks: the factor named with the exact term (1); the specific driver rather than the general heading (1); at least one decision the DESIGNER made differently because of it (1); the outcome (1).)*

*(Model — the **social** factor, Design example 2.)* The driver is that the station is unattended and used by a mixed public — people in a hurry, people with limited English, people with limited grip or reach. The designer therefore **decided** to carry the whole instruction visually: a numbered colour band and a pictorial icon above each aperture, apertures whose shapes differ enough to be told apart at a glance, and a three-step strip that fixes the order of use. The outcome is a station that can be used correctly on a first visit without a staff member present.

> **Marking trap.** A factor acts on the **designer**, not on the object and not on the audience. A response that says "environmental factors mean the station is made of recycled plastic" has described the object; it must say what the designer decided *because of* the pressure.

Question 4

a. Any **one** of: **constraint** (aperture 1 is dimensioned 300 mm maximum); **signifier** (the numbered colour band and icon above each aperture); **affordance** (the aperture shapes — a wide slot, a large soft opening, a narrow tall slot — each show what will fit); **sequence** (1 drop → 2 tag → 3 collect Saturday); **feedback** (the counter reading 1 248 items repaired here this year); **visibility** or **default** (the station sits on the walkway between the doors and the car park, so passing it is the path of least effort). *(1 mark — only the first mechanism named is marked.)*

b. *(Model.)* The three apertures work as **constraints**. Aperture 1 is dimensioned 300 mm, so an item too large to be repaired on a trestle physically will not go in; the wrong behaviour is removed rather than discouraged by a sign, and the volunteers open a bin that holds only work they can actually do. The colour band, numeral and icon above each aperture act as **signifiers**, so a shopper sorts their own item before they reach the panel and the interaction takes seconds rather than a conversation. At the level of the **system**, every item posted is one diverted out of the kerbside waste stream and into a Saturday repair round: the centre's waste contract, the volunteers' roster and the council's collection all shift slightly because the station exists, and the object's life is extended by **repair** rather than ended by disposal. The counter — *1 248 items repaired here this year* — is **feedback** that makes that diversion visible to people who have never used the station, which recruits the next user and makes the behaviour repeatable. A likely **unintended outcome** is that items too large for aperture 1 are simply left on the ground beside the panel, so the constraint that protects the volunteers creates a problem for whoever cleans the walkway. *(3 marks: at least one mechanism named and applied to evidence in the example (1); the behaviour it produces (1); an influence at the level of the system or the outcome, beyond the moment of use (1). Credit the unintended or negative effect as part of a complete analysis; a response that reports only the intended, positive effects is describing the brief.)*

Question 5

a. *Design example 1:* the **return-and-refill loop** — the tray comes back and is refilled, so the practice is **reuse**. *(Also accept: one material only, no laminate; slot-and-tab construction with no glue, i.e. design for disassembly.) Design example 2:* **repair** — the station's whole purpose is to keep objects working. *(Also accept: the panel itself is* ***repurposed*** *material, pressed from the centre's bottle-top collection; or the take-back system.) (1 mark.)*

b. *(Model, Design example 1.)* Returning the tray keeps the **object itself** in use. The board has already been sourced, cut, creased, printed and shipped; when the tray comes back and is refilled, all of that embedded work is used a second time, so the value stays in the object instead of being recovered as raw fibre. **Reuse is the top loop** — nothing of the form, the assembly or the making is lost, which is why it retains more value than any other loop. *(2 marks: the loop named (1); value retention explained as the object, its parts or its making being kept in use, not merely "it saves material" (1).)*

c. *(Model, Design example 1.)* The decision is **slot-and-tab construction, with no glue, no laminate and no plastic window**. Because the carton is a single grade of board fastened to itself, a customer can flatten it and re-erect it without tearing it and without a tool, so the same carton travels back to the nursery on the refill trip instead of being emptied and put out with the recycling. A glued pack, or one with a laminated face or a plastic window, has to be torn to open and cannot be separated by hand — once torn, its only remaining loop is **recycling**, and recycling returns the **material only**: the form, the printing and the creasing are all lost, and mixed or contaminated fibre comes back as a lower grade than it went in. Designing the glue and the laminate out therefore moves the pack **up** the loops, from recycle to reuse, and keeps it there for many trips. *(3 marks: one decision identified from the example (1); the mechanism by which it delays or avoids recycling (1); recognition that recycling recovers material only and is usually a downgrade (1).)*

