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UPR306

PLANNING MODEL MAKING WORKSHOP

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Course code: URP 306
Course title: Planning Model Making Workshop
Course credit load: 2 Units

List of Series:

- **Series 1: Model Making Tools and Materials**
- Series 2: Use and Care of Tools
- Series 3: Workshop Practices and Techniques
- Series 4: Preparation of Three-Dimensional Planning Models
- Series 5: Production of Community and Institutional Models

1 Model Making Tools and Materials

Series outline

- **Part 1 (1.1): Introduction to Planning Model Making**
  - Sub-Part 1.1.1: Definition, purpose, and types of planning models
  - Sub-Part 1.1.2: The role of models in planning communication and decision-making
  - Sub-Part 1.1.3: Overview of the model making process
- **Part 2 (1.2): Cutting and Shaping Tools**
  - Sub-Part 1.2.1: Knives, cutters, and blades
  - Sub-Part 1.2.2: Saws, files, and abrasives
  - Sub-Part 1.2.3: Scoring, folding, and forming tools
- **Part 3 (1.3): Measuring, Marking, and Fixing Tools**
  - Sub-Part 1.3.1: Measuring and marking instruments
  - Sub-Part 1.3.2: Adhesives and fixing methods
  - Sub-Part 1.3.3: Finishing tools and equipment
- **Part 4 (1.4): Model Making Materials**
  - Sub-Part 1.4.1: Board and paper-based materials
  - Sub-Part 1.4.2: Foam, wood, and rigid structural materials
  - Sub-Part 1.4.3: Supplementary and finishing materials

Introduction

A planning model is one of the most powerful communication tools available to the urban planner. When a community is invited to respond to proposals for their neighbourhood, when a client needs to understand a proposed development, or when a planner must convey the three-dimensional character of a new layout to decision-makers, a physical model speaks with a clarity and immediacy that drawings and maps cannot match. The ability to design and construct

planning models is therefore a fundamental practical skill one that links spatial imagination to physical making and that connects the abstract world of planning proposals to the tangible reality of built form.

The aim of this Series is to equip you with the knowledge and skills to identify the types and purposes of planning models, recognise and correctly name the principal tools used in model making, understand the properties and appropriate applications of model making materials, and prepare to work safely and effectively in the model making workshop.

We shall commence this Series by introducing the concept of the planning model, its types, purposes, and the general model making process. Next, we will examine the cutting and shaping tools used in model making, including knives, saws, and forming tools. Following that, we will explore measuring, marking, and fixing tools, as well as adhesives and finishing equipment. Finally, we will wrap up by examining the range of materials used in planning model making from board and paper through foam and wood to supplementary finishing materials.

Series Learning Outcomes

Upon completing this Series, you should be able to:

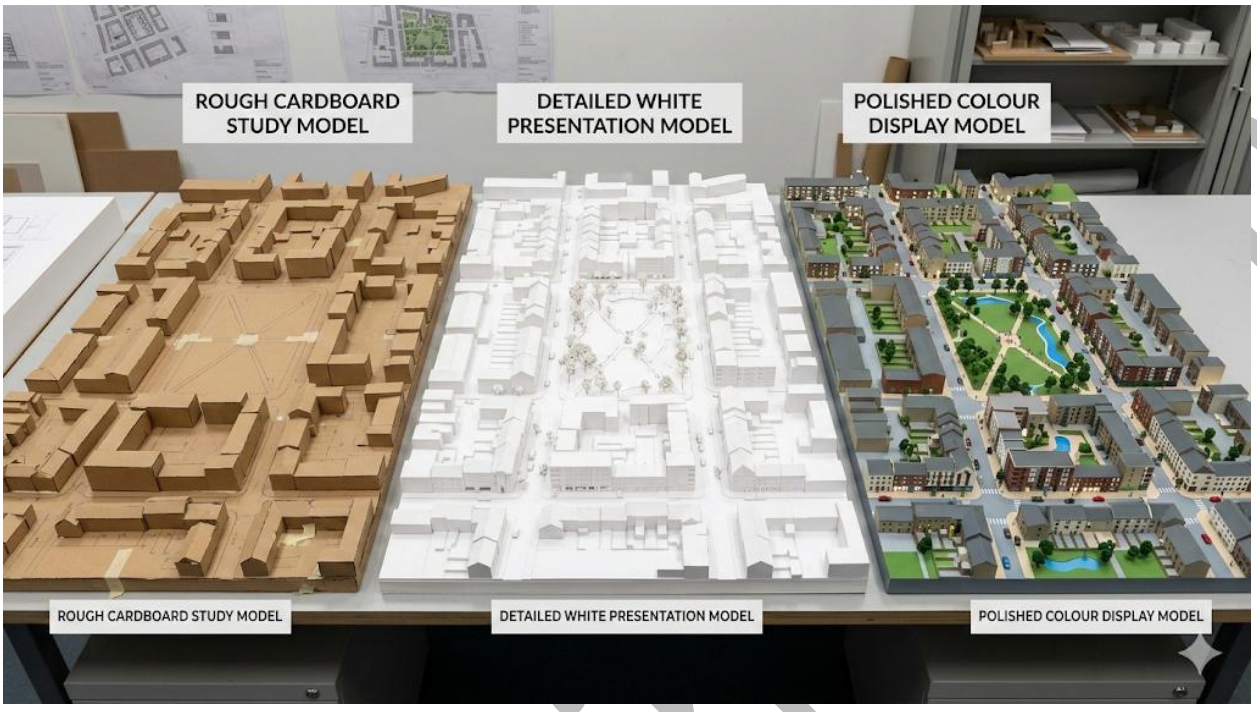
- **SLO 1.1** define planning model making and describe the types, purposes, and general process of constructing planning models,
- **SLO 1.2** identify and describe the cutting and shaping tools used in model making and their correct applications,
- **SLO 1.3** identify and describe measuring, marking, fixing, and finishing tools and methods used in model making,
- **SLO 1.4** identify the principal model making materials and explain the properties and appropriate applications of each.

1.1 Introduction to Planning Model Making

1.1.1 Definition, purpose, and types of planning models

Planning model making is the craft of constructing scaled three-dimensional physical representations of existing or proposed built environments, landscapes, and urban layouts. A **planning model** transforms the two-dimensional information of plans, sections, and elevations into a tangible object that can be viewed, handled, and understood from multiple angles. Planning models serve several purposes: they communicate design intent to clients, communities, and decision-makers; they enable planners and designers to test spatial relationships and massing before construction; and they serve as educational tools for explaining planning proposals to non-specialist audiences. Models may be classified by their purpose as **study models** rough, exploratory models used in the design process; **presentation models** finished, detailed models made to communicate a proposal; and **display models** highly detailed models made for exhibition or permanent display.

Fill in the blank: Planning models may be classified as study models, presentation models, and _____ models made for exhibition or permanent display.



Short description: Image showing three types of planning models side by side: a rough study model, a detailed presentation model, and a polished display model of an urban area.
Plate 1.1 Three types of planning models study, presentation, and display

1.1.2 The role of models in planning communication and decision-making

Physical planning models occupy a unique place in planning communication. Unlike plans and drawings, which require technical training to read, a well-constructed model can be understood intuitively by any observer a community member, an elected official, a client, or a child. This accessibility makes models particularly valuable in **public participation** contexts, where the ability to see and understand a proposal is a precondition for meaningful engagement. In **decision-making** contexts, models allow decision-makers to appreciate the three-dimensional character, massing, scale, and relationship of proposals to their surroundings in ways that elevations and perspectives alone cannot convey. In the Nigerian planning context, where technical literacy varies widely and community engagement is often challenging, the planning model is an especially important communication tool.

Fill in the blank: A well-constructed model can be understood intuitively by any observer, making it particularly valuable in public _____ contexts.

1.1.3 Overview of the model making process

Constructing a planning model follows a general process regardless of the scale or type of model being made. The process begins with **design and planning** establishing the scale, scope, materials, and level of detail required. **Preparation of the base** follows, creating the platform on which the model will be built. **Construction of terrain and landscape** represents the ground surface including contours, roads, and open spaces. **Construction of buildings and structures** adds the built elements, working from the largest to the smallest. **Finishing** applies colour,

texture, and detail to the completed model. **Presentation and display** prepares the model for its intended audience. Each stage requires specific tools and materials, and a well-organised approach to sequencing is essential to producing a high-quality model efficiently.

Fill in the blank: In the model making process, construction of buildings works from the _____ to the smallest elements.

Pilot questions 1.1

1. Define planning model making and state two purposes of planning models.
2. Which type of planning model is used in the design process to explore spatial relationships?
3. Why are planning models particularly valuable in public participation contexts?
4. Fill in the blank: The model making process begins with design and planning, followed by preparation of the _____.

1.2 Cutting and Shaping Tools

1.2.1 Knives, cutters, and blades

Cutting tools are the most essential instruments in the model maker's toolkit. The **craft knife** (or scalpel) with interchangeable blades is the workhorse of model making, used for cutting card, foam board, thin plastics, and sheet balsa wood. **Blades** must be kept sharp a dull blade requires excessive pressure, produces ragged cuts, and is more dangerous than a sharp one. The **snap-off utility knife** (or box cutter) is used for cutting thicker materials such as foam board and corrugated card. **Scissors** are used for cutting thin paper, tracing paper, and fabric. **Circle cutters** (or compass cutters) produce clean circular cuts in card and thin board. All cutting operations should be performed against a **metal safety ruler** never a plastic ruler, which can be sliced on a **self-healing cutting mat** to protect the work surface and extend blade life.

Fill in the blank: A dull blade requires excessive _____, produces ragged cuts, and is more dangerous than a sharp one.

Short description: Image showing a model maker's cutting tool set laid out on a cutting mat, including craft knife, snap-off cutter, scissors, circle cutter, and metal safety ruler.
Plate 1.2 Model making cutting tools craft knife, cutters, and metal ruler on a cutting mat

1.2.2 Saws, files, and abrasives

For thicker and harder materials, cutting tools give way to **saws**. The **junior hacksaw** cuts metal, hard plastic, and thick balsa or basswood. The **fretsaw** (or coping saw) cuts curves in wood and thick card. The **mitre box** is used in conjunction with a tenon saw to produce accurate right-angle and 45-degree cuts, essential for clean joints at building corners. **Files** flat, round, half-round, and needle files refine and smooth cut edges on wood, plastic, and metal. **Sandpaper** and **emery paper** (abrasive sheets) smooth surfaces and remove tool marks. **Sanding blocks** sandpaper wrapped around a firm block produce flat, even sanding surfaces, essential for achieving clean flat faces on foam and wood elements.

Fill in the blank: A mitre box is used in conjunction with a tenon saw to produce accurate right-angle and _____ degree cuts essential for building corners.

1.2.3 Scoring, folding, and forming tools

Scoring is the process of partially cutting through a material to create a controlled fold line without cutting all the way through. A **scoring tool** (a blunt blade or spent ballpoint pen run against a ruler) compresses the surface fibres of card or board, enabling a clean, sharp fold. **Bone folders** are smooth, hard tools traditionally made from bone but now usually plastic used to create crisp folds and to smooth down glued joints. **Tweezers** are essential for positioning and holding small components during assembly, particularly when adhesives are being applied. **Forming tools** including round dowels, pencils, and cylindrical objects are used to curve card and paper to produce cylindrical and conical forms for towers, silos, and curved building elements.

Fill in the blank: Scoring is the process of partially cutting through a material to create a controlled _____ line without cutting all the way through.

Pilot questions 1.2

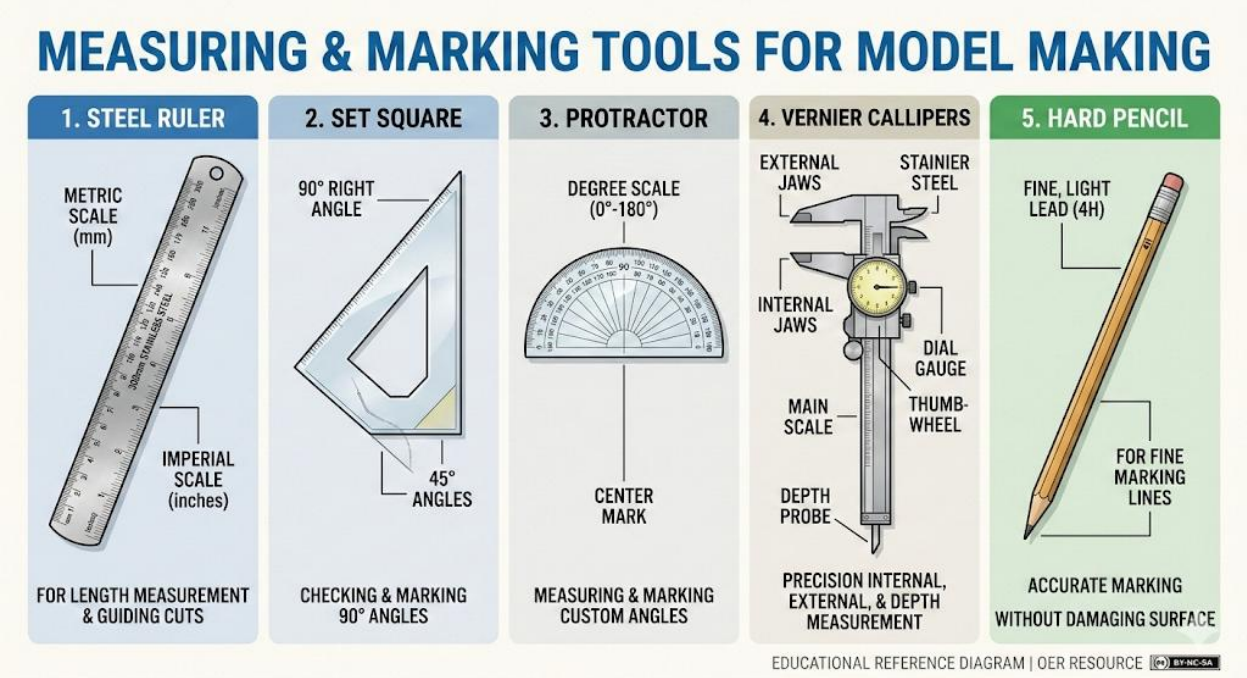
1. What is the most commonly used cutting tool in model making and what materials does it cut?
2. Why should cutting always be done against a metal ruler rather than a plastic one?
3. Fill in the blank: A mitre box helps produce accurate _____ cuts essential for clean joints at building corners.
4. What is a bone folder used for in model making?
5. Explain what scoring is and why it is used in model making.

1.3 Measuring, Marking, and Fixing Tools

1.3.1 Measuring and marking instruments

Accuracy in model making depends on precise measuring and marking. The **steel ruler** or **metal straight edge** is the primary measuring and guiding tool it doubles as a cutting guide and must be long enough for the largest cuts required. The **set square** (or triangle) ensures that lines are drawn at accurate right angles or 45-degree angles to a baseline. The **protractor** measures and transfers angles. **Vernier callipers** measure small dimensions with high precision useful for checking that model elements have been cut to the exact required thickness or width. **Pencils** (2H or harder) are used for marking on card and board because their fine lines are easily erased. **Marking gauges** and **dividers** transfer repeated measurements efficiently and accurately across multiple components.

Fill in the blank: Vernier callipers measure small dimensions with high _____, useful for checking that model elements have been cut to the exact required size.



Short description: Diagram showing the principal measuring and marking tools used in model making including steel ruler, set square, protractor, vernier callipers, and pencil.
Figure 1.1 Principal measuring and marking tools in model making

1.3.2 Adhesives and fixing methods

Choosing the right **adhesive** is critical to the strength and appearance of a model. **PVA glue** (white craft glue) is the most versatile adhesive in model making it bonds paper, card, and wood, dries clear, and can be diluted with water for papier-mâché and surface sealing. **Contact adhesive** (impact adhesive) bonds foam board, leather, and rubber applied to both surfaces and allowed to partially dry before pressing together. **Superglue** (cyanoacrylate) bonds rigid materials rapidly and is useful for joining small, difficult-to-hold components. **Hot glue** applied with a glue gun provides fast-setting bonds for larger assemblies but can leave visible threads. **Double-sided tape** is convenient for temporary fixing and for joining flat surfaces. **Pins and clips** hold components in position while adhesives cure.

Fill in the blank: PVA glue is the most versatile adhesive in model making because it bonds paper, card, and wood, dries _____, and can be diluted with water.

1.3.3 Finishing tools and equipment

Finishing gives a model its final appearance and greatly affects the quality of communication it achieves. **Paints** acrylic, poster, or watercolour are applied with soft brushes to colour surfaces and elements. **Spray paint** and **spray mount** provide even, smooth coatings on large surfaces. **Marker pens** and **felt-tip pens** mark fine details, lettering, and surface patterns. **Varnish** (matt or gloss) seals and protects finished surfaces. **Tweezers** and **fine-pointed tools** are used for placing and adjusting the smallest components model trees, figures, vehicles, and signage that bring a model to life. A well-organised finishing stage, working methodically from the largest areas of colour to the smallest details, produces a coherent, professional result.

Fill in the blank: Finishing works methodically from the largest areas of _____ to the smallest details to produce a coherent, professional result.

Adhesive	Best Applications	Main Limitations
PVA Glue (White/Wood Glue)	Porous materials like **wood, paper, card, and foam**. Great for scenic base-work (grass/gravel).	Long drying time; not waterproof; will not bond non-porous surfaces like plastic or metal.
Contact Adhesive	Large surface areas, **leather, rubber, and laminates**. Good for bonding dissimilar materials.	"Stringy" application; high fumes; usually permanent and unforgiving once the surfaces touch.
Superglue (Cyanoacrylate)	Small **metal parts, resin, and "instant" repairs**. Essential for photo-etched (PE) parts.	Very brittle (low impact resistance); can "fog" clear plastics; bonds skin instantly.
Hot Glue	**Rapid prototyping**, internal structural support, and large-scale terrain building.	Bulky (adds thickness); can melt thin plastics or EPS foam; strings can be messy.

Box 1.1 Common adhesives in model making types, applications, and limitations
Short description: A box summarising the main adhesives used in planning model making including PVA, contact adhesive, superglue, and hot glue, with their appropriate applications and main limitations.

Pilot questions 1.3

1. Why must measuring tools in model making be made of metal rather than plastic?
2. What is PVA glue and why is it the most versatile adhesive in model making?
3. Fill in the blank: Contact adhesive is applied to _____ surfaces and allowed to partially dry before pressing together.
4. What does varnish do to a finished model surface?
5. Name two tools used for placing small components such as model trees and figures during finishing.

1.4 Model Making Materials

1.4.1 Board and paper-based materials

Card and paper are the most widely used materials in planning model making because they are inexpensive, readily available, easy to cut and fold, and can represent a wide range of surfaces and textures. **Mounting board** (or mat board) is a firm, smooth card used for floors, walls, and roofs of buildings. **Corrugated card** is used for the model base and thick walls. **Foam board** a polystyrene foam core sandwiched between paper facings is one of the most useful model making materials: lightweight, rigid, easy to cut cleanly, and available in standard thicknesses. **Cartridge paper** and **tracing paper** are used for thin wall elements, glazing simulation, and surface texturing. **Balsa sheet** cut to standard thicknesses is also paper-thin and used for fine detailing.

Fill in the blank: Foam board consists of a polystyrene foam core sandwiched between paper _____ and is lightweight, rigid, and easy to cut cleanly.

Short description: Image showing a range of board and paper-based model making materials laid out on a workshop table including mounting board, foam board, corrugated card, and tracing paper.

Plate 1.3 Board and paper-based model making materials

1.4.2 Foam, wood, and rigid structural materials

Polystyrene foam (expanded and extruded) is used extensively for terrain modelling carving contours, hills, and embankments as well as for building volumes where a solid block representation is preferred over a hollow card construction. **Balsa wood** is the most common wood used in model making: lightweight, easily cut, sanded, and painted, it is used for structural frames, columns, and fine details. **Basswood** and **plywood** provide greater strength for bases and larger structural elements. **Dowel rods** in various diameters represent columns, poles, and cylindrical elements. **Wire** including florist's wire, copper wire, and stiff armature wire is used

for structural frames, handrails, and tree armatures. **Acrylic sheet** (Perspex) represents glazing, water surfaces, and transparent or translucent elements.

Fill in the blank: Balsa wood is the most common wood used in model making because it is lightweight, easily cut, sanded, and _____.

1.4.3 Supplementary and finishing materials

A range of supplementary materials transforms a structural model into a convincing representation of a planned environment. **Model grass** (static grass powder, flock, or fabric) represents lawn, grassland, and open green space. **Model trees** can be purchased ready-made or constructed from twisted wire armatures covered with lichen, sponge, or dried plant material. **Sand** and fine gravel, glued to surfaces, represent unpaved ground, beaches, and gravelled areas. **Mirror card** and **blue acetate** represent water bodies. **Scale figures**, **vehicles**, and **street furniture** add human scale and activity to the model. **Dry transfer lettering** and printed labels provide signage and annotation. Sourcing suitable supplementary materials locally and economically adapting natural materials, waste materials, and improvised solutions where commercial model supplies are unavailable is an important practical skill in the Nigerian workshop context.

Fill in the blank: Scale figures, vehicles, and street furniture add human _____ and activity to a planning model.

Pilot questions 1.4

1. What are the properties of foam board that make it one of the most useful model making materials?
2. Name two uses of polystyrene foam in planning model making.
3. What does acrylic sheet represent in a planning model?
4. Describe two ways in which model trees can be produced for a planning model.
5. Fill in the blank: Sourcing supplementary materials locally and economically adapting natural and waste materials is an important skill in the _____ workshop context.

Series Summary

This Series has introduced you to the tools and materials that are the foundation of planning model making practice. We began by defining planning model making, describing the types and purposes of models, explaining their role in planning communication and decision-making, and outlining the general model making process.

We then examined the cutting and shaping tools used in model making knives, blades, saws, files, abrasives, and forming tools before exploring the measuring, marking, and fixing instruments, adhesives, and finishing tools and equipment that complete the model maker's toolkit. Finally, we described the range of materials used in planning models board, paper, foam, wood, and supplementary finishing materials explaining the properties and appropriate applications of each. By engaging with these topics, you should now be able to identify and name the principal tools and materials of planning model making, describe their correct

applications, and prepare to begin workshop practice with confidence, as outlined in the Series Learning Outcomes.

Glossary of Terms

- **Acrylic sheet**: A transparent or translucent rigid plastic sheet (also known as Perspex) used in models to represent glazing, water surfaces, and other transparent elements.
- **Balsa wood**: A very lightweight, soft wood that is easily cut, sanded, and painted, widely used for structural elements and fine details in model making.
- **Bone folder**: A smooth, hard tool used to create crisp folds and smooth glued joints in card and paper model making.
- **Circle cutter**: A rotary cutting tool used to produce clean circular cuts in card and thin board.
- **Contact adhesive**: An adhesive applied to both surfaces to be joined, allowed to partially dry, then pressed together for an immediate strong bond.
- **Craft knife**: A precision cutting tool with interchangeable blades used for cutting card, foam board, thin plastic, and sheet balsa wood.
- **Display model**: A highly detailed, finished planning model made for exhibition or permanent public display.
- **Foam board**: A model making material consisting of a polystyrene foam core sandwiched between paper facings, lightweight, rigid, and easy to cut cleanly.
- **Mitre box**: A cutting guide used with a tenon saw to produce accurate right-angle and 45-degree cuts in wood and card.
- **Mounting board**: A firm, smooth card used for floors, walls, and roofs of building elements in planning models.
- **Planning model**: A scaled, three-dimensional physical representation of an existing or proposed built environment, landscape, or urban layout.
- **Presentation model**: A finished, detailed planning model made to communicate a proposal to clients, communities, or decision-makers.
- **PVA glue**: Polyvinyl acetate glue a versatile, water-soluble adhesive that bonds paper, card, and wood and dries clear.
- **Scoring**: The process of partially cutting through a material to create a controlled fold line without cutting all the way through.
- **Self-healing cutting mat**: A cutting surface that closes after each cut, protecting the work surface and extending blade life.
- **Study model**: A rough, exploratory planning model used during the design process to test spatial relationships and massing.

Concept Check Questions 1

Objective Questions

1. Define planning model making. (Linked to SLO 1.1)

2. Identify two types of planning models classified by purpose. (Linked to SLO 1.1)
3. Fill in the blank: Cutting should always be performed against a metal ruler on a self-healing cutting _____. (Linked to SLO 1.2)
4. State one property of foam board that makes it useful in model making. (Linked to SLO 1.4)

Short-Answer Questions

5. Explain why physical planning models are particularly effective in public participation contexts. (Linked to SLO 1.1)
6. Describe the scoring technique and explain why it is used rather than simply folding card. (Linked to SLO 1.2)
7. Compare PVA glue, contact adhesive, and superglue as model-making adhesives, explaining when each should be used. (Linked to SLO 1.3)
8. Describe the properties of balsa wood and explain why it is the most commonly used wood in model making. (Linked to SLO 1.4)

Long-Answer Questions

9. Identify and describe the principal cutting and shaping tools used in planning model making, explaining the correct application of each and the safety considerations that govern their use. (Linked to SLO 1.2)
10. Evaluate the range of materials available for planning model making, describing the properties and appropriate applications of board, paper, foam, wood, and supplementary materials, and explain how the selection of materials affects the quality and communication value of the finished model. (Linked to SLO 1.4)

Answers to Concept Check Questions 1

Objective Questions

1. Planning model making is the craft of constructing scaled three-dimensional physical representations of existing or proposed built environments, landscapes, and urban layouts.
2. Study models and presentation models.
3. Mat.
4. Foam board is lightweight, rigid, and can be cut cleanly.

Short-Answer Questions

5. Physical planning models are intuitive and accessible to non-specialists, enabling communities, officials, and clients to understand massing, scale, and spatial relationships without needing technical training.
6. Scoring compresses card fibres along a line, creating a controlled fold. Folding unscored card crushes fibres irregularly, producing weak, uneven creases.
7. **PVA glue:** bonds paper, card, wood; slow-setting, dries clear.
Contact adhesive: bonds foam board, rubber, leather; strong, immediate bond.
Superglue: bonds small rigid components; fast-setting, precise.
8. Balsa wood is lightweight, fine-grained, easy to cut, sand, and paint. It comes in standard sheet thicknesses and strips, making it versatile for frames, detailing, and components.

Long-Answer Questions

9.

