Developer Level • Full-Year Lesson Program

Indicative Years 5–6

Developing independence with design thinking, digital modelling and informed material choice.

Program overview

This program moves students from early confidence to purposeful designing. It expects growing independence in Tinkercad, measurement, evaluation and project planning while keeping tasks concrete and motivating.

Indicative year band	Indicative Years 5–6
Suggested lesson duration	55–70 minutes
Curriculum focus	AC9TDE6K01, AC9TDE6P02–P05 (indicative band alignment)
General capabilities	Literacy, Numeracy, Critical and Creative Thinking, Personal and Social capability, Ethical Understanding
Term structure	4 terms • 8 core weekly lessons per term • flexible extra weeks left available for local school calendars

Term 1 • Design Thinking Foundations

Developer Level • Term 1

Design Thinking Foundations

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

- Week 1 How 3D Printing Changed Prototyping
- Week 2 Safety, Workflow and Responsible Tool Use
- Week 3 How Printers Turn Files into Objects
- Week 4 Measurement, Accuracy and the Ruler Tool
- Week 5 Tinkercad Alignment and Grouping
- Week 6 Design Criteria and Constraints
- Week 7 Redesigning a Familiar Object
- Week 8 Term 1 Design Journal Review

Essential question	How do designers move from a rough idea to a purposeful product?
Likely term outcome	prototype file, design journal evidence and short criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 1 • Week 1: How 3D Printing Changed Prototyping

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind how 3d printing changed prototyping and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "How 3D Printing Changed Prototyping" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Industry adopted additive manufacturing because it reduced the time between a sketch and a physical prototype. This shift changed engineering, product design and even medical modelling by making iteration faster and cheaper.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "How 3D Printing Changed Prototyping" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 2: Safety, Workflow and Responsible Tool Use

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind safety, workflow and responsible tool use and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Make safety the main teaching focus: identify hazards, rehearse shutdown routines, discuss hot surfaces and moving parts, and record classroom expectations before

	any hands-on activity.

Teacher note

This week's lesson positions "Safety, Workflow and Responsible Tool Use" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Safety routines are a real part of design and technology work. Historically, industries improved safety after recognising that good systems protect people, reduce downtime and improve quality.

Discussion prompts

- Why do strong routines matter even when a classroom printer seems quiet and safe?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Safety, Workflow and Responsible Tool Use" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 3: How Printers Turn Files into Objects

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind how printers turn files into objects and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "How Printers Turn Files into Objects" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "How Printers Turn Files into Objects" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 4: Measurement, Accuracy and the Ruler Tool

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind measurement, accuracy and the ruler tool and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed

	prints, projector/display, internet-connected devices, Tinkercad accounts, mouse if available
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Measurement, Accuracy and the Ruler Tool" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Measurement, Accuracy and the Ruler Tool" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 5: Tinkercad Alignment and Grouping

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind tinkercad alignment and grouping and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.

Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, internet-connected devices, Tinkercad accounts, mouse if available
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Tinkercad Alignment and Grouping" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Tinkercad Alignment and Grouping" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 6: Design Criteria and Constraints

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind design criteria and constraints and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability

Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Design Criteria and Constraints" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Design Criteria and Constraints" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria. Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 7: Redesigning a Familiar Object

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind redesigning a familiar object and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus;

	evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Redesigning a Familiar Object" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Redesigning a Familiar Object" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 1 • Week 8: Term 1 Design Journal Review

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind term 1 design journal review and apply them to a design-and-make context appropriate to the developer pathway.

Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 1 Design Journal Review" inside the term theme of design thinking foundations. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Term 1 Design Journal Review" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria. Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Useful Products and Better Models

Developer Level • Term 2

Useful Products and Better Models

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

- Week 1 Reverse Engineering Everyday Objects
- Week 2 Ergonomics and User Needs
- Week 3 Holes, Cut-outs and Internal Space
- Week 4 Patterning with Duplicate and Repeat
- Week 5 Text, Symbols and Communication
- Week 6 Prototyping a Desk Organiser
- Week 7 Feedback and Peer Critique
- Week 8 Term 2 Prototype Showcase

Essential question	How do useful products balance function, clarity and good design decisions?
Likely term outcome	prototype file, design journal evidence and short criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 2 • Week 1: Reverse Engineering Everyday Objects

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind reverse engineering everyday objects and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Reverse Engineering Everyday Objects" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Reverse Engineering Everyday Objects" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 2: Ergonomics and User Needs

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind ergonomics and user needs and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or

	clean-up.

Teacher note

This week's lesson positions "Ergonomics and User Needs" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- How do we avoid designing only for ourselves?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Ergonomics and User Needs" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 3: Holes, Cut-outs and Internal Space

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind holes, cut-outs and internal space and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Holes, Cut-outs and Internal Space" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

The space industry embraced additive manufacturing because lightweight, custom and low-volume parts can be incredibly valuable when every gram and every design change matters.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Holes, Cut-outs and Internal Space" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 4: Patterning with Duplicate and Repeat

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind patterning with duplicate and repeat and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed

	prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Patterning with Duplicate and Repeat" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Patterning with Duplicate and Repeat" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 5: Text, Symbols and Communication

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind text, symbols and communication and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.

Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Text, Symbols and Communication" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Text, Symbols and Communication" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 6: Prototyping a Desk Organiser

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind prototyping a desk organiser and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability

Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Prototyping a Desk Organiser" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Prototyping a Desk Organiser" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 7: Feedback and Peer Critique

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind feedback and peer critique and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus;

	evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Feedback and Peer Critique" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Feedback and Peer Critique" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 2 • Week 8: Term 2 Prototype Showcase

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind term 2 prototype showcase and apply them to a design-and-make context appropriate to the developer pathway.

Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 2 Prototype Showcase" inside the term theme of useful products and better models. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Term 2 Prototype Showcase" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Mechanisms, Systems and Materials

Developer Level • Term 3

Mechanisms, Systems and Materials

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

- Week 1 Simple Mechanisms in Printed Objects
- Week 2 Strength, Infill and Wall Decisions
- Week 3 Fasteners, Clips and Snap Fits
- Week 4 Assemblies and Multi-Part Thinking
- Week 5 Material Choices and Sustainability
- Week 6 Failure Analysis with Real Prints
- Week 7 Improvement Through Testing
- Week 8 Term 3 Engineering Reflection

Essential question	How do materials and simple systems influence what we can make?
Likely term outcome	prototype file, design journal evidence and short criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 3 • Week 1: Simple Mechanisms in Printed Objects

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind simple mechanisms in printed objects and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Simple Mechanisms in Printed Objects" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to “Simple Mechanisms in Printed Objects” and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 2: Strength, Infill and Wall Decisions

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind strength, infill and wall decisions and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, calipers or rulers, sample test parts
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up. Emphasise controlled testing rather than rough play, and keep fingers clear of load points or snapping parts.

Teacher note

This week's lesson positions "Strength, Infill and Wall Decisions" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Strength, Infill and Wall Decisions" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 3: Fasteners, Clips and Snap Fits

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind fasteners, clips and snap fits and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, calipers or rulers, sample test parts
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Fasteners, Clips and Snap Fits" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- Why can two parts look correct on screen but fail to fit in real life?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Fasteners, Clips and Snap Fits" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 4: Assemblies and Multi-Part Thinking

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind assemblies and multi-part thinking and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Assemblies and Multi-Part Thinking" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Assemblies and Multi-Part Thinking" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 5: Material Choices and Sustainability

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind material choices and sustainability and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up. Add correct filament storage, avoiding contaminated material and

	supervising any discussion of fumes or ventilation.

Teacher note

This week's lesson positions "Material Choices and Sustainability" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

The materials available in any era shape what people can make. From bronze and steel to polymers and composites, manufacturing history is partly a story about learning what materials can do.

Discussion prompts

- How do material choices affect cost, strength, sustainability and print quality?
- When is a 3D print genuinely sustainable, and when is it just convenient?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Material Choices and Sustainability" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 6: Failure Analysis with Real Prints

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind failure analysis with real prints and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Failure Analysis with Real Prints" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Failure Analysis with Real Prints" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 7: Improvement Through Testing

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind improvement through testing and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, calipers or rulers, sample test parts

Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up. Emphasise controlled testing rather than rough play, and keep fingers clear of load points or snapping parts.

Teacher note

This week's lesson positions "Improvement Through Testing" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Improvement Through Testing" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 3 • Week 8: Term 3 Engineering Reflection

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind term 3 engineering reflection and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability

Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 3 Engineering Reflection" inside the term theme of mechanisms, systems and materials. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Term 3 Engineering Reflection" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Applied Innovation

Developer Level • Term 4

Applied Innovation

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

- Week 1 3D Printing in Architecture, Health and Sport
- Week 2 Assistive Design and Inclusive Thinking
- Week 3 Planning a Community-Focused Product
- Week 4 Preparing Files for Print
- Week 5 Quality Control and Production Notes
- Week 6 Presenting with Technical Vocabulary
- Week 7 Final Build and Evaluation
- Week 8 Year-End Exhibition

Essential question	How can 3D printing respond to needs in communities and industries?
Likely term outcome	prototype file, design journal evidence and short criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 4 • Week 1: 3D Printing in Architecture, Health and Sport

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind 3d printing in architecture, health and sport and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "3D Printing in Architecture, Health and Sport" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "3D Printing in Architecture, Health and Sport" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 2: Assistive Design and Inclusive Thinking

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind assistive design and inclusive thinking and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or

	clean-up.

Teacher note

This week's lesson positions "Assistive Design and Inclusive Thinking" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Assistive Design and Inclusive Thinking" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 3: Planning a Community-Focused Product

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind planning a community-focused product and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display

Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Planning a Community-Focused Product" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Planning a Community-Focused Product" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria. Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 4: Preparing Files for Print

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind preparing files for print and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability

Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Preparing Files for Print" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Preparing Files for Print" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 5: Quality Control and Production Notes

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind quality control and production notes and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.

Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Quality Control and Production Notes" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Quality Control and Production Notes" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 6: Presenting with Technical Vocabulary

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind presenting with technical vocabulary and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability

Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Presenting with Technical Vocabulary" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Presenting with Technical Vocabulary" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 7: Final Build and Evaluation

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind final build and evaluation and apply them to a design-and-make context appropriate to the developer pathway.
Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus;

	evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Final Build and Evaluation" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Final Build and Evaluation" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.

Term 4 • Week 8: Year-End Exhibition

Duration	55–70 minutes
Learning intention	Students understand the key ideas behind year-end exhibition and apply them to a design-and-make context appropriate to the developer pathway.

Success criteria	use technical language to explain a design choice or manufacturing concept; produce or modify a simple digital model or plan linked to the lesson focus; evaluate a design idea against at least one clear criterion such as function, safety or sustainability
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design criteria, alignment, grouping, prototype, user needs, tolerance, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Year-End Exhibition" inside the term theme of applied innovation. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Year-End Exhibition" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Use journals, design files, peer feedback notes and a brief exit response against success criteria.
Differentiation: Support developing learners with worked examples and checklists. Extend confident students with an added design constraint such as size, weight, material use or audience-specific communication.