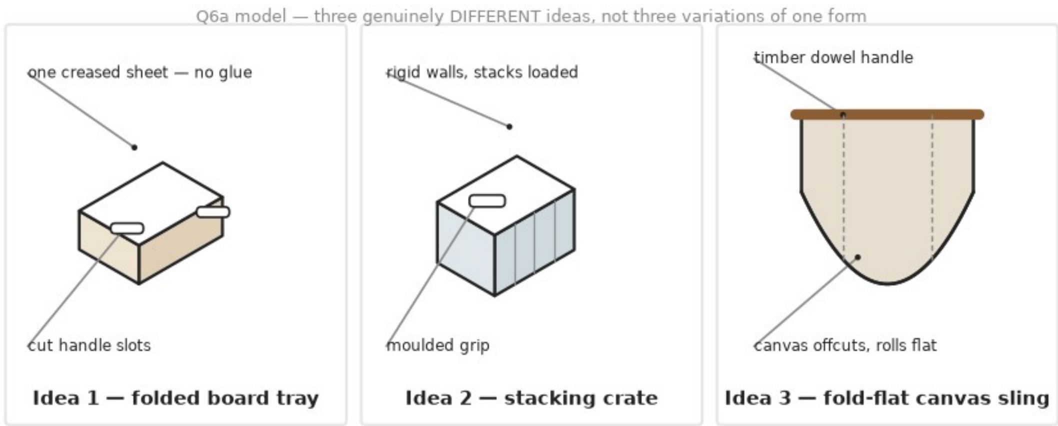
(Model, Design example 2 — COOLIBAH.) The decision is to set the **opening-hours line and the repair counter as separate cut-vinyl strips** rather than routing them into the sheet with the rest of the copy. The information most likely to change — the hours, and a number that has to be updated every year — can therefore be peeled and re-cut in an afternoon, so the panel is **refurbished** instead of being scrapped and re-made when the roster changes. Had that copy been routed in, a single change of hours would have retired a 2400 × 1200 mm sheet whose only remaining loop is **recycling**, and recycling would return the polymer alone: the routing, the aperture geometry and the pressing of the bottle tops would all be lost, and mixed polymer comes back at a lower grade than it went in.

> **Marking trap.** A response whose case is that the pack is good because it "is recyclable" has argued the opposite of the question and cannot be awarded more than 1 mark.

Question 8 is the graded evaluation; Questions 6 and 7 are graded on the student's own drawings. The model drawings below show the standard expected, not the only creditworthy answer.

Question 6

a. *(Model.)*

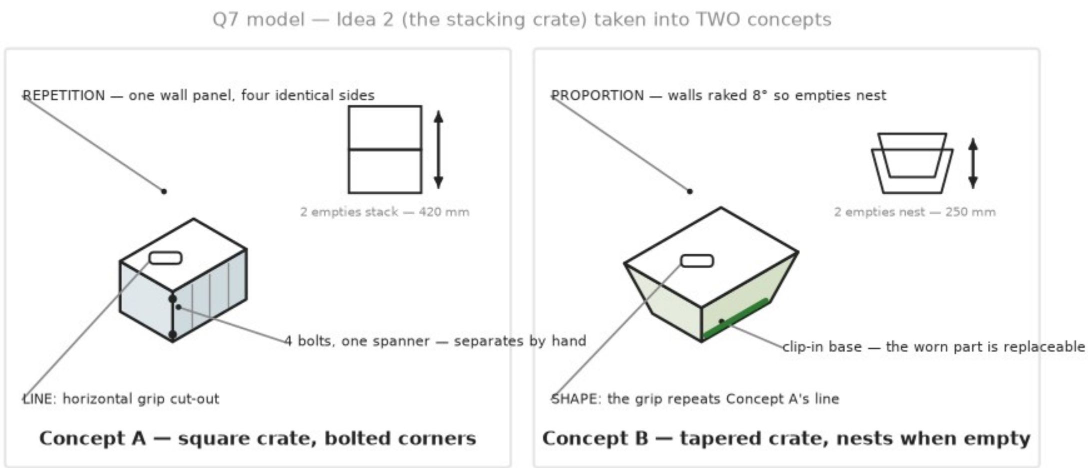


Three ideas that are distinct in **form**, in **material** and in **the way each collapses**: a tray creased from one sheet of board with cut handle slots; a rigid stacking crate with a moulded grip; and a soft canvas sling hung on a timber dowel. *(3 marks: three separate ideation sketches (1); the ideas genuinely different from one another rather than one form at three proportions (1); each drawn quickly and legibly at the level of a design* ***idea****, not a finished rendering (1). Accept any three distinct carriers — a stacked basket set, a wheeled trolley bag, a folding timber box, a strapped bundle board. Do not award the second mark where all three are open rectangular boxes.)*