- **Basic response:** Craft knife for card, snap-off cutter for thicker materials, scissors for paper, saws for wood/plastics. Safety requires sharp blades, metal rulers, cutting mats, and careful posture.
- **Value-added response:** Learners may explain tool choice by material and cut type (scoring vs. full cut vs. saw cut), and how sharp blades and mitre boxes improve joint quality and finish.

10.

- **Basic response:** Board/paper for walls/roofs; foam board for rigid elements; polystyrene foam for terrain; balsa/basswood for structure; supplementary materials for detail.
- **Value-added response:** Learners may evaluate how material choice affects communicationfor example, white foam board for clarity vs. coloured models for characterand discuss Nigerian workshop challenges, proposing local substitutes to maintain quality.

Answers to Pilot Questions 1

Part 1.1

1. Planning model making constructs scaled 3D representations of environments; purposes include communicating design intent, testing spatial relationships, and educating non-specialists.
2. A study model.
3. Models are intuitive, enabling communities to engage meaningfully with proposals.
4. Base.

Part 1.2

1. Craft knife with interchangeable blades cuts card, foam board, plastics, balsa.
2. Metal rulers resist blades; plastic rulers are damaged and unsafe.
3. Right-angle and 45°.
4. Bone folder creates crisp folds and smooth glued joints.
5. Scoring partially cuts fibres for clean folds; unscored folds produce rough creases.

Part 1.3

1. Metal rulers act as cutting guides; plastic rulers deflect cuts and risk injury.
2. PVA bonds paper, card, wood; versatile, clear-drying, inexpensive.
3. Both.
4. Varnish seals/protects surfaces, prevents paint damage, gives consistent finish.
5. Tweezers and fine-pointed tools.

Part 1.4

1. Foam board is lightweight, rigid, and cuts cleanly.
2. Used for terrain modelling and solid block building volumes.

3. Suitable for glazing, water surfaces, transparent/translucent elements.
4. Trees can be purchased or handmade from wire, lichen, sponge, or dried plants.
5. Nigerian.

References and Attributions 1

Course content references

Mills, C. B. (2005). *Designing with Models: A Studio Guide to Architectural Model Building*. Hoboken, NJ: Wiley.

Porter, T., & Neale, J. (2000). *Architectural Supermodels: Physical Design Simulation*. Oxford: Architectural Press.

Dunn, N. (2010). *Architectural Modelmaking*. London: Laurence King.

Illustrations

Plate 1.1 Three types of planning models study, presentation, and display

AI-generated suggestion: "Generate an image showing three types of planning models side by side: a rough cardboard study model, a detailed white presentation model, and a polished colour display model of an urban neighbourhood."

Suggested OER search string: "planning model types study presentation display OER."

Plate 1.2 Model making cutting tools craft knife, cutters, and metal ruler on a cutting mat

AI-generated suggestion: "Generate an image of a model maker's cutting tool set laid out on a self-healing cutting mat including a craft knife, snap-off utility knife, scissors, circle cutter, and metal safety ruler."

Suggested OER search string: "model making cutting tools craft knife cutter cutting mat OER."

Figure 1.1 Principal measuring and marking tools in model making

AI-generated suggestion: "Generate a labelled diagram showing the principal measuring and marking tools used in model making including a steel ruler, set square, protractor, vernier callipers, and hard pencil."

Suggested OER search string: "model making measuring marking tools diagram steel ruler set square OER."

Box 1.1 Common adhesives in model making types, applications, and limitations

AI-generated suggestion: "Generate a text box summarising the main adhesives used in model making including PVA glue, contact adhesive, superglue, and hot glue, showing their appropriate applications and main limitations."

Suggested OER search string: "model making adhesives PVA contact glue superglue applications OER."

Plate 1.3 Board and paper-based model making materials

AI-generated suggestion: "Generate an image of a range of board and paper-based model making materials laid out on a workshop table including mounting board, foam board, corrugated cardboard, and tracing paper."

Suggested OER search string: "model making board paper materials workshop mounting board foam board OER."

Attributions

All AI prompts are intended for use with generative tools to create original illustrations. Suggested search strings are provided to locate open educational resources (OER) for non-commercial academic use.

Course Code: URP 306

Course Title: Planning Model making Workshop

Course Units: 2 Units

Series 1: Model Making Tools and Materials
Series 2: Use and Care of Tools in Model Making
Series 3: Workshop Practices and Procedures in Model Making
Series 4: Preparation of Three-Dimensional Planning Models
Series 5: Production of Map and Building Models

Here is the proposed outline for Series 2:

Part 2.1 Proper Handling of Tools

- 2.1.1 Hand tools: safe grip, controlled cutting, correct usage.
- 2.1.2 Machine tools: following manufacturer guidelines, safe operation, switching off after use.
- 2.1.3 Common mistakes to avoid: misuse, forcing tools, ignoring safety instructions.

Part 2.2 Maintenance Practices

- Cleaning tools: removing debris, wiping surfaces, preventing rust.
- Sharpening and calibration: keeping blades sharp, ensuring accuracy of measuring tools.
- Storage and organisation: designated places, protective cases, workshop arrangement.

Part 2.3 Safety Precautions in Workshop Use

- Personal protective equipment (PPE): goggles, gloves, aprons.
- Organised workspace: clear benches, proper lighting, safe tool placement.
- Emergency procedures: reporting faulty tools, first aid readiness, fire safety.

Part 2.4 Responsible Use and Care Culture

- Respect for shared tools: accountability, returning tools after use.
- Developing good habits: consistency in care, routine checks.
- Long-term benefits: extended tool lifespan, improved efficiency, safer learning environment.

Introduction

In any model making workshop, tools are the most frequently used items, and their proper use and care determine both the quality of the models produced and the safety of the learners. Many accidents and poor outcomes occur not because of a lack of creativity, but because tools are mishandled or neglected. This Series therefore focuses on how to use tools responsibly and maintain them effectively, ensuring that they remain reliable and safe for repeated use.

The aim of this Series is to equip you with the knowledge and skills required to handle tools correctly, maintain them through cleaning and storage, observe safety precautions, and develop a culture of responsibility in the workshop.

We shall commence this Series by examining the proper handling of hand and machine tools, including common mistakes to avoid. Next, we will explore maintenance practices such as cleaning, sharpening, and storage. Following that, we will consider safety precautions in the workshop, including protective equipment and emergency procedures. Finally, we will conclude by discussing responsible use and care culture, highlighting respect for shared tools, good habits, and the long-term benefits of proper care.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 2.1** demonstrate proper handling of hand and machine tools, including identifying common mistakes to avoid,
- **SLO 2.2** apply maintenance practices such as cleaning, sharpening, and storage to extend tool lifespan,
- **SLO 2.3** explain safety precautions in workshop use, including personal protective equipment and emergency procedures, and
- **SLO 2.4** evaluate the importance of responsible use and care culture in promoting efficiency and safety in model making.

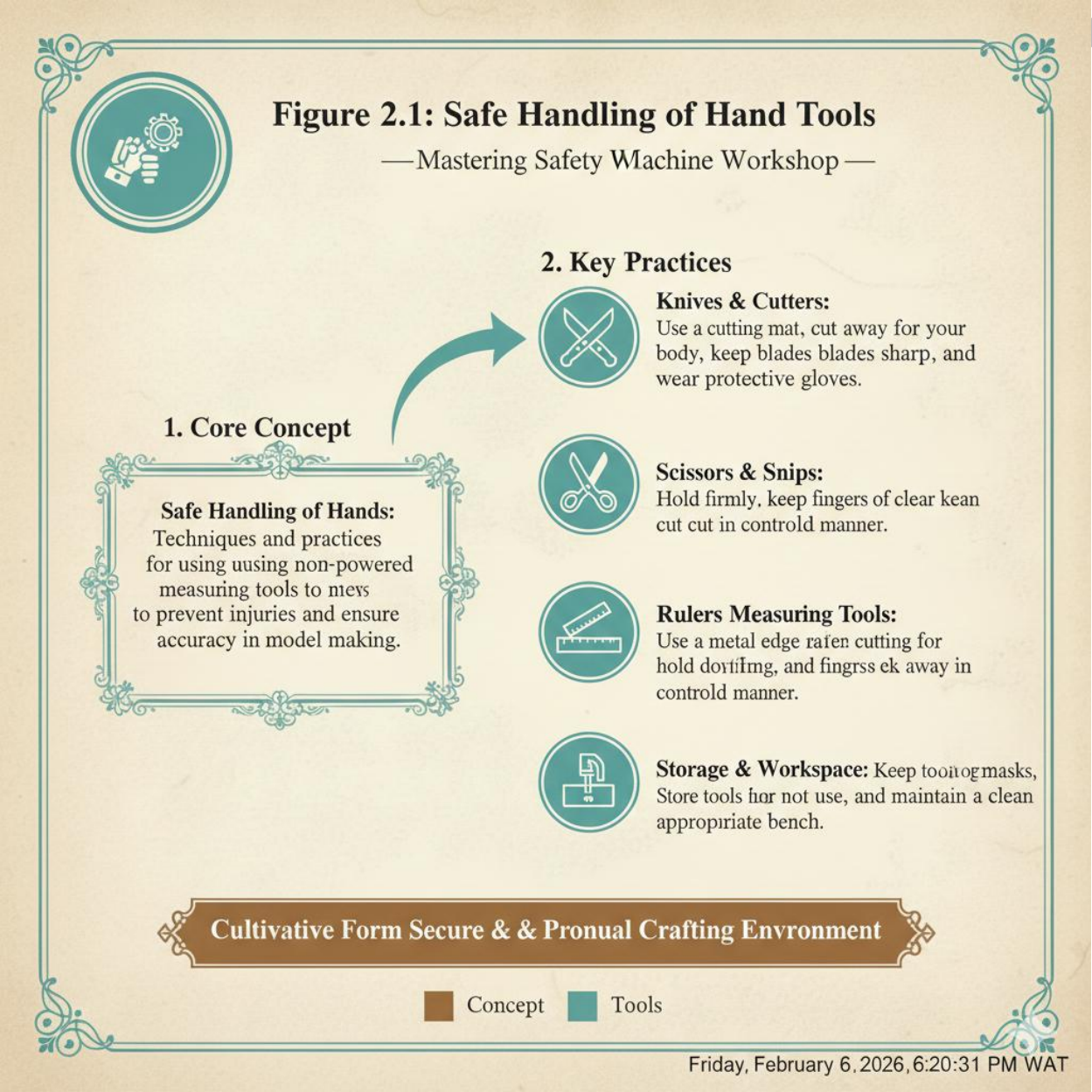
2.1 Proper Handling of Tools

The way tools are handled in a model making workshop directly affects both the quality of the models produced and the safety of the learners. **Proper handling** means using tools correctly for their intended purpose, with care and precision. This Part will guide you through the safe use of hand tools and machine tools, and highlight common mistakes to avoid.

Fill in the blank: _____ means using tools correctly for their intended purpose, with care and precision.

2.1.1 Hand tools

Hand tools are manually operated instruments such as knives, cutters, scissors, rulers, and compasses. They require firm grip and controlled movements to achieve accurate cuts and shapes. Learners should always cut away from their bodies, keep blades sharp, and use rulers or guides for straight lines. Misuse of hand tools often leads to poor results or minor injuries.

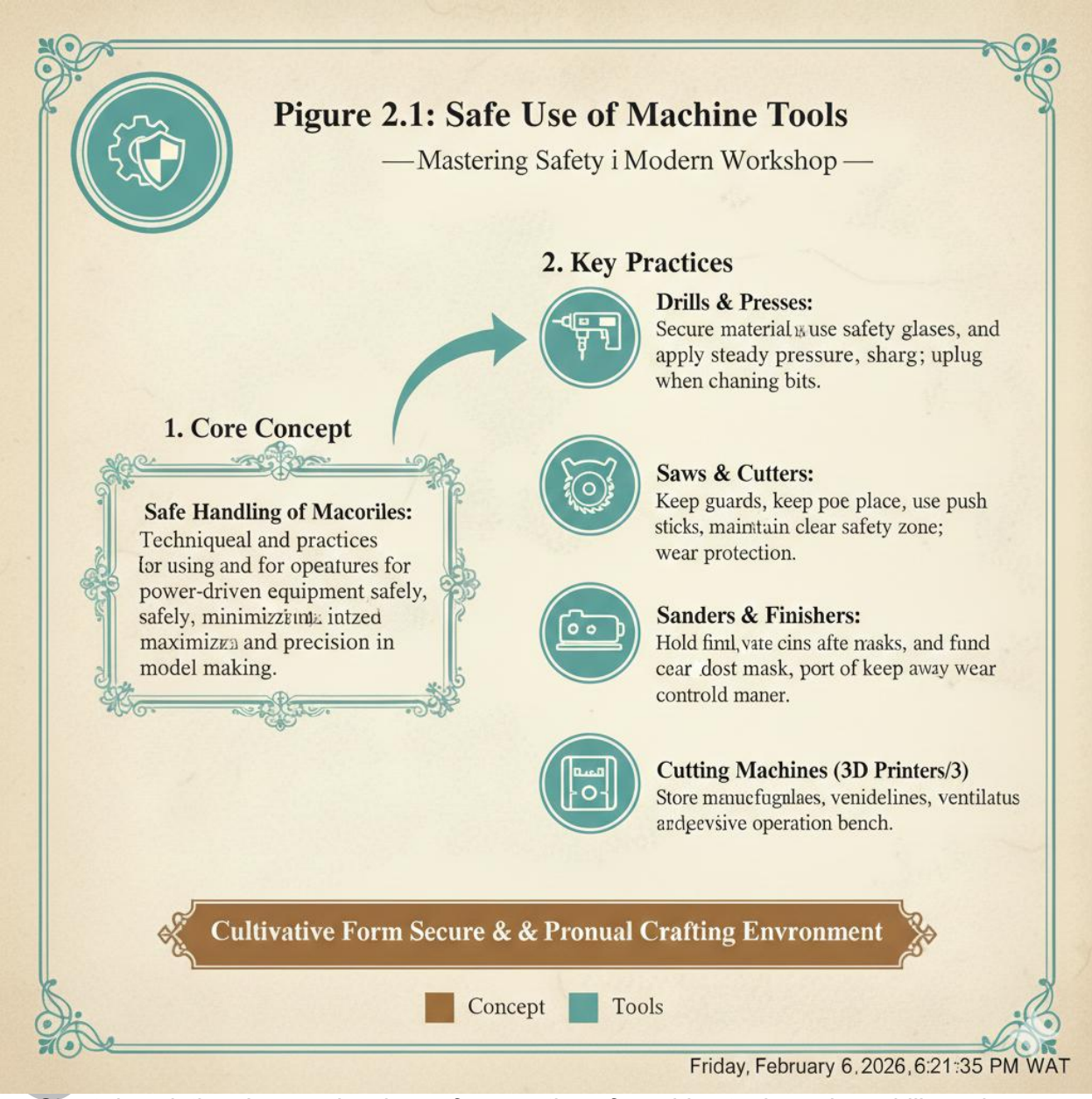


Short description: Diagram showing safe handling of hand tools such as knives and cutters.
Caption: Figure 2.1: Safe handling of hand tools

Fill in the blank: Learners should always cut _____ from their bodies when using knives or cutters.

2.1.2 Machine tools

Machine tools are powered devices such as drills, saws, sanders, and cutting machines. They allow faster and more efficient work, especially with tougher materials. However, they must be operated according to manufacturer instructions, with protective gear such as goggles and gloves. Learners should never force materials into machines, and must switch off equipment when not in use.



Short description: Image showing safe operation of machine tools such as drills and saws.
Caption: Plate 2.1: Safe use of machine tools

Fill in the blank: Learners must switch off _____ when not in use to prevent accidents.

2.1.3 Common mistakes to avoid

Common mistakes include using tools for the wrong purpose, applying excessive force, ignoring safety instructions, and leaving tools unattended. For example, using a knife instead of a saw for thick materials can damage both the tool and the model. Avoiding these mistakes ensures efficiency, safety, and better results.

Mistake	***Description***	***Consequence***
Misuse of Tools	*Using a tool for a purpose it wasn't designed for (e.g., using a scale ruler as a cutting guide or a screwdriver as a pry bar).*	*Damages the tool's precision edges and can lead to "slippage," causing unpredictable cuts or injury.*
Forcing Tools	*Applying excessive physical pressure when a blade is dull or a joint is stuck.*	*Causes blades to snap and materials to crush or tear rather than slice cleanly.*
Ignoring Safety Gear	*Failing to use cutting mats, safety rulers (with finger guards), or eye protection when using power tools.*	*Increases the risk of deep lacerations and damage to the studio work surfaces.*
Unattended Tools	*Leaving open utility knives or hot glue guns plugged in and unattended on a cluttered desk.*	*Creates a significant hazard for peers moving through the studio and leads to accidental burns or stabs.*

Caption: Box 2.1: Common mistakes in handling tools
Short description: Text box listing mistakes such as misuse, forcing tools, ignoring safety, leaving tools unattended.

Fill in the blank: Using a knife instead of a saw for thick materials can damage both the _____ and the model.

Pilot questions 2.1

1. What does proper handling of tools mean?

2. Give two examples of hand tools used in model making.
3. State one safety rule when using hand tools.
4. Mention one protective gear required when operating machine tools.
5. Identify one common mistake learners should avoid when handling tools.

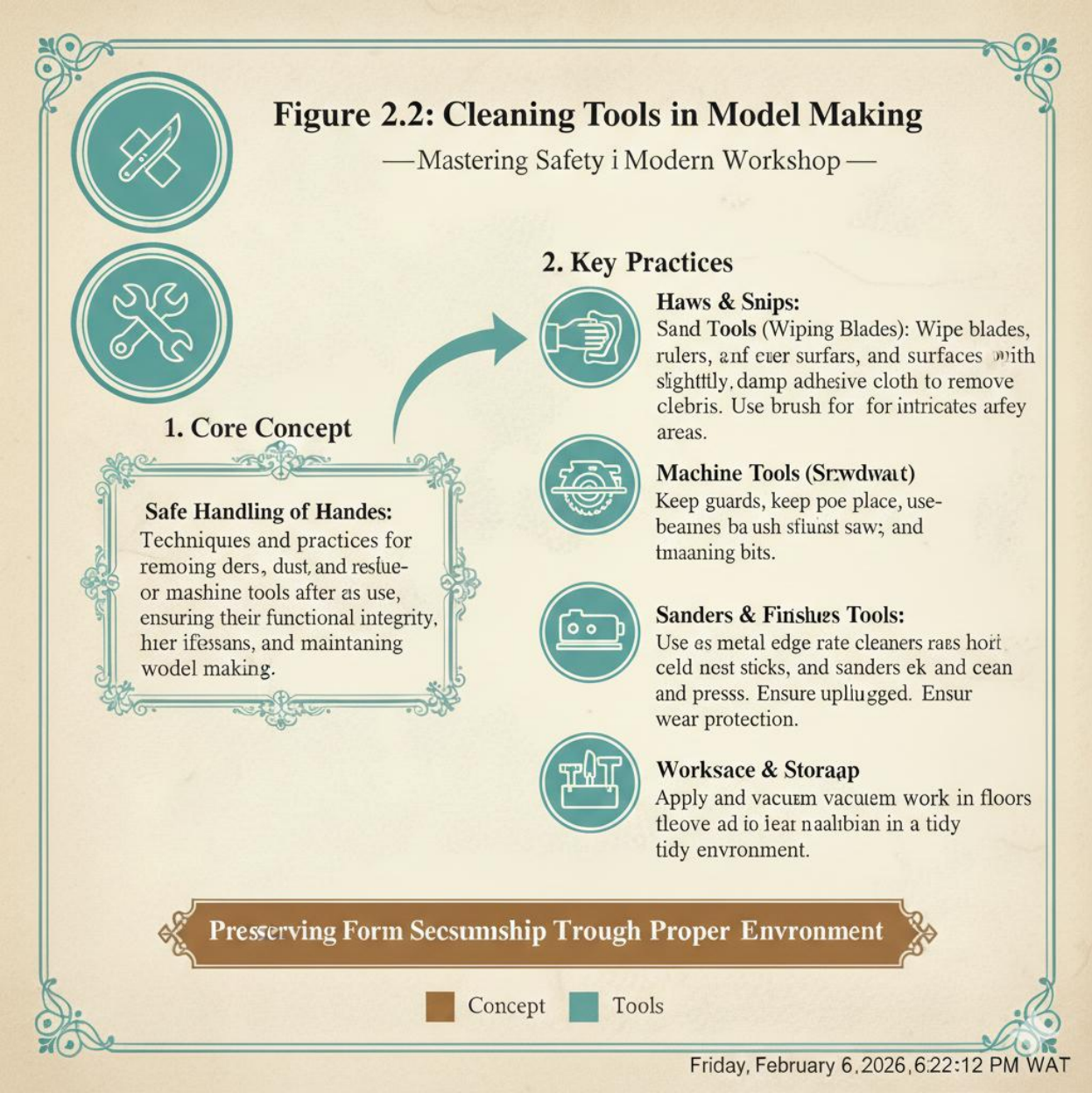
2.2 Maintenance Practices

Maintenance practices are essential for keeping tools in good working condition and ensuring they perform accurately over time. **Maintenance** refers to the regular actions taken to clean, sharpen, calibrate, and store tools properly. Without maintenance, tools may become blunt, unsafe, or ineffective, which can compromise both the quality of models and the safety of learners.

Fill in the blank: _____ refers to the regular actions taken to clean, sharpen, calibrate, and store tools properly.

2.2.1 Cleaning tools

Cleaning tools involves removing debris, dust, or residue after each use. For hand tools, this may mean wiping blades and surfaces with a dry cloth, while machine tools may require brushing or vacuuming to clear sawdust or particles. Regular cleaning prevents rust, wear, and malfunction.



Short description: Diagram showing cleaning of hand and machine tools after use.
Caption: Figure 2.2: Cleaning tools in model making

Fill in the blank: Regular cleaning prevents _____, wear, and malfunction.

2.2.2 Sharpening and calibration

Sharpening ensures that cutting tools such as knives and saws remain effective and precise. Calibration refers to adjusting measuring tools like scales and compasses to maintain accuracy.

These practices help learners achieve clean cuts and correct dimensions, which are vital for producing professional models.

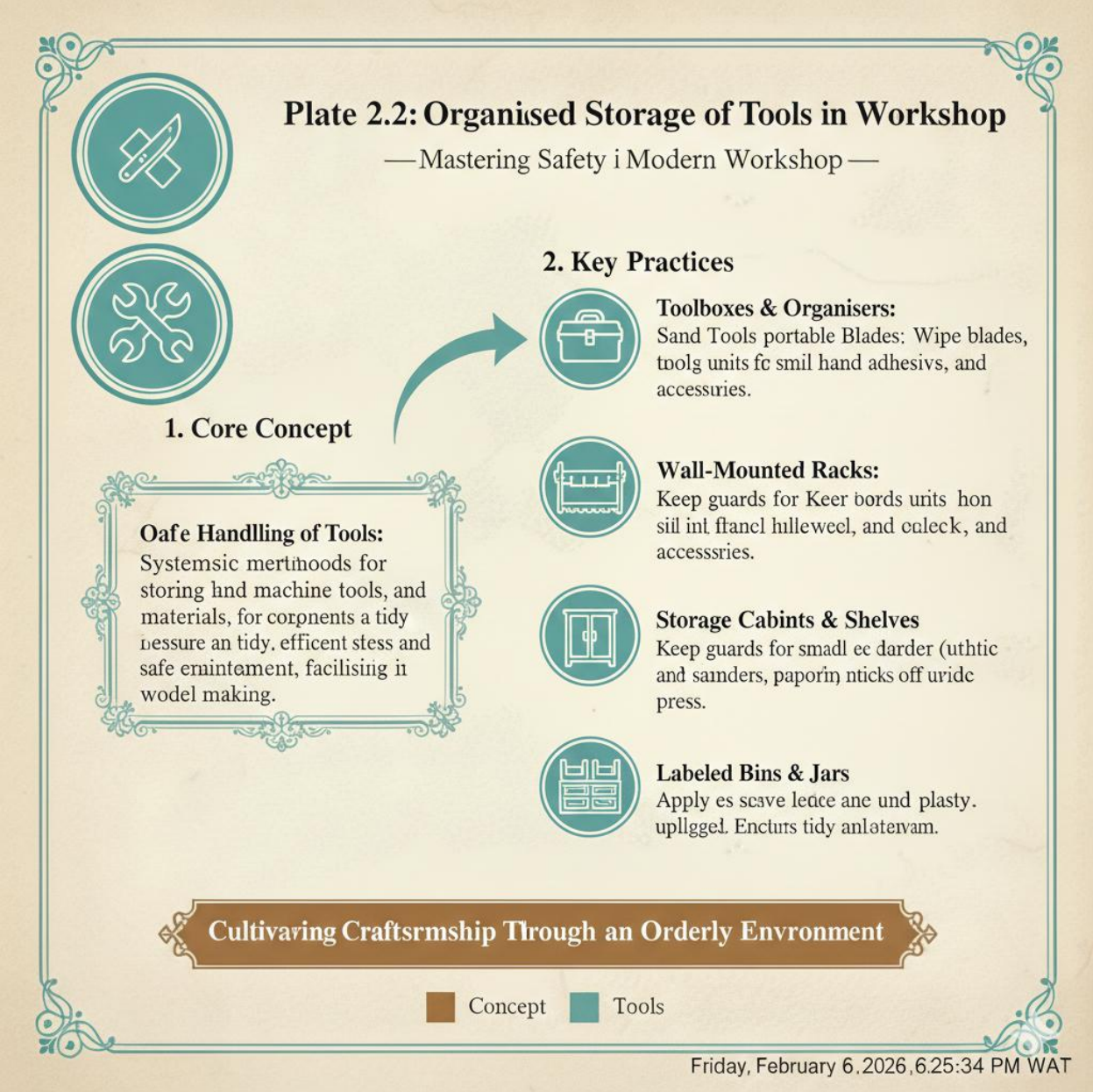
Practice	Method	Operational Impact
Blade Sharpening	*Regularly snapping off segments of retractable blades or using a fine-grit whetstone for fixed-blade chisels.*	***Edge Quality:*** *Ensures clean, burr-free cuts in balsa, foam, and card, reducing the need for extensive sanding.*
Angle Calibration	*Testing set squares and T-squares against a "Master Square" or a known vertical reference point.*	***Vertical Integrity:*** *Guarantees that walls and structural columns are perfectly perpendicular (90°) to the site base.*
Instrument Zeroing	*Ensuring digital calipers and scales are reset to 0.00 before use and checking that ruler markings start exactly at the edge.*	***Measurement Accuracy:*** *Prevents cumulative errors that occur when "end-of-ruler" wear is ignored during long-distance measurements.*
Blade Realignment	*Checking that the blade in a circular cutter or heavy-duty shear is perfectly parallel to the guide fence.*	***Straightness:*** *Prevents "drifting" during long cuts, ensuring that regional transit corridors or road networks are perfectly straight.*

Caption: Box 2.2: Sharpening and calibration practices
Short description: Text box listing sharpening of blades and calibration of measuring instruments.

