Beginner Level • Full-Year Lesson Program

Indicative Years 3–4

Foundational, highly scaffolded learning for students new to 3D printing and design.

Program overview

This program is designed for students entering 3D printing for the first time. It prioritises curiosity, safety, basic design language and highly scaffolded success with simple classroom-ready products.

Indicative year band	Indicative Years 3–4
Suggested lesson duration	50–60 minutes
Curriculum focus	AC9TDE4K01, AC9TDE4K02, AC9TDE4P01–P05 (indicative band alignment)
General capabilities	Literacy, Numeracy, Critical and Creative Thinking, Personal and Social capability
Term structure	4 terms • 8 core weekly lessons per term • flexible extra weeks left available for local school calendars

Term 1 • Getting Started with 3D Printing

Beginner Level • Term 1

Getting Started with 3D Printing

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

- Week 1 What Is 3D Printing?
- Week 2 Safety, Respect and Classroom Routines
- Week 3 Meet the Printer: Parts and Jobs
- Week 4 Materials Matter: PLA and Other Filaments
- Week 5 From Idea to Object: The Printing Workflow
- Week 6 Tinkercad First Steps
- Week 7 Shapes, Size and Measurement
- Week 8 Our First Simple Print Review

Essential question	How do digital ideas become safe, useful physical objects?
Likely term outcome	annotated sketches, safe routines, simple Tinkercad models and oral explanation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 1 • Week 1: What Is 3D Printing?

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind what is 3d printing? and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "What Is 3D Printing?" inside the term theme of getting started with 3d printing. 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

Although modern classroom printers look new, the broader idea of additive manufacture has been developing since the 1980s, when rapid prototyping systems allowed engineers to test ideas quickly without waiting for factory tooling.

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 2: Safety, Respect and Classroom Routines

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind safety, respect and classroom routines and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Safety, Respect and Classroom Routines" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 3: Meet the Printer: Parts and Jobs

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind meet the printer: parts and jobs and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve

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 "Meet the Printer: Parts and Jobs" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 4: Materials Matter: PLA and Other Filaments

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind materials matter: pla and other filaments and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection

	task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 Matter: PLA and Other Filaments" inside the term theme of getting started with 3d printing. 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. Hook (5–10 min): begin with an image, object or quick story linked to "Materials Matter: PLA and Other Filaments" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 5: From Idea to Object: The Printing Workflow

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind from idea to object: the printing workflow and apply them to a design-and-make context appropriate to the

	beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "From Idea to Object: The Printing Workflow" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 6: Tinkercad First Steps

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind tinkercad first steps and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, internet-connected devices, Tinkercad accounts, mouse if available
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Tinkercad First Steps" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially

prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 7: Shapes, Size and Measurement

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind shapes, size and measurement and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Shapes, Size and Measurement" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 1 • Week 8: Our First Simple Print Review

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind our first simple print review and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Our First Simple Print Review" inside the term theme of getting started with 3d printing. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

1. Hook (5–10 min): begin with an image, object or quick story linked to "Our First Simple Print Review" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.

4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Designing for a Purpose

Beginner Level • Term 2

Designing for a Purpose

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

- Week 1 What Makes a Good Design?
- Week 2 Designing for Real Users
- Week 3 Sketch Before You Click
- Week 4 Combining Shapes in Tinkercad
- Week 5 Names, Signs and Personalised Tags
- Week 6 Strong vs Weak Shapes
- Week 7 Testing a Classroom Tool
- Week 8 Term 2 Reflection and Mini Showcase

Essential question	How do designers create products that work for real people?
Likely term outcome	annotated sketches, safe routines, simple Tinkercad models and oral explanation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 2 • Week 1: What Makes a Good Design?

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind what makes a good design? and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "What Makes a Good Design?" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 2: Designing for Real Users

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind designing for real users and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 Real Users" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 3: Sketch Before You Click

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind sketch before you click and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Sketch Before You Click" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 4: Combining Shapes in Tinkercad

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind combining shapes in tinkercad and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from

	earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Combining Shapes in Tinkercad" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 5: Names, Signs and Personalised Tags

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind names, signs and personalised tags and apply them to a design-and-make context appropriate to the beginner pathway.

Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Names, Signs and Personalised Tags" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 6: Strong vs Weak Shapes

Duration	50–60 minutes

Learning intention	Students understand the key ideas behind strong vs weak shapes and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Strong vs Weak Shapes" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 7: Testing a Classroom Tool

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind testing a classroom tool and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 a Classroom Tool" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially

prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 2 • Week 8: Term 2 Reflection and Mini Showcase

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind term 2 reflection and mini showcase and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 Reflection and Mini Showcase" inside the term theme of designing for a purpose. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Making Better Prints

Beginner Level • Term 3

Making Better Prints

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

- Week 1 Why Prints Fail
- Week 2 Supports, Overhangs and Bridges
- Week 3 Wall Thickness and Strength
- Week 4 Tolerance and Fit: Do Parts Move?
- Week 5 Iteration: Improving a Design
- Week 6 Colour, Aesthetics and Audience
- Week 7 Sustainability in the Makerspace
- Week 8 Redesign Week

Essential question	How can testing and iteration improve a printed design?
Likely term outcome	annotated sketches, safe routines, simple Tinkercad models and oral explanation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 3 • Week 1: Why Prints Fail

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind why prints fail and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Why Prints Fail" inside the term theme of making better prints. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 2: Supports, Overhangs and Bridges

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind supports, overhangs and bridges and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Supports, Overhangs and Bridges" inside the term theme of making better prints. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 3: Wall Thickness and Strength

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind wall thickness and strength and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.

Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Wall Thickness and Strength" inside the term theme of making better prints. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 4: Tolerance and Fit: Do Parts Move?

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind tolerance and fit: do parts move? and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with

	tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Tolerance and Fit: Do Parts Move?" inside the term theme of making better prints. 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. Hook (5–10 min): begin with an image, object or quick story linked to "Tolerance and Fit: Do Parts Move?" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 5: Iteration: Improving a Design

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind iteration: improving a design and apply them to a design-and-make context appropriate to the beginner

	pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Iteration: Improving a Design" inside the term theme of making better prints. 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

Many famous designs only succeeded after repeated testing and revision. Engineering history rewards teams that treat failures as information, not embarrassment.

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 6: Colour, Aesthetics and Audience

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind colour, aesthetics and audience and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Colour, Aesthetics and Audience" inside the term theme of making better prints. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially

prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 7: Sustainability in the Makerspace

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind sustainability in the makerspace and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Sustainability in the Makerspace" inside the term theme of making better prints. 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. Hook (5–10 min): begin with an image, object or quick story linked to "Sustainability in the Makerspace" and ask students to predict, notice and wonder.
2. Explicit teaching (10–15 min): teacher models the key concept using plain language, diagrams and one worked example.
3. Guided practice (10–15 min): students complete a short paired or teacher-supported task such as labelling, comparing, sketching or modifying a simple model.
4. Independent/Collaborative task (15–20 min): students apply the concept in a manageable design or reflection activity.
5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 3 • Week 8: Redesign Week

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind redesign week and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Redesign Week" inside the term theme of making better prints. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Projects, Storytelling and Future Tech

Beginner Level • Term 4

Projects, Storytelling and Future Tech

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

- Week 1 Historical Inventions and Modern Making
- Week 2 Printing for Science and Geography
- Week 3 3D Printing in Medicine and Space
- Week 4 Designing a Helpful Product
- Week 5 Planning a Final Build
- Week 6 Building and Checking Our Final Print
- Week 7 Presenting Our Design Story
- Week 8 Year-End Showcase and Reflection

Essential question	How can 3D printing help us explore the world and imagine better futures?
Likely term outcome	annotated sketches, safe routines, simple Tinkercad models and oral explanation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 4 • Week 1: Historical Inventions and Modern Making

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind historical inventions and modern making and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Historical Inventions and Modern Making" inside the term theme of projects, storytelling and future tech. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 2: Printing for Science and Geography

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind printing for science and geography and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Printing for Science and Geography" inside the term theme of projects, storytelling and future tech. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 3: 3D Printing in Medicine and Space

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind 3d printing in medicine and space and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.

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

Teacher note

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

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 4: Designing a Helpful Product

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind designing a helpful product and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with

	tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 a Helpful Product" inside the term theme of projects, storytelling and future tech. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 5: Planning a Final Build

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind planning a final build and apply

	them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

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

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 6: Building and Checking Our Final Print

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind building and checking our final print and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
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 "Building and Checking Our Final Print" inside the term theme of projects, storytelling and future tech. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially

prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 7: Presenting Our Design Story

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind presenting our design story and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

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

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.

Term 4 • Week 8: Year-End Showcase and Reflection

Duration	50–60 minutes
Learning intention	Students understand the key ideas behind year-end showcase and reflection and apply them to a design-and-make context appropriate to the beginner pathway.
Success criteria	identify the main idea or concept in today's lesson using appropriate vocabulary; demonstrate or explain one safe and sensible way to work with tools, printers or software; complete a short design, observation or reflection task with teacher support
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	3D printer, design, model, material, safe use, measure, test, improve
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

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

Background / history hook

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

Discussion prompts

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

Suggested lesson sequence

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

5. Reflection (5 min): students record one thing they learned, one question they still have and one way the lesson links to real-world design.

Assessment and differentiation

Assessment: Collect design journals, annotated sketches, short oral explanations and teacher observation notes. Differentiation: Provide labelled exemplars, sentence starters, visual vocab cards and partially prepared templates. Extend confident students by asking them to compare two designs and justify which better meets the brief.