Intermediate Level • Full-Year Lesson Program

Indicative Years 7–8

Independent designing, richer technical language and more deliberate management of design decisions.

Program overview

This program treats students as emerging designers. They analyse needs, use technical vocabulary more consistently, document design decisions and link additive manufacturing to broader engineering and materials thinking.

Indicative year band	Indicative Years 7–8
Suggested lesson duration	60–80 minutes
Curriculum focus	AC9TDE8K01, AC9TDE8P02–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 • From User Need to Design Brief

Intermediate Level • Term 1

From User Need to Design Brief

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

- **Week 1** **Emerging Technologies and Preferred Futures**
- **Week 2** **Workshop Safety and Risk Management**
- **Week 3** **Analysing Existing Products**
- **Week 4** **Writing a Strong Design Brief**
- **Week 5** **Graphical Communication and Technical Sketching**
- **Week 6** **Advanced Tinkercad: Workplanes and Precision**
- **Week 7** **Project Planning and Milestones**
- **Week 8** **Term 1 Review and Pitch**

Essential question	How do designers frame problems before trying to solve them?
Likely term outcome	design brief, prototype evidence, testing notes and peer critique response
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 1 • Week 1: Emerging Technologies and Preferred Futures

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind emerging technologies and preferred futures and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Emerging Technologies and Preferred Futures" inside the term theme of from user need to design brief. 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

Australian Curriculum Technologies asks students to think about preferred futures. In practice, that means discussing how people use innovation to solve real problems while weighing ethics, cost and sustainability.

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. Launch (5–10 min): present a problem, prototype or case study that makes "Emerging Technologies and Preferred Futures" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 2: Workshop Safety and Risk Management

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind workshop safety and risk management and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display

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 "Workshop Safety and Risk Management" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Workshop Safety and Risk Management" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 3: Analysing Existing Products

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind analysing existing products and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan

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 "Analysing Existing Products" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Analysing Existing Products" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation
Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 4: Writing a Strong Design Brief

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind writing a strong design brief and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and

	curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Writing a Strong Design Brief" inside the term theme of from user need to design brief. 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

Design briefs became important as products and projects grew more complex. A good brief keeps a team focused on real users, real constraints and evidence-based decisions.

Discussion prompts

- What makes a brief useful rather than vague?
- 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. Launch (5–10 min): present a problem, prototype or case study that makes "Writing a Strong Design Brief" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 5: Graphical Communication and Technical Sketching

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind graphical communication and technical sketching and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or

	trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Graphical Communication and Technical Sketching" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Graphical Communication and Technical Sketching" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 6: Advanced Tinkercad: Workplanes and Precision

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind advanced tinkercad: workplanes and precision and apply them to a design-and-make context appropriate to

	the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Advanced Tinkercad: Workplanes and Precision" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Advanced Tinkercad: Workplanes and Precision" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 7: Project Planning and Milestones

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind project planning and milestones and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Project Planning and Milestones" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Project Planning and Milestones" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and

modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 1 • Week 8: Term 1 Review and Pitch

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind term 1 review and pitch and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 Review and Pitch" inside the term theme of from user need to design brief. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Term 1 Review and Pitch" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Engineering Better Solutions

Intermediate Level • Term 2

Engineering Better Solutions

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

- **Week 1** **Geometry, Structure and Load Paths**
- **Week 2** **Tolerances and Functional Fits**
- **Week 3** **Joints, Hinges and Assemblies**
- **Week 4** **SVG Import, Logos and Surface Detail**
- **Week 5** **Iterative Prototyping**
- **Week 6** **Testing for Strength and Usability**
- **Week 7** **Cost, Time and Material Trade-Offs**
- **Week 8** **Term 2 Technical Review**

Essential question	How do precision, tolerance and testing improve engineered outcomes?
Likely term outcome	design brief, prototype evidence, testing notes and peer critique response
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 2 • Week 1: Geometry, Structure and Load Paths

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind geometry, structure and load paths and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Geometry, Structure and Load Paths" inside the term theme of engineering better solutions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Geometry, Structure and Load Paths" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 2: Tolerances and Functional Fits

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind tolerances and functional fits and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Tolerances and Functional Fits" inside the term theme of engineering better solutions. 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
Precision became more important as machines and interchangeable parts became central to manufacturing. The idea of tolerance sits behind everything from screws that fit properly to machines that can be repaired.