Fill in the blank: Calibration refers to adjusting measuring tools to maintain _____.

2.2.3 Storage and organisation

Storage and organisation involve keeping tools in designated places such as toolboxes, racks, or cabinets. Proper storage prevents loss, damage, and accidents. Organised workshops also improve efficiency, as learners can easily locate the tools they need. Developing a habit of returning tools after use is part of responsible workshop culture.



Short description: Image showing organised storage of tools in a workshop.
Caption: Plate 2.2: Organised storage of tools in a workshop

Fill in the blank: Organised workshops improve _____, as learners can easily locate the tools they need.

Pilot questions 2.2

1. What is meant by maintenance of tools?
2. State one reason why cleaning tools is important.
3. What does calibration of measuring tools achieve?
4. Mention one practice that keeps cutting tools effective.
5. Why is storage and organisation important in a workshop?

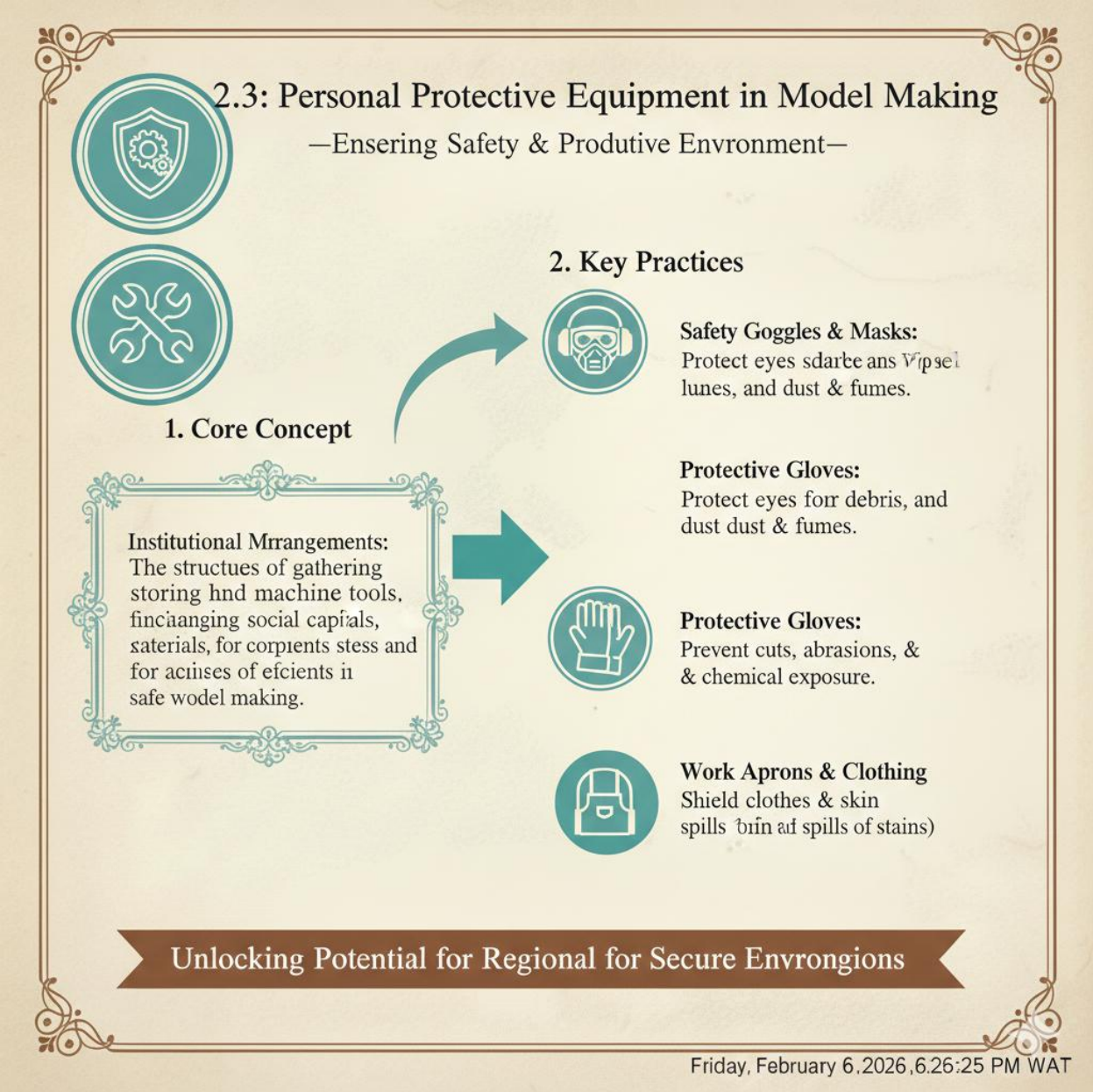
2.3 Safety Precautions in Workshop Use

Safety precautions are vital in any model making workshop because they protect learners from accidents and ensure a productive environment. **Safety precautions** are the measures taken to minimise risks when working with tools and materials. By following these practices, learners can focus on creativity and precision without fear of injury or disruption.

Fill in the blank: _____ are the measures taken to minimise risks when working with tools and materials.

2.3.1 Personal protective equipment (PPE)

Personal protective equipment (PPE) includes items such as goggles, gloves, and aprons. Goggles protect the eyes from flying particles, gloves safeguard the hands from cuts or burns, and aprons shield clothing from dust or paint. Wearing PPE is a simple but effective way to reduce the risk of injury.



Short description: Image showing learners wearing goggles, gloves, and aprons in a workshop.
Caption: Plate 2.3: Personal protective equipment in model making

Search string: "personal protective equipment workshop goggles gloves aprons OER image."

Fill in the blank: Goggles protect the _____ from flying particles.

2.3.2 Organised workspace

An **organised workspace** is essential for safe and efficient work. Tools should be placed in designated areas, benches kept clear of clutter, and lighting adequate for detailed tasks. A tidy workspace reduces the chance of accidents and allows learners to locate tools quickly.

Short description: Diagram showing an organised workshop with clear benches and proper tool placement.
Caption: Figure 2.3: Organised workspace for safe model making

Fill in the blank: A tidy workspace reduces the chance of _____ and allows learners to locate tools quickly.

2.3.3 Emergency procedures

Emergency procedures are the steps taken when accidents or hazards occur. These include reporting faulty tools immediately, knowing the location of first aid kits, and following fire safety rules. Learners should be trained to act calmly and responsibly in emergencies to protect themselves and others.

Procedure	*Immediate Action*	*Purpose*
Reporting Faulty Tools	*Tag the tool "Out of Service" and notify the studio technician or supervisor immediately.*	***Prevention:** Ensures no other student uses a dangerous or broken tool, preventing electrical shocks or mechanical failure.*
First Aid Response	*Locate the nearest First Aid Kit for minor cuts/burns. For serious injuries, alert emergency services and use the "buddy system."*	***Immediate Care:** Provides the necessary supplies (bandages, antiseptics, eyewash) to treat minor studio injuries before they worsen.*
Fire Safety Protocols	*Identify the location of fire extinguishers (Type ABC) and fire blankets. Note the nearest emergency exit and assembly point.*	***Life Safety:** Ensures a quick exit in the event of a chemical fire (adhesives/solvents) or electrical fire from power tools.*
Spill Containment	*Use absorbent materials to contain chemical or adhesive spills. Ensure the area is well-ventilated.*	***Environmental Safety:** Prevents slips and stops hazardous fumes from accumulating in the studio air.*

Caption: Box 2.3: Common emergency procedures in workshops
Short description: Text box listing procedures such as reporting faulty tools, using first aid kits, and observing fire safety.

Fill in the blank: Learners should be trained to act _____ and responsibly in emergencies.

Pilot questions 2.3

1. What are safety precautions in a workshop?
2. Mention two examples of personal protective equipment.
3. Why is an organised workspace important?
4. State one emergency procedure learners should follow.
5. How does PPE reduce the risk of injury?

2.4 Responsible Use and Care Culture

Beyond handling, maintenance, and safety, learners must develop a responsible attitude towards tools in the workshop. **Responsible use and care culture** refers to the shared values and practices that ensure tools are respected, maintained, and used efficiently. This culture not only prolongs the lifespan of tools but also fosters teamwork, accountability, and a safe learning environment.

Fill in the blank: _____ refers to the shared values and practices that ensure tools are respected, maintained, and used efficiently.

2.4.1 Respect for shared tools

Respecting shared tools means treating them as communal resources. Learners should avoid hoarding, misuse, or careless handling. Returning tools after use and reporting any damage ensures that others can also benefit from them. Respect builds trust and promotes fairness in the workshop.

Principle	***Action Required***	***Impact on Studio Culture***
Prompt Return	*Returning tools to their designated storage shadow-board or cabinet immediately after use.*	***Accessibility:*** *Prevents "tool hoarding" and ensures peers don't waste time searching for essential equipment.*
Avoidance of Misuse	*Using tools only for their intended purpose (e.g., not using a precision chisel to scrape dried glue off a table).*	***Longevity:*** *Protects the delicate edges and calibration of instruments, keeping them "studio-ready" for the next user.*

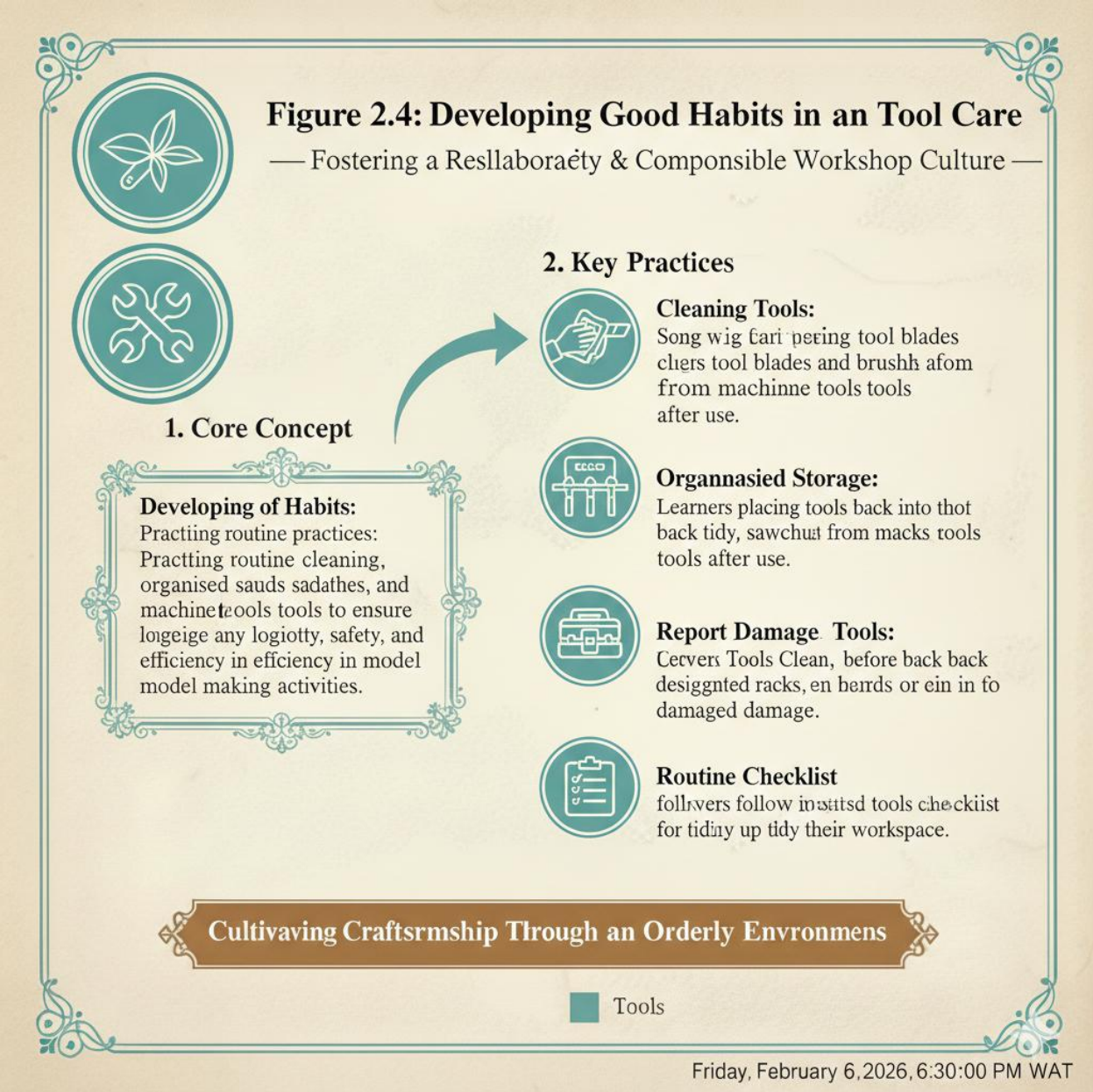
Honest Reporting	*Immediately notifying the technician if a tool breaks or becomes dull during your session.*	***Safety:*** *Prevents the next person from unknowingly using a compromised tool that could cause an accident or ruin their model.*
Cleanliness	*Wiping down tools (removing glue, dust, or paint) before returning them to storage.*	***Precision:*** *Ensures that residue from your project doesn't contaminate or "mark" the materials of the next person's model.*

Caption: Box 2.4: Principles of respecting shared tools
Short description: Text box listing principles such as returning tools after use, avoiding misuse, and reporting damage.

Fill in the blank: Returning tools after use and reporting any _____ ensures that others can also benefit from them.

2.4.2 Developing good habits

Developing good habits involves consistency in tool care and workshop practices. Learners should make it routine to clean tools after use, store them properly, and check for faults before starting work. These habits reduce accidents and improve efficiency, while also instilling discipline and responsibility.



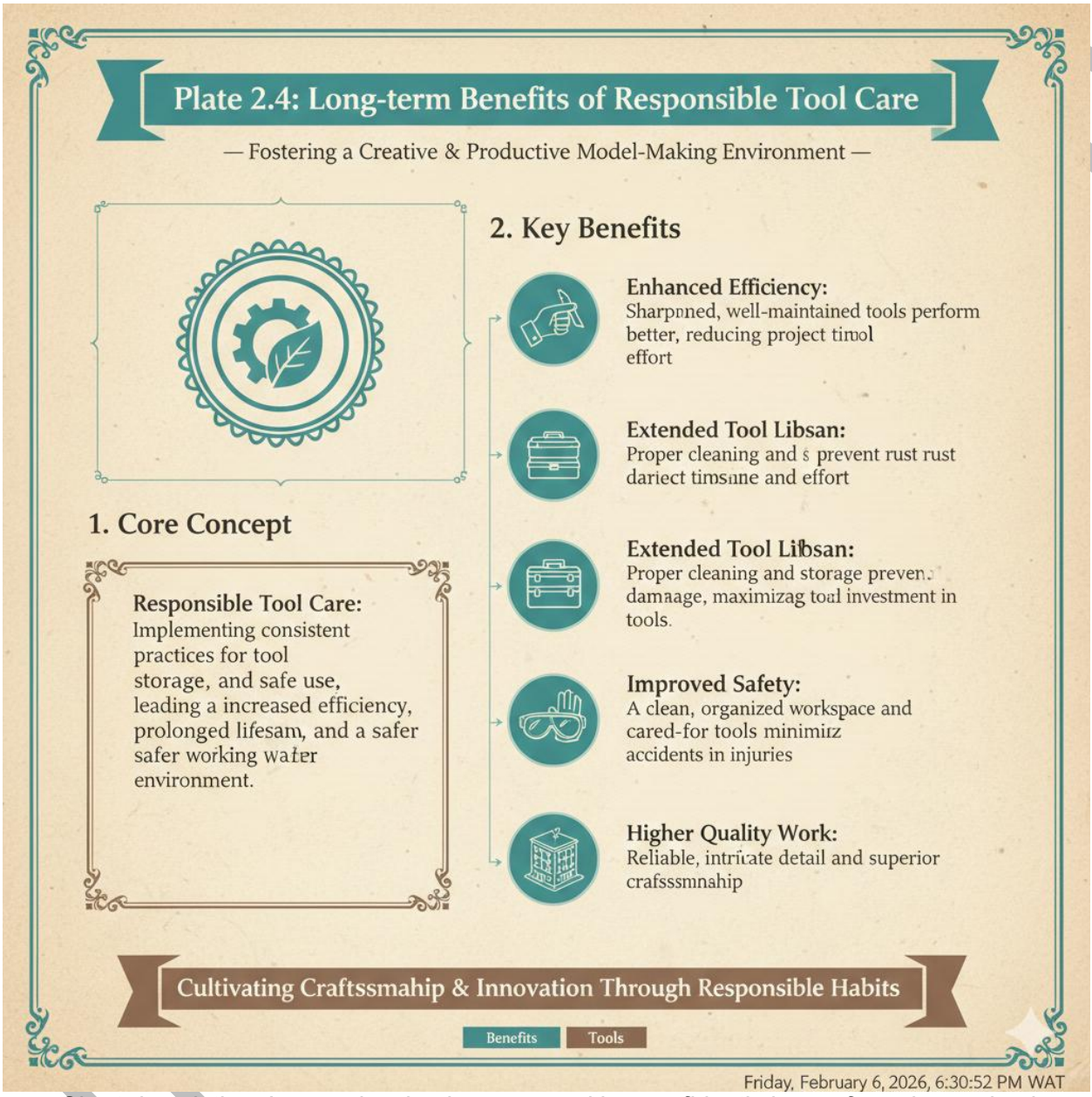
Short description: Diagram showing learners cleaning and storing tools as part of good habits.
Caption: Figure 2.4: Developing good habits in tool care

Fill in the blank: Developing good habits involves consistency in tool care and _____ practices.

2.4.3 Long-term benefits

The long-term benefits of responsible use and care include extended tool lifespan, improved efficiency, and a safer learning environment. Tools that are well-maintained perform better,

models are produced more accurately, and learners gain confidence in their work. A culture of responsibility ensures that workshops remain productive and sustainable over time.



Short description: Image showing learners working confidently in a safe and organised workshop.
Caption: Plate 2.4: Long-term benefits of responsible tool care

Fill in the blank: The long-term benefits of responsible use and care include extended tool lifespan and improved _____.

Pilot questions 2.4

1. What is meant by responsible use and care culture?

2. State one principle of respecting shared tools.
3. Mention one good habit learners should develop in tool care.
4. Give one long-term benefit of responsible use and care.
5. Why is a culture of responsibility important in a workshop?

Series Summary

This Series has focused on the correct use and care of tools in model making, emphasising that safe and responsible practices are just as important as creativity and technical skill. The purpose was to help you develop confidence in handling tools, maintaining them effectively, and fostering a culture of responsibility in the workshop.

We began by examining the proper handling of hand and machine tools, including common mistakes to avoid. Then we explored maintenance practices such as cleaning, sharpening, calibration, and organised storage. Following that, we considered safety precautions in the workshop, including the use of personal protective equipment, maintaining an organised workspace, and following emergency procedures. Finally, we discussed responsible use and care culture, highlighting respect for shared tools, the importance of good habits, and the long-term benefits of responsible practices. By completing this Series, you should now be able to demonstrate proper handling of tools, apply maintenance practices, explain safety precautions, and evaluate the importance of responsibility in tool use, as outlined in the Series Learning Outcomes.

Glossary of Terms

- **Calibration**: Adjusting measuring tools such as scales or compasses to maintain accuracy.
- **Emergency procedures**: Steps taken when accidents or hazards occur, including reporting faults, using first aid, and observing fire safety.
- **Hand tools**: Manually operated instruments such as knives, cutters, scissors, rulers, and compasses.
- **Machine tools**: Powered devices such as drills, saws, sanders, and cutting machines used for faster and more efficient work.
- **Maintenance**: Regular actions such as cleaning, sharpening, and storing tools to keep them in good condition.
- **Organised workspace**: A tidy and well-arranged workshop environment that reduces accidents and improves efficiency.
- **Personal protective equipment (PPE)**: Items such as goggles, gloves, and aprons used to protect learners from injury.
- **Proper handling**: Using tools correctly for their intended purpose, with care and precision.
- **Responsible use and care culture**: Shared values and practices that ensure tools are respected, maintained, and used efficiently.
- **Safety precautions**: Measures taken to minimise risks when working with tools and materials.

Concept Check Questions [Series 2]

Objective Questions

1. Proper handling of tools means using them _____ for their intended purpose. *(Linked to SLO 2.1)*

Which of the following is a machine tool? *(Linked to SLO 2.1)*
a) Knife
b) Drill
c) Compass

2. d) Ruler
3. Regular cleaning of tools helps to prevent _____. *(Linked to SLO 2.2)*
4. Goggles, gloves, and aprons are examples of _____. *(Linked to SLO 2.3)*
5. Returning tools after use is part of a _____ culture. *(Linked to SLO 2.4)*

Short-Answer Questions

6. Define proper handling of tools and give one example. *(Linked to SLO 2.1)*
7. State one maintenance practice that keeps cutting tools effective. *(Linked to SLO 2.2)*
8. Mention two safety precautions learners should observe in the workshop. *(Linked to SLO 2.3)*
9. What does respect for shared tools mean? *(Linked to SLO 2.4)*
10. Why is developing good habits important in tool care? *(Linked to SLO 2.4)*

Long-Answer Questions

11. Describe the correct handling of hand and machine tools, and explain why misuse should be avoided. *(Linked to SLO 2.1)*
    - **Basic response**: Learners should describe safe handling of hand tools and machine tools, with examples.
    - **Value-added response**: Outstanding learners may analyse how misuse leads to accidents, poor results, and tool damage.
12. Discuss maintenance practices for model making tools, highlighting cleaning, sharpening, calibration, and storage. *(Linked to SLO 2.2)*
    - **Basic response**: Learners should explain each practice and its role in keeping tools effective.
    - **Value-added response**: Outstanding learners may evaluate how consistent maintenance improves efficiency and reduces costs.
13. Explain safety precautions in workshop use, including PPE, workspace organisation, and emergency procedures. *(Linked to SLO 2.3)*
    - **Basic response**: Learners should describe each precaution and its importance.
    - **Value-added response**: Outstanding learners may assess how safety precautions contribute to a culture of responsibility and confidence.
14. Evaluate the importance of responsible use and care culture in model making workshops. *(Linked to SLO 2.4)*
    - **Basic response**: Learners should explain respect for shared tools, good habits, and long-term benefits.
    - **Value-added response**: Outstanding learners may analyse how responsibility fosters teamwork, sustainability, and safer learning environments.

Answers to Pilot Questions [Series 2]

Pilot questions 2.1

1. Proper handling means using tools correctly for their intended purpose, with care and precision.
2. Knives and cutters.
3. Always cut away from the body.
4. Goggles.
5. Misuse, forcing tools, ignoring safety instructions, leaving tools unattended.

Pilot questions 2.2

1. Maintenance means regular actions to clean, sharpen, calibrate, and store tools properly.
2. It prevents rust, wear, and malfunction.
3. Calibration ensures accuracy of measurements.
4. Sharpening blades regularly.
5. It prevents loss, damage, and accidents, and improves efficiency.

Pilot questions 2.3

1. Safety precautions are measures taken to minimise risks when working with tools and materials.
2. Goggles and gloves.
3. It reduces accidents and improves efficiency.
4. Reporting faulty tools immediately.
5. PPE protects learners from cuts, burns, and flying particles.

Pilot questions 2.4

1. Responsible use and care culture refers to shared values and practices that ensure tools are respected, maintained, and used efficiently.
2. Returning tools after use.
3. Cleaning tools after use.
4. Extended tool lifespan.
5. It ensures workshops remain safe, efficient, and sustainable.

References and Attributions [Series 2]

General References

- Glasson, J. (1978). *An Introduction to Regional Planning*. London: Hutchinson.

- Friedmann, J., & Weaver, C. (1979). *Territory and Function: The Evolution of Regional Planning*. Berkeley: University of California Press.
- Isard, W. (1960). *Methods of Regional Analysis*. Cambridge, MA: MIT Press.
- Richardson, H.W. (1972). *Regional Growth Theory*. London: Macmillan.
- UN-Habitat. (2015). *International Guidelines on Urban and Territorial Planning*. Nairobi: United Nations Human Settlements Programme.