b. Ideation sketching. *(Accept any named process: rapid making, low-fidelity prototyping, collage, mind mapping, brainstorming with words and images, inspiration seeking. 1 mark. "Adobe Illustrator", "pencil", "marker" and "digital" name a* ***medium****, not a method, and earn 0.)*

Question 7

a. *(Model — Idea 2, the stacking crate, taken into two concepts.)*



Concept A is a square crate: straight walls, four identical bolted panels and a horizontal grip cut-out. Concept B is the same crate with its walls raked 8° so that empties nest, the same grip line repeated, and a clip-in base. Both are the **same idea** — a rigid open crate a member carries and returns — resolved two different ways. *(4 marks: ONE idea from Question 6 carried into TWO concepts, not two different ideas (1); each concept drawn at concept level, showing construction and not only outline (2); a genuine difference between them that a design criterion could choose between (1). Two drawings of the same crate at different sizes are one concept, not two.)*

b. *(Model annotations.)*

Concept A: Element — **line**: one horizontal grip cut-out, repeated on all four walls. Principle — **repetition**: a single wall panel used four times, so one tool makes the whole crate. Method — injection moulding, prototyped first as a 3D print; media — one grade of polypropylene; material — polypropylene throughout, with no metal insert, joined by four bolts of one size.

Concept B: Element — **shape**: the trapezoidal wall section. Principle — **proportion**: walls raked 8°, so two empties nest to 250 mm where Concept A's stack to 420 mm. Method — injection moulding; media — the same single polypropylene grade; material — polypropylene body with a clip-in base of the same polymer.

(2 marks: one design element AND one design principle correctly named and genuinely visible on each concept (1); method, media and material each stated and correctly categorised (1). An element named but not present in the drawing earns nothing.)

Question 8

a. *(Model, evaluating Concept B.)*

Sustainability criterion	Evidence in the concept	Judgement
2. one material, or materials that separate by hand	Body, grip and clip-in base are all the same grade of polypropylene; the base unclips without a tool; no adhesive and no metal fasteners.	**Met**
3. folds flat or nests when empty	Walls raked 8°: two empties nest to 250 mm against 420 mm stacked, so 30 empties take roughly a third of the shelf.	**Met**
4. repairable with ordinary hand tools	The base — the part that takes the wear from being set down on concrete — unclips and can be replaced. A cracked side wall, however, cannot be repaired and retires the whole crate.	**Partly met**

(4 marks: 1 mark for each row that cites evidence from the student's own concept and states a judgement (3); 1 mark for at least one criterion honestly judged partly met* or *not met* with the limitation named (1). A row that restates the criterion instead of citing evidence earns nothing. Three unqualified "met"s with no limitation identified cannot be awarded the fourth mark — this is a convergent evaluation, and its value is that it can show a concept failing.)*

Concept A evaluated against the same criteria would read: criterion 2 **partly met** (one polymer, but four bolts to remove); criterion 3 **not met** (empties stack rim-on-rim at full height, so 30 of them still fill the shelf); criterion 4 **met** (every panel unbolts and can be replaced individually).

b. *(Model.)* I would take **Concept B** forward. Against **criterion 3** it is the only one of the two concepts that solves the pantry's actual storage problem: Concept A's empties stack rim-on-rim at full height, so 30 of them still need a whole shelf, whereas Concept B's raked walls bring the same 30 down to about a third of it. Concept A is the easier crate to repair, because every panel unbolts — so what I am giving up is repairability at the wall, and the resolved design will need to answer that. But criterion 3 is the criterion that separates the two concepts, and Concept B is the one that meets it. *(2 marks: a concept chosen (1); the justification tied to a NAMED criterion, supported by evidence from the concept, and acknowledging what is given up (1). Either concept may be chosen — the mark is for the reasoning against a named criterion, not for the choice.)*