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. Launch (5–10 min): present a problem, prototype or case study that makes "Tolerances and Functional Fits" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation
Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 3: Joints, Hinges and Assemblies

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind joints, hinges and assemblies and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production

	plan
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 "Joints, Hinges and Assemblies" inside the term theme of engineering better solutions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Joints, Hinges and Assemblies" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 4: SVG Import, Logos and Surface Detail

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind svg import, logos and surface detail and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way

Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 “SVG Import, Logos and Surface Detail” inside the term theme of engineering better solutions. 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

As digital tools improved, designers moved from pencil sketches to vector graphics, CAD and simulation. Importing graphics into design tools reflects how visual communication and manufacturing have become closely linked.

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. Launch (5–10 min): present a problem, prototype or case study that makes “SVG Import, Logos and Surface Detail” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 5: Iterative Prototyping

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind iterative prototyping and apply them to a design-and-make context appropriate to the intermediate

	pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Iterative Prototyping" inside the term theme of engineering better solutions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Iterative Prototyping" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 6: Testing for Strength and Usability

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind testing for strength and usability and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Testing for Strength and Usability" inside the term theme of engineering better solutions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Testing for Strength and Usability" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and

modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 7: Cost, Time and Material Trade-Offs

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind cost, time and material trade-offs and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 “Cost, Time and Material Trade-Offs” inside the term theme of engineering better solutions. 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?
- 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. Launch (5–10 min): present a problem, prototype or case study that makes “Cost, Time and Material Trade-Offs” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 2 • Week 8: Term 2 Technical Review

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind term 2 technical review and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 Technical Review" inside the term theme of engineering better solutions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Term 2 Technical Review" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.

4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Production Decisions

Intermediate Level • Term 3

Production Decisions

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

- **Week 1** Slicer Settings and Print Quality
- **Week 2** Additive Manufacturing in Industry
- **Week 3** Materials Comparison: PLA, PETG, TPU and Beyond
- **Week 4** Troubleshooting and Fault Trees
- **Week 5** Ethics, Waste and Sustainable Design
- **Week 6** Collaborative Project Roles
- **Week 7** Designing for a Specific Client
- **Week 8** Term 3 Prototype Defence

Essential question	How do production settings and material choices affect quality, waste and risk?
Likely term outcome	design brief, prototype evidence, testing notes and peer critique response
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 3 • Week 1: Slicer Settings and Print Quality

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind slicer settings and print quality and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Slicer Settings and Print Quality" inside the term theme of production decisions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Slicer Settings and Print Quality" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 2: Additive Manufacturing in Industry

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind additive manufacturing in industry and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Additive Manufacturing in Industry" inside the term theme of production decisions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Additive Manufacturing in Industry" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation
Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 3: Materials Comparison: PLA, PETG, TPU and Beyond

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind materials comparison: pla, petg, tpu and beyond and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production

	plan
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 "Materials Comparison: PLA, PETG, TPU and Beyond" inside the term theme of production decisions. 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?
- 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. Launch (5–10 min): present a problem, prototype or case study that makes "Materials Comparison: PLA, PETG, TPU and Beyond" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 4: Troubleshooting and Fault Trees

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind troubleshooting and fault trees and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or

	trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 “Troubleshooting and Fault Trees” inside the term theme of production decisions. 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. Launch (5–10 min): present a problem, prototype or case study that makes “Troubleshooting and Fault Trees” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 5: Ethics, Waste and Sustainable Design

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind ethics, waste and sustainable design and apply them to a design-and-make context appropriate to the

	intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Ethics, Waste and Sustainable Design" inside the term theme of production decisions. 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
Sustainability is now a design requirement rather than an optional extra. Modern manufacturing increasingly considers waste, energy use, durability, repairability and product life cycle.