Illustration Placeholders and Attributions

- *Figure 2.1: Safe handling of hand tools*
  - AI prompt: “Create a labelled diagram showing safe handling of hand tools: knives, cutters, scissors, rulers.”
  - Suggested OER search string: “safe handling hand tools model making knives cutters scissors rulers OER diagram.”
- *Plate 2.1: Safe use of machine tools*
  - AI prompt: “Generate an image showing safe operation of machine tools: drills, saws, sanders, cutting machines.”
  - Suggested OER search string: “safe use machine tools model making drills saws sanders cutting machines OER image.”
- *Box 2.1: Common mistakes in handling tools*
  - AI prompt: “Create a text box summarising common mistakes in handling tools: misuse, forcing tools, ignoring safety.”
  - Suggested OER search string: “common mistakes handling tools model making misuse forcing ignoring safety OER summary.”
- *Figure 2.2: Cleaning tools in model making*
  - AI prompt: “Create a labelled diagram showing cleaning of hand tools (wiping blades) and machine tools (brushing sawdust).”
  - Suggested OER search string: “cleaning tools model making hand tools machine tools OER diagram.”
- *Box 2.2: Sharpening and calibration practices*
  - AI prompt: “Create a text box summarising sharpening and calibration practices for model making tools.”
  - Suggested OER search string: “sharpening calibration practices model making tools OER summary.”
- *Plate 2.2: Organised storage of tools in a workshop*
  - AI prompt: “Generate an image showing organised storage of tools in a workshop: toolboxes, racks, cabinets.”
  - Suggested OER search string: “organised storage tools workshop model making OER image.”
- *Plate 2.3: Personal protective equipment in model making*
  - AI prompt: “Generate an image showing learners in a model making workshop wearing goggles, gloves, and aprons.”
  - Suggested OER search string: “personal protective equipment workshop goggles gloves aprons OER image.”
- *Figure 2.3: Organised workspace for safe model making*
  - AI prompt: “Create a labelled diagram showing an organised workshop with clear benches, proper lighting, and tool placement.”
  - Suggested OER search string: “organised workspace workshop model making OER diagram.”
- *Box 2.3: Common emergency procedures in workshops*

    - AI prompt: “Create a text box summarising emergency procedures in workshops: reporting faulty tools, first aid, fire safety.”
    - Suggested OER search string: “emergency procedures workshop model making OER summary.”
- *Box 2.4: Principles of respecting shared tools*
    - AI prompt: “Create a text box summarising principles of respecting shared tools in a workshop.”
    - Suggested OER search string: “respect shared tools workshop model making OER summary.”
- *Figure 2.4: Developing good habits in tool care*
    - AI prompt: “Create a labelled diagram showing learners cleaning and storing tools after use in a workshop.”
    - Suggested OER search string: “developing good habits tool care workshop model making OER diagram.”
- *Plate 2.4: Long-term benefits of responsible tool care*
    - AI prompt: “Generate an image showing learners working confidently in a safe and organised workshop environment.”
    - Suggested OER search string: “long-term benefits responsible tool care workshop model making OER image.”

Course Code: URP 306

Course Title: Planning Model making Workshop

Course Units: 2 Units

Series 1: Model Making Tools and Materials
Series 2: Use and Care of Tools in Model Making
Series 3: Workshop Practices and Procedures in Model Making
Series 4: Preparation of Three-Dimensional Planning Models
Series 5: Production of Map and Building Models

Here is the proposed outline for Series 3:

Part 3.1 Preparing the Workshop Environment

- Workspace organisation: arranging benches, lighting, and ventilation.
- Tool and material layout: positioning tools and materials for easy access.
- Safety readiness: ensuring first aid kits, fire extinguishers, and emergency exits are available.

Part 3.2 Standard Workshop Procedures

- Entry and exit protocols: signing in, storing personal items, and orderly movement.

- Tool usage protocols: borrowing, returning, and recording tool use.
- Waste management: disposal of scraps, recycling, and maintaining cleanliness.

Part 3.3 Collaborative Practices in Model Making

- Teamwork and role allocation: assigning tasks and responsibilities.
- Communication in the workshop: clear instructions, reporting issues, and feedback.
- Respect for shared resources: fair use of tools, materials, and space.

Part 3.4 Efficiency and Productivity in Workshop Practice

- Time management: planning tasks and meeting deadlines.
- Workflow organisation: sequencing tasks for smooth progress.
- Quality assurance: checking models for accuracy and presentation before completion.

Introduction

A model making workshop is more than just a space with tools and materials; it is a structured environment where practices and procedures guide how work is carried out. These practices ensure order, safety, collaboration, and efficiency, allowing learners to focus on creativity and accuracy. Without clear procedures, workshops can become disorganised, unsafe, and less productive.

The aim of this Series is to familiarise you with the essential practices and procedures that govern workshop activities. You will learn how to prepare the workshop environment, follow standard procedures, collaborate effectively with others, and maintain efficiency and productivity. These skills are vital not only for producing quality models but also for developing professional discipline and teamwork.

We shall begin by exploring how to prepare the workshop environment, including workspace organisation, tool layout, and safety readiness. Next, we will examine standard workshop procedures such as entry and exit protocols, tool usage rules, and waste management. Following that, we will consider collaborative practices, focusing on teamwork, communication, and respect for shared resources. Finally, we will discuss efficiency and productivity, highlighting time management, workflow organisation, and quality assurance.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 3.1** organise and prepare the workshop environment for safe and effective model making,
- **SLO 3.2** apply standard procedures for entry, tool usage, and waste management in the workshop,
- **SLO 3.3** demonstrate collaborative practices such as teamwork, communication, and respect for shared resources, and

- **SLO 3.4** evaluate methods for improving efficiency and productivity in workshop practice.

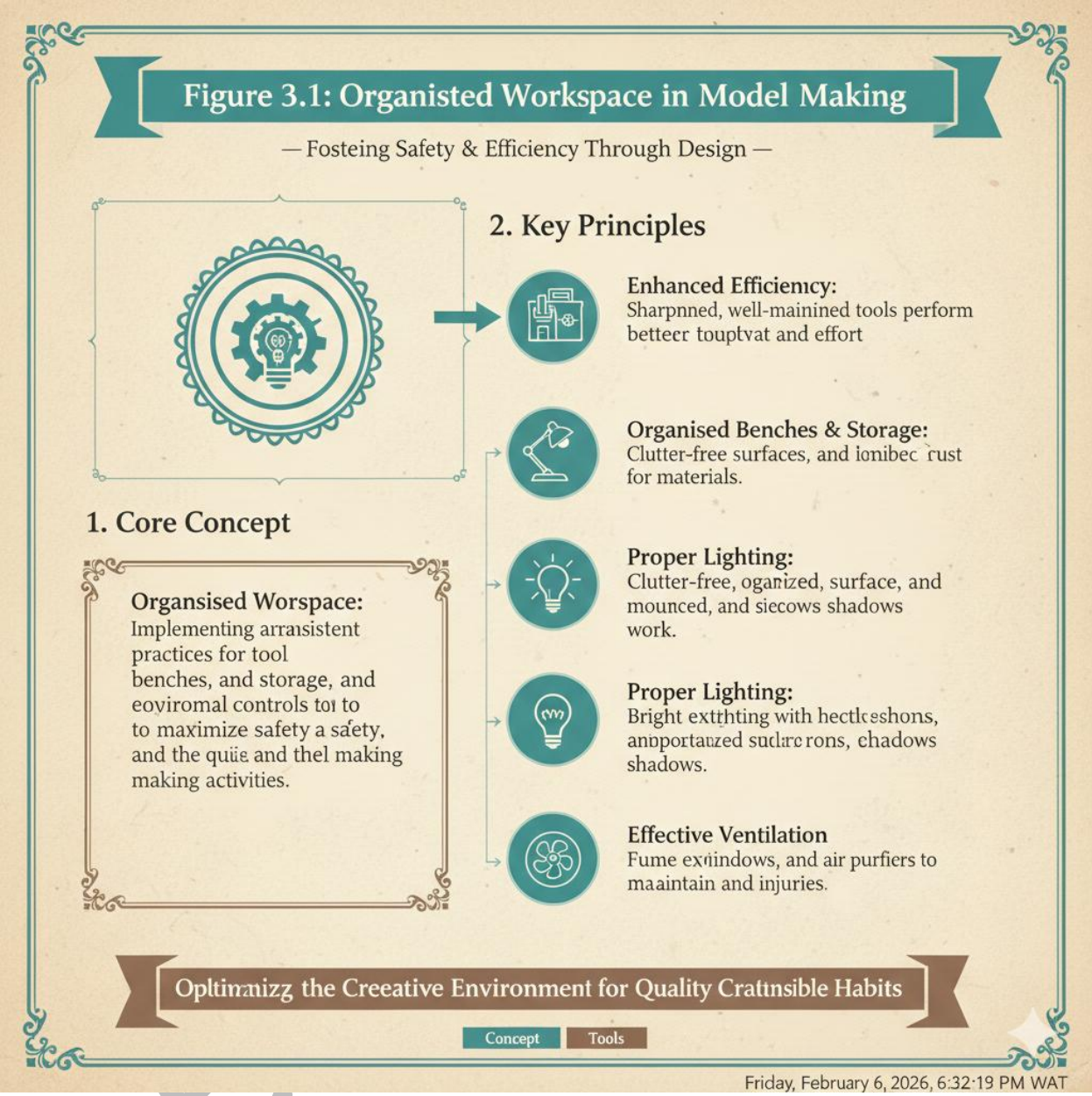
3.1 Preparing the Workshop Environment

A well-prepared workshop environment is the foundation for safe, efficient, and creative model making. Preparation involves organising the workspace, arranging tools and materials, and ensuring safety readiness. When the environment is properly set up, learners can focus on their tasks without unnecessary distractions or risks.

Fill in the blank: A well-prepared workshop environment is the foundation for _____, efficient, and creative model making.

3.1.1 Workspace organisation

Workspace organisation means arranging benches, lighting, and ventilation to create a comfortable and safe working area. Clear benches reduce clutter, good lighting ensures accuracy in cutting and detailing, and proper ventilation prevents inhalation of dust or fumes.



Short description: Diagram showing organised benches, lighting, and ventilation in a workshop.
Caption: Figure 3.1: Organised workspace in model making

Fill in the blank: Good _____ ensures accuracy in cutting and detailing.

3.1.2 Tool and material layout

Tool and material layout refers to positioning tools and materials for easy access. Frequently used items such as rulers, cutters, and adhesives should be placed within reach, while larger tools and materials should be stored safely nearby. Proper layout saves time and reduces accidents caused by searching or reaching across the workspace.

Short description: Image showing tools and materials arranged neatly for easy access.
Caption: Plate 3.1: Tool and material layout in a workshop

Fill in the blank: Proper layout saves _____ and reduces accidents caused by searching or reaching across the workspace.

3.1.3 Safety readiness

Safety readiness means ensuring that first aid kits, fire extinguishers, and emergency exits are available and accessible. Learners should know where these items are located and how to use them. Safety readiness prepares the workshop to respond quickly to accidents or hazards.

Category	Item / Action	Status Check (Yes/No)
Medical	***First Aid Kit:*** *Fully stocked with bandages, antiseptic, and sterile eyewash.*	*[ ]*
	Emergency Contacts: *List of campus security and local hospitals posted clearly.*	*[ ]*
Fire Safety	***Fire Extinguisher:*** *Inspected, pressurized, and appropriate for the materials (ABC type).*	*[ ]*
	Fire Blanket: *Accessible near "hot zones" like glue gun or laser cutter stations.*	*[ ]*
Egress	***Emergency Exits:*** *Unblocked by models or baseboards and clearly illuminated.*	*[ ]*
	Floor Paths: *Clear of trip hazards like power cords or discarded scrap materials.*	*[ ]*
Environment	***Ventilation:*** *Spray booths and windows operational for adhesive/paint fumes.*	*[ ]*
	Lighting: *Adequate brightness over all cutting and measuring surfaces.*	*[ ]*

Caption: Box 3.1: Safety readiness checklist
Short description: Text box listing items such as first aid kits, fire extinguishers, and emergency exits.

Fill in the blank: Safety readiness prepares the workshop to respond quickly to _____ or hazards.

Pilot questions 3.1

1. What is meant by preparing the workshop environment?
2. State one reason why workspace organisation is important.
3. Mention one item that should be included in tool and material layout.
4. Give one example of safety readiness in a workshop.
5. Why is preparation important before starting model making tasks?

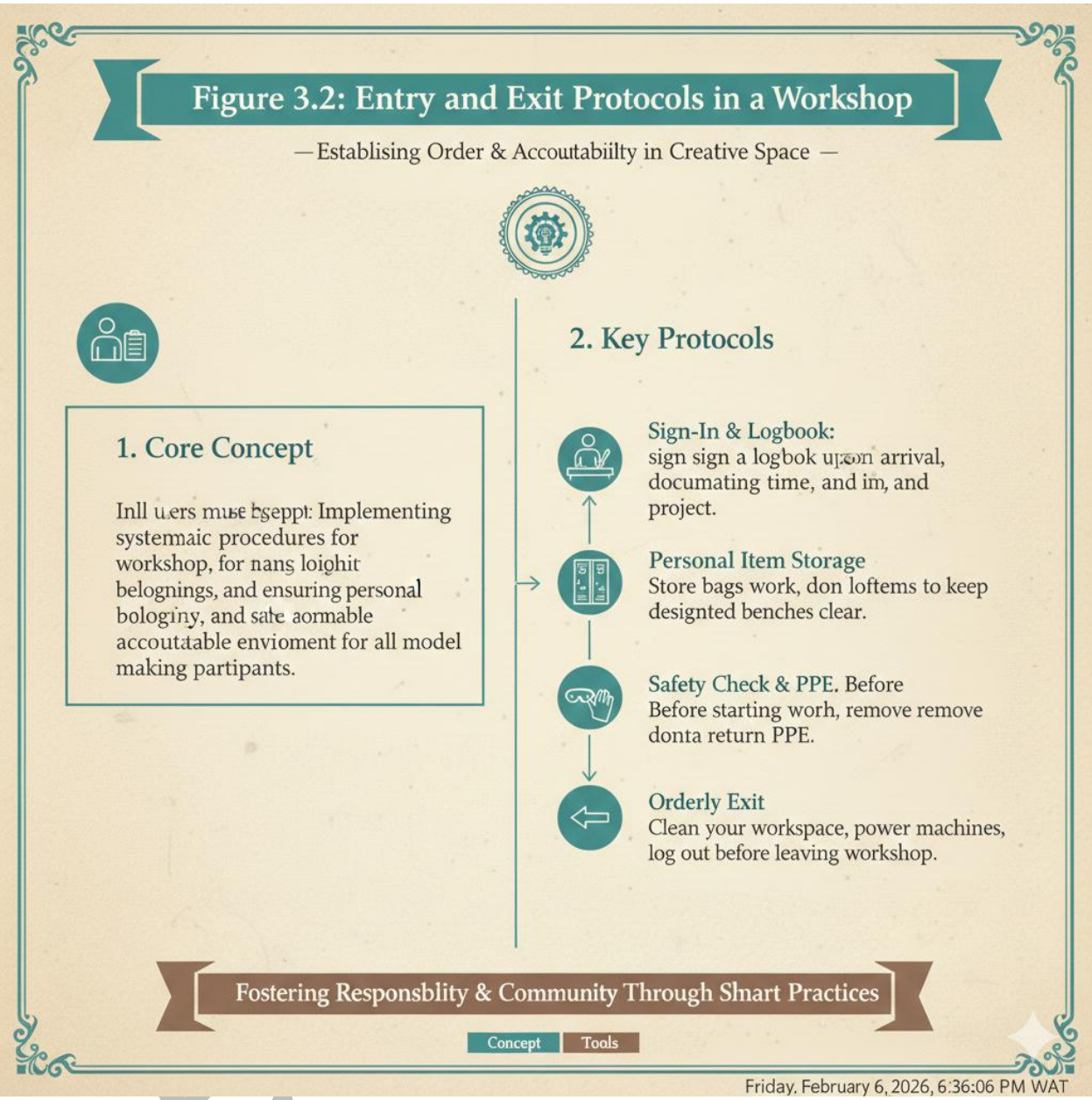
3.2 Standard Workshop Procedures

Standard workshop procedures are the rules and routines that guide how learners use the workshop. They ensure order, safety, and efficiency, making it possible for everyone to work productively. Following these procedures helps prevent accidents, reduces confusion, and promotes discipline.

Fill in the blank: Standard workshop procedures are the _____ and routines that guide how learners use the workshop.

3.2.1 Entry and exit protocols

Entry and exit protocols involve signing in, storing personal items, and moving in and out of the workshop in an orderly manner. Learners should avoid rushing or blocking pathways, and must ensure that tools and materials are returned before leaving. These protocols maintain accountability and prevent loss or damage.



Short description: Diagram showing learners signing in and storing personal items before starting work.
Caption: Figure 3.2: Entry and exit protocols in a workshop

Fill in the blank: Entry and exit protocols maintain _____ and prevent loss or damage.

3.2.2 Tool usage protocols

Tool usage protocols refer to borrowing, returning, and recording tool use. Learners should only take tools when authorised, return them promptly after use, and report any faults. These protocols ensure that tools remain available, functional, and safe for everyone.

Short description: Image showing learners borrowing and returning tools in a workshop.
Caption: Plate 3.2: Tool usage protocols in a workshop

Fill in the blank: Tool usage protocols ensure that tools remain _____, functional, and safe for everyone.

3.2.3 Waste management

Waste management involves disposing of scraps properly, recycling where possible, and keeping the workspace clean. Learners should separate recyclable materials such as paper and

plastics from general waste. Proper waste management reduces hazards, promotes sustainability, and keeps the workshop tidy.

Practice	*Action Required*	*Benefit to the Studio*
Scrap Segregation	*Sorting offcuts into designated bins for "Reuse," "Recycle," or "Landfill."*	***Resource Efficiency:*** *Allows students to find small pieces of balsa or card for detailing without cutting into fresh, expensive sheets.*
Hazardous Disposal	*Placing used blades in "Sharps" containers and empty aerosol cans in chemical waste bins.*	***Injury Prevention:*** *Protects janitorial staff and peers from accidental cuts or exposure to pressurized/flammable residues.*
Dust & Debris Control	*Using hand vacuums or brushes to clear sawdust and foam "crumbs" after every session.*	***Health & Precision:*** *Prevents respiratory irritation from fine particles and ensures a smooth surface for precise gluing.*
Liquid Waste Mgmt.	*Never pouring solvents or toxic paints down the sink; using a designated collection drum.*	***Environmental Protection:*** *Prevents water contamination and adheres to institutional sustainability policies.*

Caption: Box 3.2: Waste management practices in workshops
Short description: Text box listing practices such as disposal of scraps, recycling, and maintaining cleanliness.

Fill in the blank: Proper waste management reduces _____, promotes sustainability, and keeps the workshop tidy.

Pilot questions 3.2

1. What are standard workshop procedures?

2. State one entry protocol learners should follow.
3. Mention one rule for tool usage in the workshop.
4. Why is waste management important in a workshop?
5. How do procedures promote discipline among learners?

3.3 Collaborative Practices in Model Making

Collaboration in the workshop is essential because model making often involves teamwork, shared resources, and collective responsibility. **Collaborative practices** ensure that learners work together effectively, communicate clearly, and respect one another's contributions. This not only improves efficiency but also builds professional skills that are valuable beyond the classroom.

Fill in the blank: _____ practices ensure that learners work together effectively, communicate clearly, and respect one another's contributions.

3.3.1 Teamwork and role allocation

Teamwork means working together towards a common goal, while role allocation involves assigning specific tasks to each member. For example, one learner may focus on cutting materials, another on assembling, and another on finishing. Clear roles prevent duplication of effort and ensure that all aspects of the model are completed efficiently.

Short description: Diagram showing learners working together with assigned roles in model making.
Caption: Figure 3.3: Teamwork and role allocation in model making

Fill in the blank: Clear roles prevent duplication of effort and ensure that all aspects of the model are completed _____.

3.3.2 Communication in the workshop

Communication in the workshop involves giving clear instructions, reporting issues, and providing feedback. Effective communication reduces misunderstandings and ensures that tasks are completed correctly. Learners should practise active listening and respectful dialogue to maintain harmony in the group.

Short description: Image showing learners discussing tasks and giving instructions in a workshop.

Caption: Plate 3.3: Communication in the workshop

Fill in the blank: Effective communication reduces _____ and ensures that tasks are completed correctly.

3.3.3 Respect for shared resources

Respect for shared resources means using tools, materials, and workspace fairly and responsibly. Learners should avoid wasting materials, hoarding tools, or occupying more space than necessary. Respect ensures that everyone has equal opportunity to work and that resources last longer.

Principle	***Action Required***	***Professional Outcome***
Fair Use of Utilities	*Turning off power tools, glue guns, and light tables immediately after use.*	***Sustainability:*** *Reduces the studio's energy footprint and prevents equipment burnout or fire hazards.*
Waste Minimization	*Planning cuts to maximize material yield and donating clean offcuts to the "Scrap Library."*	***Cost-Efficiency:*** *Ensures that resources aren't depleted prematurely, benefiting students on a limited budget.*
Spatial Etiquette	*Keeping projects within assigned zones and avoiding "encroachment" on neighbors' desks.*	***Operational Flow:*** *Maintains clear pathways and ensures everyone has the necessary room to assemble large regional models.*
Information Sharing	*Labeling communal material bins clearly and sharing technical tips for using complex machinery.*	***Collective Intelligence:*** *Levels the playing field, helping the entire cohort achieve higher technical standards.*

Caption: Box 3.3: Principles of respecting shared resources
Short description: Text box listing principles such as fair use of tools, avoiding waste, and sharing workspace.

Fill in the blank: Respect for shared resources ensures that everyone has equal opportunity to _____ and that resources last longer.

Pilot questions 3.3

1. What are collaborative practices in model making?
2. State one benefit of teamwork and role allocation.

3. Mention one way communication helps in the workshop.
4. Give one principle of respecting shared resources.
5. Why is collaboration important in model making workshops?

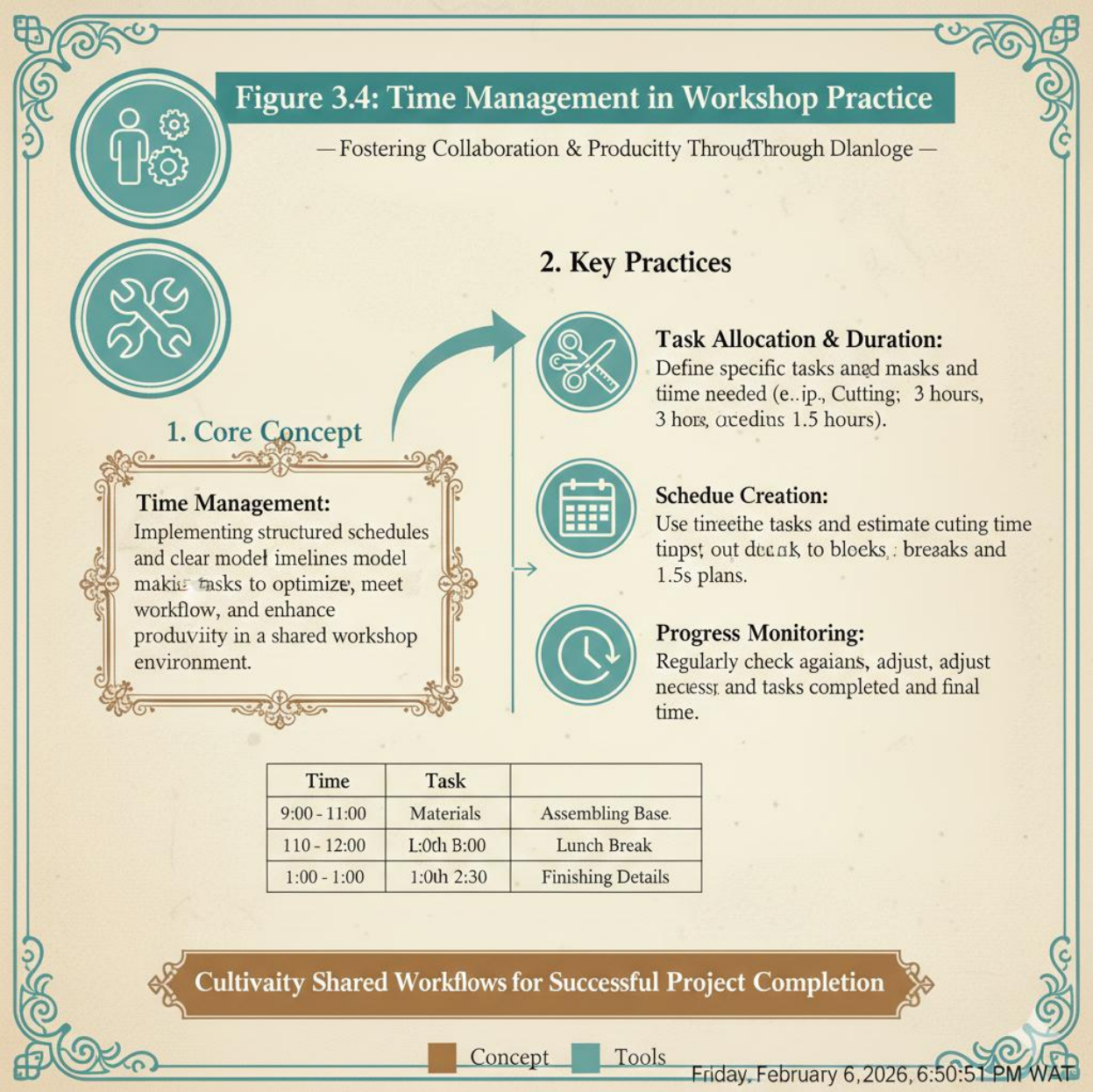
3.4 Efficiency and Productivity in Workshop Practice

Efficiency and productivity are crucial in model making workshops because they determine how well tasks are completed within available time and resources. **Efficiency** means using time, tools, and materials wisely, while **productivity** refers to the amount and quality of work achieved. Together, they ensure that learners produce accurate models without unnecessary delays or waste.

Fill in the blank: _____ means using time, tools, and materials wisely, while productivity refers to the amount and quality of work achieved.

3.4.1 Time management

Time management involves planning tasks and meeting deadlines. Learners should create schedules, allocate time for each stage of model making, and avoid procrastination. Good time management ensures that projects are completed on time and reduces stress in the workshop.



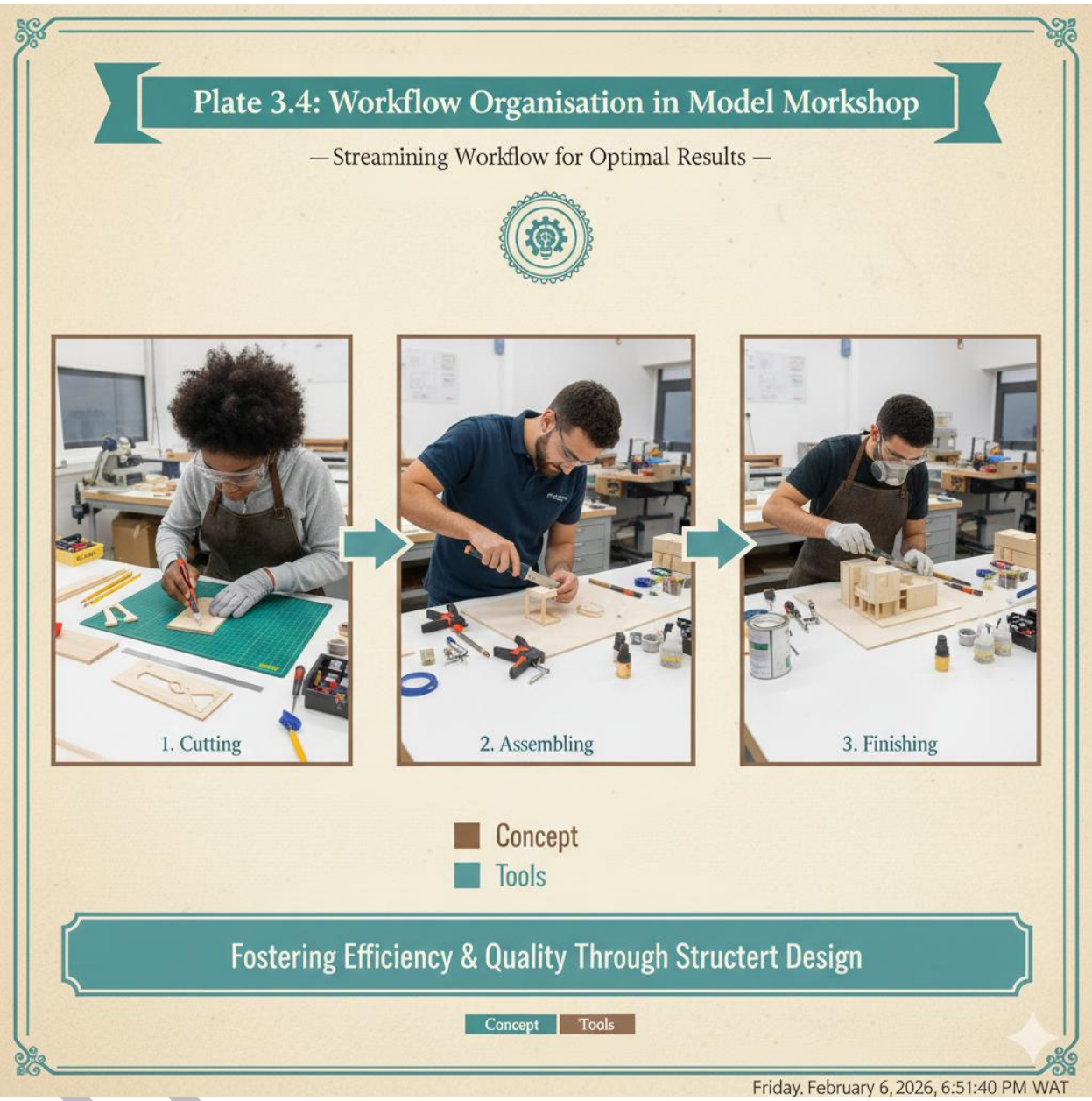
Short description: Diagram showing a timetable for model making tasks.
Caption: Figure 3.4: Time management in workshop practice

Fill in the blank: Good time management ensures that projects are completed _____ and reduces stress in the workshop.

3.4.2 Workflow organisation

Workflow organisation refers to sequencing tasks in a logical order to avoid confusion and duplication. For example, cutting materials should come before assembling, and assembling

should precede finishing. Organised workflow improves efficiency and ensures smooth progress from start to completion.



Short description: Image showing workflow sequence: cutting → assembling → finishing.
Caption: Plate 3.4: Workflow organisation in model making

Fill in the blank: Organised workflow improves _____ and ensures smooth progress from start to completion.

3.4.3 Quality assurance

Quality assurance involves checking models for accuracy, neatness, and presentation before completion. Learners should measure dimensions, inspect joints, and ensure finishing is

smooth. This practice guarantees that models meet required standards and reflect professional workmanship.

Category	Inspection Item	Quality Standard
Dimensions	***Scale Accuracy:*** *Check key lengths (e.g., road widths, building heights) against the scale ruler.*	*Dimensions must be within $\pm 0.5\text{mm}$ of the intended scale to maintain technical integrity.*
Structural Integrity	***Joint Inspection:*** *Apply light pressure to wall-to-floor and corner joints.*	*Joints should be flush with no visible gaps or "wobble." Glue should be invisible and fully cured.*
Finishing	***Surface Quality:*** *Check for adhesive "strings," fingerprints, or jagged edges from dull blades.*	*Surfaces must be smooth; balsa should be sanded; and paint/varnish must be free of bubbles or dust particles.*
Contextual Logic	***Topographical Alignment:*** *Ensure the building bases sit perfectly flat on the site contours.*	*No "daylight" should be visible under buildings; they must look integrated into the terrain.*
Aesthetics	***Cleanliness:*** *Remove all stray pencil marks, tape residue, and foam dust.*	*The model should look "fresh" and professional, emphasizing form over construction flaws.*

Caption: Box 3.4: Quality assurance checklist
Short description: Text box listing checks such as measuring dimensions, inspecting joints, and ensuring smooth finishing.

Fill in the blank: Quality assurance guarantees that models meet required _____ and reflect professional workmanship.

Pilot questions 3.4

1. What is meant by efficiency and productivity in workshop practice?
2. State one benefit of good time management.
3. Why is workflow organisation important?
4. Mention one item in a quality assurance checklist.
5. How do efficiency and productivity improve model making outcomes?

Series Summary

This Series has examined the essential practices and procedures that govern activities in a model making workshop. The purpose was to help you understand how preparation, discipline, collaboration, and efficiency contribute to safe and productive learning.

We began by exploring how to prepare the workshop environment, including workspace organisation, tool and material layout, and safety readiness. Next, we studied standard workshop procedures such as entry and exit protocols, tool usage rules, and waste management. Following that, we considered collaborative practices, focusing on teamwork, communication, and respect for shared resources. Finally, we discussed efficiency and productivity, highlighting time management, workflow organisation, and quality assurance.

By completing this Series, you should now be able to organise and prepare the workshop environment, apply standard procedures, demonstrate collaborative practices, and evaluate methods for improving efficiency and productivity, as outlined in the Series Learning Outcomes.

Glossary of Terms

- **Collaborative practices**: Shared methods of working together effectively, including teamwork, communication, and respect for resources.
- **Efficiency**: Using time, tools, and materials wisely to avoid waste.
- **Entry and exit protocols**: Rules for signing in, storing personal items, and leaving the workshop in an orderly manner.
- **Productivity**: The amount and quality of work achieved in a given time.
- **Quality assurance**: Checking models for accuracy, neatness, and presentation before completion.
- **Safety readiness**: Ensuring first aid kits, fire extinguishers, and emergency exits are available and accessible.
- **Standard workshop procedures**: Rules and routines that guide how learners use the workshop.
- **Teamwork and role allocation**: Working together towards a common goal by assigning specific tasks to each member.
- **Tool usage protocols**: Rules for borrowing, returning, and recording tool use.
- **Waste management**: Practices for disposing of scraps, recycling, and maintaining cleanliness in the workshop.
- **Workflow organisation**: Sequencing tasks in a logical order to ensure smooth progress.
- **Workspace organisation**: Arranging benches, lighting, and ventilation to create a safe and comfortable working area.

Concept Check Questions [Series 3]

Objective Questions

1. Preparing the workshop environment involves organising the _____, arranging tools and materials, and ensuring safety readiness. *(Linked to SLO 3.1)*

Which of the following is a standard workshop procedure? *(Linked to SLO 3.2)*
a) Teamwork
b) Tool usage protocols
c) Quality assurance

2. d) Ventilation
3. Effective communication in the workshop reduces _____ and ensures tasks are completed correctly. *(Linked to SLO 3.3)*
4. Sequencing tasks in a logical order to avoid duplication is known as _____. *(Linked to SLO 3.4)*
5. Quality assurance guarantees that models meet required _____ and reflect professional workmanship. *(Linked to SLO 3.4)*

Short-Answer Questions

6. Define workspace organisation and explain why it is important. *(Linked to SLO 3.1)*
7. State one entry protocol learners should follow in the workshop. *(Linked to SLO 3.2)*
8. Mention two ways communication helps in collaborative practices. *(Linked to SLO 3.3)*
9. What is meant by respect for shared resources in a workshop? *(Linked to SLO 3.3)*
10. Give one example of a quality assurance check in model making. *(Linked to SLO 3.4)*

Long-Answer Questions

11. Describe how to prepare the workshop environment, highlighting workspace organisation, tool and material layout, and safety readiness. *(Linked to SLO 3.1)*
    - **Basic response**: Learners should explain each aspect of preparation and its role in creating a safe and efficient environment.
    - **Value-added response**: Outstanding learners may analyse how preparation contributes to professional discipline, reduces accidents, and enhances creativity.
12. Discuss standard workshop procedures, including entry and exit protocols, tool usage rules, and waste management. *(Linked to SLO 3.2)*
    - **Basic response**: Learners should describe each procedure and its importance in maintaining order and safety.
    - **Value-added response**: Outstanding learners may evaluate how adherence to procedures fosters accountability, sustainability, and long-term efficiency.
13. Explain collaborative practices in model making workshops, focusing on teamwork, communication, and respect for shared resources. *(Linked to SLO 3.3)*
    - **Basic response**: Learners should outline each practice and its role in promoting cooperation.
    - **Value-added response**: Outstanding learners may assess how collaboration builds professional skills such as leadership, negotiation, and conflict resolution.
14. Evaluate methods for improving efficiency and productivity in workshop practice, including time management, workflow organisation, and quality assurance. *(Linked to SLO 3.4)*
    - **Basic response**: Learners should explain each method and its contribution to better outcomes.
    - **Value-added response**: Outstanding learners may analyse how efficiency and productivity practices prepare learners for real-world professional environments where deadlines and quality standards are critical.

Answers to Concept Check Questions [Series 3]

Objective Questions

1. Workspace.
2. b) Tool usage protocols.
3. Misunderstandings.
4. Workflow organisation.
5. Standards.

Short-Answer Questions

6. Workspace organisation means arranging benches, lighting, and ventilation to create a safe and comfortable area. It is important because it reduces clutter, improves accuracy, and prevents accidents.
7. Signing in before starting work.
8. Communication helps by reducing misunderstandings and ensuring tasks are completed correctly.
9. Respect for shared resources means using tools, materials, and workspace fairly and responsibly.
10. Measuring dimensions or inspecting joints.

Long-Answer Questions

11.

- **Basic response**: Preparing the workshop environment involves organising benches, lighting, and ventilation, arranging tools and materials for easy access, and ensuring safety readiness with first aid kits and fire extinguishers.
- **Value-added response**: Beyond these basics, preparation fosters discipline, reduces accidents, and enhances creativity by providing a structured and safe environment.

12.

- **Basic response**: Standard procedures include entry and exit protocols (signing in, orderly movement), tool usage rules (borrowing, returning, reporting faults), and waste management (disposing scraps, recycling, cleanliness).
- **Value-added response**: Outstanding learners may evaluate how these procedures promote accountability, sustainability, and long-term efficiency in workshop practice.

13.

- **Basic response**: Collaborative practices include teamwork and role allocation, communication, and respect for shared resources. These ensure cooperation and fairness.
- **Value-added response**: Outstanding learners may assess how collaboration builds professional skills such as leadership, negotiation, and conflict resolution, preparing learners for group work in professional contexts.

14.

- **Basic response**: Efficiency and productivity methods include time management (planning tasks), workflow organisation (sequencing tasks logically), and quality assurance (checking models for accuracy and presentation).
- **Value-added response**: Outstanding learners may analyse how these practices prepare learners for professional environments where deadlines, standards, and teamwork are critical for success.

Answers to Pilot Questions [Series 3]

Pilot questions 3.1

1. Preparing the workshop environment means organising the workspace, arranging tools and materials, and ensuring safety readiness.
2. Workspace organisation reduces clutter, improves accuracy, and prevents accidents.
3. Rulers, cutters, or adhesives.
4. First aid kits, fire extinguishers, or emergency exits.
5. Preparation ensures safety, efficiency, and focus before starting tasks.

Pilot questions 3.2

1. Standard workshop procedures are the rules and routines that guide how learners use the workshop.
2. Signing in before starting work.
3. Borrowing and returning tools responsibly.
4. Waste management reduces hazards and promotes sustainability.
5. Procedures promote discipline and accountability among learners.

Pilot questions 3.3

1. Collaborative practices are shared methods of working together effectively, including teamwork, communication, and respect for resources.
2. Teamwork and role allocation prevent duplication of effort and improve efficiency.
3. Communication reduces misunderstandings and ensures tasks are completed correctly.
4. Fair use of tools, avoiding waste, and sharing workspace.
5. Collaboration is important because it builds cooperation, efficiency, and professional skills.

Pilot questions 3.4

1. Efficiency means using time, tools, and materials wisely, while productivity refers to the amount and quality of work achieved.
2. Good time management ensures projects are completed on time and reduces stress.

3. Workflow organisation improves efficiency and ensures smooth progress.
4. Measuring dimensions, inspecting joints, or checking finishing.
5. Efficiency and productivity improve accuracy, timeliness, and overall outcomes in model making.

References and Attributions [Series 3]

General References

- Glasson, J. (1978). *An Introduction to Regional Planning*. London: Hutchinson.
- Friedmann, J., & Weaver, C. (1979). *Territory and Function: The Evolution of Regional Planning*. Berkeley: University of California Press.
- Isard, W. (1960). *Methods of Regional Analysis*. Cambridge, MA: MIT Press.
- Richardson, H.W. (1972). *Regional Growth Theory*. London: Macmillan.
- UN-Habitat. (2015). *International Guidelines on Urban and Territorial Planning*. Nairobi: United Nations Human Settlements Programme.

Illustration Placeholders and Attributions

- *Figure 3.1: Organised workspace in model making*
  - AI prompt: “Create a labelled diagram showing organised benches, lighting, and ventilation in a model making workshop.”
  - Suggested OER search string: “workspace organisation benches lighting ventilation model making OER diagram.”
- *Plate 3.1: Tool and material layout in a workshop*
  - AI prompt: “Generate an image showing tools and materials arranged neatly on benches and racks for easy access.”
  - Suggested OER search string: “tool material layout workshop model making OER image.”
- *Box 3.1: Safety readiness checklist*
  - AI prompt: “Create a text box summarising safety readiness checklist for workshops: first aid kits, fire extinguishers, emergency exits.”
  - Suggested OER search string: “safety readiness checklist workshop model making OER summary.”
- *Figure 3.2: Entry and exit protocols in a workshop*
  - AI prompt: “Create a labelled diagram showing learners signing in, storing personal items, and leaving the workshop in an orderly manner.”
  - Suggested OER search string: “entry exit protocols workshop model making OER diagram.”
- *Plate 3.2: Tool usage protocols in a workshop*
  - AI prompt: “Generate an image showing learners borrowing and returning tools in a workshop setting.”
  - Suggested OER search string: “tool usage protocols workshop model making OER image.”
- *Box 3.2: Waste management practices in workshops*
  - AI prompt: “Create a text box summarising waste management practices in workshops: disposal, recycling, cleanliness.”
  - Suggested OER search string: “waste management practices workshop model making OER summary.”
- *Figure 3.3: Teamwork and role allocation in model making*

    - AI prompt: “Create a labelled diagram showing learners working together with assigned roles: cutting, assembling, finishing.”
    - Suggested OER search string: “teamwork role allocation workshop model making OER diagram.”
- *Plate 3.3: Communication in the workshop*
    - AI prompt: “Generate an image showing learners discussing tasks and giving instructions in a model making workshop.”
    - Suggested OER search string: “communication teamwork workshop model making OER image.”
- *Box 3.3: Principles of respecting shared resources*
    - AI prompt: “Create a text box summarising principles of respecting shared resources in a workshop.”
    - Suggested OER search string: “respect shared resources workshop model making OER summary.”
- *Figure 3.4: Time management in workshop practice*
    - AI prompt: “Create a labelled diagram showing a timetable for model making tasks: cutting, assembling, finishing.”
    - Suggested OER search string: “time management workshop model making OER diagram.”
- *Plate 3.4: Workflow organisation in model making*
    - AI prompt: “Generate an image showing workflow sequence in model making: cutting, assembling, finishing.”
    - Suggested OER search string: “workflow organisation model making cutting assembling finishing OER image.”
- *Box 3.4: Quality assurance checklist*
    - AI prompt: “Create a text box summarising quality assurance checklist for model making: dimensions, joints, finishing.”
    - Suggested OER search string: “quality assurance checklist workshop model making OER summary.”

Course Code: URP 306

Course Title: Planning Model making Workshop

Course Units: 2 Units

Series 1: Model Making Tools and Materials
Series 2: Use and Care of Tools in Model Making
Series 3: Workshop Practices and Procedures in Model Making
Series 4: Preparation of Three-Dimensional Planning Models
Series 5: Production of Map and Building Models

Here is the proposed outline for Series 4:

Part 4.1 Understanding Three-Dimensional Planning Models

- Definition and purpose: what 3D planning models are and why they are used.
- Types of 3D models: physical models, digital models, hybrid approaches.
- Applications in planning: visualisation, communication, and decision-making.

Part 4.2 Materials and Tools for 3D Model Preparation

- Common materials: cardboard, foam, wood, plastics, and finishing materials.
- Specialised tools: cutting, shaping, assembling, and detailing equipment.
- Criteria for material selection: durability, cost, ease of use, and aesthetics.

Part 4.3 Techniques for Constructing 3D Models

- Cutting and shaping methods: precision cutting, layering, and contouring.
- Joining and assembling methods: adhesives, clips, and modular connections.
- Finishing and detailing: painting, texturing, and adding realistic features.

Part 4.4 Presentation and Evaluation of 3D Models

- Display methods: mounting, protective casings, and exhibition setups.
- Evaluation criteria: accuracy, scale, aesthetics, and clarity of communication.
- Feedback and improvement: peer review, instructor input, and iterative refinement.

Introduction

Three-dimensional (3D) planning models are powerful tools in urban and regional planning. They transform abstract ideas, maps, and designs into tangible forms that can be seen, touched, and evaluated. These models help planners, students, and stakeholders to visualise proposals, communicate ideas clearly, and make informed decisions. Unlike two-dimensional drawings, 3D models provide depth and realism, making them invaluable for presentations, teaching, and professional practice.

The aim of this Series is to guide learners through the preparation of three-dimensional planning models. You will explore the meaning and purpose of 3D models, the materials and tools required, the techniques for constructing them, and the methods for presenting and evaluating them. By mastering these practices, you will gain confidence in producing models that are accurate, attractive, and effective in communicating planning concepts.

We shall begin by understanding what 3D planning models are, their types, and their applications. Next, we will examine the materials and tools used in their preparation. Following that, we will study techniques for constructing models, including cutting, joining, and finishing. Finally, we will consider how to present and evaluate models, focusing on display methods, evaluation criteria, and feedback for improvement.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 4.1** explain the definition, types, and applications of three-dimensional planning models,
- **SLO 4.2** identify and select appropriate materials and tools for preparing 3D models,
- **SLO 4.3** apply techniques for constructing 3D models, including cutting, joining, and finishing, and
- **SLO 4.4** demonstrate methods for presenting and evaluating 3D models effectively.

4.1 Understanding Three-Dimensional Planning Models

Three-dimensional (3D) planning models are physical or digital representations of planning concepts that provide depth, scale, and realism. They allow planners, students, and stakeholders to visualise proposals more clearly than two-dimensional drawings. By offering a tangible perspective, 3D models improve communication, support decision-making, and enhance learning.

Fill in the blank: Three-dimensional planning models provide _____, scale, and realism in representing planning concepts.

4.1.1 Definition and purpose

A **three-dimensional planning model** is a structured representation of a planning idea or design in physical or digital form. Its purpose is to make abstract concepts visible and understandable. These models help in teaching, presentations, and professional practice by bridging the gap between theory and reality.

Purpose	***Objective***	***Impact on the Planning Process***

Visualisation	*Translating 2D site plans and contours into a physical form that shows volume and scale.*	***Spatial Understanding:*** *Helps planners see the "real-world" impact of building heights, overshadowing, and topographical challenges.*
Communication	*Acting as a focal point for discussions between developers, government officials, and the public.*	***Consensus Building:*** *Simplifies complex spatial concepts for non-professionals, making it easier to explain "how the project will actually look."*
Teaching & Learning	*Providing a tactile tool for students to experiment with massing, density, and urban form.*	***Skills Development:*** *Teaches students to think in three dimensions and understand the relationship between built form and open space.*
Analytical Testing	*Simulating environmental factors like wind flow, sunlight, and drainage patterns.*	***Technical Validation:*** *Allows for physical testing (e.g., in a wind tunnel) to ensure the design is sustainable and comfortable.*

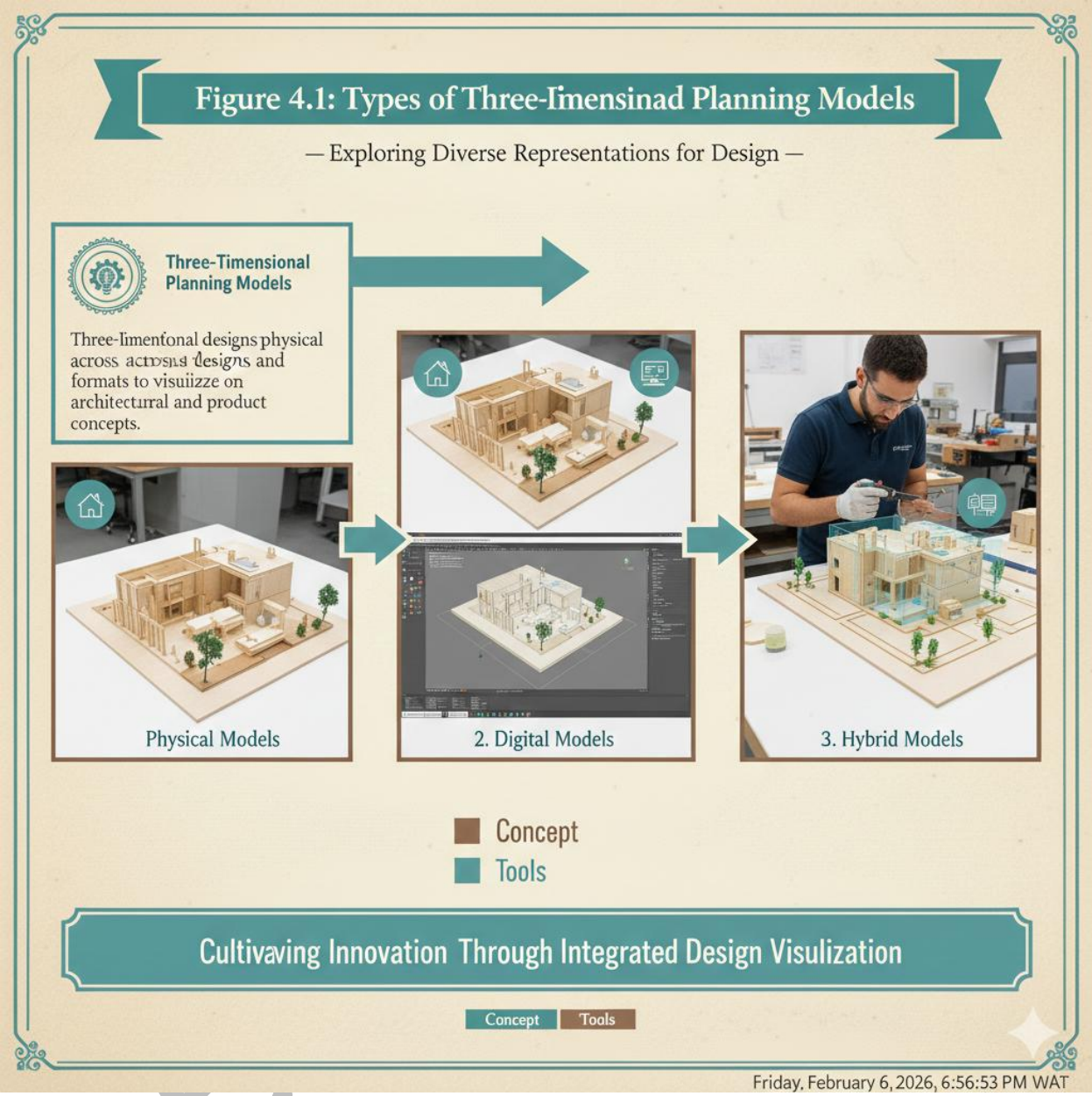
Caption: Box 4.1: Purposes of three-dimensional planning models
Short description: Text box listing purposes such as visualisation, communication, and teaching.

Fill in the blank: The purpose of a three-dimensional planning model is to make _____ concepts visible and understandable.

4.1.2 Types of 3D models

There are different types of 3D models used in planning:

- **Physical models**: built with materials such as cardboard, foam, or wood.
- **Digital models**: created using software for virtual visualisation.
- **Hybrid models**: combine physical and digital elements for enhanced presentation.