Discussion prompts
- 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. Launch (5–10 min): present a problem, prototype or case study that makes "Ethics, Waste and Sustainable Design" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation
Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 6: Collaborative Project Roles

Duration	60–80 minutes

Learning intention	Students understand the key ideas behind collaborative project roles and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Collaborative Project Roles" inside the term theme of production decisions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Collaborative Project Roles" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 7: Designing for a Specific Client

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind designing for a specific client and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Designing for a Specific Client" inside the term theme of production decisions. 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

Professional designers rarely work in isolation; they work with clients, communities or users. Listening well has always mattered because poor assumptions lead to poor products.

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. Launch (5–10 min): present a problem, prototype or case study that makes "Designing for a Specific Client" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 3 • Week 8: Term 3 Prototype Defence

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind term 3 prototype defence and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 Prototype Defence" inside the term theme of production decisions. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Term 3 Prototype Defence" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Capstone Term

Intermediate Level • Term 4

Capstone Term

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

- Week 1 Researching a Real Problem
- Week 2 Generating Multiple Concepts
- Week 3 Selection Matrices and Decision Making
- Week 4 Refining a Print-Ready Solution
- Week 5 Documenting Production Steps
- Week 6 User Testing and Evidence Gathering
- Week 7 Presentation and Technical Explanation
- Week 8 Capstone Showcase and Reflection

Essential question	How do we turn a well-researched idea into a tested, presentable solution?
Likely term outcome	design brief, prototype evidence, testing notes and peer critique response
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 4 • Week 1: Researching a Real Problem

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind researching a real problem and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Researching a Real Problem" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Researching a Real Problem" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 2: Generating Multiple Concepts

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind generating multiple concepts and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 “Generating Multiple Concepts” inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes “Generating Multiple Concepts” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 3: Selection Matrices and Decision Making

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind selection matrices and decision making and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production

	plan
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 "Selection Matrices and Decision Making" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Selection Matrices and Decision Making" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 4: Refining a Print-Ready Solution

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind refining a print-ready solution and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way

Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Refining a Print-Ready Solution" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Refining a Print-Ready Solution" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 5: Documenting Production Steps

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind documenting production steps and apply them to a design-and-make context appropriate to the intermediate pathway.

Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 “Documenting Production Steps” inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes “Documenting Production Steps” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 6: User Testing and Evidence Gathering

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind user testing and evidence gathering and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "User Testing and Evidence Gathering" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "User Testing and Evidence Gathering" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and

modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 7: Presentation and Technical Explanation

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind presentation and technical explanation and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Presentation and Technical Explanation" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Presentation and Technical Explanation" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.

Term 4 • Week 8: Capstone Showcase and Reflection

Duration	60–80 minutes
Learning intention	Students understand the key ideas behind capstone showcase and reflection and apply them to a design-and-make context appropriate to the intermediate pathway.
Success criteria	analyse a need, opportunity or design problem using evidence from examples or testing; communicate a reasoned design or production decision using appropriate technical terms; record improvements, risks or trade-offs in a structured way
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	design brief, iteration, tolerance, criteria, prototype, materials, production plan
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 "Capstone Showcase and Reflection" inside the term theme of capstone term. 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. Launch (5–10 min): present a problem, prototype or case study that makes "Capstone Showcase and Reflection" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.

4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess planning records, prototype evidence, technical language, peer critique and short written justifications. Differentiation: Use scaffolded planning sheets, structured peer feedback and modelled teacher demonstrations as needed. Extend advanced students by requiring a second iteration justified with measured evidence.