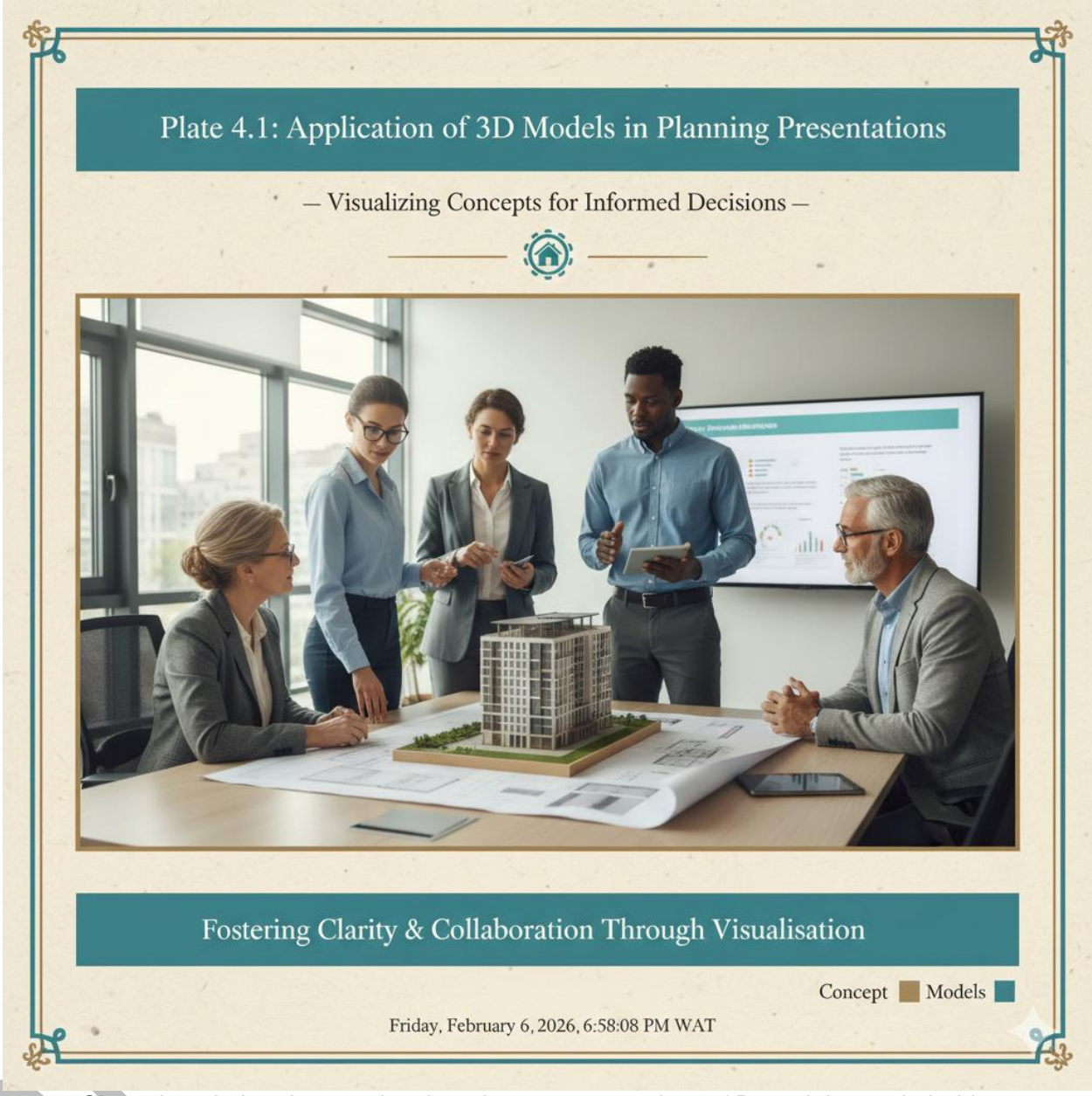
Short description: Diagram showing physical, digital, and hybrid models side by side.
Caption: Figure 4.1: Types of three-dimensional planning models

Fill in the blank: Hybrid models combine _____ and digital elements for enhanced presentation.

4.1.3 Applications in planning

Applications of 3D models in planning include:

- **Visualisation**: showing how a proposed design will look in reality.
- **Communication**: helping planners explain ideas to stakeholders.
- **Decision-making**: supporting choices by providing clear and realistic representations.



Short description: Image showing planners presenting a 3D model to stakeholders.
Caption: Plate 4.1: Application of 3D models in planning presentations

Fill in the blank: Applications of 3D models in planning include visualisation, communication, and _____.

Pilot questions 4.1

1. What is a three-dimensional planning model?

2. State one purpose of 3D planning models.
3. Mention two types of 3D models.
4. Give one application of 3D models in planning.
5. Why are 3D models more effective than two-dimensional drawings?

4.2 Materials and Tools for 3D Model Preparation

The choice of materials and tools is critical in preparing three-dimensional planning models. Materials determine durability, appearance, and cost, while tools influence precision and efficiency. Selecting the right combination ensures that models are both functional and visually appealing.

Fill in the blank: The choice of _____ and tools is critical in preparing three-dimensional planning models.

4.2.1 Common materials

Common materials used in 3D model preparation include:

- **Cardboard and paperboard**: lightweight and easy to cut.
- **Foam boards**: versatile and suitable for layering.
- **Wood**: durable and strong for structural parts.
- **Plastics**: flexible and useful for transparent or curved surfaces.
- **Finishing materials**: paints, textures, and adhesives for detail and presentation.

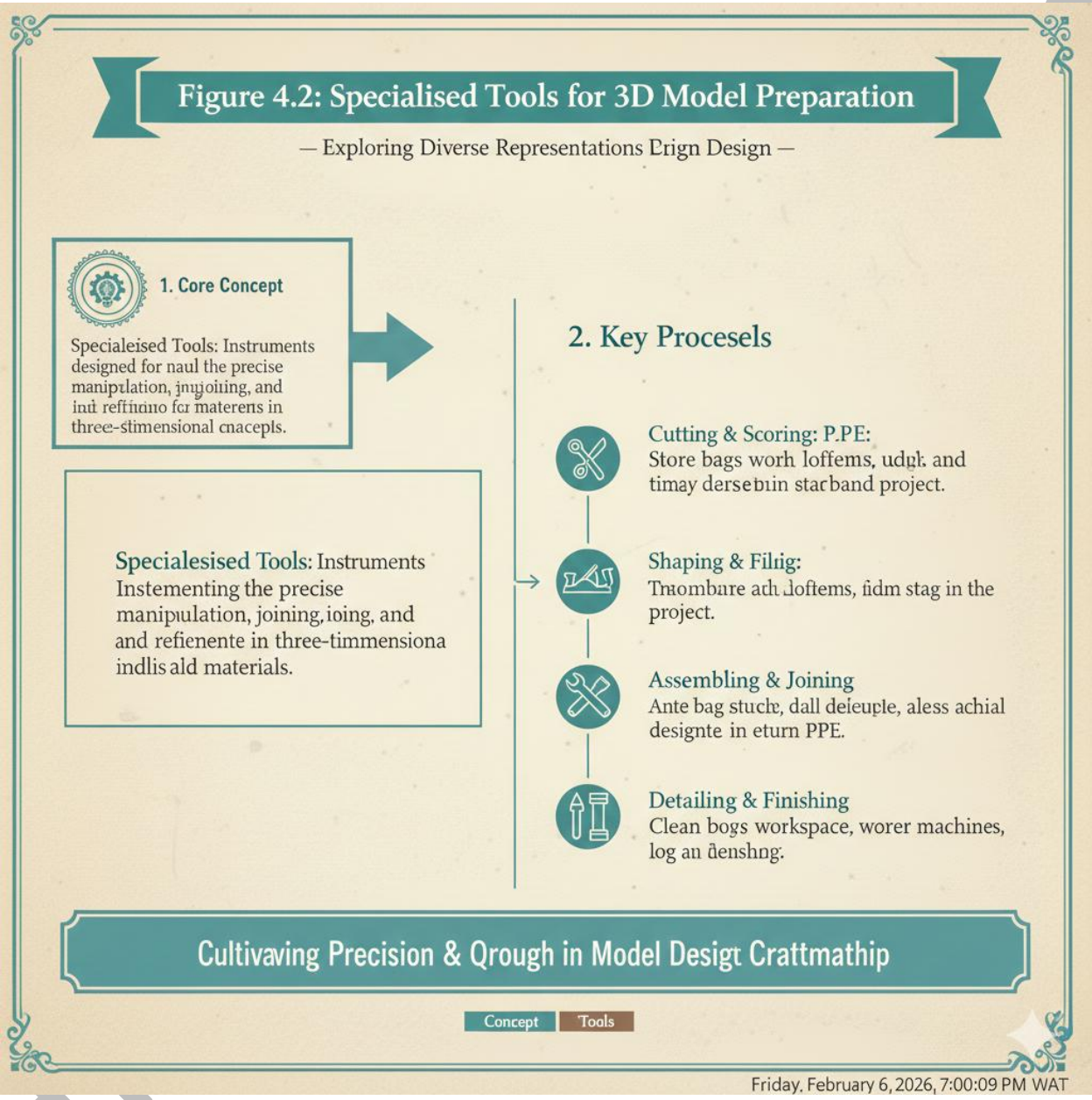
Short description: Image showing different materials (cardboard, foam, wood, plastics) arranged for model making.
Caption: Plate 4.2: Common materials for 3D model preparation

Fill in the blank: Foam boards are versatile and suitable for _____.

4.2.2 Specialised tools

Specialised tools used in 3D model preparation include:

- **Cutting tools**: knives, cutters, and saws for shaping materials.
- **Shaping tools**: files, sanders, and heat tools for refining surfaces.
- **Assembling tools**: adhesives, clips, and clamps for joining parts.
- **Detailing tools**: brushes, markers, and engraving tools for finishing touches.



Short description: Diagram showing cutting, shaping, assembling, and detailing tools.
Caption: Figure 4.2: Specialised tools for 3D model preparation

Fill in the blank: Assembling tools such as adhesives and clamps are used for _____ parts.

4.2.3 Criteria for material selection

Criteria for selecting materials include:

- **Durability**: ability to withstand handling and display.
- **Cost**: affordability for learners and institutions.
- **Ease of use**: suitability for cutting, shaping, and assembling.
- **Aesthetics**: appearance and ability to represent realistic features.

Criterion	***Key Considerations***	***Impact on Model Success***
Durability	*Resistance to warping, UV fading, and physical handling.*	***Longevity:*** *Essential for models that must travel to public consultations or sit in a planning office for years.*
Cost	*Price per sheet/unit and the cost of specialized adhesives or tools required.*	***Project Scope:*** *High-cost materials (like acrylic or hardwood) may limit the size of the model, whereas cheaper materials (card/foam) allow for larger regional coverage.*
Ease of Use	*Flexibility, cutting resistance, and drying time of compatible glues.*	***Turnaround Time:*** *Soft materials like balsa or foam-core are ideal for rapid prototyping under tight deadlines.*
Aesthetics	*Texture, color, and how the material reflects light.*	***Professionalism:*** *The material choice sets the "tone"—monochromatic white suggests high-concept design, while realistic textures suggest a final, polished proposal.*
Weight	*Portability and the structural strength of the baseboard required.*	***Logistics:*** *Large regional models made of heavy materials require specialized transport and sturdier supports.*

Caption: Box 4.2: Criteria for selecting materials in 3D model preparation
Short description: Text box listing durability, cost, ease of use, and aesthetics.

Fill in the blank: One criterion for selecting materials is _____, which refers to affordability for learners and institutions.

Pilot questions 4.2

1. Mention two common materials used in 3D model preparation.
2. State one specialised tool used for shaping surfaces.
3. What is the purpose of assembling tools?
4. Give one criterion for selecting materials.
5. Why is the choice of materials and tools critical in model preparation?

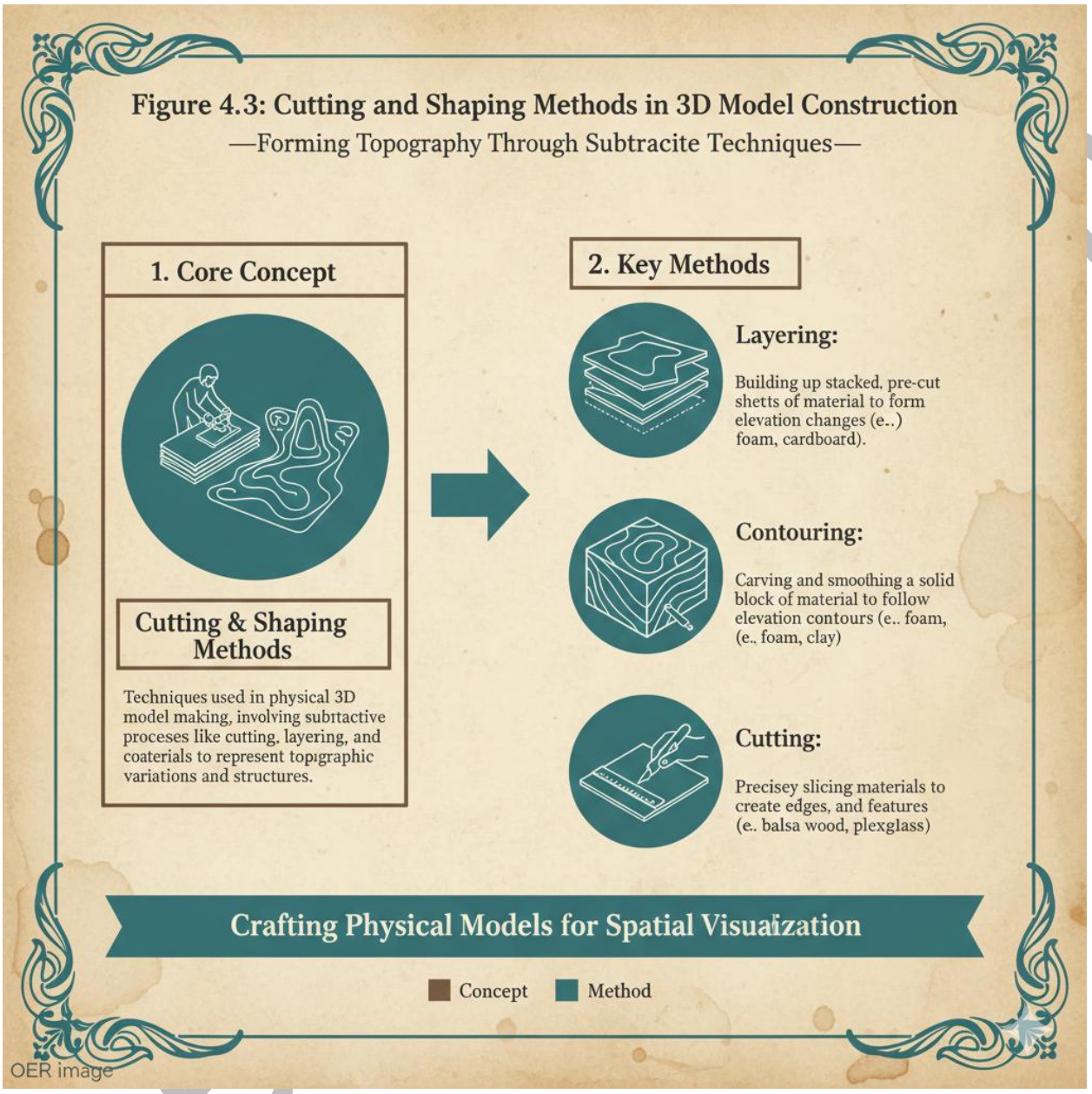
4.3 Techniques for Constructing 3D Models

Constructing three-dimensional planning models requires skill and precision. Techniques such as cutting, joining, and finishing determine the accuracy, durability, and attractiveness of the final product. Mastering these techniques ensures that models communicate planning ideas effectively.

Fill in the blank: Techniques such as cutting, joining, and finishing determine the _____, durability, and attractiveness of the final product.

4.3.1 Cutting and shaping methods

Cutting and shaping methods involve precision cutting, layering, and contouring. Learners should use sharp tools for clean edges, apply layering to represent elevation, and contour materials to show terrain or design features. Accuracy in cutting and shaping is the foundation of a well-constructed model.



Short description: Diagram showing cutting, layering, and contouring methods in model making.
Caption: Figure 4.3: Cutting and shaping methods in 3D model construction

Fill in the blank: Accuracy in cutting and shaping is the _____ of a well-constructed model.

4.3.2 Joining and assembling methods

Joining and assembling methods include the use of adhesives, clips, and modular connections. Adhesives such as glue provide strong bonds, clips allow temporary connections, and modular systems enable flexibility in design. Proper joining ensures stability and ease of handling.

Short description: Image showing learners using adhesives and clips to assemble model parts.
Caption: Plate 4.3: Joining and assembling methods in 3D model construction

Search string: "joining assembling methods three-dimensional planning models OER image."

Fill in the blank: Proper joining ensures _____ and ease of handling.

4.3.3 Finishing and detailing

Finishing and detailing involve painting, texturing, and adding realistic features. Learners may use paints for colour, textures to represent surfaces such as grass or water, and miniature features like trees or vehicles to enhance realism. Finishing makes models visually appealing and professional.

Practice	***Technique***	***Purpose in Planning***
Painting & Color Coding	*Using specific palettes for land-use (e.g., yellow for residential, blue for water).*	*Immediate visual recognition of zoning and "Spatial Logic" (Box 2.1).*
Texturing	*Applying tactile or visual "skins" (grass, asphalt, brick, corrugated metal).*	*Differentiating between "Permeable Surfaces" (Box 2.4) and hard infrastructure.*
Realistic Features	*Adding scale figures (people, cars), streetlights, and indigenous trees.*	*Providing a "Human Scale" and showing the functionality of "Public Spaces."*
Weathering & Detailing	*Adding shadows, grime, or "lived-in" details to digital or physical models.*	*Creating a "Postmodern Reality" (Box 3.2) that looks achievable rather than utopian.*

Caption: Box 4.3: Finishing and detailing practices
Short description: Text box listing practices such as painting, texturing, and adding realistic features.

Fill in the blank: Finishing makes models visually _____ and professional.

Pilot questions 4.3

1. What are cutting and shaping methods in 3D model construction?
2. State one joining method used in assembling models.
3. Mention one purpose of adhesives in model making.
4. Give one example of finishing or detailing practice.
5. Why are construction techniques important in preparing 3D models?

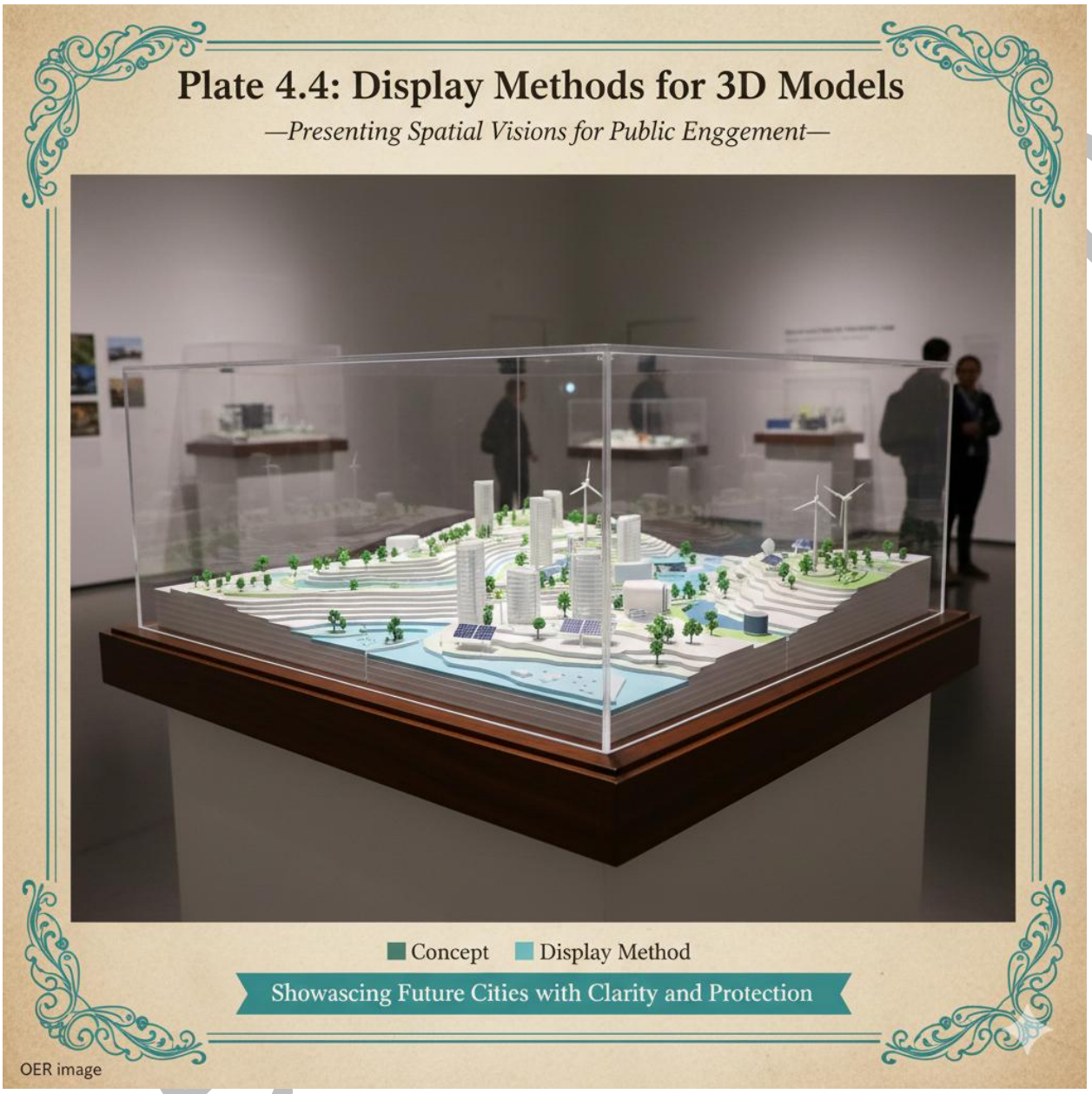
4.4 Presentation and Evaluation of 3D Models

The final stage in preparing three-dimensional planning models is their presentation and evaluation. A well-constructed model must be displayed effectively, assessed against clear criteria, and refined based on feedback. This ensures that the model communicates planning ideas accurately and professionally.

Fill in the blank: The final stage in preparing 3D models is their _____ and evaluation.

4.4.1 Display methods

Display methods include mounting models on bases, using protective casings, and arranging exhibition setups. Mounting provides stability, casings protect against dust and damage, and exhibitions allow models to be viewed by larger audiences. Proper display enhances the visibility and durability of models.



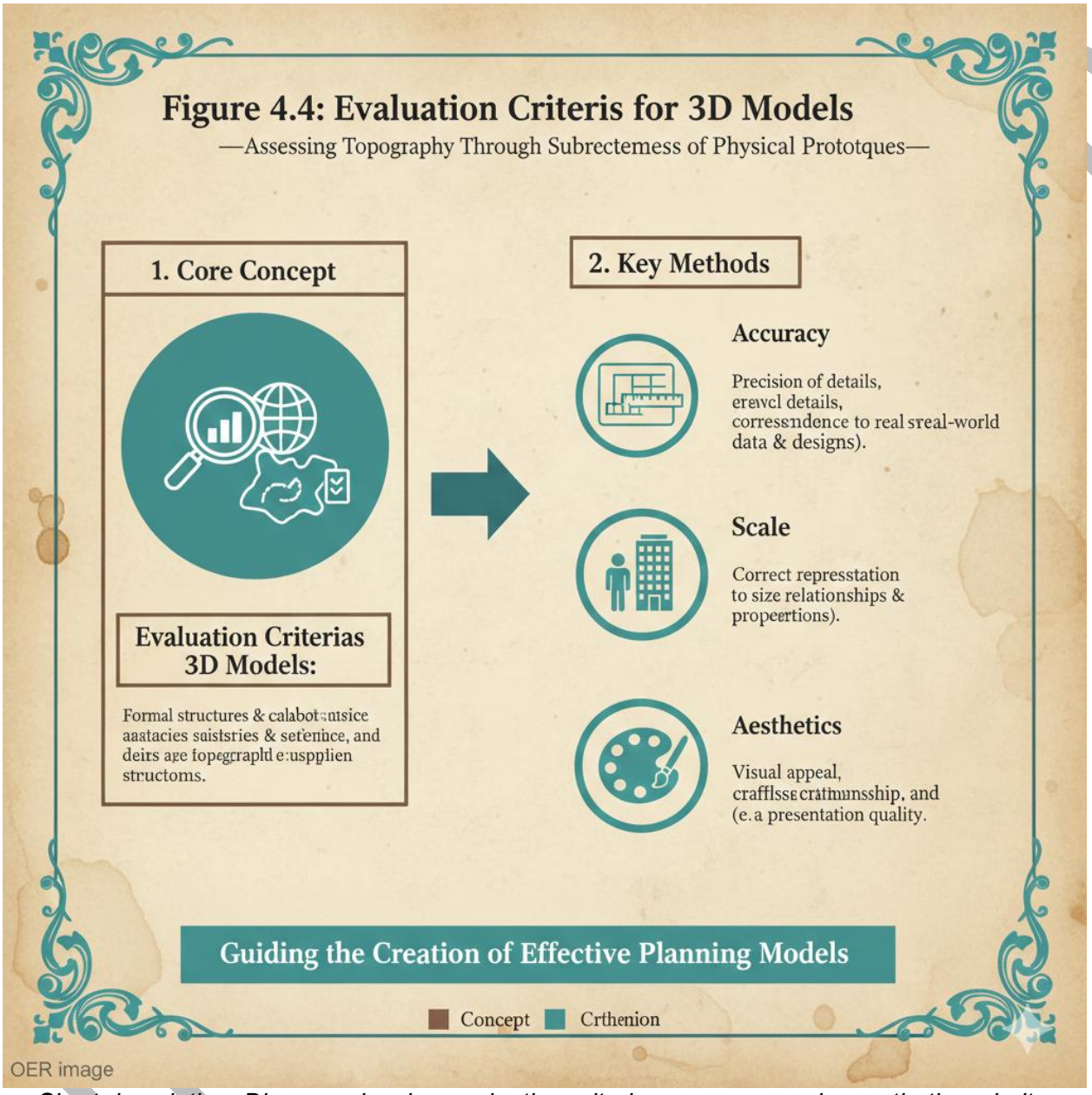
Short description: Image showing a 3D model mounted on a base with protective casing.
Caption: Plate 4.4: Display methods for 3D models

Fill in the blank: Proper display enhances the _____ and durability of models.

4.4.2 Evaluation criteria

Evaluation criteria include accuracy, scale, aesthetics, and clarity of communication. Accuracy ensures the model reflects real dimensions, scale maintains proportion, aesthetics improve

visual appeal, and clarity ensures ideas are communicated effectively. These criteria guide both learners and instructors in assessing quality.



Short description: Diagram showing evaluation criteria: accuracy, scale, aesthetics, clarity.
Caption: Figure 4.4: Evaluation criteria for 3D models

Fill in the blank: Evaluation criteria include accuracy, scale, _____, and clarity of communication.

4.4.3 Feedback and improvement

Feedback and improvement involve peer review, instructor input, and iterative refinement. Learners should present models for critique, accept constructive comments, and make

necessary adjustments. This process strengthens skills and ensures models meet professional standards.

Practice	*Mechanism*	*Benefit to the Planning Process*
Peer Review	*Evaluation by fellow surveyors or urban designers.*	*Detects technical errors in topography, scale, and "Spatial Logic."*
Instructor/Expert Input	*Guidance from senior planners or specialized consultants.*	*Aligns the model with statutory building codes and "Regional Objectives" (Box 1.1).*
Iterative Refinement	*Continuous cycles of testing, adjusting, and re-modeling.*	*Allows for the "Fine-Tuning" of details like drainage flow and sunlight exposure.*
Stakeholder Validation	*Presenting the model to the community for critique.*	*Identifies "Social Gaps" (e.g., missed traditional paths or vital market spaces).*

Caption: Box 4.4: Feedback and improvement practices
Short description: Text box listing practices such as peer review, instructor input, and iterative refinement.

Fill in the blank: Feedback and improvement involve peer review, instructor input, and _____ refinement.

Pilot questions 4.4

1. What is the final stage in preparing 3D models?
2. State one display method used for 3D models.
3. Mention two evaluation criteria for assessing models.
4. Give one example of feedback practice in model preparation.
5. Why is evaluation important in 3D model making?

Series Summary

This Series has explored the preparation of three-dimensional planning models, focusing on their definition, materials, construction techniques, and presentation. The purpose was to equip learners with the knowledge and skills required to transform abstract planning concepts into tangible, realistic representations.

We began by understanding what 3D planning models are, their types (physical, digital, and hybrid), and their applications in visualisation, communication, and decision-making. Next, we examined the materials and tools used in model preparation, including criteria for selecting the most suitable options. Following that, we studied techniques for constructing models, such as cutting, joining, and finishing. Finally, we considered how to present and evaluate models, highlighting display methods, evaluation criteria, and feedback practices.

By completing this Series, you should now be able to explain the definition, types, and applications of 3D models, identify and select appropriate materials and tools, apply construction techniques, and demonstrate effective methods for presenting and evaluating models.

Glossary of Terms

- **3D planning model**: A physical or digital representation of planning concepts with depth, scale, and realism.
- **Applications**: Uses of 3D models in visualisation, communication, and decision-making.
- **Cardboard**: Lightweight material commonly used in model making.
- **Foam board**: Versatile material suitable for layering and contouring.
- **Cutting and shaping methods**: Techniques such as precision cutting, layering, and contouring.
- **Joining methods**: Ways of assembling models using adhesives, clips, or modular connections.
- **Finishing and detailing**: Practices such as painting, texturing, and adding realistic features.
- **Display methods**: Techniques for presenting models, including mounting and protective casings.
- **Evaluation criteria**: Standards for assessing models, including accuracy, scale, aesthetics, and clarity.
- **Feedback and improvement**: Practices involving peer review, instructor input, and iterative refinement.

Concept Check Questions [Series 4]

Objective Questions

1. Three-dimensional planning models provide _____, scale, and realism in representing planning concepts. *(Linked to SLO 4.1)*

Which of the following is a common material used in 3D model preparation? *(Linked to SLO 4.2)*
a) Foam board
b) Steel beams
c) Concrete blocks

2. d) Glass panels
3. Accuracy in cutting and shaping is the _____ of a well-constructed model. *(Linked to SLO 4.3)*
4. Proper display enhances the _____ and durability of models. *(Linked to SLO 4.4)*
5. Evaluation criteria include accuracy, scale, aesthetics, and _____. *(Linked to SLO 4.4)*

Short-Answer Questions

6. Define a three-dimensional planning model and state its purpose. *(Linked to SLO 4.1)*
7. Mention two common materials used in 3D model preparation. *(Linked to SLO 4.2)*
8. State one specialised tool used for shaping surfaces in model making. *(Linked to SLO 4.2)*
9. Give one example of a finishing or detailing practice in 3D model construction. *(Linked to SLO 4.3)*
10. What is the importance of feedback and improvement in model evaluation? *(Linked to SLO 4.4)*

Long-Answer Questions

11. Explain the types of three-dimensional planning models and their applications in planning. *(Linked to SLO 4.1)*
    - **Basic response**: Learners should describe physical, digital, and hybrid models and their uses.
    - **Value-added response**: Outstanding learners may analyse how each type enhances communication, decision-making, and professional practice.
12. Discuss the materials and tools used in preparing 3D models, including criteria for selection. *(Linked to SLO 4.2)*
    - **Basic response**: Learners should list common materials, specialised tools, and selection criteria.
    - **Value-added response**: Outstanding learners may evaluate how material and tool choices affect durability, cost, and aesthetics in professional contexts.
13. Describe techniques for constructing 3D models, focusing on cutting, joining, and finishing. *(Linked to SLO 4.3)*
    - **Basic response**: Learners should explain each technique and its role in construction.
    - **Value-added response**: Outstanding learners may assess how precision and detailing contribute to professional standards and stakeholder engagement.

14. Evaluate methods for presenting and assessing 3D models, including display, evaluation criteria, and feedback. *(Linked to SLO 4.4)*

- **Basic response**: Learners should outline display methods, criteria, and feedback practices.
- **Value-added response**: Outstanding learners may analyse how effective presentation and evaluation improve communication, learning, and iterative design.

Answers to Concept Check Questions [Series 4]

Objective Questions

1. Depth.
2. a) Foam board.
3. Foundation.
4. Visibility.
5. Clarity of communication.

Short-Answer Questions

6. A three-dimensional planning model is a physical or digital representation of planning concepts. Its purpose is to make abstract ideas visible and understandable.
7. Cardboard and foam boards.
8. A sander or file.
9. Painting or texturing.
10. Feedback and improvement help learners refine models, meet standards, and strengthen skills.

Long-Answer Questions

11.

- **Basic response**: Physical models are built with materials like cardboard and foam; digital models are created using software; hybrid models combine both. Applications include visualisation, communication, and decision-making.
- **Value-added response**: Outstanding learners may analyse how physical models aid tactile understanding, digital models allow simulations, and hybrid models enhance presentations by combining realism and flexibility.

12.

- **Basic response**: Materials include cardboard, foam, wood, and plastics; tools include cutters, sanders, adhesives, and brushes. Criteria for selection include durability, cost, ease of use, and aesthetics.
- **Value-added response**: Outstanding learners may evaluate how material and tool choices influence sustainability, professional presentation, and long-term usability of models.

13.

- **Basic response**: Cutting and shaping methods involve precision cutting, layering, and contouring; joining methods include adhesives and clips; finishing involves painting, texturing, and adding realistic features.
- **Value-added response**: Outstanding learners may assess how precision cutting ensures accuracy, joining methods provide stability, and finishing enhances realism and professional appeal.

14.

- **Basic response**: Presentation methods include mounting and protective casings; evaluation criteria include accuracy, scale, aesthetics, and clarity; feedback involves peer review and instructor input.
- **Value-added response**: Outstanding learners may analyse how effective presentation improves communication with stakeholders, evaluation ensures quality, and feedback fosters iterative design and professional growth.

Answers to Pilot Questions [Series 4]

Pilot questions 4.1

1. A three-dimensional planning model is a physical or digital representation of planning concepts with depth, scale, and realism.
2. One purpose of 3D planning models is visualisation of planning ideas.
3. Physical and digital models.
4. Visualisation, communication, or decision-making.
5. Because they provide depth and realism, making ideas clearer than two-dimensional drawings.

Pilot questions 4.2

1. Cardboard and foam boards.
2. A sander or file.
3. Assembling tools are used for joining parts together.
4. Durability, cost, ease of use, or aesthetics.
5. Because they determine durability, precision, and appearance of the model.

Pilot questions 4.3

1. Cutting and shaping methods involve precision cutting, layering, and contouring to form model parts.
2. Adhesives or clips.
3. Adhesives provide strong bonds between parts.
4. Painting, texturing, or adding realistic features.
5. They ensure accuracy, stability, and professional appearance of models.

Pilot questions 4.4

1. Presentation and evaluation.

2. Mounting on bases or using protective casings.
3. Accuracy, scale, aesthetics, and clarity of communication.
4. Peer review or instructor input.
5. Evaluation ensures models meet standards and communicate ideas effectively.

References and Attributions [Series 4]

General References

- Ching, F. D. K. (2015). *Architecture: Form, Space, and Order*. Hoboken: Wiley.
- UN-Habitat. (2015). *International Guidelines on Urban and Territorial Planning*. Nairobi: United Nations Human Settlements Programme.
- Hamid, S. (2018). *Model Making for Architects*. London: Laurence King Publishing.
- Isard, W. (1960). *Methods of Regional Analysis*. Cambridge, MA: MIT Press.

Illustration Placeholders and Attributions

- *Box 4.1: Purposes of three-dimensional planning models*
  - AI prompt: “Create a text box summarising purposes of three-dimensional planning models: visualisation, communication, teaching.”
  - Suggested OER search string: “purposes three-dimensional planning models OER summary.”
- *Figure 4.1: Types of three-dimensional planning models*
  - AI prompt: “Create a labelled diagram showing physical, digital, and hybrid planning models side by side.”
  - Suggested OER search string: “types three-dimensional planning models physical digital hybrid OER diagram.”
- *Plate 4.1: Application of 3D models in planning presentations*
  - AI prompt: “Generate an image showing planners presenting a three-dimensional model to stakeholders in a meeting.”
  - Suggested OER search string: “application three-dimensional planning models presentation stakeholders OER image.”
- *Plate 4.2: Common materials for 3D model preparation*
  - AI prompt: “Generate an image showing cardboard, foam boards, wood, and plastics arranged for model making.”
  - Suggested OER search string: “common materials three-dimensional planning models cardboard foam wood plastics OER image.”
- *Figure 4.2: Specialised tools for 3D model preparation*
  - AI prompt: “Create a labelled diagram showing cutting, shaping, assembling, and detailing tools for 3D model preparation.”
  - Suggested OER search string: “specialised tools three-dimensional planning models cutting shaping assembling detailing OER diagram.”
- *Box 4.2: Criteria for selecting materials in 3D model preparation*
  - AI prompt: “Create a text box summarising criteria for selecting materials in 3D model preparation: durability, cost, ease of use, aesthetics.”
  - Suggested OER search string: “criteria selecting materials three-dimensional planning models OER summary.”
- *Figure 4.3: Cutting and shaping methods in 3D model construction*
  - AI prompt: “Create a labelled diagram showing cutting, layering, and contouring methods in 3D model construction.”

    - Suggested OER search string: “cutting shaping methods three-dimensional planning models OER diagram.”
- *Plate 4.3: Joining and assembling methods in 3D model construction*
    - AI prompt: “Generate an image showing learners using adhesives and clips to assemble parts of a 3D model.”
    - Suggested OER search string: “joining assembling methods three-dimensional planning models OER image.”
- *Box 4.3: Finishing and detailing practices*
    - AI prompt: “Create a text box summarising finishing and detailing practices in 3D model construction: painting, texturing, adding features.”
    - Suggested OER search string: “finishing detailing practices three-dimensional planning models OER summary.”
- *Plate 4.4: Display methods for 3D models*
    - AI prompt: “Generate an image showing a 3D planning model mounted on a base with protective casing for exhibition.”
    - Suggested OER search string: “display methods three-dimensional planning models exhibition casing OER image.”
- *Figure 4.4: Evaluation criteria for 3D models*
    - AI prompt: “Create a labelled diagram showing evaluation criteria for 3D models: accuracy, scale, aesthetics, clarity.”
    - Suggested OER search string: “evaluation criteria three-dimensional planning models OER diagram.”
- *Box 4.4: Feedback and improvement practices*
    - AI prompt: “Create a text box summarising feedback and improvement practices in 3D model preparation.”
    - Suggested OER search string: “feedback improvement three-dimensional planning models OER summary.”

Course Code: URP 306

Course Title: Planning Model making Workshop

Course Units: 2 Units

Series 1: Model Making Tools and Materials
Series 2: Use and Care of Tools in Model Making
Series 3: Workshop Practices and Procedures in Model Making
Series 4: Preparation of Three-Dimensional Planning Models
Series 5: Production of Map and Building Models

Here is the proposed outline for Series 5:

Part 5.1 Preparation for Map and Building Model Production

- Understanding scale and proportion: importance of accurate scaling in maps and buildings.
- Selection of base materials: cardboard, foam, wood, and plastics.

- Gathering reference data: maps, plans, and architectural drawings.

Part 5.2 Techniques for Producing Map Models

- Base preparation: cutting and shaping the map surface.
- Representation of features: roads, rivers, contours, and land use.
- Labelling and finishing: adding names, symbols, and colour coding.

Part 5.3 Techniques for Producing Building Models

- Structural framework: walls, floors, and roofs.
- Detailing and finishing: windows, doors, textures, and paint.
- Integration with site plans: placing buildings within map or landscape models.

Part 5.4 Presentation and Evaluation of Map and Building Models

- Display methods: mounting, casing, and exhibition setups.
- Evaluation criteria: accuracy, aesthetics, clarity, and durability.
- Feedback and improvement: peer review, instructor input, and refinement.

Introduction

Maps and building models are essential components of planning model making. They provide tangible representations of spatial layouts, land use, and architectural designs, allowing planners, students, and stakeholders to visualise and evaluate planning concepts more effectively. Map models highlight geographical features and spatial relationships, while building models showcase structural details and design aesthetics. Together, they bridge the gap between abstract plans and real-world understanding.

The aim of this Series is to guide learners through the production of map and building models. You will learn how to prepare for production, apply techniques for creating map models, construct building models, and present and evaluate the finished products. These skills are vital for communicating planning ideas clearly and professionally.

We shall begin by examining preparation for map and building model production, including scale, materials, and reference data. Next, we will explore techniques for producing map models, focusing on base preparation, feature representation, and finishing. Following that, we will study techniques for producing building models, including structural framework, detailing, and integration with site plans. Finally, we will consider presentation and evaluation, highlighting display methods, evaluation criteria, and feedback practices.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 5.1** explain preparation steps for producing map and building models, including scale, materials, and reference data,
- **SLO 5.2** apply techniques for producing map models, including base preparation, feature representation, and finishing,
- **SLO 5.3** construct building models using structural frameworks, detailing, and integration with site plans, and
- **SLO 5.4** demonstrate methods for presenting and evaluating map and building models effectively.

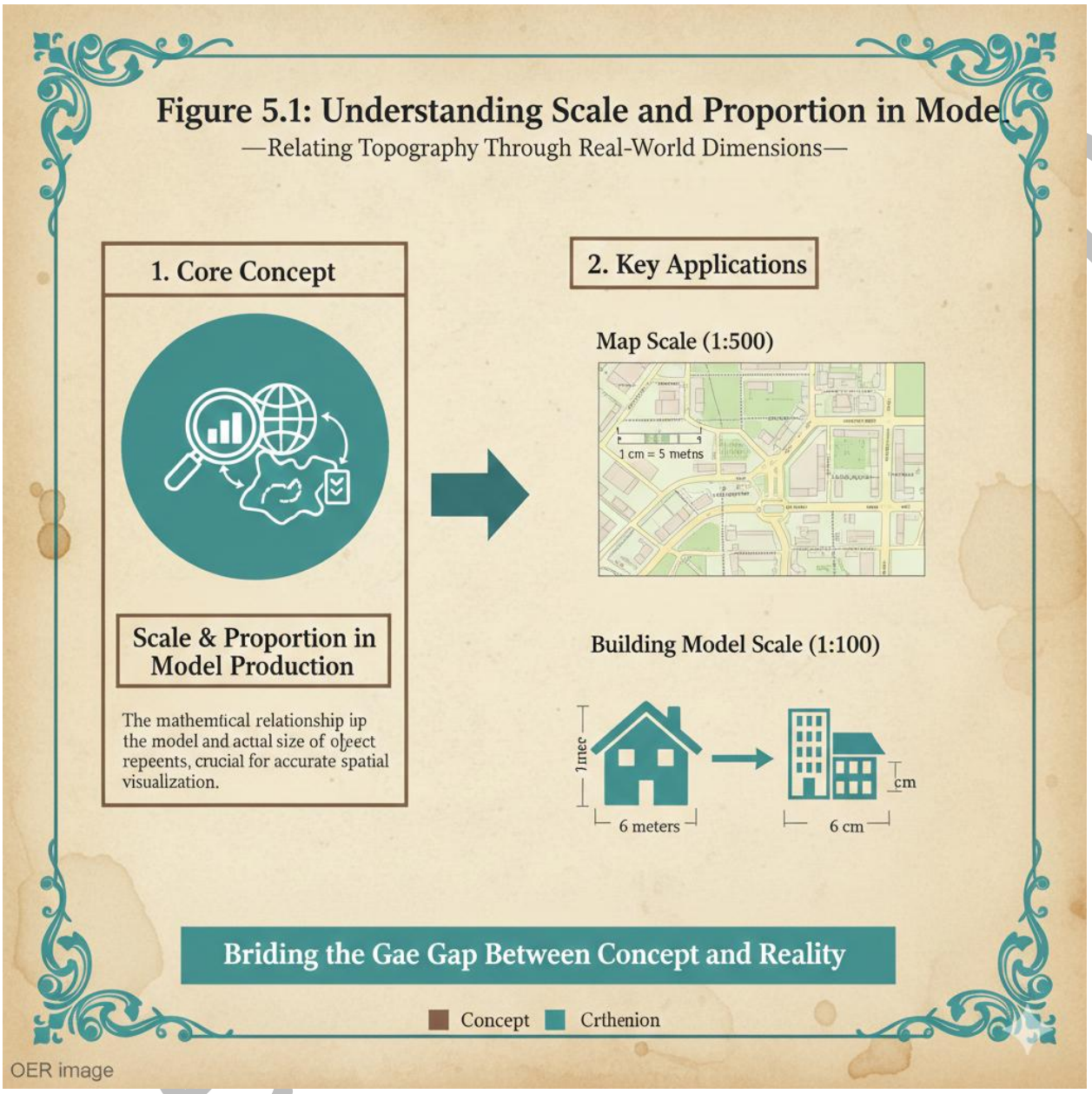
5.1 Preparation for Map and Building Model Production

Preparation is the foundation of producing accurate and professional map and building models. It involves understanding scale and proportion, selecting appropriate base materials, and gathering reliable reference data. Without proper preparation, models may lack accuracy, durability, or clarity.

Fill in the blank: Preparation is the _____ of producing accurate and professional map and building models.

5.1.1 Understanding scale and proportion

Scale and proportion ensure that models represent real-world dimensions accurately. Learners must calculate scale ratios (e.g., 1:100, 1:500) and apply them consistently. Proportion ensures that features such as roads, buildings, and landscapes are represented in correct relation to one another.



Short description: Diagram showing scale ratios applied to a map and building model.
Caption: Figure 5.1: Understanding scale and proportion in model production

Fill in the blank: Scale and proportion ensure that models represent _____ dimensions accurately.

5.1.2 Selection of base materials

Base materials provide the foundation for map and building models. Common options include cardboard, foam boards, wood, and plastics. The choice depends on durability, cost, and ease of handling. Strong bases prevent warping and ensure stability during construction and display.

Short description: Image showing cardboard, foam boards, and wood used as base materials.
Caption: Plate 5.1: Base materials for map and building models

Fill in the blank: Strong bases prevent _____ and ensure stability during construction and display.

5.1.3 Gathering reference data

Reference data includes maps, plans, and architectural drawings. Learners should obtain accurate sources from planning authorities, survey records, or design documents. Reliable data ensures that models reflect real features and designs, avoiding errors in representation.

Data Source	***Type of Information Provided***	***Application in Modeling***
Planning Authorities	*Master plans, zoning regulations, and land-use maps.*	*Establishing the "legal envelope" and permissible building heights.*
Survey Records	*Cadastral maps, Topographic surveys, and GIS coordinates.*	*Creating the "Digital Terrain Model" (DTM) and plot boundaries.*
Architectural Drawings	*Floor plans, sections, and detailed building elevations.*	*Ensuring accurate "texturing" and 3D volume of individual structures.*
Utility Agencies	*Water, sewage, and power line layouts.*	*Integrating "invisible" infrastructure into the subterranean model layers.*
Satellite & Drone Data	*Orthophotos and LiDAR point clouds.*	*Providing the current "as-built" reality of informal structures and vegetation.*

Caption: Box 5.1: Sources of reference data for model production
Short description: Text box listing sources such as planning authorities, survey records, and architectural drawings.

Fill in the blank: Reliable reference data ensures that models reflect real _____ and designs.

Pilot questions 5.1

1. Why is preparation important in producing map and building models?
2. State one purpose of scale and proportion.

3. Mention two base materials used in model production.
4. Give one source of reference data.
5. How does reliable reference data improve model accuracy?

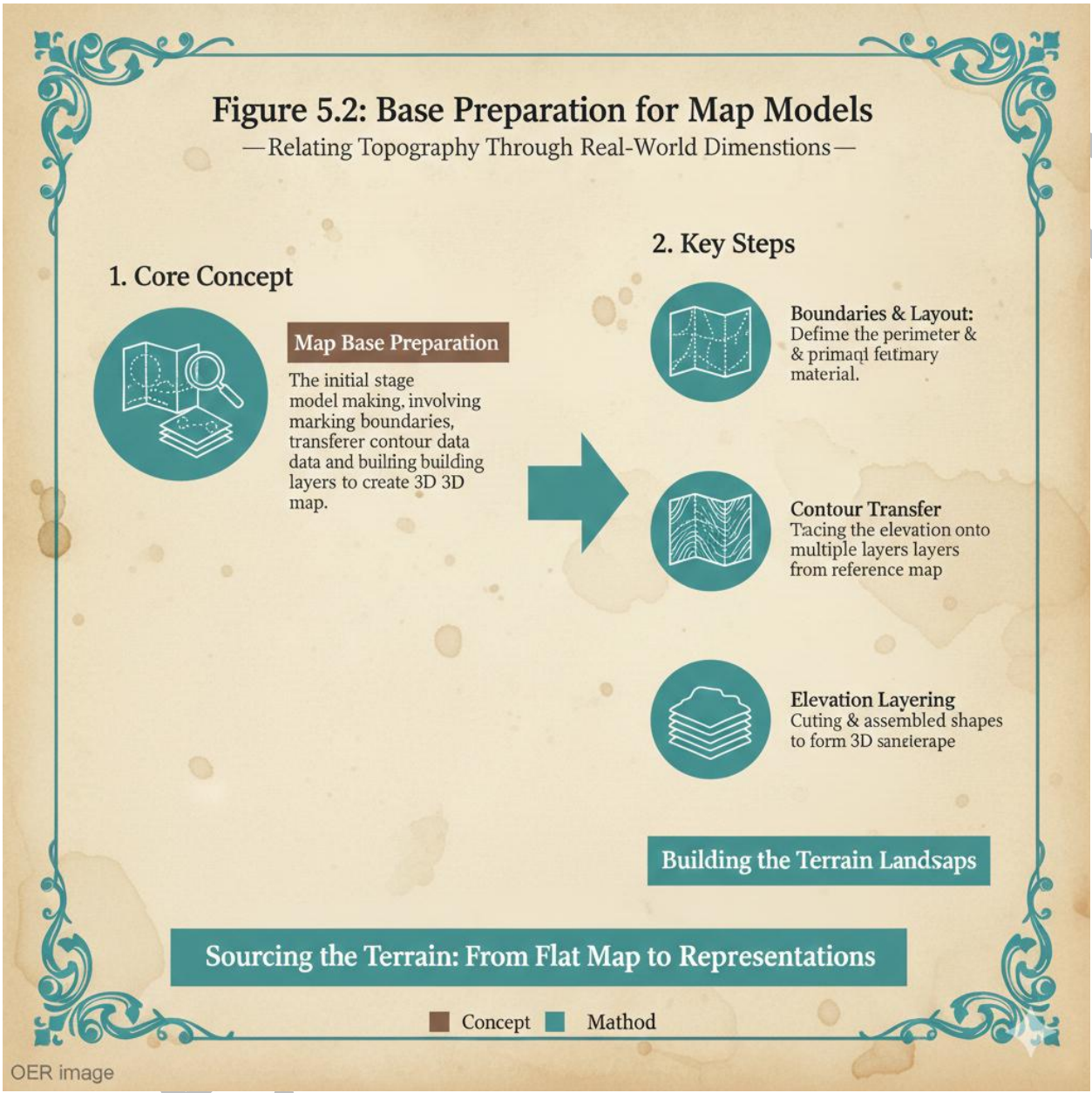
5.2 Techniques for Producing Map Models

Producing map models requires careful preparation and accurate representation of geographical features. Techniques include preparing the base, representing features such as roads and rivers, and adding labels and finishing touches. These steps ensure that map models are clear, informative, and visually appealing.

Fill in the blank: Producing map models requires careful preparation and accurate representation of _____ features.

5.2.1 Base preparation

Base preparation involves cutting and shaping the surface of the map model. Learners should mark boundaries, cut materials to scale, and prepare layers for contours or elevation. A well-prepared base provides the foundation for accurate feature placement.

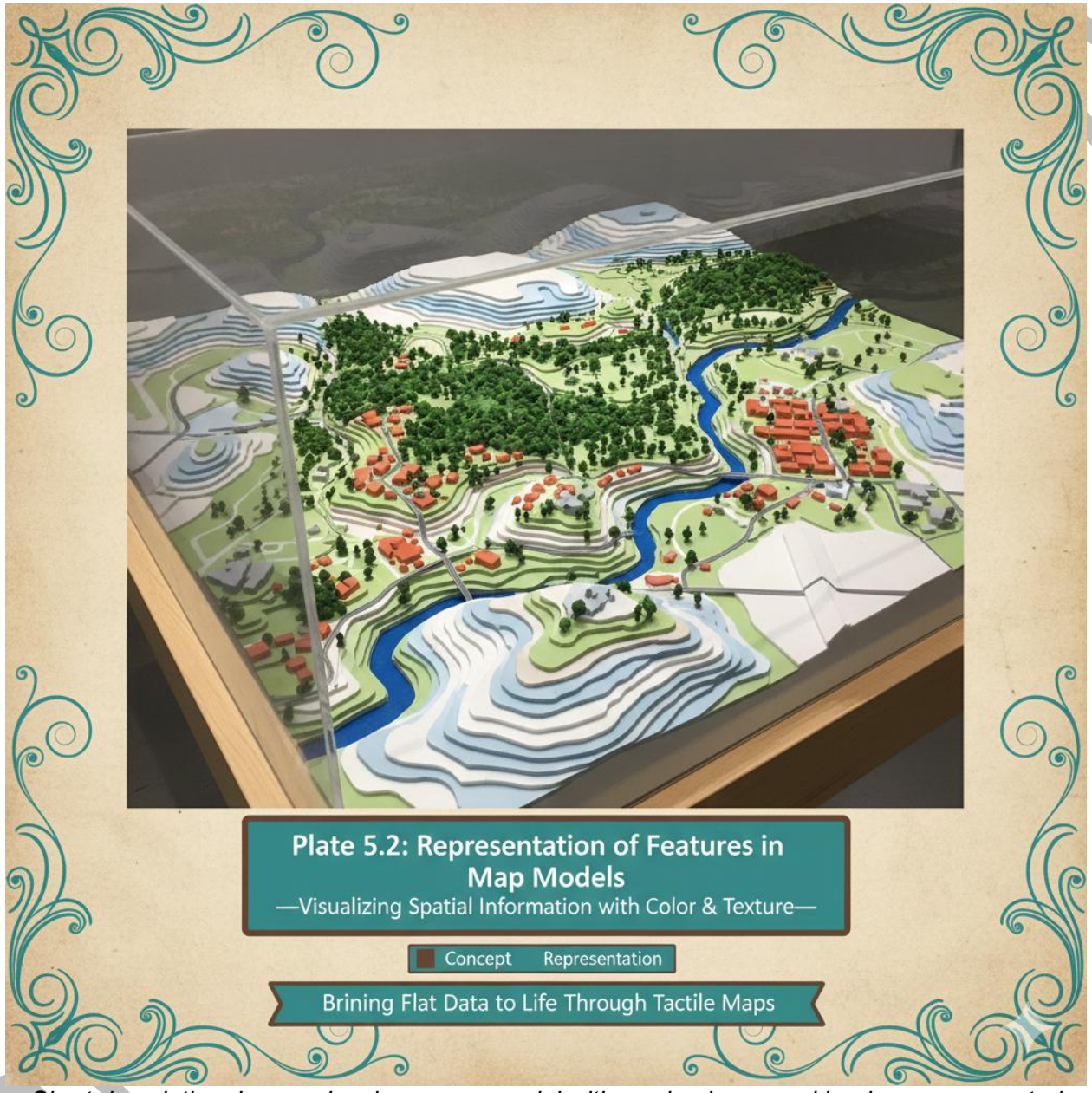


Short description: Diagram showing base preparation with boundaries, contours, and elevation layers.
Caption: Figure 5.2: Base preparation for map models

Fill in the blank: A well-prepared base provides the _____ for accurate feature placement.

5.2.2 Representation of features

Representation of features includes roads, rivers, contours, and land use. Learners should use colour coding, textures, and symbols to differentiate features. Accuracy in representation ensures that the map model communicates spatial relationships effectively.



Short description: Image showing a map model with roads, rivers, and land use represented using colours and textures.
Caption: Plate 5.2: Representation of features in map models

Fill in the blank: Accuracy in representation ensures that the map model communicates _____ relationships effectively.

5.2.3 Labelling and finishing

Labelling and finishing involve adding names, symbols, and colour coding to improve clarity. Labels identify features, symbols provide quick recognition, and finishing enhances visual appeal. These practices make map models professional and easy to interpret.

Practice	***Technique***	***Function in Urban Planning***
Annotative Labelling	*Placing names of streets, landmarks, and owners directly on the model.*	*Identifying "Sense of Place" and ensuring accurate property recognition.*
Standardized Symbols	*Using 2D or 3D icons for hospitals, schools, and utilities (e.g., North Arrow).*	*Providing a universal "Legend" that transcends language barriers.*
Functional Color Coding	*Applying distinct hues for different zones (e.g., Purple for Industry, Yellow for Housing).*	*Highlighting the **Spatial Logic** and functional segregation of the site.*
Scale & Orientation	*Including a visible scale bar and a North Point icon.*	*Ensuring the model can be used for precise measurements and site orientation.*

Caption: Box 5.2: Labelling and finishing practices in map models
Short description: Text box listing practices such as adding names, symbols, and colour coding.

Fill in the blank: Labelling and finishing make map models _____ and easy to interpret.

Pilot questions 5.2

1. What is base preparation in map model production?
2. State one feature represented in map models.
3. Mention one method used to differentiate features.
4. Give one purpose of labelling in map models.
5. Why is accuracy important in representing features?

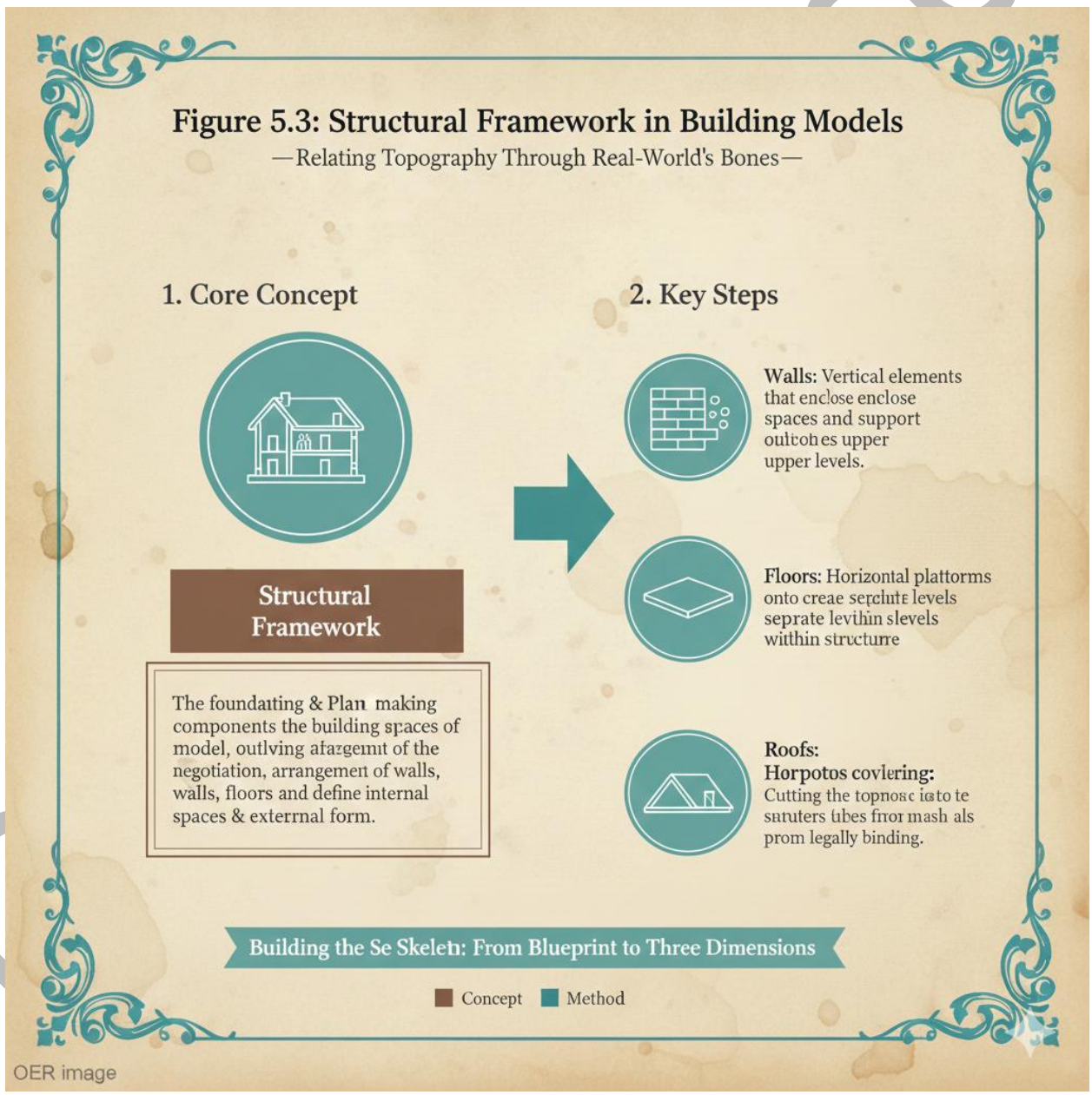
5.3 Techniques for Producing Building Models

Building models are miniature representations of architectural designs. They help learners and planners visualise structures, understand spatial relationships, and communicate design ideas effectively. Techniques for producing building models include creating structural frameworks, adding details and finishes, and integrating buildings with site plans.

Fill in the blank: Building models are miniature representations of _____ designs.

5.3.1 Structural framework

Structural framework involves constructing the basic skeleton of the building, including walls, floors, and roofs. Learners should use durable materials and precise measurements to ensure stability. A strong framework provides the foundation for adding details and finishing.



Short description: Diagram showing structural framework with walls, floors, and roofs.

Caption: Figure 5.3: Structural framework in building models

Fill in the blank: A strong framework provides the _____ for adding details and finishing.

5.3.2 Detailing and finishing

Detailing and finishing involve adding windows, doors, textures, and paint. These elements make the building model realistic and visually appealing. Learners should ensure neatness and accuracy in detailing to reflect professional standards.

Short description: Image showing a building model with windows, doors, and painted surfaces.
Caption: Plate 5.3: Detailing and finishing in building models

Fill in the blank: Detailing and finishing make building models _____ and visually appealing.

5.3.3 Integration with site plans

Integration with site plans involves placing building models within map or landscape models. This shows how structures relate to surrounding features such as roads, open spaces, and other buildings. Integration enhances realism and helps in evaluating spatial relationships.

Integration Practice	Technical Action	Planning Value
Positioning	*Placing 3D building masses accurately within surveyed plot boundaries.*	*Ensuring compliance with legal setbacks and preventing encroachment.*
Road Alignment	*Orienting building entrances and garages to the primary and secondary road networks.*	*Optimizing traffic flow and ensuring "Active Frontages" for street safety.*
Open Space Provision	*Mapping the "Void" between buildings for parks, courtyards, and easements.*	*Enhancing "Micro-climates" (Box 2.2) and providing communal breathing space.*
Topographic Fitting	*Adjusting building "Finished Floor Levels" (FFL) to the natural slope of the land.*	*Minimizing excavation costs and preventing localized flooding.*

Caption: Box 5.3: Integration of building models with site plans
Short description: Text box listing practices such as positioning buildings, aligning with roads, and showing open spaces.

Fill in the blank: Integration with site plans enhances _____ and helps in evaluating spatial relationships.

Pilot questions 5.3

1. What is structural framework in building model production?
2. State one element added during detailing and finishing.
3. Why is neatness important in detailing?
4. Mention one purpose of integrating building models with site plans.
5. How do building models help in visualising architectural designs?

5.4 Presentation and Evaluation of Map and Building Models

The final stage in producing map and building models is their presentation and evaluation. A well-prepared model must be displayed effectively, assessed against clear criteria, and refined based on feedback. This ensures that the models communicate planning ideas accurately and professionally.

Fill in the blank: The final stage in producing map and building models is their _____ and evaluation.

5.4.1 Display methods

Display methods include mounting models on bases, using protective casings, and arranging exhibition setups. Mounting provides stability, casings protect against dust and damage, and exhibitions allow models to be viewed by larger audiences. Proper display enhances visibility and durability.

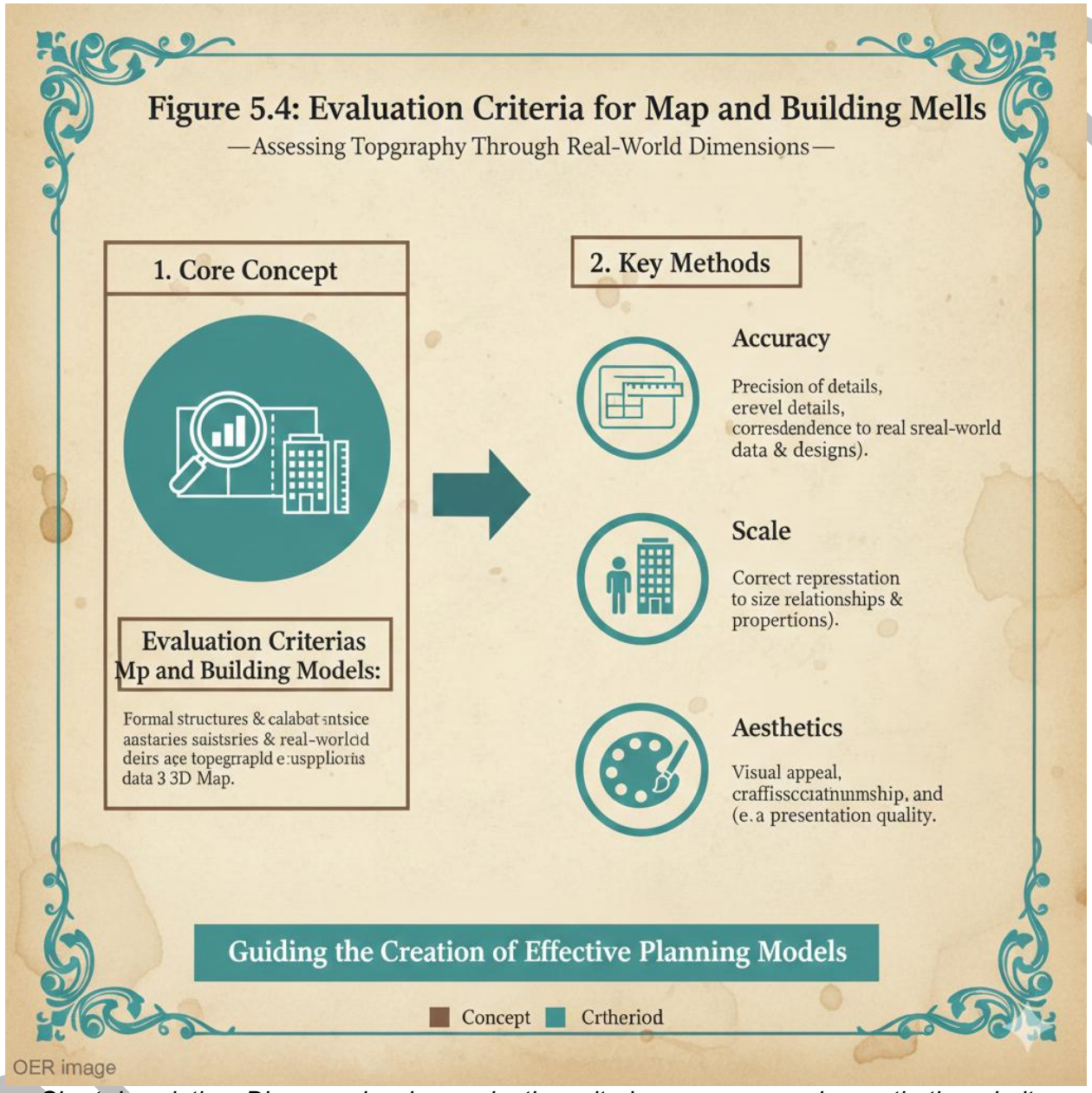
Short description: Image showing map and building models mounted on bases with protective casing.

Caption: Plate 5.4: Display methods for map and building models

Fill in the blank: Proper display enhances _____ and durability of models.

5.4.2 Evaluation criteria

Evaluation criteria include accuracy, scale, aesthetics, and clarity of communication. Accuracy ensures the model reflects real dimensions, scale maintains proportion, aesthetics improve visual appeal, and clarity ensures ideas are communicated effectively.



Short description: Diagram showing evaluation criteria: accuracy, scale, aesthetics, clarity.
Caption: *Figure 5.4: Evaluation criteria for map and building models*

Fill in the blank: Evaluation criteria include accuracy, scale, aesthetics, and _____ of communication.

5.4.3 Feedback and improvement

Feedback and improvement involve peer review, instructor input, and iterative refinement. Learners should present models for critique, accept constructive comments, and make necessary adjustments. This process strengthens skills and ensures models meet professional standards.

Practice	***Action & Mechanism***	***Benefit to Model Quality***
Peer Review	*Evaluation by fellow professionals (surveyors, architects, or planners).*	*Detects technical errors in scale, contour alignment, and "Spatial Logic."*
Instructor / Expert Input	*Review by senior planners or academic advisors.*	*Aligns the model with statutory building codes and "Regional Objectives" (Box 1.1).*
Iterative Refinement	*Continuous cycles of testing, adjusting, and re-modeling.*	*Allows for "Fine-Tuning" of complex elements like drainage flow and sunlight exposure.*
Stakeholder Validation	*Presenting the model to the community for critique.*	*Identifies "Social Gaps" (e.g., missed traditional paths or vital informal market spaces).*

Caption: Box 5.4: Feedback and improvement practices
Short description: Text box listing practices such as peer review, instructor input, and iterative refinement.

Fill in the blank: Feedback and improvement involve peer review, instructor input, and _____ refinement.

Pilot questions 5.4

1. What is the final stage in producing map and building models?
2. State one display method used for models.
3. Mention two evaluation criteria for assessing models.
4. Give one example of feedback practice in model preparation.
5. Why is evaluation important in map and building model making?

Series Summary

This Series has examined the **production of map and building models**, focusing on preparation, techniques, and evaluation. The purpose was to help learners develop practical skills in representing spatial layouts and architectural designs through tangible models.

We began by studying preparation, including understanding scale and proportion, selecting base materials, and gathering reference data. Next, we explored techniques for producing map models, such as base preparation, feature representation, and labelling/finishing. Following that, we examined techniques for producing building models, including structural frameworks, detailing, and integration with site plans. Finally, we considered presentation and evaluation, highlighting display methods, evaluation criteria, and feedback practices.

By completing this Series, you should now be able to explain preparation steps, apply techniques for producing map models, construct building models, and demonstrate methods for presenting and evaluating them effectively.

Glossary of Terms

- **Scale and proportion**: Ratios used to represent real-world dimensions accurately in models.
- **Base materials**: Foundational materials such as cardboard, foam boards, wood, and plastics used in model making.
- **Reference data**: Maps, plans, and architectural drawings used to guide model production.
- **Base preparation**: Cutting and shaping the surface of a map model to establish boundaries and contours.
- **Feature representation**: Depicting roads, rivers, contours, and land use in map models.
- **Labelling and finishing**: Adding names, symbols, and colour coding to improve clarity and professionalism.
- **Structural framework**: The skeleton of a building model, including walls, floors, and roofs.
- **Detailing and finishing**: Adding windows, doors, textures, and paint to enhance realism.
- **Integration with site plans**: Positioning building models within maps or landscapes to show spatial relationships.
- **Display methods**: Techniques for presenting models, such as mounting and protective casings.
- **Evaluation criteria**: Standards for assessing models, including accuracy, scale, aesthetics, and clarity.
- **Feedback and improvement**: Practices involving peer review, instructor input, and iterative refinement.

Concept Check Questions [Series 5]

Objective Questions

1. Preparation is the _____ of producing accurate and professional map and building models. *(Linked to SLO 5.1)*

Which of the following is a common base material used in model production? *(Linked to SLO 5.1)*
a) Foam board
b) Steel beams
c) Concrete blocks

2. d) Glass panels
3. A well-prepared base provides the _____ for accurate feature placement in map models. *(Linked to SLO 5.2)*
4. Detailing and finishing make building models _____ and visually appealing. *(Linked to SLO 5.3)*
5. Evaluation criteria include accuracy, scale, aesthetics, and _____ of communication. *(Linked to SLO 5.4)*

Short-Answer Questions

6. Why is preparation important in producing map and building models? *(Linked to SLO 5.1)*
7. Mention two features represented in map models. *(Linked to SLO 5.2)*
8. State one element added during detailing and finishing of building models. *(Linked to SLO 5.3)*
9. Give one display method used for presenting models. *(Linked to SLO 5.4)*
10. How does feedback improve the quality of map and building models? *(Linked to SLO 5.4)*

Long-Answer Questions

11. Explain preparation steps for producing map and building models, including scale, materials, and reference data. *(Linked to SLO 5.1)*
    - **Basic response**: Learners should describe scale, base materials, and reference data.
    - **Value-added response**: Outstanding learners may analyse how preparation influences accuracy, durability, and professional presentation.
12. Discuss techniques for producing map models, focusing on base preparation, feature representation, and finishing. *(Linked to SLO 5.2)*
    - **Basic response**: Learners should explain each technique and its role.
    - **Value-added response**: Outstanding learners may evaluate how these techniques enhance clarity and communication of spatial relationships.
13. Describe techniques for producing building models, including structural framework, detailing, and integration with site plans. *(Linked to SLO 5.3)*
    - **Basic response**: Learners should outline framework, detailing, and integration.
    - **Value-added response**: Outstanding learners may assess how these techniques improve realism and stakeholder engagement.
14. Evaluate methods for presenting and assessing map and building models, including display, evaluation criteria, and feedback. *(Linked to SLO 5.4)*
    - **Basic response**: Learners should list display methods, criteria, and feedback practices.
    - **Value-added response**: Outstanding learners may analyse how effective presentation and evaluation improve communication, learning, and iterative design.

Answers to Concept Check Questions [Series 5]

Objective Questions

1. Foundation.
2. a) Foam board.
3. Basis.
4. Realistic.
5. Clarity.

Short-Answer Questions

6. Preparation ensures accuracy, durability, and clarity in model production.
7. Roads and rivers.
8. Windows or doors.
9. Mounting on bases or using protective casings.
10. Feedback helps learners refine models, meet standards, and strengthen skills.

Long-Answer Questions

11.

- **Basic response**: Preparation involves calculating scale and proportion, selecting base materials like cardboard or foam, and gathering reference data such as maps and architectural drawings.
- **Value-added response**: Outstanding learners may analyse how preparation ensures accuracy in representation, durability of models, and professional presentation in planning contexts.

12.

- **Basic response**: Base preparation involves cutting and shaping; feature representation includes roads, rivers, and land use; finishing involves labelling and colour coding.
- **Value-added response**: Outstanding learners may evaluate how these techniques enhance clarity, communication, and professional appeal of map models.

13.

- **Basic response**: Structural framework includes walls, floors, and roofs; detailing adds windows, doors, and textures; integration places buildings within site plans.
- **Value-added response**: Outstanding learners may assess how these techniques improve realism, stakeholder engagement, and evaluation of spatial relationships.

14.

- **Basic response**: Presentation methods include mounting and casing; evaluation criteria include accuracy, scale, aesthetics, and clarity; feedback involves peer review and instructor input.
- **Value-added response**: Outstanding learners may analyse how effective presentation improves communication, evaluation ensures quality, and feedback fosters iterative design.

Answers to Pilot Questions [Series 5]

Pilot questions 5.1

1. Preparation is important because it ensures accuracy, durability, and clarity in producing models.
2. One purpose of scale and proportion is to represent real-world dimensions accurately.
3. Cardboard and foam boards.
4. Planning authorities or architectural drawings.
5. Reliable reference data improves accuracy by ensuring models reflect real features and designs.

Pilot questions 5.2

1. Base preparation involves cutting and shaping the surface of the map model to establish boundaries and contours.
2. Roads or rivers.
3. Colour coding or textures.
4. Labelling identifies features and improves clarity.
5. Accuracy ensures that spatial relationships are communicated effectively.

Pilot questions 5.3

1. Structural framework is the basic skeleton of the building, including walls, floors, and roofs.
2. Windows or doors.
3. Neatness ensures professional standards and realism in detailing.
4. Integration shows how buildings relate to surrounding features such as roads and open spaces.
5. Building models help visualise architectural designs and spatial relationships.

Pilot questions 5.4

1. Presentation and evaluation.
2. Mounting on bases or using protective casings.
3. Accuracy, scale, aesthetics, and clarity of communication.
4. Peer review or instructor input.
5. Evaluation ensures models meet standards and communicate ideas effectively.

References and Attributions [Series 5]

General References

- Ching, F. D. K. (2015). *Architecture: Form, Space, and Order*. Hoboken: Wiley.
- Hamid, S. (2018). *Model Making for Architects*. London: Laurence King Publishing.
- UN-Habitat. (2015). *International Guidelines on Urban and Territorial Planning*. Nairobi: United Nations Human Settlements Programme.
- Isard, W. (1960). *Methods of Regional Analysis*. Cambridge, MA: MIT Press.

Illustration Placeholders and Attributions

- *Figure 5.1: Understanding scale and proportion in model production*
  - AI prompt: “Create a labelled diagram showing scale ratios (1:100, 1:500) applied to map and building models.”
  - Suggested OER search string: “scale proportion map building models OER diagram.”
- *Plate 5.1: Base materials for map and building models*
  - AI prompt: “Generate an image showing cardboard, foam boards, and wood used as base materials for map and building models.”
  - Suggested OER search string: “base materials map building models cardboard foam wood OER image.”
- *Box 5.1: Sources of reference data for model production*
  - AI prompt: “Create a text box summarising sources of reference data for model production: planning authorities, survey records, architectural drawings.”
  - Suggested OER search string: “sources reference data map building models OER summary.”
- *Figure 5.2: Base preparation for map models*
  - AI prompt: “Create a labelled diagram showing base preparation for map models with boundaries, contours, and elevation layers.”
  - Suggested OER search string: “base preparation map models boundaries contours elevation OER diagram.”
- *Plate 5.2: Representation of features in map models*
  - AI prompt: “Generate an image showing a map model with roads, rivers, contours, and land use represented using colours and textures.”
  - Suggested OER search string: “representation features map models roads rivers contours land use OER image.”
- *Box 5.2: Labelling and finishing practices in map models*
  - AI prompt: “Create a text box summarising labelling and finishing practices in map models: names, symbols, colour coding.”
  - Suggested OER search string: “labelling finishing practices map models OER summary.”
- *Figure 5.3: Structural framework in building models*
  - AI prompt: “Create a labelled diagram showing structural framework of a building model with walls, floors, and roofs.”

    - Suggested OER search string: “structural framework building models walls floors roofs OER diagram.”
- *Plate 5.3: Detailing and finishing in building models*
    - AI prompt: “Generate an image showing a building model with windows, doors, textures, and painted surfaces.”
    - Suggested OER search string: “detailing finishing building models windows doors textures paint OER image.”
- *Box 5.3: Integration of building models with site plans*
    - AI prompt: “Create a text box summarising integration of building models with site plans: positioning, alignment, open spaces.”
    - Suggested OER search string: “integration building models site plans positioning alignment OER summary.”
- *Plate 5.4: Display methods for map and building models*
    - AI prompt: “Generate an image showing map and building models mounted on bases with protective casing for exhibition.”
    - Suggested OER search string: “display methods map building models exhibition casing OER image.”
- *Figure 5.4: Evaluation criteria for map and building models*
    - AI prompt: “Create a labelled diagram showing evaluation criteria for map and building models: accuracy, scale, aesthetics, clarity.”
    - Suggested OER search string: “evaluation criteria map building models OER diagram.”
- *Box 5.4: Feedback and improvement practices*
    - AI prompt: “Create a text box summarising feedback and improvement practices in map and building model production.”
    - Suggested OER search string: “feedback improvement map building models OER summary.”